TETRA TECH

TECHNICAL MEMORANDUM

To:	**Nevada Environmental Response Trust**
Cc:	Nevada Division of Environmental Protection United States Environmental Protection Agency
From:	Chris Hayes and Dana Grady
Date:	December 5, 2023
Subject:	**Unit 4 Source Area In-Situ Bioremediation Treatability Study Monthly Progress Report**

At the direction of the Nevada Environmental Response Trust (NERT or Trust), Tetra Tech, Inc. (Tetra Tech) has prepared this memorandum to summarize Tetra Tech's progress during October 2023 toward successfully implementing the Unit 4 Source Area In-Situ Bioremediation (ISB) Treatability Study.

Task Progress Update: October 2023

Task M21 – Unit 4 Source Area ISB Treatability Study

- Current Status –

  Phase 2 of the Unit 4 Source Area ISB Treatability Study is ongoing. A layout map and construction details of all injection, monitoring, and extraction wells are provided on Figure 1 and in Table 1, respectively. Operations, maintenance, and monitoring activities completed during October 2023 are summarized below.

  - Operations and Maintenance
    - Area 1 – The first phase of the treatability study for Area 1 consisted of a total dissolved solids (TDS) reduction period prior to the injection of a carbon substrate due to the presence of elevated TDS concentrations in groundwater in the Area 1 deep zone. This phase included the injection of clean water (formerly known as stabilized Lake Mead water [SLMW]) in a pulsed manner and continuous groundwater extraction to reduce TDS concentrations to levels that would allow biodegradation processes to proceed (i.e., TDS concentrations to below 21,000 milligrams per liter [mg/L] prior to carbon substrate/water injections). The TDS reduction period began on September 8, 2022 in the Area 1 deep zone. Once TDS concentrations were below the TDS goal of 21,000 mg/L for three consecutive events, a baseline groundwater sampling event was performed and the second phase of the treatability study, which included the start-up of carbon substrate injections for application of ISB into Area 1 intermediate and deep zones, was initiated. The baseline groundwater sampling event was performed in March 2023 and the carbon substrate injections as part of the ISB phase began on April 6, 2023.

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The ISB injection process into Area 1 consists of daily-pulsed injections of a carbon substrate solution, followed by daily injections of anaerobic distribution water (clean water amended with Vitamin C). The carbon substrate solution initially consisted of 0.5 percent molasses solution, 0.5 molar sodium bicarbonate solution, trace mineral solution, and vitamin B12. The carbon substrate solution also initially contained filtered biosolids collected from the on-site fluidized bed reactors. The addition of the biosolids in the carbon substrate solution was discontinued on June 6, 2023, after the Area 1 60-day evaluation period (in accordance with the NDEP-approved Unit 4 Source Area ISB Treatability Study Work Plan Addendum).

In an effort to meet the large theoretical carbon demand due to the high concentrations of chemicals of potential concern present in Area 1, the molasses concentration was increased from 0.5 percent to 1.0 percent on July 12, 2023 and then further increased to 2.5 percent on October 24, 2023. The Area 1 deep extraction well U4-E-03D was also transitioned to an injection well on October 24, 2023. The macronutrient solution consisting of urea and diammonium phosphate is not currently being added to the injectate solution to minimize precipitate formation. The macronutrient solution may be added in the future if required based on effectiveness monitoring results. Summaries of Area 1 extractions and injections are provided in Tables 2 and 3, respectively. Specific details of ongoing operations in October 2023 include the following:

- Area 1 Intermediate Zone – A total of 17,076 gallons of groundwater was extracted from two extraction wells screened within Area 1 intermediate zone while approximately 24,373 gallons of carbon substrate solution and 18,841 gallons of distribution water were injected into two injection wells.
- Area 1 Deep Zone – Approximately 6,221 gallons of groundwater were extracted from one extraction well screened within the Area 1 deep zone, while approximately 21,894 gallons of carbon substrate solution and 15,976 gallons of distribution water were injected into five Area 1 deep injection wells.
- Operations were suspended from October 20 to 23, 2023 to perform routine system maintenance and complete modifications to the Area 1 injection/extraction well network to convert extraction well U4-E-03D into an injection well. Injection into U4-E-03D began receiving injectate when operations resumed on October 24, 2023.

- Area 2 – Because TDS concentrations in Area 2 were lower than Area 1 and averaged approximately 19,500 mg/L during baseline sampling, ISB injection/extraction activities were implemented without an initial TDS reduction step. Carbon substrate solution/water injection and groundwater extraction operations in both the intermediate and deep zones within Area 2 began on September 13, 2022 and are ongoing. The injection process consists of daily-pulsed injections of a carbon substrate solution, followed by daily injections of anaerobic distribution water (clean water amended with Vitamin C). The carbon substrate solution initially consisted of 0.5 percent molasses solution, 0.5 molar sodium bicarbonate solution, trace mineral solution, vitamin B12, and filtered biosolids collected from the on-site fluidized bed reactors. The addition of the biosolids in the carbon substrate solution was discontinued on December 15, 2022 following completion of the first 90 days of system operation (in accordance with the NDEP-approved Unit 4 Source Area ISB Treatability Study Work Plan Addendum).

  The molasses concentration was increased from 0.5 percent to 1.0 percent on July 12, 2023 and further increased to 2.5 percent on October 24, 2023. In order to minimize hydraulic effects and potential for overdosing specifically in Area 2 following the increase

to 2.5 percent molasses, the injection rates for Area 2 intermediate and deep injection wells were simultaneously reduced to approximately 0.5 gpm in all Area 2 intermediate and deep injection wells. The macronutrient solution consisting of urea and diammonium phosphate is not currently being added to the injectate solution to minimize precipitate formation. This macronutrient solution may be added in the future if required based on effectiveness monitoring results. Summaries of Area 2 extractions and injections are provided in Tables 2 and 4, respectively. Specific details of ongoing operations during October 2023 include the following:

- Area 2 Intermediate Zone – Approximately 3,314 gallons of groundwater were extracted from two extraction wells, while approximately 10,938 gallons of carbon substrate solution and 8,457 gallons of distribution water were injected into two injection wells.
- Area 2 Deep Zone – Approximately 26,677 gallons of carbon substrate solution and 20,639 gallons of distribution water were injected into four injection wells. As presented in previous monthly progress reports, extraction operations in the Area 2 deep zone were discontinued on July 17, 2023 and injection well U4-E-07D was shut down on September 9, 2023 due to a compromised well seal.
- Operations were suspended from October 20 to 23, 2023 to perform routine system maintenance and complete modifications to the Area 1 injection/extraction well network. As discussed above, the molasses concentration was increased to 2.5 percent on October 24, 2023. In order to minimize hydraulic effects and potential for overdosing in Area 2 following the increase to 2.5 percent molasses, the injection rates for Area 2 were reduced to maintain the same approximate daily carbon dose. Specifically, the injection rates into Area 2 intermediate injection wells were reduced from approximately 1 gpm to 0.5 gpm and the injection rates into the Area 2 deep injection wells were reduced from approximately 1.25 gpm to 0.5 gpm.

- Effectiveness Monitoring – The effectiveness monitoring program included a baseline groundwater sampling event completed in April 2022 prior to system start-up. Following start-up in early September 2022, the effectiveness monitoring program was implemented in accordance with the Work Plan Addendum. During the first month of operations in Area 2, one biweekly sampling event of Area 2 monitoring wells was conducted in September 2022. The monitoring program shifted to monthly sampling in October 2022 and is ongoing for both Areas 1 and 2. In March 2023, groundwater samples were collected from all Area 1 intermediate and deep injection, extraction, and monitoring wells to establish baseline conditions prior to the startup of carbon substrate solution injections in Area 1, which began on April 6, 2023. The April 2023 sampling event was performed approximately two weeks after ISB start-up in Area 1, and therefore serves as a biweekly sampling event for Area 1 monitoring wells and the regular monthly sampling event for Area 2. Similar to the Area 2 monitoring program, the sampling in Area 1 then shifted to a monthly basis in May 2023 and coincides with the monthly sampling performed for Area 2. Available draft groundwater analytical results from the baseline sampling event and subsequent monitoring events performed from September 2022 to September 2023 are presented in Table 5. The September 2023 groundwater results are summarized below. Groundwater analytical results from the most recent effectiveness monitoring event performed from October 16 to October 20, 2023 will be provided in future monthly progress reports as data become available from the laboratory. Final validated data will be provided in the final treatability study results report.

- Area 1 Intermediate – The September 2023 sampling event was conducted approximately five months after the start of ISB injections into Area 1 and included collection of groundwater samples from two extraction wells screened in the Area 1 intermediate zone and ten monitoring wells, including three monitoring wells located immediately within the Area 1 study area and seven monitoring wells around the perimeter of the Area 1 study area. Three of the ten monitoring wells are screened in the overlying shallow zone. Groundwater analytical results from the September 2023 sampling event are summarized below.
    - Results from groundwater samples collected from three intermediate monitoring wells located within the immediate vicinity of the Area 1 intermediate treatment zone (i.e., U4-MW-02I, U4-MW-05I, and U4-MW-07I) indicated perchlorate concentration reductions ranging from 12 percent to 82 percent compared to pre-ISB baseline concentrations in March 2023. Although the perchlorate concentration in groundwater collected from monitoring well U4-MW-02I is still below pre-ISB March 2023 baseline levels, the concentration increased significantly from 0.158 mg/L in July 2023 to 435 mg/L and 239 mg/L in August and September 2023, respectively. Perchlorate concentrations in groundwater samples collected from monitoring wells U4-MW-05I and U4-MW-07I were similar to the previous sampling event in August 2023, with concentrations also notably higher than the June 2023 sampling event. These perchlorate concentration increases in the intermediate zone compared to June 2023 sampling event are likely related to the operational change that occurred in the underlying deep zone in July 2023. Specifically, it has been observed during this treatability study that when injection rates are increased within the underlying deep zone, perchlorate concentrations increase within the overlying intermediate zone. This is likely a result of hydraulic gradient changes that can cause a flux of untreated groundwater into the intermediate treatment zone. It is anticipated that as the system continues to reach homeostasis under the new injection scheme, this influx of perchlorate mass will be treated and perchlorate concentrations within the Area 1 intermediate zone will decrease over time, as evidenced by the decreasing concentrations in groundwater collected from U4-MW-05I and U4-MW-07I in August and September 2023 compared to July 2023. The increase in molasses concentration from 1 percent to 2.5 percent in October 2024 may also help treat this influx of perchlorate mass by providing additional carbon to the subsurface. The perchlorate concentrations in the groundwater samples collected from the four intermediate perimeter monitoring wells and three shallow monitoring wells indicated similar concentrations compared to the March 2023 pre-ISB baseline concentration.
    - Chlorate concentration trends were similar to perchlorate concentration trends, with the highest reduction of 88 percent observed in the groundwater sample collected from monitoring well U4-MW-02I (chlorate concentration of 1,430 mg/L compared to a pre-ISB baseline concentration of 12,000 mg/L). Although initially reduced, chlorate concentrations in groundwater samples collected from monitoring wells U4-MW-05I and U4-MW-07I have remained elevated above the pre-ISB baseline concentrations since the July 2023 system modifications. Significant chlorate concentration reductions were not observed in samples collected from the Area 1 perimeter wells and overlying shallow monitoring wells during the September 2023 sampling event.

- Nitrate concentration reductions ranging from 88 percent to 98 percent were observed in groundwater samples collected from all three monitoring wells within the immediate vicinity of the Area 1 intermediate treatment zone (i.e., U4-MW-02I, U4-MW-05I and U4-MW-07I). Nitrate concentration reductions were also observed in select samples collected from the Area 1 perimeter wells, with reductions of 41 percent and 51 percent observed in groundwater samples collected from U4-MW-01I and U4-MW-01S, respectively.
- Groundwater samples collected from two monitoring wells located in the immediate vicinity of the Area 1 intermediate treatment zone (i.e., U4-MW-02I, and U4-MW-05I) continued to indicate hexavalent chromium reductions of 99 percent, with concentrations ranging from 293 μg/L to 867 μg/L. Although elevated compared to baseline concentrations, the hexavalent chromium concentration in groundwater collected from U4-MW-07I decreased to 4,220 μg/L in September 2023 compared to the previous August 2023 result of 7,420 μg/L. Similar to perchlorate and chlorate, hexavalent concentrations in the groundwater samples collected from monitoring wells U4-MW-02I, U4-MW-05I and U4-MW-07I increased significantly between the June 2023 and August 2023 sampling events likely due to operational changes performed in July 2023. The hexavalent chromium concentrations are expected to continue to decrease as the system reaches homeostasis under the new injection scheme and with the subsequent increase in molasses concentration from 1 percent to 2.5 percent on October 24, 2023. Lastly, hexavalent chromium concentrations in the groundwater samples collected from the four intermediate perimeter monitoring wells and three shallow monitoring wells indicated similar concentrations compared to the March 2023 pre-ISB baseline concentration. Slight reductions ranging from 18 percent to 27 percent were observed in groundwater samples collected from three of the monitoring wells, namely, U4-MW-01I, U4-MW-03S and U4-MW-06I.
- Elevated TOC concentrations continued to be observed five months after the start of ISB, with TOC concentrations in groundwater samples collected from monitoring wells located within the immediate vicinity of the Area 1 intermediate treatment zone ranging from 98.1 mg/L to 409 mg/L in September 2023 (compared to an average baseline concentration of 1.77 mg/L). The groundwater sample collected from perimeter monitoring well U4-MW-06I also indicated an elevated TOC concentration of 73.8 mg/L. Lastly, a slight increase in TOC concentration to 5.95 mg/L was observed in the groundwater sample collected from shallow perimeter monitoring well U4-MW-03S. These results indicate that the influence of the ISB injections is being observed up to 30 feet cross-gradient from Area 1 injection wells and approximately 20 feet above the injection interval in the overlying shallow zone. Notably, the highest TOC concentrations measured in groundwater collected from the Area 1 intermediate zone were collected from extraction wells U4-E-01I and U4-E-02I, which measured 3,310 mg/L and 845 mg/L, respectively. As a result, it was recommended that extraction operations cease in November 2023 to prevent further development of preferential flow pathways and removal of carbon substrate from the targeted treatment interval.

- Area 1 Deep – During the September 2023 sampling event performed five months after the start of ISB operations in Area 1, groundwater samples were collected from one deep extraction well, four deep monitoring wells within Area 1, and six perimeter monitoring

wells surrounding Area 1 screened in the targeted deep treatment interval and underlying deep zone (designated with "DD"), and one monitoring well screened in the underlying deep zone within Area 1 (namely, M-252). Groundwater analytical results from the September 2023 sampling event are summarized below.

- The groundwater samples collected from all four of the Area 1 deep zone monitoring wells exhibited decreased perchlorate concentrations during the September 2023 sampling event compared to the previous August 2023 sampling event. The greatest concentration reduction was observed in the groundwater sample collected from monitoring well U4-MW-05D, with the result indicating the lowest perchlorate concentration measured to date at this location of 323 mg/L (representative of a 70 percent reduction compared to March 2023 pre-ISB baseline conditions). In addition, perchlorate concentrations in groundwater samples collected from two of the six perimeter monitoring wells (namely, U4-MW-01D and U4-MW-03DD) reduced by approximately 62 percent and 66 percent, respectively, compared to the March 2023 pre-ISB baseline concentrations. The perchlorate concentration in the groundwater sample collected from M-252, which is located within Area 1 but is screened below the targeted treatment interval, measured 108 mg/L, which represents a reduction of 40 percent compared to the March 2023 pre-ISB baseline concentration. As discussed in previous monthly progress reports, the operational change that occurred in July 2023 to increase injection rates likely altered the horizontal gradients within the Area 1 deep zone resulting in the higher concentration groundwater in the northern portion of the Area 1 deep zone influencing the perchlorate concentrations in the lower concentration portions of the Area 1 deep zone. It is anticipated that as the system reaches homeostasis under the new injection scheme, this influx of perchlorate mass will continue to be treated and perchlorate concentrations within Area 1 deep will continue to decrease over time, as evidenced by the decreasing concentration in samples collected from all four Area 1 deep monitoring wells in September 2023.
- Chlorate concentration trends were similar to perchlorate concentration trends. The chlorate concentration detected in the groundwater sample collected from U4-MW-05D in September 2023 was the lowest observed at this location to-date, with a concentration of 937 mg/L compared to a baseline concentration of 5,680 mg/L. Chlorate concentrations in groundwater samples collected from perimeter monitoring wells U4-MW-01D and U4-MW-03DD indicated moderate decreases, with concentration reductions of 30 percent and 73 percent, respectively.
- Nitrate concentrations in groundwater collected from Area 1 deep zone monitoring wells were significantly less than the March 2023 pre-ISB baseline concentrations. Moderate nitrate concentration reductions were also observed in groundwater samples collected from four of the six perimeter monitoring wells located cross gradient and downgradient of the targeted injection interval, with average reductions of 24 percent compared to the March 2023 pre-ISB baseline concentrations.
- In general, hexavalent chromium concentration trends followed a similar pattern to perchlorate concentrations (i.e., concentration increases between the June 2023 and August 2023 sampling events likely due to July operational changes followed by decreasing trends in September 2023). Samples collected in

September 2023 from three monitoring wells U4-MW-02D, U4-MW-05D, and U4-MW-07D indicated a decrease in hexavalent chromium compared to the previous August 2023 sampling event. Hexavalent chromium was detected at a concentration of 2,260 μg/L in the groundwater sample collected from U4-MW-05D, which represents a reduction of 92 percent compared to the March 2023 pre-ISB baseline concentration of 28,200 μg/L. In addition, hexavalent concentration reductions ranging from 14 percent to 66 percent were observed in groundwater samples collected from four perimeter monitoring wells (U4-MW-01D, U4-MW-03DD, U4-MW-06D, and M-252).

- TOC concentrations in groundwater samples collected in September 2023 from U4-MW-05D and U4-MW-07D remained elevated at concentrations of 127 mg/L and 129 mg/L, respectively, which is notably higher than the July 2023 results of 22.1 mg/L and 38.9 mg/L, respectively. It is anticipated that as the system reaches homeostasis under the new injection scheme and after the molasses concentration increase to 2.5 percent in October 2023, TOC concentrations will continue to increase to concentrations greater than the September 2023 values. Although moderate reductions in perchlorate, chlorate, and hexavalent chromium concentrations were observed at perimeter monitoring wells U4-MW-01D and U4-MW-03DD, elevated TOC concentrations were not observed in groundwater collected from these locations, suggesting that the concentration reductions are due to the flow of treated groundwater to these downgradient monitoring wells rather than due to the arrival of injectate solution. An elevated TOC concentration of 180 mg/L was noted in the sample collected from monitoring well U4-MW-06D, which is significantly above the 1.35 mg/L baseline concentration.

- Area 2 Intermediate – In September 2023, approximately twelve months after the start of ISB in Area 2, groundwater samples were collected from three intermediate monitoring wells located within Area 2 and two extraction wells screened in the Area 2 intermediate zone. In addition, groundwater samples were collected from ten perimeter monitoring wells located immediately around the perimeter of the Area 2 study area. Four of these ten perimeter monitoring wells are screened in the overlying shallow zone, while the remaining six monitoring wells are screened in the intermediate zone. Groundwater analytical results from the September 2023 sampling event are summarized below.
  - As discussed in the previous monthly progress report, perchlorate concentrations in the groundwater samples collected from all three intermediate monitoring wells (i.e., U4-MW-11I, U4-MW-12I, and U4-MW-13I) increased in August 2023 compared to the concentrations observed during the July 2023 sampling event. These perchlorate concentration increases in the intermediate zone in August 2023 were likely related to the operational modifications in July 2023 (i.e., converting extraction well U4-E-08D into an injection well and increasing injection rates) that altered the vertical hydraulic gradient that likely caused a flux of untreated groundwater into the Area 2 intermediate treatment zone. Perchlorate concentrations measured in the groundwater samples collected from U4-MW-12I and U4-MW-13I in September 2023 indicated decreasing perchlorate concentrations, with reductions of 92 percent and 22 percent, respectively, compared to baseline concentrations. It is anticipated that as the system continues to reach homeostasis under the new injection scheme, the influx of perchlorate mass will continue to be treated and perchlorate concentrations within the Area 2 intermediate zone will continue to decrease

over time. Other notable results include the greater than 99 percent reduction in perchlorate concentrations observed in groundwater samples collected from all four perimeter monitoring wells screened in the overlying shallow zone. Specifically, perchlorate concentrations were below the sample detection limit of 0.0003 mg/L in groundwater collected from all four of the shallow perimeter monitoring wells. Perchlorate concentration reductions of 96 percent and 27 percent were also observed in groundwater samples collected from cross-gradient intermediate perimeter monitoring wells U4-MW-10I and U4-MW-14I. Perchlorate concentrations in samples collected from upgradient intermediate monitoring wells U4-MW-15I and U4-MW-16I in September 2023 increased to 93.5 mg/L and 1,080 mg/L, which are above baseline concentrations.

- Chlorate and nitrate concentration trends were similar to perchlorate trends, with overall concentration reductions generally observed when compared to baseline but increases in concentrations observed when comparing the results from the September 2023 sampling event to results prior to the July 2023 operational changes. Despite these fluctuations related to the operational changes, significant chlorate and nitrate concentration decreases of 97 percent and 92 percent, respectively, were observed in the groundwater sample collected from U4-MW-12I. It is anticipated that as the system continues to reach homeostasis under the new injection scheme, chlorate and nitrate concentrations within Area 2 deep will continue to decrease over time. As with perchlorate, significant chlorate and nitrate concentration decreases of up to 99 percent were observed in groundwater collected from all four shallow perimeter monitoring wells.
- Hexavalent chromium concentration reductions ranged from 40 percent to greater than 99 percent in samples collected from all three intermediate monitoring wells in September 2023. The hexavalent chromium concentration measured in groundwater collected from monitoring well U4-MW-12I was 1.65 μg/L, which represents a greater than 99 percent reduction compared to the baseline concentration of 21,200 μg/L. Groundwater samples collected from the other two intermediate monitoring wells within the immediate vicinity of the Area 2 treatment zone in September 2023 indicated a continued increasing trend in hexavalent chromium concentration when compared to the pre-July 2023 operational changes, but still remained 40 percent to 68 percent below their respective baseline concentrations. Hexavalent chromium was not detected above the sample detection limit of 0.15 μg/L in groundwater collected from all four of the shallow perimeter monitoring wells, which represents reductions of greater than 99 percent compared to baseline concentrations. In addition, a hexavalent chromium concentration reduction of greater than 99 percent was observed in the groundwater sample collected from cross-gradient intermediate perimeter monitoring wells U4-MW-10I and U4-MW-15I.
- TOC concentrations in groundwater samples collected from Area 2 intermediate monitoring wells ranged from 2.56 mg/L to 14 mg/L, which are above the average baseline TOC concentration of 1.25 mg/L but lower than TOC concentrations observed during previous sampling events. The system modifications performed in July 2023 and October 2023, which included increasing the molasses concentration from 0.5 percent to 2.5 percent, were incorporated into the operations in an effort to improve distribution of carbon substrate throughout the Area 2 intermediate zone. As a result, it is likely that TOC concentrations will increase during future monitoring events. Although

TOC concentrations in several groundwater samples collected from the 10 perimeter wells were lower than previously measured, TOC concentrations were elevated above baseline concentrations at all 10 perimeter monitoring wells, with concentrations ranging from 5.26 mg/L to 895 mg/L. Notably, the highest TOC concentration measured in groundwater collected from the Area 2 intermediate zone was collected from extraction well U4-E-06I, which measured 1,400 mg/L. As a result, extraction operations ceased on November 8, 2023 to prevent further development of preferential flow pathways and removal of carbon substrate from the targeted treatment interval.

- Area 2 Deep – During the September 2023 sampling event performed twelve months after the start of ISB operations in Area 2, groundwater samples were collected from three deep monitoring wells within Area 2 and and ten perimeter monitoring wells surrounding Area 2 and screened in the targeted deep treatment interval or the underlying deep zone (designated with "DD"). Groundwater analytical results from the September 2023 sampling event are summarized below.
  - When compared to baseline, perchlorate concentration reductions ranging from 36 percent to 80 percent were observed in groundwater samples collected from the three deep monitoring wells located within Area 2 (i.e., U4-MW-11D, U4-MW-12D, and U4-MW-13D). The perchlorate concentration in the groundwater sample collected from monitoring well U4-MW-12D in September 2023 measured 256 mg/L, which represents an 80 percent reduction compared to the baseline concentration of 1,280 mg/L and is the lowest perchlorate concentration observed to date in groundwater samples collected from U4-MW-12D. In addition, perchlorate concentration reductions averaging 65 percent were observed in groundwater samples collected from eight of the ten perimeter monitoring wells.
  - Concentration reductions for chlorate and nitrate in the groundwater samples collected from the three deep monitoring wells within Area 2 were slightly greater than perchlorate (reductions averaging 66 percent for chlorate and 85 percent for nitrate when compared to baseline concentrations). As with perchlorate concentrations, the chlorate concentration of 3,370 mg/L in groundwater collected from monitoring well U4-MW-12D in September 2023 is the lowest concentrations observed to date in samples collected from this location, representing a reduction of 77 percent compared to baseline concentrations. Chlorate and/or nitrate concentration reductions were also observed in groundwater samples collected from six of the ten perimeter monitoring wells.
  - Hexavalent chromium concentration reductions ranging from 36 percent to 81 percent when compared to baseline concentrations were observed in groundwater samples collected from the three deep monitoring wells located within Area 2. The hexavalent chromium concentration in groundwater collected from U4-MW-12D in September 2023 was 11,900 μg/L, which is the lowest hexavalent chromium concentration observed to date in groundwater samples collected from this location and represents an 81 percent reduction compared to the baseline concentration of 63,700 mg/L. Hexavalent chromium concentration reductions were also observed in groundwater samples collected from nine of the ten perimeter monitoring wells, with reductions ranging from 19 percent to greater than 99 percent compared to baseline concentrations. Hexavalent

chromium concentrations were less than the sample detection limit of 0.3 µg/L in the samples collected from perimeter monitoring wells U4-MW-09DD and U4-MW-10D.

  - TOC concentrations in groundwater samples collected from the Area 2 deep monitoring wells ranged from 1.75 mg/L to 13.2 mg/L (baseline concentration average of 2.17 mg/L). TOC concentrations elevated above baseline conditions were observed in groundwater samples collected from five of the ten perimeter monitoring wells, with TOC concentrations ranging from 4.30 mg/L to 87.7 mg/L. The system modifications performed in July and October 2023, which included increasing the molasses concentration and converting the extraction well U4-E-08D into an injection well, were incorporated into the operations in an effort to improve distribution of carbon substrate throughout the Area 2 deep zone.

- Schedule and Progress Updates
  - Area 1 ISB operations are anticipated to continue through early April 2024.
  - Per the Work Plan Addendum, Area 2 ISB operations were projected to be implemented for a duration of 12 to 18 months. Based on the results from the first twelve months of operations, it was decided to continue the ISB operations in Area 2 for the full 18 months to fully evaluate the effects of July 2023 operational modifications made in an effort to improve the distribution of carbon substrate throughout the Area 2 Deep zone. Therefore, Area 2 ISB operations are anticipated to continue through early April 2024 and coincide with the operational shutdown for Area 1.
  - Extraction operations within the Area 1 and Area 2 deep treatment intervals were ceased in October 2023 and July 2023, respectively, when deep extraction wells U4-E-03D and U4-E-08D were converted into injection wells. As discussed herein, extraction operations in the Area1 and Area 2 intermediate zones ceased in November 2023 based on the elevated TOC concentrations measured in the extraction effluent to prevent further development of preferential flow pathways and removal of carbon substrate from the targeted treatment interval.
- Health and Safety
  - There were no health and safety incidents related to Task M21 in October 2023.

CERTIFICATION

Unit 4 Source Area In-Situ Bioremediation Treatability Study Monthly Progress 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 President of the Trustee

Signature: Jay A Steinberg, President, 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

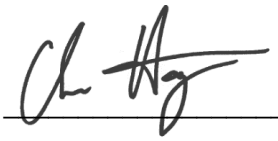
Date: 12/5/03

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 Unit 4 Source Area In-Situ Bioremediation Treatability Study Monthly Progress Report.



December 5, 2023

Christopher Hayes, CEM
Environmental Engineer
Tetra Tech, Inc.

Date

Nevada CEM Certificate Number: EM2499
Nevada CEM Expiration Date: December 15, 2024

Figures

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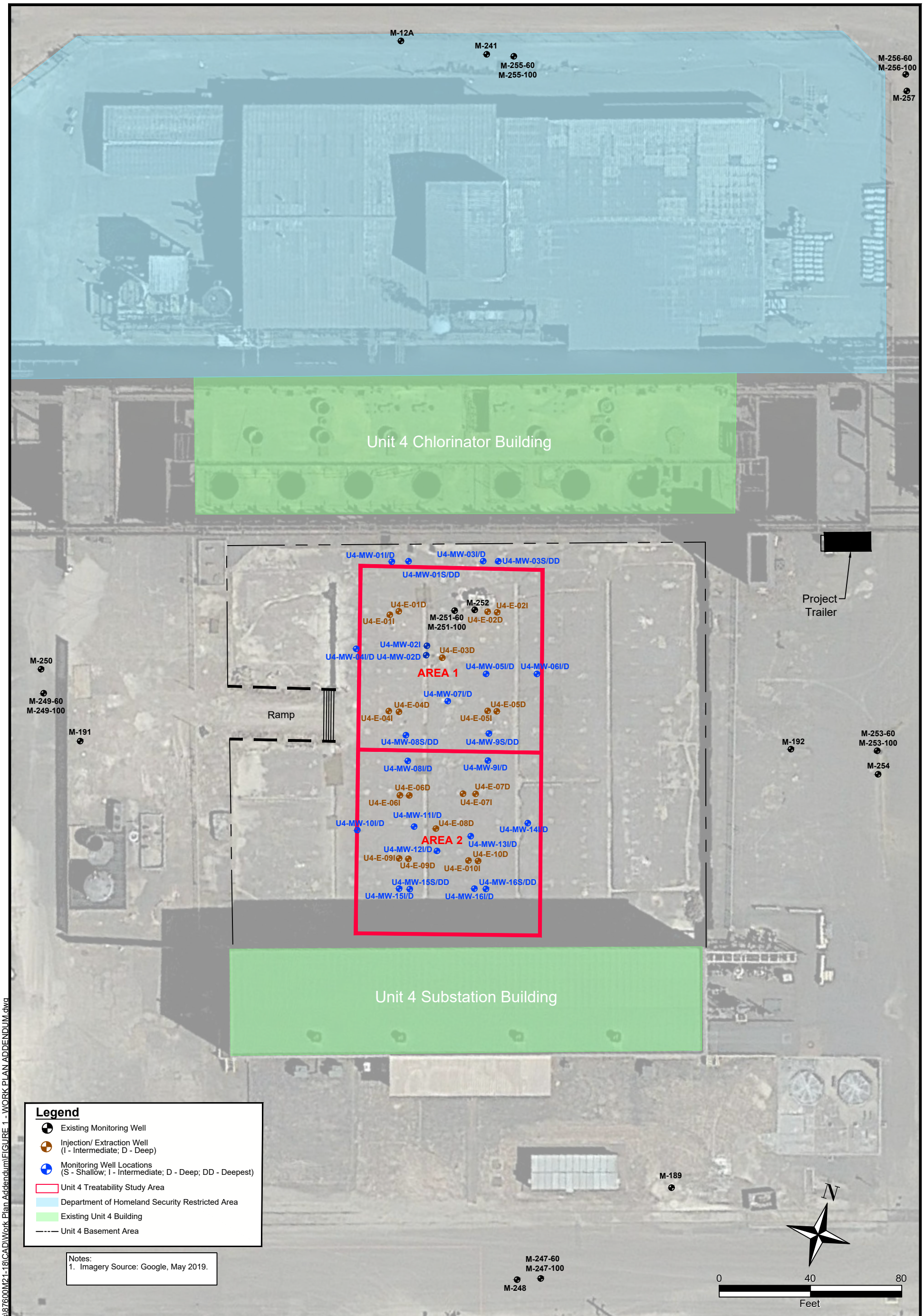

Legend

- Existing Monitoring Well
- Injection/ Extraction Well (I - Intermediate; D - Deep)
- Monitoring Well Locations (S - Shallow; I - Intermediate; D - Deep; DD - Deepest)
- Unit 4 Treatability Study Area
- Department of Homeland Security Restricted Area
- Existing Unit 4 Building
- Unit 4 Basement Area

Notes:
1. Imagery Source: Google, May 2019.

\\tts318fs3.ttl.local\CES\Projects\87600M21-18\CAD\Work Plan Addendum\FIGURE 1 - WORK PLAN ADDENDUM.dwg

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NEVADA ENVIRONMENTAL RESPONSE TRUST SITE

UNIT 4 SOURCE AREA IN-SITU BIOREMEDIATION TREATABILITY STUDY
HENDERSON, NEVADA

INJECTION/ EXTRACTION AND MONITORING WELL LAYOUT

Project No.:	117-7502021-M21
Date:	May 10, 2022
Designed By:	AC

Figure No.

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Tables

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Table 1
Well Construction Details
Unit 4 Source Area In-Situ Bioremediation Treatability Study

Well ID	Screened Lithology	Northing	Easting	Ground Surface Elevation[1]	Top of Casing Elevation	Construction Type	Casing Material	Screen Material	Slot Size	Filter Pack Gradation	Borehole Diameter	Borehole Total Depth	Well Diameter	Nominal Screen Length	Well Total Depth	Bottom of Screen	Top of Screen
				feet amsl	feet amsl				inches		inches	feet bgs[1]	inches	feet	feet bgs[1]	feet bgs[1]	feet bgs[1]
U4-E-01D	UMCf	26717332.49	828215.74	1805.50	1805.11	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	115.0	4	15	110.3	94.7	109.7
U4-E-01I	UMCf	26717330.42	828212.11	1805.40	1805.15	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	92.0	4	15	90.3	74.6	89.6
U4-E-02D	UMCf	26717338.47	828258.40	1805.55	1804.99	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	115.0	4	15	110.3	94.4	109.4
U4-E-02I	UMCf	26717338.14	828254.24	1805.51	1804.99	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	92.0	4	15	90.3	74.4	89.4
U4-E-04D	UMCf	26717288.90	828222.53	1805.49	1804.95	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	115.0	4	15	110.3	95.0	110.0
U4-E-03D	UMCf	26717310.37	828241.13	1805.49	1804.94	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	113.0	4	15	111.1	110.1	95.1
U4-E-04I	UMCf	26717288.51	828217.91	1805.64	1805.03	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	92.0	4	15	90.3	75.0	90.0
U4-E-05D	UMCf	26717295.64	828264.86	1805.48	1804.95	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	115.0	4	15	110.3	95.0	110.0
U4-E-05I	UMCf	26717295.15	828260.95	1805.58	1804.72	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	92.0	4	15	90.3	75.0	90.0
U4-E-06D	UMCf	26717253.44	828232.43	1805.44	1804.74	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	112.0	4	15	111.1	110.1	95.1
U4-E-06I	UMCf	26717252.90	828228.29	1805.47	1805.04	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	92.5	4	15	89.2	88.2	73.2
U4-E-07D	UMCf	26717258.48	828261.02	1805.62	1805.31	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	111.5	4	15	110.6	109.6	94.6
U4-E-07I	UMCf	26717257.68	828255.56	1805.62	1805.16	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	92.0	4	15	90.7	89.7	74.7
U4-E-08D	UMCf	26717240.82	828246.11	1805.45	1804.91	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	120.0	4	15	110.6	109.6	94.6
U4-E-09D	UMCf	26717225.92	828236.22	1805.45	1804.91	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	112.0	4	15	110.5	109.5	94.5
U4-E-09I	UMCf	26717225.46	828232.18	1805.47	1805.14	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	93.3	4	15	90.9	89.9	74.9
U4-E-10D	UMCf	26717229.55	828266.50	1805.66	1805.28	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	112.0	4	15	110.5	109.5	94.5
U4-E-10I	UMCf	26717229.15	828262.34	1805.71	1805.37	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	92.0	4	15	90.2	89.2	74.2
U4-MW-01I	UMCf	26717353.59	828209.51	1805.57	1805.14	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	108.0	2	10	86.7	86.7	76.7
U4-MW-01D	UMCf	26717353.51	828209.25	1805.57	1805.10		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	106.7	106.7	96.7
U4-MW-01S	UMCf	26717354.83	828216.42	1805.57	1805.02	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	131.0	2	10	64.7	64.7	54.7
U4-MW-01DD	UMCf	26717354.86	828216.87	1805.57	1805.09		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	129.9	129.9	119.9
U4-MW-02D	UMCf	26717315.33	828230.47	1805.50	1805.07	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	115.0	4	15	110.3	95.0	110.0
U4-MW-02I	UMCf	26717319.45	828230.17	1805.47	1805.07	Single	Schedule 80 PVC	Stainless Steel	0.010	#2/16	8	92.0	4	15	90.3	75.0	90.0
U4-MW-03I	UMCf	26717359.79	828248.76	1805.61	1805.17	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	108.3	2	10	86.6	86.6	76.6
U4-MW-03D	UMCf	26717360.01	828249.20	1805.61	1805.18		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	106.6	106.6	96.6
U4-MW-03S	UMCf	26717360.79	828255.35	1805.56	1805.19	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	131.3	2	10	64.5	64.5	54.5
U4-MW-03DD	UMCf	26717360.84	828255.62	1805.56	1805.20		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	129.7	129.7	119.7
U4-MW-04I	UMCf	26717313.50	828199.89	1805.49	1805.13	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	108.5	2	10	86.8	86.8	76.8
U4-MW-04D	UMCf	26717313.36	828199.55	1805.49	1805.15		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	107.0	107.0	97.0
U4-MW-05I	UMCf	26717311.18	828257.53	1805.52	1805.06	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	108.0	2	10	86.6	86.6	76.6
U4-MW-05D	UMCf	26717311.18	828257.89	1805.52	1805.05		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	108.2	108.2	98.2
U4-MW-06I	UMCf	26717314.46	828279.53	1805.52	1805.21	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	108.3	2	10	86.5	86.5	76.5
U4-MW-06D	UMCf	26717314.51	828279.82	1805.52	1805.20		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	107.1	107.1	97.1
U4-MW-07I	UMCf	26717296.98	828242.85	1805.36	1805.16	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	109.2	2	10	86.8	86.8	76.8
U4-MW-07D	UMCf	26717296.68	828242.80	1805.36	1805.01		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	106.5	106.5	96.5
U4-MW-08I	UMCf	26717268.25	828229.36	1805.45	1804.97	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	108.0	2	10	88.0	88.0	78.0
U4-MW-08D	UMCf	26717268.30	828229.62	1805.45	1804.99		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	108.6	108.6	98.6
U4-MW-08S	UMCf	26717279.33	828226.78	1805.47	1804.94	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	131.2	2	10	64.9	64.9	54.9
U4-MW-08DD	UMCf	26717279.35	828227.22	1805.47	1804.95		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	129.8	129.8	119.8
U4-MW-09I	UMCf	26717273.70	828264.04	1805.62	1805.22	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	108.0	2	10	86.8	86.8	76.8
U4-MW-09D	UMCf	26717273.73	828264.40	1805.62	1805.20		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	106.9	106.9	96.9
U4-MW-09S	UMCf	26717285.44	828262.62	1805.55	1805.12	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	132.0	2	10	65.3	65.3	55.3
U4-MW-09DD	UMCf	26717285.52	828263.00	1805.55	1805.12		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	129.8	129.8	119.8
U4-MW-10I	UMCf	26717234.83	828212.05	1805.55	1805.10	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	109.0	2	10	87.1	87.1	77.1
U4-MW-10D	UMCf	26717235.18	828212.26	1805.55	1805.07		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	106.9	106.9	96.9
U4-MW-11I	UMCf	26717240.19	828236.42	1805.41	1805.03	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	109.0	2	10	87.0	87.0	77.0
U4-MW-11D	UMCf	26717240.23	828236.77	1805.41	1804.96		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	107.4	107.4	97.4
U4-MW-12I	UMCf	26717231.25	828247.87	1805.47	1805.11	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	108.0	2	10	86.8	86.8	76.8
U4-MW-12D	UMCf	26717231.22	828248.29	1805.47	1805.12		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	107.1	107.1	97.1
U4-MW-13I	UMCf	26717242.66	828261.00	1805.64	1805.28	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	109.0	2	10	87.1	87.1	77.1
U4-MW-13D	UMCf	26717242.70	828261.37	1805.64	1805.35		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	108.2	108.2	98.2
U4-MW-14I	UMCf	26717249.26	828285.32	1805.43	1805.13	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	109.0	2	10	87.3	87.3	77.3
U4-MW-14D	UMCf	26717249.24	828285.84	1805.43	1805.05		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	107.3	107.3	97.3
U4-MW-15I	UMCf	26717212.34	828233.91	1805.48	1805.03	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	109.0	2	10	86.8	86.8	76.8
U4-MW-15D	UMCf	26717212.35	828234.41	1805.48	1804.97		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	106.0	106.0	96.0
U4-MW-15S	UMCf	26717212.89	828238.61	1805.44	1805.05	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	132.0	2	10	64.8	64.8	54.8
U4-MW-15DD	UMCf	26717212.87	828239.01	1805.44	1804.98		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	130.3	130.3	120.3
U4-MW-16I	UMCf	26717217.25	828266.62	1805.68	1805.36	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	108.5	2	10	87.0	87.0	77.0
U4-MW-16D	UMCf	26717217.40	828266.90	1805.68	1805.27		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	106.8	106.8	96.8
U4-MW-16S	UMCf	26717217.87	828271.70	1805.59	1805.24	Dual-Nested	Schedule 80 PVC	Stainless Steel	0.010	#2/16	11	131.0	2	10	64.8	64.8	54.8
U4-MW-16DD	UMCf	26717218.04	828271.95	1805.59	1805.32		Schedule 80 PVC	Stainless Steel	0.010	#2/16			2	10	130.8	130.8	120.8

Notes
amsl - above mean sea level
bgs - below ground surface
bTOC - below top of casing
PVC - polyvinyl chloride
UMCf - Upper Muddy Creek formation
1. Ground surface refers to the concrete floor of the Unit 4 basement, which is approximately 8 feet below the surrounding grade.
2. Well names including E indicate an extraction/injection well. Well names including MW indicate a monitoring well.

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Table 2
Summary of Groundwater Extraction Activities - October 2023
Unit 4 Source Area Bioremediation Treatability Study

Study Area			Area 1 Deep						Area 1 Intermediate									Area 2 Intermediate					
Well ID			U4-E-03D						U4-E-01I				U4-E-02I					U4-E-06I			U4-E-07I		
Date	Time	Duration	Average Flow Rate	Volume Extracted	Cumulative Total Volume	Time	Duration	Average Flow Rate	Volume Extracted	Cumulative Total Volume	Average Flow Rate	Volume Extracted	Cumulative Total Volume	Average Flow Rate	Volume Extracted	Cumulative Total Volume	Average Flow Rate	Volume Extracted	Cumulative Total Volume	Average Flow Rate	Volume Extracted	Cumulative Total Volume
		minutes	gpm	gallons	gallons		minutes	gpm	gallons	gallons	gpm	gallons	gallons	gpm	gallons	gallons	gpm	gallons	gallons	gpm	gallons	gallons
10/1/2023	15:08	1,446	0.2	314.64	279,617.01	15:08	543	1.0	525.33	169,053.96	0.3	136.47	148,092.78	0.1	72.41	122,949.49	0.1	56.67	65,526.10			
10/2/2023	15:13	1,445	0.2	289.05	279,906.06	15:13	552	1.0	522.88	169,576.84	0.3	139.39	148,232.17	0.1	76.45	123,025.94	0.04	20.89	65,546.99			
10/3/2023	15:04	1,431	0.2	268.45	280,174.51	15:04	545	0.9	469.93	170,046.77	0.3	140.11	148,372.28	0.1	74.37	123,100.31	0.1	70.32	65,617.31			
10/4/2023	15:07	1,443	0.2	278.29	280,452.80	15:07	545	0.7	363.51	170,410.28	0.2	111.18	148,483.46	0.1	64.03	123,164.34	0.1	71.13	65,688.44			
10/5/2023	15:05	1,438	0.2	269.10	280,721.90	15:05	545	0.8	435.71	170,845.99	0.2	116.91	148,600.37	0.1	59.83	123,224.17	0.1	79.80	65,768.24			
10/6/2023	15:03	1,438	0.2	260.18	280,982.08	15:03	544	0.9	470.06	171,316.05	0.4	207.20	148,807.57	0.1	55.76	123,279.93	0.1	80.37	65,848.61			
10/7/2023	15:03	1,440	0.2	274.23	281,256.31	15:03	544	0.9	499.73	171,815.78	0.3	165.37	148,972.94	0.1	66.16	123,346.09	0.1	79.48	65,928.09			
10/8/2023	15:02	1,439	0.2	274.66	281,530.97	15:02	544	0.9	500.78	172,316.56	0.3	163.98	149,136.92	0.1	50.63	123,396.72	0.1	69.53	65,997.62			
10/9/2023	15:04	1,442	0.2	280.25	281,811.22	15:04	544	1.0	524.67	172,841.23	0.3	163.29	149,300.21	0.1	70.10	123,466.82	0.1	79.62	66,077.24			
10/10/2023	15:04	1,440	0.2	298.93	282,110.15	15:04	545	0.9	479.17	173,320.40	0.3	181.77	149,481.98	0.1	53.99	123,520.81	0.1	53.19	66,130.43			
10/11/2023	15:04	1,440	0.2	280.89	282,391.04	15:04	544	1.0	516.84	173,837.24	0.3	158.68	149,640.66	0.2	110.22	123,631.03	0.1	62.68	66,193.11			
10/12/2023	15:03	1,439	0.2	274.44	282,665.48	15:03	544	1.0	517.23	174,354.47	0.3	165.53	149,806.19	0.1	56.77	123,687.80	0.1	55.65	66,248.76			
10/13/2023	15:05	1,442	0.3	409.31	283,074.79	15:05	545	0.9	501.55	174,856.02	0.3	162.87	149,969.06	0.2	87.43	123,775.23	0.1	43.99	66,292.75			
10/14/2023	15:04	1,439	0.3	411.78	283,486.57	15:04	544	0.9	510.58	175,366.60	0.3	160.93	150,129.99	0.2	88.79	123,864.02	0.1	53.53	66,346.28			
10/15/2023	15:05	1,441	0.3	413.16	283,899.73	15:05	543	1.0	517.61	175,884.21	0.3	154.31	150,284.30	0.2	108.16	123,972.18	--	--	66,346.28			
10/16/2023	15:01	1,436	0.3	417.91	284,317.64	15:01	544	0.9	487.33	176,371.54	0.3	163.62	150,447.92	0.2	127.94	124,100.12	0.1	32.21	66,378.49			
10/17/2023	15:03	1,442	0.3	416.39	284,734.03	15:03	545	0.9	503.93	176,875.47	0.3	162.45	150,610.37	0.3	180.16	124,280.28	0.1	45.61	66,424.10			
10/18/2023	15:03	1,440	0.3	408.60	285,142.63	15:03	544	0.9	514.51	177,389.98	0.3	142.90	150,753.27	0.1	53.90	124,334.18	0.1	65.43	66,489.53			
10/19/2023	14:01	1,378	0.3	380.34	285,522.97	14:01	485	0.8	410.70	177,800.68	0.2	130.10	150,883.37	0.1	41.50	124,375.68	0.1	62.50	66,552.03			
10/20/2023	--	--	--	--	--	--	--	--	--	177,800.68	--	--	150,883.37	--	--	124,375.68	--	--	66,552.03			
10/21/2023	--	--	--	--	--	--	--	--	--	177,800.68	--	--	150,883.37	--	--	124,375.68	--	--	66,552.03			
10/22/2023	--	--	--	--	--	--	--	--	--	177,800.68	--	--	150,883.37	--	--	124,375.68	--	--	66,552.03			
10/23/2023	--	--	--	--	--	--	--	--	--	177,800.68	--	--	150,883.37	--	--	124,375.68	--	--	66,552.03			
10/24/2023	--	--	--	--	--	14:08	486	0.8	461.06	178,261.74	0.3	139.20	151,022.57	0.1	51.97	124,427.65	0.1	59.29	66,611.32			
10/25/2023	--	--	--	--	--	15:02	496	0.9	482.37	178,744.11	0.3	169.03	151,191.60	0.1	29.95	124,457.60	0.1	65.13	66,676.45			
10/26/2023	--	--	--	--	--	15:05	496	0.9	477.50	179,221.61	0.3	152.25	151,343.85	0.0	21.52	124,479.12	0.1	63.17	66,739.62			
10/27/2023	--	--	--	--	--	15:03	495	0.8	418.39	179,640.00	0.3	168.56	151,512.41	0.1	28.76	124,507.88	0.1	62.38	66,802.00			
10/28/2023	--	--	--	--	--	15:02	495	0.9	465.39	180,105.39	0.3	144.76	151,657.17	0.0	17.72	124,525.60	0.1	38.58	66,840.58			
10/29/2023	--	--	--	--	--	15:06	498	0.9	467.87	180,573.26	0.3	142.67	151,799.84	0.1	38.19	124,563.79	0.1	63.88	66,904.46			
10/30/2023	--	--	--	--	--	15:01	495	0.9	468.29	181,041.55	0.3	139.17	151,939.01	0.1	38.56	124,602.35	0.1	66.99	66,971.45			
10/31/2023	--	--	--	--	--	15:04	496	0.8	444.83	181,486.38	0.3	135.85	152,074.86	0.0	22.39	124,624.74	0.1	64.38	67,035.83			
October 2023 Total		**6,221**					**12,958**				**4,119**			**1,748**			**1,566**					
Cumulative Total		**285,523**					**181,486**				**152,075**			**124,625**			**67,036**					

Notes:

gpm - gallons per minute

1. Extraction operations are active 24 hours per day. Volume and duration quantities represent gallons or minutes of extraction since previous record indicated. On January 18, 2023, Area 2 intermediate wells were transitioned from 24-hour operation to 12-hour operation in an effort to improve daily extraction rates. On June 7, 2023, all extraction wells except U4-E-03D were transitioned to a 12-hour operation to help improve daily extraction rates.

2. System operations were temporarily suspended from October 20, 2023 to October 23, 2023, to perform system maintenance and transition extraction well U4-E-03D to an injection well.

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Table 3
Summary of Injection Activities
Area 1 - October 2023
Unit 4 Source Area Bioremediation Treatability Study

Study Area				Area 1 Intermediate								Area 1 Deep				Area 1 Deep															
Well ID				U4-E-04I				U4-E-05I				U4-E-01D				U4-E-02D				U4-E-03D				U4-E-04D				U4-E-05D			
Date	Injection Start Time	Injection Stop Time	Duration(1)	Volume Carbon Solution Injected(2)	Volume Distribution Water Solution Injected(3,4)	Average Flow Rate	Maximum Injection Pressure	Volume Carbon Solution Injected(2)	Volume Distribution Water Solution Injected(3,4)	Average Flow Rate	Maximum Injection Pressure	Volume Carbon Solution Injected(2)	Volume Distribution Water Solution Injected(3,4)	Average Flow Rate	Maximum Injection Pressure	Volume Carbon Solution Injected(2)	Volume Distribution Water Solution Injected(3,4)	Average Flow Rate	Maximum Injection Pressure	Volume Carbon Solution Injected(2)	Volume Distribution Water Solution Injected(3,4)	Average Flow Rate	Maximum Injection Pressure	Volume Carbon Solution Injected(2)	Volume Distribution Water Solution Injected(3,4)	Average Flow Rate	Maximum Injection Pressure	Volume Carbon Solution Injected(2)	Volume Distribution Water Solution Injected(3,4)	Average Flow Rate	Maximum Injection Pressure
			minutes	gallons	gallons	gpm	psi	gallons	gallons	gpm	psi	gallons	gallons	gpm	psi	gallons	gallons	gpm	psi	gallons	gallons	gpm	psi	gallons	gallons	gpm	psi	gallons	gallons	gpm	psi
10/1/2023	6:15	14:11	463	462.39	345.05	1.7	20	475.67	347.50	1.8	15	198.24	132.10	0.7	16	191.4	145.24	0.7	32	--	--	--	--	207.10	144.06	0.8	32	177.31	140.88	0.7	38
10/2/2023	6:15	14:12	464	464.47	359.21	1.8	19	476.77	360.19	1.8	14	204.26	131.62	0.7	14	198.3	143.60	0.7	31	--	--	--	--	194.06	149.08	0.7	32	192.26	157.21	0.8	39
10/3/2023	6:15	14:15	466	441.65	357.90	1.7	21	472.25	359.08	1.8	14	184.66	132.13	0.7	17	192.5	146.74	0.7	33	--	--	--	--	207.29	149.32	0.8	30	164.47	141.16	0.7	38
10/4/2023	6:15	14:10	461	454.65	350.66	1.7	20	465.89	361.70	1.8	14	187.84	143.24	0.7	22	198.5	148.95	0.8	32	--	--	--	--	192.83	145.11	0.7	32	213.79	144.92	0.8	41
10/5/2023	6:15	14:15	466	426.70	358.19	1.7	20	468.36	360.24	1.8	14	188.14	140.26	0.7	20	215.2	145.97	0.8	32	--	--	--	--	194.53	149.95	0.7	30	177.39	140.96	0.7	41
10/6/2023	6:15	14:08	459	461.29	349.60	1.8	20	472.67	349.06	1.8	14	180.43	153.90	0.7	17	194.8	135.80	0.7	31	--	--	--	--	201.65	152.50	0.8	31	198.54	136.30	0.7	40
10/7/2023	6:15	14:03	453	462.78	338.22	1.8	20	470.95	350.47	1.8	14	202.60	150.69	0.8	17	193.5	144.13	0.7	33	--	--	--	--	211.72	143.03	0.8	33	191.61	155.42	0.8	39
10/8/2023	6:15	14:08	459	464.84	352.50	1.8	20	469.63	363.31	1.8	14	193.73	133.64	0.7	14	191.7	128.60	0.7	34	--	--	--	--	217.64	148.39	0.8	32	199.10	161.12	0.8	38
10/9/2023	6:15	14:08	459	462.71	356.69	1.8	20	474.29	358.79	1.8	14	195.97	145.60	0.7	15	184.9	138.31	0.7	34	--	--	--	--	206.47	156.13	0.8	32	183.36	139.75	0.7	39
10/10/2023	6:15	14:13	463	465.25	334.68	1.7	19	443.18	341.66	1.7	14	173.49	122.58	0.6	14	207.2	134.23	0.7	33	--	--	--	--	197.93	145.49	0.7	32	221.09	146.20	0.8	40
10/11/2023	6:15	14:09	460	426.53	319.88	1.6	20	475.25	355.27	1.8	14	183.18	137.18	0.7	16	197.9	66.67	0.6	32	--	--	--	--	188.30	144.35	0.7	31	183.48	144.31	0.7	38
10/12/2023	6:15	14:12	463	435.69	323.82	1.6	19	467.10	365.92	1.8	15	184.20	129.37	0.7	16	278.1	139.42	0.9	34	--	--	--	--	183.03	142.14	0.7	32	227.35	146.98	0.8	41
10/13/2023	6:15	14:10	462	441.14	352.15	1.7	20	460.52	374.02	1.8	15	206.44	120.26	0.7	14	184.8	146.82	0.7	33	--	--	--	--	193.06	146.52	0.7	32	177.98	146.24	0.7	38
10/14/2023	6:15	14:05	456	444.72	360.45	1.8	20	499.58	355.21	1.9	15	187.90	147.36	0.7	16	202.4	150.55	0.8	33	--	--	--	--	201.94	139.80	0.7	29	211.42	148.00	0.8	41
10/15/2023	6:15	14:14	465	461.64	346.99	1.7	19	459.37	354.72	1.8	14	207.92	126.68	0.7	16	172.9	140.27	0.7	32	--	--	--	--	195.04	150.93	0.7	32	161.03	142.64	0.7	38
10/16/2023	6:15	14:05	457	451.80	338.07	1.7	19	463.76	344.80	1.8	14	150.90	156.56	0.7	16	205.9	146.18	0.8	33	--	--	--	--	181.59	140.34	0.7	34	208.42	142.14	0.8	40
10/17/2023	6:15	14:07	459	447.17	365.65	1.8	19	474.86	358.39	1.8	14	182.83	136.86	0.7	17	206.4	141.04	0.8	33	--	--	--	--	193.95	143.24	0.7	31	199.61	136.70	0.7	40
10/18/2023	6:15	14:10	461	447.26	345.76	1.7	19	461.27	363.58	1.8	14	207.45	156.04	0.8	18	186.3	133.88	0.7	34	--	--	--	--	202.49	137.76	0.7	32	227.38	142.76	0.8	39
10/19/2023	6:15	13:54	445	423.29	330.31	1.7	19	460.78	338.90	1.8	15	186.30	134.66	0.7	18	193.5	138.44	0.7	34	--	--	--	--	199.18	141.75	0.8	29	203.59	139.81	0.8	41
10/20/2023	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/21/2023	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/22/2023	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/23/2023	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/24/2023	6:05	13:36	438	442.80	342.39	1.8	22	426.57	359.08	1.8	19	190.05	164.09	0.8	16	174.6	128.44	0.7	31	183	115	0.7	16	184.85	138.86	0.7	34	191.69	130.97	0.7	40
10/25/2023	6:40	14:19	444	429.57	360.02	1.8	19	420.07	336.08	1.7	14	175.50	144.32	0.7	16	176.4	125.10	0.7	31	147	120	0.6	25	199.80	114.55	0.7	31	183.35	135.70	0.7	38
10/26/2023	6:40	14:17	431	444.51	335.52	1.8	20	432.43	361.43	1.8	15	168.58	138.25	0.7	16	163.0	101.90	0.6	32	175	141	0.7	21	183.80	126.44	0.7	30	164.93	132.45	0.7	39
10/27/2023	6:40	14:16	435	429.99	343.51	1.8	20	444.87	343.59	1.8	16	171.22	96.56	0.6	17	178.2	121.37	0.7	30	175	146	0.7	22	198.73	139.58	0.8	28	159.81	137.95	0.7	41
10/28/2023	6:40	14:11	425	450.22	332.99	1.8	20	428.42	346.16	1.8	15	171.21	138.74	0.7	20	165.5	120.63	0.7	33	183	144	0.8	23	191.93	133.12	0.8	29	133.99	114.70	0.6	39
10/29/2023	6:40	14:17	440	417.42	330.71	1.7	29	453.76	340.91	1.8	16	178.84	132.53	0.7	18	185.4	100.54	0.6	32	164	155	0.7	34	175.25	145.13	0.7	28	153.16	142.50	0.7	40
10/30/2023	6:40	14:24	451	452.78	347.18	1.8	20	375.92	358.27	1.6	16	193.89	121.53	0.7	16	177.6	128.50	0.7	32	146	128	0.6	26	190.57	131.50	0.7	25	150.51	117.76	0.6	38
10/31/2023	6:40	14:13	424	440.73	339.55	1.8	20	424.51	315.44	1.7	16	170.10	133.08	0.7	20	173.1	114.72	0.7	33	182	141	0.8	29	179.23	135.90	0.7	24	192.62	130.71	0.8	39
			October 2023 Total	**12,054**	**9,318**			**12,319**	**9,524**			**5,026**	**3,700**			**5,190**	**3,556**			**1,354**	**1,089**			**5,274**	**3,835**			**5,049**	**3,796**		
			Cumulative Total	**99,947**	**76,330**			**89,433**	**77,281**			**31,219**	**159,855**			**29,003**	**156,623**			**1,354**	**1,089**			**41,403**	**166,179**			**39,055**	**163,261**		

Notes:

gpm - gallons per minute 24,373 18,841 34,212 25,500

psi - pounds per square inch

1. Injection duration indicates the total minutes of active injection per day, accounting for any downtime in injections that may have occurred throughout the day. Therefore, injection duration may be less than the difference in daily injection start and stop times indicated.
2. Carbon substrate solution is batch mixed. Batches of carbon substrate solution includes the following components in solution with Stabilized Lake Mead Water (SLMW): 1% molasses, 2.5% 0.5 Molar Sodium Bicarbonate Solution, 0.001% trace mineral solution, and 5 milligrams per liter Vitamin B12. On October 24, 2023, the concentration of molasses in solution was increased to 2.5%.
3. Distribution water solution is batch mixed. Batches of distribution water solution includes 0.0025 pounds of Vitamin C per gallon of Stabilized Lake Mead Water (SLMW).
4. Prior to April 6, 2023, injections into Area 1 Deep wells consisted of only Stabilized Lake Mead Water as part of the total dissolved solids (TDS)-reduction period of the treatability study water injection.
5. System operations were temporarily suspended from October 20, 2023 to October 23, 2023, to perform system maintenance and transition extraction well U4-E-03D to an injection well.

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Table 4
Summary of Injection Activities
Area 2 - October 2023
Unit 4 Source Area Bioremediation Treatability Study

Study Area				Area 2 Intermediate								Area 2 Deep												Area 2 Deep			
Well ID				U4-E-09I				U4-E-10I				U4-E-06D				U4-E-08D				U4-E-09D				U4-E-010D			
Date	Injection Start Time	Injection Stop Time	Duration(1)	Volume Carbon Solution Injected(2)	Volume Distribution Water Solution Injected(3)	Average Flow Rate	Maximum Injection Pressure	Volume Carbon Solution Injected(2)	Volume Distribution Water Solution Injected(3)	Average Flow Rate	Maximum Injection Pressure	Volume Carbon Solution Injected(2)	Volume Distribution Water Solution Injected(3)	Average Flow Rate	Maximum Injection Pressure	Volume Carbon Solution Injected(2)	Volume Distribution Water Solution Injected(3)	Average Flow Rate	Maximum Injection Pressure	Volume Carbon Solution Injected(2)	Volume Distribution Water Solution Injected(3)	Average Flow Rate	Maximum Injection Pressure	Volume Carbon Solution Injected(2)	Volume Distribution Water Solution Injected(3)	Average Flow Rate	Maximum Injection Pressure
			minutes	gallons	gallons	gpm	psi	gallons	gallons	gpm	psi	gallons	gallons	gpm	psi	gallons	gallons	gpm	psi	gallons	gallons	gpm	psi	gallons	gallons	gpm	psi
10/1/2023	6:15	14:11	463	247.46	191.44	0.9	13	243.28	188.19	0.9	18	314.38	275.78	1.3	23	304	258	1.2	22	319.08	235.50	1.2	15	289.15	233.31	1.1	18
10/2/2023	6:15	14:12	464	252.80	197.03	1.0	14	240.24	187.64	0.9	18	310.43	239.32	1.2	24	318	239	1.2	21	320.92	232.45	1.2	15	278.71	223.04	1.1	18
10/3/2023	6:15	14:15	466	251.16	189.54	0.9	14	244.06	163.40	0.9	19	337.05	248.37	1.3	24	298	260	1.2	20	316.00	237.90	1.2	15	294.33	236.68	1.1	22
10/4/2023	6:15	14:10	461	261.55	172.11	0.9	14	207.17	158.31	0.8	20	296.24	244.06	1.2	24	318	251	1.2	21	299.91	234.96	1.2	15	298.91	230.82	1.1	18
10/5/2023	6:15	14:15	466	246.60	177.92	0.9	16	239.84	175.19	0.9	20	317.33	272.88	1.3	24	312	247	1.2	21	322.81	230.86	1.2	15	264.20	231.29	1.1	18
10/6/2023	6:15	14:08	459	239.20	190.79	0.9	14	230.12	203.32	0.9	19	316.99	265.98	1.3	23	301	243	1.2	22	316.64	242.76	1.2	16	294.40	211.03	1.1	18
10/7/2023	6:15	14:03	453	238.79	195.56	1.0	14	249.24	180.61	0.9	19	312.45	246.00	1.2	23	319	241	1.2	20	285.62	232.46	1.1	16	295.38	217.68	1.1	17
10/8/2023	6:15	14:08	459	247.86	204.09	1.0	14	247.34	175.54	0.9	20	270.48	253.85	1.1	23	319	231	1.2	21	303.24	229.44	1.2	16	301.33	239.67	1.2	18
10/9/2023	6:15	14:08	459	253.56	186.38	1.0	16	226.90	176.25	0.9	20	300.45	264.40	1.2	22	305	237	1.2	21	309.19	225.79	1.2	17	302.35	240.11	1.2	19
10/10/2023	6:15	14:13	463	248.23	188.06	0.9	17	236.07	185.10	0.9	23	278.25	217.74	1.1	22	305	263	1.2	20	318.69	244.90	1.2	16	305.81	208.98	1.1	18
10/11/2023	6:15	14:09	460	245.88	189.34	0.9	18	244.44	176.60	0.9	22	320.32	267.12	1.3	22	280	245	1.1	20	313.94	241.77	1.2	16	293.97	242.36	1.2	18
10/12/2023	6:15	14:12	463	223.75	185.00	0.9	18	203.43	189.14	0.8	22	294.78	218.55	1.1	27	285	248	1.2	20	324.03	235.47	1.2	17	287.31	236.95	1.1	18
10/13/2023	6:15	14:10	462	246.21	179.81	0.9	17	217.26	192.41	0.9	20	291.30	218.82	1.1	22	318	235	1.2	21	314.15	240.64	1.2	25	298.93	217.48	1.1	18
10/14/2023	6:15	14:05	456	243.19	191.98	1.0	15	227.79	172.73	0.9	20	311.28	220.38	1.2	23	254	229	1.1	25	299.87	223.33	1.1	17	290.27	249.06	1.2	17
10/15/2023	6:15	14:14	465	252.15	194.04	1.0	16	250.16	172.97	0.9	19	301.21	227.21	1.1	22	310	237	1.2	20	305.64	225.46	1.1	17	299.84	226.56	1.1	17
10/16/2023	6:15	14:05	457	253.08	186.73	1.0	15	224.79	194.48	0.9	20	320.11	243.64	1.2	24	286	205	1.1	21	312.45	237.50	1.2	17	294.82	243.12	1.2	16
10/17/2023	6:15	14:07	459	240.94	166.85	0.9	16	236.91	166.40	0.9	19	305.97	245.13	1.2	23	316	213	1.2	21	295.23	242.42	1.2	18	296.45	227.23	1.1	17
10/18/2023	6:15	14:10	461	245.14	212.86	1.0	16	229.89	170.38	0.9	20	294.79	265.78	1.2	22	293	220	1.1	21	319.01	235.68	1.2	18	290.73	234.73	1.1	17
10/19/2023	6:15	13:54	445	254.91	161.24	0.9	16	255.66	179.40	1.0	20	311.70	246.24	1.3	24	259	229	1.1	20	312.71	235.19	1.2	17	295.33	236.50	1.2	16
10/20/2023	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/21/2023	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/22/2023	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/23/2023	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/24/2023	6:05	13:36	438	120.02	99.98	0.5	18	102.25	86.52	0.4	21	89.36	71.98	0.4	14	125	52	0.4	20	119.59	99.11	0.5	22	102.37	93.36	0.4	20
10/25/2023	6:40	14:19	444	73.89	76.01	0.3	18	112.69	104.29	0.5	22	126.31	145.73	0.6	20	129	96	0.5	18	127.94	94.42	0.5	23	97.16	85.01	0.4	20
10/26/2023	6:40	14:17	431	125.44	92.66	0.5	19	116.48	88.66	0.5	22	119.97	97.14	0.5	22	109	91	0.5	15	118.11	92.53	0.5	22	112.80	71.02	0.4	18
10/27/2023	6:40	14:16	435	92.66	86.42	0.4	22	104.11	99.35	0.5	24	102.78	98.03	0.5	22	130	104	0.5	15	119.58	91.12	0.5	22	96.16	52.01	0.3	20
10/28/2023	6:40	14:11	425	118.49	87.86	0.5	19	124.12	97.55	0.5	24	117.37	95.01	0.5	23	121	103	0.5	14	128.76	89.28	0.5	23	100.35	37.49	0.3	20
10/29/2023	6:40	14:17	440	96.26	99.59	0.4	20	116.07	93.59	0.5	24	132.40	52.86	0.4	26	124	86	0.5	15	111.15	31.13	0.3	24	93.60	42.16	0.3	23
10/30/2023	6:40	14:24	451	116.61	101.13	0.5	19	134.02	86.92	0.5	24	115.75	95.46	0.5	26	139	95	0.5	16	106.68	63.99	0.4	24	94.68	-35.04	0.1	20
10/31/2023	6:40	14:13	424	103.71	110.46	0.5	20	134.36	77.40	0.5	24	130.02	105.86	0.6	28	133	100	0.5	18	114.27	108.06	0.5	24	104.16	70.41	0.4	20
October 2023 Total				**5,540**	**4,315**			**5,399**	**4,142**			**6,739**	**5,443**			**6,709**	**5,259**			**6,855**	**5,134**			**6,374**	**4,803**		
Cumulative Total				**128,739**	**103,255**			**129,607**	**104,224**			**94,502**	**67,895**			**26,017**	**20,700**			**95,511**	**68,403**			**93,178**	**67,342**		

Notes:
gpm - gallons per minute
psi - pounds per square inch
1. Injection duration indicates the total minutes of active injection per day, accounting for any downtime in injections that may have occurred throughout the day. Therefore, injection duration may be less than the difference in daily injection start and stop times indicated.
2. Carbon substrate solution is batch mixed. Batches of carbon substrate solution includes the following components in solution with Stabilized Lake Mead Water (SLMW): 1% molasses, 2.5% 0.5 Molar Sodium Bicarbonate Solution, 0.001% trace mineral solution, and 5 milligrams per liter Vitamin B12. On October 24, 2023, the concentration of molasses in solution was increased to 2.5%.
3. Distribution water solution is batch mixed. Batches of distribution water solution includes 0.0025 pounds of Vitamin C per gallon of Stabilized Lake Mead Water (SLMW).
4. Injection into U4-E-07D was suspended on September 9, 2023 after injection of a total of 82,978 gallons of carbon substrate solution and 57,820 gallons of distribution water.
5. System operations were temporarily suspended from October 20, 2023 to October 23, 2023, to perform system maintenance and transition extraction well U4-E-03D to an injection well.

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	E314.0	E300.1	E300.1	E350.1	E351.2	E365.1	Anions by E300.0/SW9065A	Anions by E300.0/SW9065A	Anions by E300.0/SW9065A	Alkalinity by SM2320B	Alkalinity by SM2320B	Alkalinity by SM2320B	Alkalinity by SM2320B	Dissolved Metals by SW6010B/SW6020	Dissolved Metals by SW6010B/SW6020
						Perchlorate	Chlorate	Chlorite	Ammonia (as N)	Total Kjeldahl Nitrogen (TKN)	Phosphorus	Chloride	Nitrate (as N)	Sulfate	Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Hydroxide Alkalinity as CaCO3	Aluminum	Antimony
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
M-251-100	9/14/2023	N	EM13	UMCf	92.5 - 102.5	1,550,000	9,930,000	<24,000	<117	<1,400	38.4 J	2,410,000	26,800 J+	454,000 J	79,000	79,000	<8,450	<8,450	<56.1	<5.15
M-251-60	9/14/2023	N	EM13	UMCf	52.3 - 62.3	27,600	378,000	<2,400	<117	<140	<33.3	281,000	6,040	1,150,000	149,000	<8,450	82,400	66,800	60.6 J	2.01 J
M-252	9/19/2023	N	EM13	UMCf	132.3 - 142.3	108,000	644,000	<2,400	<117	<140	<33.3	325,000	1,720	165,000	42,200	42,200	<8,450	<8,450	56.6 J	<1.03
U4-E-01I	9/11/2023	N	EM13	UMCf	74.6 - 89.6	24,800	197,000	500,000	----	----	----	334,000	----	250,000 J	----	----	----	----	----	----
U4-E-02I	9/11/2023	N	EM13	UMCf	74.4 - 89.4	111,000	508,000	999,000	----	----	----	523,000	----	111,000	----	----	----	----	----	----
U4-E-03D	9/11/2023	N	EM13	UMCf	95.1 - 110.1	1,030,000	7,790,000	<24,000	----	----	----	2,280,000	----	537,000	----	----	----	----	----	----
U4-E-06I	9/11/2023	N	EM13	UMCf	73.2 - 88.2	171,000	2,810,000	31,700 J	----	----	----	949,000	----	379,000	----	----	----	----	----	----
U4-E-07I	9/11/2023	N	EM13	UMCf	74.7 - 89.7	689,000	7,300,000	<24,000	----	----	----	2,080,000	----	685,000	----	----	----	----	----	----
U4-MW-01D	9/14/2023	N	EM13	UMCf	96.7 - 106.7	429,000	3,000,000	<24,000	<117	<280	<33.3	727,000	6,890	356,000	85,200	85,200	<8,450	<8,450	<56.1	<5.15
U4-MW-01DD	9/14/2023	N	EM13	UMCf	119.9 - 129.9	267,000	2,110,000	<24,000	<117	<140	<33.3	437,000	4,470 J+	242,000	46,600	46,600	<8,450	<8,450	<56.1	<1.03
U4-MW-01I	9/14/2023	N	EM13	UMCf	76.7 - 86.7	532,000	3,980,000	<24,000	<117	<280	<33.3	850,000	7,850	348,000	81,500	81,500	<8,450	<8,450	67.7 J	<5.15
U4-MW-01S	9/15/2023	N	EM13	UMCf	54.7 - 64.7	21,300	251,000	<2,400	<117	<140 UJ	<33.3	286,000	2,760 J-	1,200,000	138,000	126,000	12,100 J	<8,450	63.4 J	<1.03
U4-MW-02D	9/11/2023	N	EM13	UMCf	95.0 - 110.0	2,210,000	18,500,000	<480,000	<117	<2,800	148	4,350,000	54,700	1,010,000	140,000	140,000	<8,450	<8,450	84.2 J	<20.6
U4-MW-02I	9/11/2023	N	EM13	UMCf	75.0 - 90.0	239,000	1,430,000	118,000 J+	<117	<140	<33.3	1,490,000	779 J	299,000	1,490,000	1,490,000	<8,450	<8,450	<56.1	<5.15
U4-MW-02I	9/11/2023	FD	EM13	UMCf	75.0 - 90.0	246,000	1,360,000	128,000 J+	<117	<140	34.8 J	1,490,000	<48.0	298,000	1,490,000	1,490,000	<8,450	<8,450	<56.1	<5.15
U4-MW-03D	9/14/2023	N	EM13	UMCf	96.6 - 106.6	1,300,000	7,370,000	<24,000	<117	<700	<33.3	1,690,000	21,700 J+	437,000 J	130,000	130,000	<8,450	<8,450	<56.1	<5.15
U4-MW-03DD	9/14/2023	N	EM13	UMCf	119.7 - 129.7	1,720	6,610	<120	<117	<140	95.7 J	140,000 J-	1,300	170,000	87,400	83,800	<8,450	<8,450	<56.1	<1.03
U4-MW-03I	9/11/2023	N	EM13	UMCf	76.6 - 86.6	1,270,000	6,400,000	<24,000	<117	<1,400	<33.3	1,600,000	17,900 J	402,000 J	136,000	136,000	<8,450	<8,450	19,800	<5.15
U4-MW-03I	9/11/2023	FD	EM13	UMCf	76.6 - 86.6	1,340,000	6,880,000	<24,000	<117	<1,400	<33.3	1,660,000	37,500 J	499,000 J	142,000	142,000	<8,450	<8,450	14,900	<5.15
U4-MW-03S	9/14/2023	N	EM13	UMCf	54.5 - 64.5	46,400	359,000	<2,400	<117	<140	<33.3	313,000	4,650	989,000	358,000	319,000	38,900	<8,450	<56.1	<1.03
U4-MW-04D	9/15/2023	N	EM13	UMCf	97.0 - 107.0	527,000	3,430,000	<24,000	<117	<280	<33.3	842,000	6,060	266,000	202,000	202,000	<8,450	<8,450	<56.1	<5.15
U4-MW-04I	9/14/2023	N	EM13	UMCf	76.8 - 86.8	1,540,000	13,500,000	<240,000	<117	<1,400	41.5 J	3,240,000	40,000 J+	729,000	179,000	179,000	<8,450	<8,450	<56.1	<10.3
U4-MW-05D	9/12/2023	N	EM13	UMCf	98.2 - 108.2	323,000	937,000	<24,000	<117	<140	<33.3	1,410,000	752 J	217,000	1,590,000	1,590,000	<8,450	<8,450	<56.1	8.82
U4-MW-05I	9/13/2023	N	EM13	UMCf	76.6 - 86.6	443,000	6,170,000	<120,000	<117	<140	<33.3	1,980,000	<480	366,000	2,010,000	2,010,000	<8,450	<8,450	<56.1	<5.15
U4-MW-06D	9/13/2023	N	EM13	UMCf	97.1 - 107.1	1,800,000	7,990,000	28,600 J	<117	<1,120	<33.3	2,460,000	15,000	455,000	870,000	870,000	<8,450	<8,450	<56.1	<5.15
U4-MW-06I	9/12/2023	N	EM13	UMCf	76.5 - 86.5	1,840,000	8,310,000	<24,000	<117	<1,120	<33.3	2,270,000	14,700	456,000 J	702,000	702,000	<8,450	<8,450	94.4 J	<5.15
U4-MW-07D	9/13/2023	N	EM13	UMCf	96.8 - 106.5	500,000	4,320,000	<24,000	<117	<560	<33.3	1,750,000	<240	367,000	1,290,000	1,290,000	<8,450	<8,450	<56.1	<5.15
U4-MW-07I	9/13/2023	N	EM13	UMCf	76.8 - 86.8	287,000	1,330,000	155,000 J+	<117	<140	<33.3	1,800,000	<240	366,000	2,150,000	2,150,000	<8,450	<8,450	<56.1	<5.15
U4-MW-08D	9/13/2023	N	EM13	UMCf	98.6 - 108.6	1,300,000	16,600,000	<240,000	<117	<1,400	<33.3	4,010,000	53,800	860,000	236,000	236,000	<8,450	<8,450	<56.1	<10.3
U4-MW-08DD	9/14/2023	N	EM13	UMCf	119.8 - 129.8	75,000	514,000	<2,400	<117	<140	89.2 J	262,000	1,390	160,000	78,200	78,200	<8,450	<8,450	<56.1	<1.03
U4-MW-08I	9/13/2023	N	EM13	UMCf	78.0 - 88.0	578,000	6,670,000	72,300 J+	<117	<560 R	<33.3	1,990,000	13,300 J-	710,000	526,000	526,000	<8,450	<8,450	68.2 J	<5.15
U4-MW-08S	9/13/2023	N	EM13	UMCf	54.9 - 64.9	<0.300	1,350	<24.0	<117	1,450	53.0 J	195,000	57.9 J	1,540 J	1,680,000	1,680,000	<8,450	<8,450	<56.1	<1.03
U4-MW-08S	9/13/2023	FD	EM13	UMCf	54.9 - 64.9	<0.300	1,370	<24.0	<117	1,600	71.1 J	196,000	50.7 J	1,780 J	1,690,000	1,690,000	<8,450	<8,450	<56.1	<10.3
U4-MW-09D	9/12/2023	N	EM13	UMCf	96.9 - 106.9	219,000	1,300,000	<24,000	<117	<140	<33.3	1,410,000	1,540	129,000	1,160,000	1,160,000	<8,450	<8,450	<56.1	8.48
U4-MW-09DD	9/13/2023	N	EM13	UMCf	119.8 - 129.8	143,000	464,000	3,710 J	<117	<140	<33.3	508,000	<48.0	106,000	340,000	340,000	<8,450	<8,450	<56.1	<1.03
U4-MW-09I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	316,000	1,780,000	<24,000	<117	<140	<33.3	1,430,000	1,620	183,000	1,110,000	1,110,000	<8,450	<8,450	<56.1	1.58 J
U4-MW-09S	9/13/2023	N	EM13	UMCf	55.3 - 65.3	<0.300	1,470 J+	<120	181 J	2,320	99.4 J	163,000	<48.0	3,600 J	2,920,000	2,920,000	<8,450	<8,450	<56.1	<10.3
U4-MW-10D	9/13/2023	N	EM13	UMCf	96.9 - 106.9	15,900	164,000	<2,400	<117	937	<33.3	760,000	<48.0	174,000	725,000	725,000	<8,450	<8,450	<56.1	1.36 J
U4-MW-10I	9/13/2023	N	EM13	UMCf	77.1 - 87.1	4,990	29,500	<240	314	3,060	<33.3	686,000	<48.0	273,000	1,390,000	1,390,000	<8,450	<8,450	<56.1	----
U4-MW-11D	9/13/2023	N	EM13	UMCf	97.4 - 107.4	825,000 J-	11,500,000	<240,000	<117	<1,120	<33.3	3,240,000	13,500	637,000	444,000	444,000	<8,450	<8,450	<56.1	<5.15
U4-MW-11I	9/13/2023	N	EM13	UMCf	77.0 - 87.0	396,000	5,100,000	<24,000	243 J	<560	<33.3	2,030,000	5,990	1,070,000	666,000	666,000	<8,450	<8,450	<56.1	<5.15
U4-MW-11I	9/13/2023	FD	EM13	UMCf	77.0 - 87.0	391,000	4,920,000	<24,000	223 J	<560	<33.3	2,110,000	6,440	1,110,000	672,000	672,000	<8,450	<8,450	<56.1	<5.15
U4-MW-12D	9/12/2023	N	EM13	UMCf	97.1 - 107.1	256,000	3,370,000	<24,000	<117	<280	<33.3	1,180,000	9,300 J	269,000 J	369,000	369,000	<8,450	<8,450	<56.1	1.14 J
U4-MW-12I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	31,900	109,000	<2,400	<117	679	209 J-	610,000	395	348,000	1,150,000	1,150,000	<8,450	<8,450	<56.1	1.45 J
U4-MW-13D	9/11/2023	N	EM13	UMCf	98.2 - 108.2	288,000	3,190,000	<24,000	<117	<560	<33.3	1,030,000	4,860	255,000	189,000	189,000	<8,450	<8,450	<56.1	<1.03
U4-MW-13I	9/11/2023	N	EM13	UMCf	77.1 - 87.1	327,000	3,300,000	<24,000	130 J	<560	38.5 J	1,020,000	5,460	311,000	222,000	222,000	<8,450	<8,450	<56.1	3.62 J
U4-MW-14D	9/14/2023	N	EM13	UMCf	97.3 - 107.3	75,100	627,000	<2,400	<117	<140	<33.3	656,000	856	179,000	569,000	569,000	<8,450	<8,450	<56.1	<1.03
U4-MW-14I	9/14/2023	N	EM13	UMCf	77.3 - 87.3	133,000	683,000	<2400 UJ	<117	<140	45.3 J	623,000	658	438,000	521,000	521,000	<8,450	<8,450	<56.1	<1.03
U4-MW-15D	9/13/2023	N	EM13	UMCf	96.0 - 106.0	68,000	1,100,000	<24,000	<117	<140	<33.3	419,000	1,650	196,000	75,600	75,600	<8,450	<8,450	<56.1	<1.03
U4-MW-15DD	9/14/2023	N	EM13	UMCf	120.3 - 130.3	21.2	126 J	<120	<117	<140	<33.3	143,000	1,590	174,000	82,200	82,200	<8,450	<8,450	<56.1	<1.03
U4-MW-15I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	93,500	1,400,000	<24,000	213 J	<140	<33.3	938,000	<48.0	223,000	734,000	734,000	<8,450	<8,450	<56.1	<1.03

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	E314.0	E300.1	E300.1	E350.1	E351.2	E365.1	Anions by E300.0/SW9065A	Anions by E300.0/SW9065A	Anions by E300.0/SW9065A	Alkalinity by SM2320B	Alkalinity by SM2320B	Alkalinity by SM2320B	Alkalinity by SM2320B	Dissolved Metals by SW6010B/SW6020	Dissolved Metals by SW6010B/SW6020
						Perchlorate	Chlorate	Chlorite	Ammonia (as N)	Total Kjeldahl Nitrogen (TKN)	Phosphorus	Chloride	Nitrate (as N)	Sulfate	Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Hydroxide Alkalinity as CaCO3	Aluminum	Antimony
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
U4-MW-15S	9/14/2023	N	EM13	UMCf	54.8 - 64.8	<0.300	253 J	<240	257 J-	15,700 J-	232	136,000	5,550 J	<59,400	4,130,000	4,130,000	<8,450	<8,450	<56.1	<1.03
U4-MW-16D	9/15/2023	N	EM13	UMCf	96.8 - 106.8	629,000	5,870,000	<24,000	208 J	<700	<33.3	1,460,000	15,200	217,000	483,000	483,000	<8,450	<8,450	<56.1	<5.15
U4-MW-16DD	9/14/2023	N	EM13	UMCf	120.8 - 130.8	24,200	105,000	<480	<117	<140	<33.3	166,000	728	336,000	97,900	97,900	<8,450	<8,450	<56.1	<1.03
U4-MW-16I	9/11/2023	N	EM13	UMCf	77.0 - 87.0	1,080,000	6,830,000	<24,000	174 J	<1,400	49.2 J	1,660,000	4,520	498,000	401,000	401,000	<8,450	<8,450	<56.1	<1.03
U4-MW-16I	9/11/2023	FD	EM13	UMCf	77.0 - 87.0	926,000	6,880,000	<24,000	172 J	<1,400	<33.3	1,690,000	3,660	501,000	396,000	396,000	<8,450	<8,450	<56.1	<1.03
U4-MW-16S	9/11/2023	N	EM13	UMCf	54.8 - 64.8	<0.300	1,680 J	254,000	<117	1,270	322	129,000	<48.0	34,700	1,220,000	1,220,000	<8,450	<8,450	<56.1	<1.03
U4-T3	9/11/2023	N	EM13	N/A	N/A	217,000	1,990,000	54,900 J+	----	----	----	836,000	----	292,000	----	----	----	----	----	----

Notes:

FD - Field duplicate

E - Field instrument error.

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.

J+ - The result is an estimated quantity, but the result may be biased high.

N/A - Not Applicable

mg/L - milligrams per liter

µg/L - micrograms per liter

N - Normal field sample

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.

UMCf- Upper Muddy Creek Formation

< - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

-- Not tested.

M-252 damaged/obstructed when checked on June 14, 2023 and September 14, 2023.

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020
						Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Molybdenum	Nickel	Phosphorus
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
M-251-100	9/14/2023	N	EM13	UMCf	92.5 - 102.5	6.38 J	119	<0.330	<0.750	856,000	28,200	<0.840	25.0	<18.0	4.50 J	396,000	<0.934	10.2	<4.08	----
M-251-60	9/14/2023	N	EM13	UMCf	52.3 - 62.3	47.6	20.1	<0.330	<0.150	25,400	1,640	<0.840	1.75 J	<18.0	1.05 J	142 J	2.49 J	21.7	1.01 J	----
M-252	9/19/2023	N	EM13	UMCf	132.3 - 142.3	7.37	338	<0.330	<0.150	225,000	26.2	<0.840	<1.51	<18.0	<0.849	22,600	<0.934	5.67	6.46	----
U4-E-01I	9/11/2023	N	EM13	UMCf	74.6 - 89.6	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
U4-E-02I	9/11/2023	N	EM13	UMCf	74.4 - 89.4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
U4-E-03D	9/11/2023	N	EM13	UMCf	95.1 - 110.1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
U4-E-06I	9/11/2023	N	EM13	UMCf	73.2 - 88.2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
U4-E-07I	9/11/2023	N	EM13	UMCf	74.7 - 89.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
U4-MW-01D	9/14/2023	N	EM13	UMCf	96.7 - 106.7	7.50 J	132	<0.330	<0.750	423,000	17,500	<0.840	8.15 J	<18.0	<4.24	230,000	3.88 J	4.70 J	<4.08	----
U4-MW-01DD	9/14/2023	N	EM13	UMCf	119.9 - 129.9	5.37	119	<0.330	<0.150	290,000	9,630	<0.840	<1.51	<18.0	<0.849	126,000	8.70 J	5.18	<0.816	----
U4-MW-01I	9/14/2023	N	EM13	UMCf	76.7 - 86.7	6.96 J	131	<0.330	<0.750	548,000	18,700	2.50 J	8.54 J	32.0 J	<4.24	304,000	1.96 J	5.64	<4.08	----
U4-MW-01S	9/15/2023	N	EM13	UMCf	54.7 - 64.7	50.6	11.9	<0.330	<0.150	17,000	1,510	<0.840	<1.51	<18.0	<0.849	4,790	0.987 J	26.5	<0.816	----
U4-MW-02D	9/11/2023	N	EM13	UMCf	95.0 - 110.0	8.17 J	102	<0.330	<3.00	1,080,000	107,000	24.4 J	<30.2	27.3 J	<17.0	525,000	3.39 J	16.4	<16.3	----
U4-MW-02I	9/11/2023	N	EM13	UMCf	75.0 - 90.0	66.5	421	<0.330	<0.750	254,000	2,410	6.69 J	<7.55	322	<4.24	202,000	2,330	22.4	104	----
U4-MW-02I	9/11/2023	FD	EM13	UMCf	75.0 - 90.0	65.9	416	<0.330	<0.750	250,000	2,190	5.73 J	<7.55	346	4.25 J	199,000	2,310	20.9	105	----
U4-MW-03D	9/14/2023	N	EM13	UMCf	96.6 - 106.6	6.25 J	130	<0.330	<0.750	681,000	31,400	<0.840	17.8 J	<18.0	<4.24	354,000	<0.934	6.42	<4.08	----
U4-MW-03DD	9/14/2023	N	EM13	UMCf	119.7 - 129.7	11.0	24.1	<0.330	<0.150	30,800	27.6	<0.840	<1.51	83.8 J	<0.849	16,000	3.27 J	8.47	1.26 J	----
U4-MW-03I	9/11/2023	N	EM13	UMCf	76.6 - 86.6	19.9	170	1.45 J	<0.750	717,000	27,800	7.31 J	9.56 J	5,590	9.18 J	458,000	416	3.18 J	8.15 J	----
U4-MW-03I	9/11/2023	FD	EM13	UMCf	76.6 - 86.6	18.2	157	1.05 J	<0.750	698,000	27,900	6.45 J	9.01 J	4,580	10.3 J+	434,000	312	3.98 J	7.49 J	----
U4-MW-03S	9/14/2023	N	EM13	UMCf	54.5 - 64.5	116	11.5	<0.330	<0.150	5,300	1,860	<0.840	<1.51	<18.0	1.51 J	1,230	1.29 J	26.2	1.23 J	----
U4-MW-04D	9/15/2023	N	EM13	UMCf	97.0 - 107.0	10.8	93.1	<0.330	<0.750	314,000	17,200	<0.840	8.84 J	<18.0	<4.24	164,000	73.2	5.53	<4.08	----
U4-MW-04I	9/14/2023	N	EM13	UMCf	76.8 - 86.8	12.5 J	132	<0.330	<1.50	1,240,000	58,800	<0.840	37.7 J	<18.0	<8.49	607,000	10.7	9.54	<8.16	----
U4-MW-05D	9/12/2023	N	EM13	UMCf	98.2 - 108.2	82.1	129	<0.330	<0.150	154,000	3,000	1.88 J	<1.51	<18.0	<0.849	137,000	714	12.0	7.62	----
U4-MW-05I	9/13/2023	N	EM13	UMCf	76.6 - 86.6	132	171	1.32 J	<0.750	162,000	991	4.93 J	10.7 J	<18.0	6.99 J	166,000	470	59.2	17.3	----
U4-MW-06D	9/13/2023	N	EM13	UMCf	97.1 - 107.1	20.4	227	3.85	<0.750	748,000	30,100	3.39 J	15.7 J	20.9 J	<4.24	455,000	209	80.8	<4.08	----
U4-MW-06I	9/12/2023	N	EM13	UMCf	76.5 - 86.5	33.4	123	<0.330	<0.750	687,000	33,500	<0.840	<7.55	146	<4.24	420,000	102	9.96	<4.08	----
U4-MW-07D	9/13/2023	N	EM13	UMCf	96.8 - 106.5	32.9	140	2.31	<0.750	360,000	16,100	5.81 J	14.0 J	<18.0	<4.24	249,000	614	69.3	6.87 J	----
U4-MW-07I	9/13/2023	N	EM13	UMCf	76.8 - 86.8	91.6	167	1.39 J	<0.750	188,000	4,220	6.58 J	12.6 J	<18.0	<4.24	218,000	600	57.7	22.7	----
U4-MW-08D	9/13/2023	N	EM13	UMCf	98.6 - 108.6	10.1 J	122	5.16	<1.50	1,100,000	90,000	9.79 J	31.5 J	<18.0	<8.49	557,000	39.7	117	<8.16	----
U4-MW-08DD	9/14/2023	N	EM13	UMCf	119.8 - 129.8	6.97	43.8	<0.330	<0.150	82,400	504	<0.840	<1.51	40.2 J	1.42 J	45,200	2.85 J	8.49	1.61 J	----
U4-MW-08I	9/13/2023	N	EM13	UMCf	78.0 - 88.0	45.6	62.2	2.30	<0.750	307,000	30,500	3.48 J	13.8 J	<18.0	<4.24	210,000	35.6	77.0	14.9	----
U4-MW-08S	9/13/2023	N	EM13	UMCf	54.9 - 64.9	31.4	335	0.836 J	<0.150	118,000	25.4 J	2.00 J	<1.51	1,480	6.72	88,500	2,800	35.5	2.03	----
U4-MW-08S	9/13/2023	FD	EM13	UMCf	54.9 - 64.9	41.3	335	0.893 J	<1.50	117,000	15.2 J	1.94 J	<15.1	1,360	<8.49	87,600	2,750	35.9	<8.16	----
U4-MW-09D	9/12/2023	N	EM13	UMCf	96.9 - 106.9	28.8	457	<0.330	<0.150	318,000	2,950	1.21 J	<1.51	80.7 J	<0.849	241,000	979	10.0	9.23	----
U4-MW-09DD	9/13/2023	N	EM13	UMCf	119.8 - 129.8	6.26	188	1.25 J	<0.150	167,000	13.8	5.65 J	<1.51	107	<0.849	97,000	300	40.7	32.1	----
U4-MW-09I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	30.1	281	<0.330	<0.150	328,000	5,550	<0.840	<1.51	<18.0	<0.849	251,000	458	8.86	23.7	----
U4-MW-09S	9/13/2023	N	EM13	UMCf	55.3 - 65.3	123	402	0.397 J	<1.50	36,300	120	2.28 J	<15.1	586	<8.49	30,500	515	36.4	<8.16	----
U4-MW-10D	9/13/2023	N	EM13	UMCf	96.9 - 106.9	11.2	783	1.31 J	<0.150	197,000	12.7	1.73 J	<1.51	2,470	<0.849	178,000	1,910	66.3	7.78	----
U4-MW-10I	9/13/2023	N	EM13	UMCf	77.1 - 87.1	----	----	----	----	225,000	----	----	----	15,200	----	184,000	4,630	----	----	----
U4-MW-11D	9/13/2023	N	EM13	UMCf	97.4 - 107.4	10.6	110	4.28	<0.750	851,000	58,400	19.5 J	22.4 J	20.0 J	<4.24	526,000	90.1	97.3	<4.08	----
U4-MW-11I	9/13/2023	N	EM13	UMCf	77.0 - 87.0	8.23 J	195	2.76	<0.750	501,000	2,820	17.6	17.6 J	18.0 J	<4.24	373,000	2,400	82.6	80.7	----
U4-MW-11I	9/13/2023	FD	EM13	UMCf	77.0 - 87.0	7.62 J	203	2.87	<0.750	515,000	2,820	17.8	17.6 J	<18.0	<4.24	385,000	2,440	81.2	82.1	----
U4-MW-12D	9/12/2023	N	EM13	UMCf	97.1 - 107.1	8.71	96.9	<0.330	<0.150	397,000	11,900	<0.840	<1.51	<18.0	<0.849	232,000	50.0 J+	5.17	1.11 J	----
U4-MW-12I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	5.09	99.2	<0.330	<0.150	154,000	20.0	<0.840	<1.51	32.3 J	<0.849	121,000	1,080	146	4.28	----
U4-MW-13D	9/11/2023	N	EM13	UMCf	98.2 - 108.2	6.15	92.8	<0.330	<0.150	364,000	12,500	1.97 J	5.42	<18.0	3.07 J+	211,000	51.6	3.59 J	1.42 J	----
U4-MW-13I	9/11/2023	N	EM13	UMCf	77.1 - 87.1	20.6	127	<0.330	<0.150	341,000	12,600	3.13 J	<1.51	<18.0	3.32 J+	210,000	197	4.85 J	2.18	----
U4-MW-14D	9/14/2023	N	EM13	UMCf	97.3 - 107.3	15.3	191	<0.330	<0.150	219,000	2,540	<0.840	5.59	<18.0	<0.849	126,000	283	7.16	3.52	----
U4-MW-14I	9/14/2023	N	EM13	UMCf	77.3 - 87.3	20.7	63.8	<0.330	<0.150	296,000	2,060	<0.840	1.60 J	<18.0	<0.849	123,000	85.8	5.72	5.21	----
U4-MW-15D	9/13/2023	N	EM13	UMCf	96.0 - 106.0	10.0	50.3	1.26 J	<0.150	185,000	3,310	1.23 J	<1.51	<18.0	<0.849	89,900	10.3	45.5	5.43	----
U4-MW-15DD	9/14/2023	N	EM13	UMCf	120.3 - 130.3	13.7	22.6	<0.330	<0.150	28,400	3.78 J	<0.840	<1.51	40.0 J	<0.849	16,000	5.65 J	9.31	17.7	----
U4-MW-15I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	26.8	509	<0.330	<0.150	180,000	42.6	1.59 J	<1.51	143	<0.849	145,000	1,240	32.2	50.1	----

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020
						Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Molybdenum	Nickel	Phosphorus
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
U4-MW-15S	9/14/2023	N	EM13	UMCf	54.8 - 64.8	80.5	694	<0.330	<0.150	135,000	11.0	<0.840	<1.51	1,790	1.22 J	120,000	1,190	2.44 J	3.15	----
U4-MW-16D	9/15/2023	N	EM13	UMCf	96.8 - 106.8	12.7	137	<0.330	<0.750	596,000	17,700	<0.840	15.1 J	21.7 J	<4.24	340,000	199	8.47	7.75 J	----
U4-MW-16DD	9/14/2023	N	EM13	UMCf	120.8 - 130.8	23.7	21.6	<0.330	<0.150	54,700	146	<0.840	1.68 J	<18.0	<0.849	25,900	3.25 J	11.0	2.56	----
U4-MW-16I	9/11/2023	N	EM13	UMCf	77.0 - 87.0	8.62	408	<0.330	0.162 J	515,000	13,800	6.06 J	3.78 J	18.7 J	2.11 J+	473,000	2,590	25.9	77.3	----
U4-MW-16I	9/11/2023	FD	EM13	UMCf	77.0 - 87.0	8.52	408	<0.330	<0.150	509,000	13,800	5.81 J	3.43 J	20.4 J	<0.849	472,000	2,590	26.9	75.6	----
U4-MW-16S	9/11/2023	N	EM13	UMCf	54.8 - 64.8	170	183	<0.330	<0.150	86,400	6.78 J	1.28 J	<1.51	4,050	1.26 J	93,200	720	<1.16	2.79	----
U4-T3	9/11/2023	N	EM13	N/A	N/A	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Notes:

FD - Field duplicate

E - Field instrument error.

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.

J+ - The result is an estimated quantity, but the result may be biased high.

N/A - Not Applicable

mg/L - milligrams per liter

µg/L - micrograms per liter

N - Normal field sample

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.

UMCf- Upper Muddy Creek Formation

< - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

-- Not tested.

M-252 damaged/obstructed when checked on June 14, 2023 and September 14, 2023.

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	FIELD TESTS	FIELD TESTS	FIELD TESTS	FIELD TESTS	FIELD TESTS	FIELD TESTS	FIELD TESTS
						Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc	Conductivity	Dissolved Oxygen	Ferrous Iron	Oxidation-Reduction Potential	pH	Sulfide	Temperature
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mS/cm	mg/L	mg/L	mV	SU	mg/L	C
M-251-100	9/14/2023	N	EM13	UMCf	92.5 - 102.5	53,600	3.17 J	<0.350	2,520,000	<0.605	9.66	<4.99	<15.1	18.1	1.48	0 U	-27.3	7.22	0 U	27.7
M-251-60	9/14/2023	N	EM13	UMCf	52.3 - 62.3	24,800	2.73	<0.0700	772,000	<0.121	<0.0789	75.2	<3.02	4.01	0.65	0 U	25	10.46	0 U	28.7
M-252	9/19/2023	N	EM13	UMCf	132.3 - 142.3	11,600	1.75 J	<0.0700	195,000	<0.121	1.93	9.74 J	10.5 J	3.971	-4.01	0 U	363.8	7.32	0 U	36
U4-E-01I	9/11/2023	N	EM13	UMCf	74.6 - 89.6	----	----	----	----	----	----	----	----	3.207	0.47	----	-377.9	5.96	----	29.5
U4-E-02I	9/11/2023	N	EM13	UMCf	74.4 - 89.4	----	----	----	----	----	----	----	----	2.626	0.82	----	-204.4	6.43	----	32.5
U4-E-03D	9/11/2023	N	EM13	UMCf	95.1 - 110.1	----	----	----	----	----	----	----	----	17.112	1.28	----	95.6	6.58	----	33.9
U4-E-06I	9/11/2023	N	EM13	UMCf	73.2 - 88.2	----	----	----	----	----	----	----	----	3.76	2.52	----	-110.2	6.1	----	32.3
U4-E-07I	9/11/2023	N	EM13	UMCf	74.7 - 89.7	----	----	----	----	----	----	----	----	6.764	1.89	----	107.1	6.68	----	33.3
U4-MW-01D	9/14/2023	N	EM13	UMCf	96.7 - 106.7	27,600	1.74 J	<0.350	729,000	<0.605	4.02 J	6.62 J	<15.1	6.26	5.35	0 U	171.4	7.5	0 U	29.3
U4-MW-01DD	9/14/2023	N	EM13	UMCf	119.9 - 129.9	25,300	2.05	<0.0700	425,000	<0.121	1.65	<4.99	12.8 J	4.64	2.03	0 U	145.3	7.45	0 U	28.6
U4-MW-01I	9/14/2023	N	EM13	UMCf	76.7 - 86.7	31,100	2.68 J	<0.350	873,000	<0.605	5.11	<4.99	<15.1	7.818	4.76	0 U	133.7	7.49	0 U	30.9
U4-MW-01S	9/15/2023	N	EM13	UMCf	54.7 - 64.7	19,300	2.67	<0.0700	907,000	<0.121	3.16	68.2	<3.02	3.367	0.79	0 U	83.9	8.6	0 U	28.8
U4-MW-02D	9/11/2023	N	EM13	UMCf	95.0 - 110.0	110,000	6.05 J	<1.40	7,670,000	<2.42	4.70 J	<4.99	<60.4	33.003	1.98	0 U	150.9	7.38	0 U	28.9
U4-MW-02I	9/11/2023	N	EM13	UMCf	75.0 - 90.0	34,700	<1.50	<0.350	1,630,000	<0.605	65.1	34.5	<15.1	8.481	0.14	0 U	128.6	6.31	0 U	28
U4-MW-02I	9/11/2023	FD	EM13	UMCf	75.0 - 90.0	34,000	1.65 J	<0.350	1,600,000	<0.605	63.9	34.0	<15.1	----	----	----	----	----	----	----
U4-MW-03D	9/14/2023	N	EM13	UMCf	96.6 - 106.6	39,000	2.48 J	<0.350	2,000,000	<0.605	19.6	<4.99	<15.1	12.23	-1.53	0 U	198.5	6.9	0 U	27.1
U4-MW-03DD	9/14/2023	N	EM13	UMCf	119.7 - 129.7	6,230	1.36 J	<0.0700	138,000	<0.121	2.53	8.13 J	3.18 J	0.855	-1.23	0 U	189.8	8.45	0 U	30.1
U4-MW-03I	9/11/2023	N	EM13	UMCf	76.6 - 86.6	43,500	2.90 J	0.501 J	1,910,000	<0.605	13.0	16.6 J	36.4 J	13.726	2.78	0 U	157.1	7.16	0 U	36.1
U4-MW-03I	9/11/2023	FD	EM13	UMCf	76.6 - 86.6	42,700	2.59 J	0.414 J	1,900,000	<0.605	11.9	14.1 J	27.8 J	----	----	----	----	----	----	----
U4-MW-03S	9/14/2023	N	EM13	UMCf	54.5 - 64.5	10,400	2.07	<0.0700	881,000	<0.121	13.0	127	<3.02	3.313	-1.93	0 U	-20	8.81	0 U	27.3
U4-MW-04D	9/15/2023	N	EM13	UMCf	97.0 - 107.0	23,500	1.70 J	<0.350	1,330,000	<0.605	14.8	5.26 J	50.2 J	8.782	2.88	0 U	279.6	6.88	0 U	28.7
U4-MW-04I	9/14/2023	N	EM13	UMCf	76.8 - 86.8	60,900	4.06 J	<0.700	4,020,000	<1.21	30.1	<4.99	<30.2	27.215	0.72	0 U	168.9	6.83	0 U	28.4
U4-MW-05D	9/12/2023	N	EM13	UMCf	98.2 - 108.2	27,000	0.894 J	<0.0700	1,680,000	0.257 J	117	<4.99	12.8 J	9.152	0.08	0 U	99.9	6.21	0 U	29.4
U4-MW-05I	9/13/2023	N	EM13	UMCf	76.6 - 86.6	33,200	<1.50	<0.350	2,130,000	<0.605	163	21.9	20.6 J	10.838	0.08	0 U	126.6	6.36	0 U	28.2
U4-MW-06D	9/13/2023	N	EM13	UMCf	97.1 - 107.1	48,700	2.50 J	<0.350	2,900,000	<0.605	74.5	<4.99	16.4 J	20.472	0.84	0 U	23.9	6.08	0 U	34.2
U4-MW-06I	9/12/2023	N	EM13	UMCf	76.5 - 86.5	50,900	2.82 J	<0.350	3,330,000	<0.605	87.3	<25.0	24.4 J	20.743	0.68	0 U	31.2	6.42	0 U	36.9
U4-MW-07D	9/13/2023	N	EM13	UMCf	96.8 - 106.5	36,300	<1.50	<0.350	2,250,000	<0.605	128	8.03 J	<15.1	13.126	0.06	0 U	174.6	6.3	0 U	29.2
U4-MW-07I	9/13/2023	N	EM13	UMCf	76.8 - 86.8	32,700	<1.50	<0.350	2,130,000	<0.605	218	22.2	18.6 J	11.049	0.1	0 U	156.1	6.31	0 U	29
U4-MW-08D	9/13/2023	N	EM13	UMCf	98.6 - 108.6	90,900	3.93 J	<0.700	6,620,000	<1.21	39.1	<4.99	<30.2	50.933	-1.16	0 U	263.7	6.48	0 U	28.6
U4-MW-08DD	9/14/2023	N	EM13	UMCf	119.8 - 129.8	11,300	1.50 J	<0.0700	230,000	<0.121	2.91	7.29 J	<3.02	1.655	-1.71	0 U	290.1	7.54	0 U	27.1
U4-MW-08I	9/13/2023	N	EM13	UMCf	78.0 - 88.0	42,800	2.03 J	<0.350	2,860,000	<0.605	109	10.5 J	<15.1	22.556	-1.3	0 U	216.1	6.72	0 U	27.1
U4-MW-08S	9/13/2023	N	EM13	UMCf	54.9 - 64.9	18,500	<0.300	<0.0700	527,000	<0.121	8.27	22.2	9.25 J	4.902	-1.41	0 U	-184.8	6.65	0 U	29
U4-MW-08S	9/13/2023	FD	EM13	UMCf	54.9 - 64.9	17,400	<3.00	<0.700	517,000	<1.21	8.89 J	22.4	<30.2	----	----	----	----	----	----	----
U4-MW-09D	9/12/2023	N	EM13	UMCf	96.9 - 106.9	24,800	0.867 J	<0.0700	1,140,000	0.195 J	86.5	<4.99	14.3 J	7.12	1.59	0 U	-170.2	6.4	0 U	29.6
U4-MW-09DD	9/13/2023	N	EM13	UMCf	119.8 - 129.8	14,900	1.29 J	<0.0700	319,000	<0.121	7.89	<4.99	4.42 J	5.041	-1.2	0 U	160	6.36	0 U	29.8
U4-MW-09I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	27,100	1.06 J	<0.0700	1,280,000	0.188 J	86.2	<4.99	14.9 J	7.94	0.34	0 U	-130.8	6.44	0 U	29.4
U4-MW-09S	9/13/2023	N	EM13	UMCf	55.3 - 65.3	16,600	<3.00	<0.700	1,530,000	<1.21	10.1	34.9	<30.2	8.97	-1.46	0.5	-170.8	6.79	0.3	27.3
U4-MW-10D	9/13/2023	N	EM13	UMCf	96.9 - 106.9	19,800	0.441 J	<0.0700	362,000	0.332 J	130	5.23 J	3.27 J	3.965	1	3	-29.7	6.66	0 U	31.3
U4-MW-10I	9/13/2023	N	EM13	UMCf	77.1 - 87.1	22,900	----	----	571,000	----	42.9	----	----	4.813	0.57	6	-70.6	6.46	0.2	30.5
U4-MW-11D	9/13/2023	N	EM13	UMCf	97.4 - 107.4	64,400	3.40 J	<0.350	4,240,000	0.844 J	70.5	<4.99	21.4 J	22.158	1.2	0 U	-2.9	6.49	0 U	28.6
U4-MW-11I	9/13/2023	N	EM13	UMCf	77.0 - 87.0	50,600	5.48 J	<0.350	2,050,000	<0.605	242	<4.99	213	15.082	0.86	0 U	261.3	6.3	0 U	33.4
U4-MW-11I	9/13/2023	FD	EM13	UMCf	77.0 - 87.0	51,700	7.34 J	<0.350	2,090,000	<0.605	246	<4.99	212	----	----	----	----	----	----	----
U4-MW-12D	9/12/2023	N	EM13	UMCf	97.1 - 107.1	27,800	1.94 J	<0.0700	1,150,000	0.201 J	56.9	<25.0	15.4 J	9.274	0.83	0 U	257.9	6.63	0 U	29.7
U4-MW-12I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	26,100	0.954 J	<0.0700	742,000	<0.121	257	<4.99	15.9 J	5.619	0.68	0 U	-81.5	6.69	0 U	34
U4-MW-13D	9/11/2023	N	EM13	UMCf	98.2 - 108.2	29,500	1.80 J	<0.0700	929,000	0.342 J	30.2	5.22 J	6.85 J	7.059	1.65	0 U	255.6	6.9	0 U	29.6
U4-MW-13I	9/11/2023	N	EM13	UMCf	77.1 - 87.1	30,400	2.04	<0.0700	1,060,000	<0.121	30.7	<4.99	9.22 J	8.29	1.69	0 U	227	7	0 U	34.6
U4-MW-14D	9/14/2023	N	EM13	UMCf	97.3 - 107.3	18,000	1.93 J	<0.0700	425,000	<0.121	47.7	9.33 J	5.36 J	3.694	1.94	0 U	273.2	6.53	0 U	28.2
U4-MW-14I	9/14/2023	N	EM13	UMCf	77.3 - 87.3	20,100	1.13 J	<0.0700	450,000	<0.121	55.6	10.2 J	8.92 J	4.131	0.73	0 U	238.2	6.83	0 U	30.5
U4-MW-15D	9/13/2023	N	EM13	UMCf	96.0 - 106.0	17,400	1.90 J	<0.0700	358,000	<0.121	6.81	9.95 J	3.80 J	3.276	1.03	0 U	31.4	7.55	0 U	26
U4-MW-15DD	9/14/2023	N	EM13	UMCf	120.3 - 130.3	6,150	1.70 J	<0.0700	130,000	<0.121	3.64	13.1 J	<3.02	0.905	2.24	0 U	-32	8.48	0 U	28.1
U4-MW-15I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	25,200	2.07	<0.0700	1,010,000	<0.121	95.8	13.3 J	16.5 J	6.172	1.16	0 U	7	6.57	0 U	27.2

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	Dissolved Metals by SW6010B/SW 6020	FIELD TESTS	FIELD TESTS	FIELD TESTS	FIELD TESTS	FIELD TESTS	FIELD TESTS	FIELD TESTS
						Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc	Conductivity	Dissolved Oxygen	Ferrous Iron	Oxidation-Reduction Potential	pH	Sulfide	Temperature
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mS/cm	mg/L	mg/L	mV	SU	mg/L	C
U4-MW-15S	9/14/2023	N	EM13	UMCf	54.8 - 64.8	25,800	<0.300	0.0732 J	478,000	<0.121	3.32	13.9 J	8.39 J	2.629	0.25	0 U	-165.9	6.53	0 U	25.6
U4-MW-16D	9/15/2023	N	EM13	UMCf	96.8 - 106.8	37,400	<1.50	<0.350	1,800,000	<0.605	24.8	7.10 J	<15.1	18.739	-7.04	0 U	367.1	6.59	0 U	24.7
U4-MW-16DD	9/14/2023	N	EM13	UMCf	120.8 - 130.8	8,270	1.76 J	<0.0700	199,000	<0.121	7.28	19.3 J	3.51 J	1.398	1.21	0 U	-27.1	7.75	0 U	28.2
U4-MW-16I	9/11/2023	N	EM13	UMCf	77.0 - 87.0	51,000	3.86	<0.0700	1,990,000	0.152 J	108	<4.99	10.2 J	14.244	0.85	0 U	120.2	6.61	0 U	26.2
U4-MW-16I	9/11/2023	FD	EM13	UMCf	77.0 - 87.0	49,700	3.61	<0.0700	1,980,000	0.142 J	107	<4.99	<3.02	----	----	----	----	----	----	----
U4-MW-16S	9/11/2023	N	EM13	UMCf	54.8 - 64.8	14,000	<0.300	<0.0700	362,000	<0.121	0.266 J	<4.99	<3.02	2.498	1.55	2	-84.7	7.14	2.5	27.8
U4-T3	9/11/2023	N	EM13	N/A	N/A	----	----	----	----	----	----	----	----	6.711	1.03	----	-247	6.23	----	29.2

Notes:

FD - Field duplicate

E - Field instrument error.

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.

J+ - The result is an estimated quantity, but the result may be biased high.

N/A - Not Applicable

mg/L - milligrams per liter

µg/L - micrograms per liter

N - Normal field sample

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.

UMCf- Upper Muddy Creek Formation

< - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

-- Not tested.

M-252 damaged/obstructed when checked on June 14, 2023 and September 14, 2023.

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	FIELD TESTS	RSK175	RSK175	RSK175	SM2540C	SW7199	SW9060A/SM 5310B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B
						Turbidity	Ethane	Ethene	Methane	Total Dissolved Solids	Chromium, Hexavalent	Total Organic Carbon	1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene
						NTU	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
M-251-100	9/14/2023	N	EM13	UMCf	92.5 - 102.5	144.9	<4.07	<4.26	5,540	12,500,000	31,600	963 J	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
M-251-60	9/14/2023	N	EM13	UMCf	52.3 - 62.3	84.9	<4.07	<4.26	1,410	2,330,000	1,740	1,430 J+	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
M-252	9/19/2023	N	EM13	UMCf	132.3 - 142.3	2	<4.07	<4.26	12.8	2,110,000	23.5	1,480	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-E-01I	9/11/2023	N	EM13	UMCf	74.6 - 89.6	1311.9	----	----	----	7,010,000	22.3	3,310,000	<0.735	<0.745	<0.665	<0.790	<0.500	<0.940
U4-E-02I	9/11/2023	N	EM13	UMCf	74.4 - 89.4	175.6	----	----	----	4,850,000	11.0	845,000 J-	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-E-03D	9/11/2023	N	EM13	UMCf	95.1 - 110.1	371.6	----	----	----	15,500,000	35,700	34,500	<0.147	<0.149	<0.133	<0.158	<0.100	0.270 J
U4-E-06I	9/11/2023	N	EM13	UMCf	73.2 - 88.2	165	----	----	----	7,360,000	7.42	1,270,000	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-E-07I	9/11/2023	N	EM13	UMCf	74.7 - 89.7	246.8	----	----	----	15,900,000	36,500	15,700	<0.147	<0.149	<0.133	<0.158	<0.100	0.277 J
U4-MW-01D	9/14/2023	N	EM13	UMCf	96.7 - 106.7	110.3	<4.07	<4.26	<2.91	3,940,000	18,300	456 J	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-01DD	9/14/2023	N	EM13	UMCf	119.9 - 129.9	55.4	<4.07	<4.26	<2.91	3,910,000	11,000	447 J	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-01I	9/14/2023	N	EM13	UMCf	76.7 - 86.7	151	<4.07	<4.26	29.9	5,630,000	19,300	494 J	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-01S	9/15/2023	N	EM13	UMCf	54.7 - 64.7	167.4	<4.07	<4.26	2,150	2,850,000	1,460	963 J	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-02D	9/11/2023	N	EM13	UMCf	95.0 - 110.0	92.1	<4.07	<4.26	67.6	39,000,000	92,700	1,570 J+	<0.147	<0.149	<0.133	<0.158	0.113 J	0.594 J
U4-MW-02I	9/11/2023	N	EM13	UMCf	75.0 - 90.0	102	<4.07	<4.26	9,930	7,750,000	867	253,000	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-02I	9/11/2023	FD	EM13	UMCf	75.0 - 90.0	----	<4.07	<4.26	10,300	6,530,000	869	253,000	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-03D	9/14/2023	N	EM13	UMCf	96.6 - 106.6	385	<4.07	<4.26	920	14,700,000	34,700 J	1,900	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-03DD	9/14/2023	N	EM13	UMCf	119.7 - 129.7	28.4	<4.07	<4.26	<2.91	560,000	20.7	161 J	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-03I	9/11/2023	N	EM13	UMCf	76.6 - 86.6	76.7	<4.07	<4.26	316 J	14,900,000	26,400	1,120 J+	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-03I	9/11/2023	FD	EM13	UMCf	76.6 - 86.6	----	<4.07	<4.26	149 J	13,700,000	26,700	1,190 J+	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-03S	9/14/2023	N	EM13	UMCf	54.5 - 64.5	7.7	<4.07	<4.26	3,620	2,470,000	1,840	5,950	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-04D	9/15/2023	N	EM13	UMCf	97.0 - 107.0	14.3	<4.07	<4.26	15,100	9,070,000	19,800	4,430	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-04I	9/14/2023	N	EM13	UMCf	76.8 - 86.8	403.3	<4.07	<4.26	3,910	30,700,000	63,400	1,630	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-05D	9/12/2023	N	EM13	UMCf	98.2 - 108.2	28.3	<4.07	<4.26	23,000	4,150,000	2,260	127,000	<3.68	<3.73	<3.33	<3.95	<2.50	<4.70
U4-MW-05I	9/13/2023	N	EM13	UMCf	76.6 - 86.6	5801.7	<4.07	<4.26	21,300	4,520,000	293	98,100 J-	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-06D	9/13/2023	N	EM13	UMCf	97.1 - 107.1	52.2	<4.07	<4.26	14,500	11,800,000	31,500	180,000	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-06I	9/12/2023	N	EM13	UMCf	76.5 - 86.5	23.1	<4.07	<4.26	12,100	16,800,000	35,200	73,800	<7.35	<7.45	<6.65	<7.90	<5.00	<9.40
U4-MW-07D	9/13/2023	N	EM13	UMCf	96.8 - 106.5	41.7	<4.07	<4.26	17,700	7,100,000	15,700	129,000	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-07I	9/13/2023	N	EM13	UMCf	76.8 - 86.8	97.1	<4.07	<4.26	14,700	5,300,000	4,220	409,000 J-	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-08D	9/13/2023	N	EM13	UMCf	98.6 - 108.6	193.8	<4.07	<4.26	21,800	31,900,000	85,600	1,930 J+	<0.147	<0.149	<0.133	<0.158	<0.100	0.671 J
U4-MW-08DD	9/14/2023	N	EM13	UMCf	119.8 - 129.8	9.8	<4.07	<4.26	<2.91	1,330,000 J	504	214 J	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-08I	9/13/2023	N	EM13	UMCf	78.0 - 88.0	82.9	<4.07	<4.26	10,200	9,260,000	30,800	5,260	<0.147	<0.149	<0.133	<0.158	<0.100	0.259 J
U4-MW-08S	9/13/2023	N	EM13	UMCf	54.9 - 64.9	154.1	<4.07	<4.26	23,900	1,710,000	<0.150	52,200 J-	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-08S	9/13/2023	FD	EM13	UMCf	54.9 - 64.9	----	<4.07	<4.26	24,800	1,580,000	<0.150	51,600 J-	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-09D	9/12/2023	N	EM13	UMCf	96.9 - 106.9	7.4	<4.07	<4.26	28,900	4,020,000	2,990	87,700	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-09DD	9/13/2023	N	EM13	UMCf	119.8 - 129.8	14.4	<4.07	<4.26	2,520	1,880,000	<0.300	9,120	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-09I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	132	<4.07	<4.26	34,600	5,690,000	5,850	33,600	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-09S	9/13/2023	N	EM13	UMCf	55.3 - 65.3	57.2	<4.07	<4.26	24,500	3,690,000	<0.150 UJ	895,000 J-	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-10D	9/13/2023	N	EM13	UMCf	96.9 - 106.9	49.9	<4.07	<4.26	35,300	2,200,000	<0.150	10,700	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-10I	9/13/2023	N	EM13	UMCf	77.1 - 87.1	55.3	<4.07	<4.26	25,500	2,570,000	0.261 J	43,800	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-11D	9/13/2023	N	EM13	UMCf	97.4 - 107.4	35	<4.07	<4.26	24,000	22,400,000	58,100	13,200	<0.147	<0.149	<0.133	<0.158	<0.100	0.407 J
U4-MW-11I	9/13/2023	N	EM13	UMCf	77.0 - 87.0	15.2	<4.07	<4.26	24,100	7,240,000	2,050	12,500	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-11I	9/13/2023	FD	EM13	UMCf	77.0 - 87.0	----	<4.07	<4.26	21,000	7,060,000	2,050	12,000	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-12D	9/12/2023	N	EM13	UMCf	97.1 - 107.1	17.6	<4.07	<4.26	24,100	6,550,000	11,900	7,900	<7.35	<7.45	<6.65	<7.90	<5.00	<9.40
U4-MW-12I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	5	<4.07	<4.26	31,400	2,660,000	1.65	14,300	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-13D	9/11/2023	N	EM13	UMCf	98.2 - 108.2	22.8	<4.07	<4.26	9,280	7,100,000	12,500	1,750 J+	<3.68	<3.73	<3.33	<3.95	<2.50	<4.70
U4-MW-13I	9/11/2023	N	EM13	UMCf	77.1 - 87.1	44	<4.07	<4.26	9,520	7,040,000	13,100	2,560 J+	<3.68	<3.73	<3.33	<3.95	<2.50	<4.70
U4-MW-14D	9/14/2023	N	EM13	UMCf	97.3 - 107.3	13.8	<4.07	<4.26	15,500	2,320,000	2,670	6,160	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-14I	9/14/2023	N	EM13	UMCf	77.3 - 87.3	18.8	<4.07	<4.26	12,800	2,590,000	2,240	4,970	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-15D	9/13/2023	N	EM13	UMCf	96.0 - 106.0	146.2	<4.07	<4.26	47,400	2,460,000	3,270	447 J	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-15DD	9/14/2023	N	EM13	UMCf	120.3 - 130.3	479.8	<4.07	<4.26	<2.91	551,000	0.817	109 J	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-15I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	308.6	<4.07	<4.26	14,600	3,370,000	6.35	11,900	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	FIELD TESTS	RSK175	RSK175	RSK175	SM2540C	SW7199	SW9060A/SM 5310B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B
						Turbidity	Ethane	Ethene	Methane	Total Dissolved Solids	Chromium, Hexavalent	Total Organic Carbon	1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene
						NTU	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
U4-MW-15S	9/14/2023	N	EM13	UMCf	54.8 - 64.8	8.2	<4.07	<4.26	21,000	1,450,000	<0.150	41,400 J-	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-16D	9/15/2023	N	EM13	UMCf	96.8 - 106.8	15.7	<4.07	<4.26	7,240	7,180,000 J-	17,600	4,300	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-16DD	9/14/2023	N	EM13	UMCf	120.8 - 130.8	14	<4.07	<4.26	<2.91	972,000 J	153	151 J	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-16I	9/11/2023	N	EM13	UMCf	77.0 - 87.0	38.9	<4.07	<4.26	22,900	15,900,000	14,100	6,750	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-16I	9/11/2023	FD	EM13	UMCf	77.0 - 87.0	----	<4.07	<4.26	22,500	13,200,000	14,100	6,830	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-MW-16S	9/11/2023	N	EM13	UMCf	54.8 - 64.8	60.4	<4.07	<4.26	25,400	1,400,000 J	<0.150	41,600	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188
U4-T3	9/11/2023	N	EM13	N/A	N/A	95.4	----	----	----	6,800,000	57.0	1,400,000	<0.147	<0.149	<0.133	<0.158	<0.100	<0.188

Notes:

FD - Field duplicate

E - Field instrument error.

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.

J+ - The result is an estimated quantity, but the result may be biased high.

N/A - Not Applicable

mg/L - milligrams per liter

µg/L - micrograms per liter

N - Normal field sample

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.

UMCf- Upper Muddy Creek Formation

< - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

-- Not tested.

M-252 damaged/obstructed when checked on June 14, 2023 and September 14, 2023.

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B
						1,1-Dichloropropene	1,2,3-Trichlorobenzene	1,2,3-Trichloropropane	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,2-Dibromo-3-Chloropropane	1,2-Dibromoethane	1,2-Dichlorobenzene	1,2-Dichloroethane	1,2-Dichloropropane	1,3,5-Trimethylbenzene (Mesitylene)	1,3-Dichlorobenzene
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
M-251-100	9/14/2023	N	EM13	UMCf	92.5 - 102.5	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
M-251-60	9/14/2023	N	EM13	UMCf	52.3 - 62.3	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
M-252	9/19/2023	N	EM13	UMCf	132.3 - 142.3	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-E-01I	9/11/2023	N	EM13	UMCf	74.6 - 89.6	<0.710	<1.15	<1.19	<2.41	<1.61	<1.38	<0.630	<0.535	<0.409	<0.745	<0.520	<0.550
U4-E-02I	9/11/2023	N	EM13	UMCf	74.4 - 89.4	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-E-03D	9/11/2023	N	EM13	UMCf	95.1 - 110.1	0.373 J	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	0.131 J	0.183 J	<0.104	<0.110
U4-E-06I	9/11/2023	N	EM13	UMCf	73.2 - 88.2	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-E-07I	9/11/2023	N	EM13	UMCf	74.7 - 89.7	0.388 J	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	0.105 J	<0.149	<0.104	<0.110
U4-MW-01D	9/14/2023	N	EM13	UMCf	96.7 - 106.7	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-01DD	9/14/2023	N	EM13	UMCf	119.9 - 129.9	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-01I	9/14/2023	N	EM13	UMCf	76.7 - 86.7	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-01S	9/15/2023	N	EM13	UMCf	54.7 - 64.7	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-02D	9/11/2023	N	EM13	UMCf	95.0 - 110.0	0.313 J	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	0.155 J	<0.104	<0.110
U4-MW-02I	9/11/2023	N	EM13	UMCf	75.0 - 90.0	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-02I	9/11/2023	FD	EM13	UMCf	75.0 - 90.0	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-03D	9/14/2023	N	EM13	UMCf	96.6 - 106.6	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-03DD	9/14/2023	N	EM13	UMCf	119.7 - 129.7	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-03I	9/11/2023	N	EM13	UMCf	76.6 - 86.6	0.165 J	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-03I	9/11/2023	FD	EM13	UMCf	76.6 - 86.6	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-03S	9/14/2023	N	EM13	UMCf	54.5 - 64.5	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-04D	9/15/2023	N	EM13	UMCf	97.0 - 107.0	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-04I	9/14/2023	N	EM13	UMCf	76.8 - 86.8	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-05D	9/12/2023	N	EM13	UMCf	98.2 - 108.2	<3.55	<5.75	<5.93	<12.0	<8.05	<6.90	<3.15	<2.68	<2.05	<3.73	<2.60	<2.75
U4-MW-05I	9/13/2023	N	EM13	UMCf	76.6 - 86.6	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-06D	9/13/2023	N	EM13	UMCf	97.1 - 107.1	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-06I	9/12/2023	N	EM13	UMCf	76.5 - 86.5	<7.10	<11.5	<11.9	<24.1	<16.1	<13.8	<6.30	<5.35	<4.09	<7.45	<5.20	<5.50
U4-MW-07D	9/13/2023	N	EM13	UMCf	96.8 - 106.5	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-07I	9/13/2023	N	EM13	UMCf	76.8 - 86.8	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-08D	9/13/2023	N	EM13	UMCf	98.6 - 108.6	0.485 J	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-08DD	9/14/2023	N	EM13	UMCf	119.8 - 129.8	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-08I	9/13/2023	N	EM13	UMCf	78.0 - 88.0	0.285 J	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-08S	9/13/2023	N	EM13	UMCf	54.9 - 64.9	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-08S	9/13/2023	FD	EM13	UMCf	54.9 - 64.9	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-09D	9/12/2023	N	EM13	UMCf	96.9 - 106.9	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-09DD	9/13/2023	N	EM13	UMCf	119.8 - 129.8	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-09I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-09S	9/13/2023	N	EM13	UMCf	55.3 - 65.3	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-10D	9/13/2023	N	EM13	UMCf	96.9 - 106.9	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-10I	9/13/2023	N	EM13	UMCf	77.1 - 87.1	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-11D	9/13/2023	N	EM13	UMCf	97.4 - 107.4	0.234 J	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-11I	9/13/2023	N	EM13	UMCf	77.0 - 87.0	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-11I	9/13/2023	FD	EM13	UMCf	77.0 - 87.0	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-12D	9/12/2023	N	EM13	UMCf	97.1 - 107.1	<7.10	<11.5	<11.9	<24.1	<16.1	<13.8	<6.30	<5.35	<4.09	<7.45	<5.20	<5.50
U4-MW-12I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-13D	9/11/2023	N	EM13	UMCf	98.2 - 108.2	<3.55	<5.75	<5.93	<12.0	<8.05	<6.90	<3.15	<2.68	<2.05	<3.73	<2.60	<2.75
U4-MW-13I	9/11/2023	N	EM13	UMCf	77.1 - 87.1	<3.55	<5.75	<5.93	<12.0	<8.05	<6.90	<3.15	<2.68	<2.05	<3.73	<2.60	<2.75
U4-MW-14D	9/14/2023	N	EM13	UMCf	97.3 - 107.3	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-14I	9/14/2023	N	EM13	UMCf	77.3 - 87.3	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-15D	9/13/2023	N	EM13	UMCf	96.0 - 106.0	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-15DD	9/14/2023	N	EM13	UMCf	120.3 - 130.3	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-15I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B
						1,1-Dichloropropene	1,2,3-Trichlorobenzene	1,2,3-Trichloropropane	1,2,4-Trichlorobenzene	1,2,4-Trimethylbenzene	1,2-Dibromo-3-Chloropropane	1,2-Dibromoethane	1,2-Dichlorobenzene	1,2-Dichloroethane	1,2-Dichloropropane	1,3,5-Trimethylbenzene (Mesitylene)	1,3-Dichlorobenzene
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
U4-MW-15S	9/14/2023	N	EM13	UMCf	54.8 - 64.8	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-16D	9/15/2023	N	EM13	UMCf	96.8 - 106.8	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-16DD	9/14/2023	N	EM13	UMCf	120.8 - 130.8	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-16I	9/11/2023	N	EM13	UMCf	77.0 - 87.0	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-16I	9/11/2023	FD	EM13	UMCf	77.0 - 87.0	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-MW-16S	9/11/2023	N	EM13	UMCf	54.8 - 64.8	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110
U4-T3	9/11/2023	N	EM13	N/A	N/A	<0.142	<0.230	<0.237	<0.481	<0.322	<0.276	<0.126	<0.107	<0.0819	<0.149	<0.104	<0.110

Notes:

FD - Field duplicate

E - Field instrument error.

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.

J+ - The result is an estimated quantity, but the result may be biased high.

N/A - Not Applicable

mg/L - milligrams per liter

µg/L - micrograms per liter

N - Normal field sample

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.

UMCf- Upper Muddy Creek Formation

< - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

-- Not tested.

M-252 damaged/obstructed when checked on June 14, 2023 and September 14, 2023.

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B
						1,3-Dichloropropane	1,4-Dichlorobenzene	2,2-Dichloropropane	2-Butanone (MEK)	2-Chlorotoluene	2-Hexanone	4-Chlorotoluene	4-Methyl-2-Pentanone	Acetone	Benzene	Bromobenzene	Bromochloro-methane	Bromodichlor-omethane	Bromoform
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
M-251-100	9/14/2023	N	EM13	UMCf	92.5 - 102.5	<0.110	<0.120	<0.161	1.97 J	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	3.13	1.23
M-251-60	9/14/2023	N	EM13	UMCf	52.3 - 62.3	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
M-252	9/19/2023	N	EM13	UMCf	132.3 - 142.3	<0.110	<0.120	<0.161	4.31 J	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-E-01I	9/11/2023	N	EM13	UMCf	74.6 - 89.6	<0.550	<0.600	<0.805	<5.95	<0.530	<3.94	<0.570	<2.39	<56.5	<0.471	<0.590	<0.640	<0.680	<0.645
U4-E-02I	9/11/2023	N	EM13	UMCf	74.4 - 89.4	<0.110	<0.120	<0.161	41.3	<0.106	<0.787	<0.114	<0.478	57.0	<0.0941	<0.118	<0.128	0.380 J	0.224 J
U4-E-03D	9/11/2023	N	EM13	UMCf	95.1 - 110.1	<0.110	<0.120	<0.161	32.7	<0.106	<0.787	<0.114	<0.478	201	<0.0941	<0.118	<0.128	4.84	2.48
U4-E-06I	9/11/2023	N	EM13	UMCf	73.2 - 88.2	<0.110	<0.120	<0.161	11.1	<0.106	<0.787	<0.114	<0.478	87.0	<0.0941	<0.118	<0.128	0.936 J	0.305 J
U4-E-07I	9/11/2023	N	EM13	UMCf	74.7 - 89.7	<0.110	<0.120	<0.161	6.21 J	<0.106	<0.787	<0.114	<0.478	32.0 J	<0.0941	<0.118	<0.128	2.90	1.33
U4-MW-01D	9/14/2023	N	EM13	UMCf	96.7 - 106.7	<0.110	<0.120	<0.161	1.26 J	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-01DD	9/14/2023	N	EM13	UMCf	119.9 - 129.9	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-01I	9/14/2023	N	EM13	UMCf	76.7 - 86.7	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	2.22	<0.129
U4-MW-01S	9/15/2023	N	EM13	UMCf	54.7 - 64.7	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	0.274 J	<0.129
U4-MW-02D	9/11/2023	N	EM13	UMCf	95.0 - 110.0	<0.110	<0.120	<0.161	5.69 J	<0.106	0.860 J	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	7.33	3.71
U4-MW-02I	9/11/2023	N	EM13	UMCf	75.0 - 90.0	<0.110	<0.120	<0.161	60.9 J	<0.106	1.26 J	<0.114	0.779 J	437 J	<0.0941	<0.118	<0.128	1.13	0.404 J
U4-MW-02I	9/11/2023	FD	EM13	UMCf	75.0 - 90.0	<0.110	<0.120	<0.161	36.0 J	<0.106	<0.787	<0.114	<0.478	274 J	<0.0941	<0.118	<0.128	1.64	0.713 J
U4-MW-03D	9/14/2023	N	EM13	UMCf	96.6 - 106.6	<0.110	<0.120	<0.161	1.43 J	<0.106	<0.787	<0.114	<0.478	13.4 J	<0.0941	<0.118	<0.128	2.75	<0.129
U4-MW-03DD	9/14/2023	N	EM13	UMCf	119.7 - 129.7	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-03I	9/11/2023	N	EM13	UMCf	76.6 - 86.6	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	2.32	0.674 J
U4-MW-03I	9/11/2023	FD	EM13	UMCf	76.6 - 86.6	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	2.14	0.706 J
U4-MW-03S	9/14/2023	N	EM13	UMCf	54.5 - 64.5	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-04D	9/15/2023	N	EM13	UMCf	97.0 - 107.0	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	21.3 J	<0.0941	<0.118	<0.128	1.78	<0.129
U4-MW-04I	9/14/2023	N	EM13	UMCf	76.8 - 86.8	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	3.07	<0.129
U4-MW-05D	9/12/2023	N	EM13	UMCf	98.2 - 108.2	<2.75	<3.00	<4.03	<29.8	<2.65	<19.7	<2.85	<12.0	<282	<2.35	<2.95	<3.20	<3.40	<3.22
U4-MW-05I	9/13/2023	N	EM13	UMCf	76.6 - 86.6	<0.110	<0.120	<0.161	42.3	<0.106	4.26 J	<0.114	<0.478	103	<0.0941	<0.118	<0.128	1.72	0.525 J
U4-MW-06D	9/13/2023	N	EM13	UMCf	97.1 - 107.1	<0.110	<0.120	<0.161	55.5	<0.106	<0.787 UJ	<0.114	<0.478	200	<0.0941	<0.118	<0.128	3.65	0.843 J
U4-MW-06I	9/12/2023	N	EM13	UMCf	76.5 - 86.5	<5.50	<6.00	<8.05	<59.5	<5.30	<39.4	<5.70	<23.9	<565	<4.71	<5.90	<6.40	<6.80	<6.45
U4-MW-07D	9/13/2023	N	EM13	UMCf	96.8 - 106.5	<0.110	<0.120	<0.161	125	<0.106	<0.787 UJ	<0.114	<0.478	970	<0.0941	<0.118	<0.128	2.06	0.654 J
U4-MW-07I	9/13/2023	N	EM13	UMCf	76.8 - 86.8	<0.110	<0.120	<0.161	117	<0.106	3.53 J	<0.114	<0.478	780	<0.0941	<0.118	<0.128	1.68	0.394 J
U4-MW-08D	9/13/2023	N	EM13	UMCf	98.6 - 108.6	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787 UJ	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	5.95	1.99
U4-MW-08DD	9/14/2023	N	EM13	UMCf	119.8 - 129.8	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-08I	9/13/2023	N	EM13	UMCf	78.0 - 88.0	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787 UJ	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	3.80	0.489 J
U4-MW-08S	9/13/2023	N	EM13	UMCf	54.9 - 64.9	<0.110	<0.120	<0.161	13.7	<0.106	<0.787 UJ	<0.114	<0.478	16.4 J	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-08S	9/13/2023	FD	EM13	UMCf	54.9 - 64.9	<0.110	<0.120	<0.161	14.3	<0.106	<0.787 UJ	<0.114	<0.478	16.6 J	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-09D	9/12/2023	N	EM13	UMCf	96.9 - 106.9	<0.110	<0.120	<0.161	38.2	<0.106	<0.787	<0.114	<0.478	201	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-09DD	9/13/2023	N	EM13	UMCf	119.8 - 129.8	<0.110	<0.120	<0.161	6.38 J	<0.106	<0.787 UJ	<0.114	<0.478	12.9 J	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-09I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.110	<0.120	<0.161	4.54 J	<0.106	<0.787	<0.114	<0.478	32.8 J	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-09S	9/13/2023	N	EM13	UMCf	55.3 - 65.3	<0.110	<0.120	<0.161	164	<0.106	<0.787 UJ	<0.114	<0.478	85.5	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-10D	9/13/2023	N	EM13	UMCf	96.9 - 106.9	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787 UJ	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-10I	9/13/2023	N	EM13	UMCf	77.1 - 87.1	<0.110	<0.120	<0.161	11.4	<0.106	<0.787 UJ	<0.114	<0.478	29.0 J	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-11D	9/13/2023	N	EM13	UMCf	97.4 - 107.4	<0.110	<0.120	<0.161	10.4	<0.106	<0.787 UJ	<0.114	<0.478	158	<0.0941	<0.118	<0.128	1.87	0.509 J
U4-MW-11I	9/13/2023	N	EM13	UMCf	77.0 - 87.0	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787 UJ	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	0.695 J	<0.129
U4-MW-11I	9/13/2023	FD	EM13	UMCf	77.0 - 87.0	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787 UJ	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	0.727 J	<0.129
U4-MW-12D	9/12/2023	N	EM13	UMCf	97.1 - 107.1	<5.50	<6.00	<8.05	<59.5	<5.30	<39.4	<5.70	<23.9	<565	<4.71	<5.90	<6.40	<6.80	<6.45
U4-MW-12I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.110	<0.120	<0.161	2.56 J	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-13D	9/11/2023	N	EM13	UMCf	98.2 - 108.2	<2.75	<3.00	<4.03	<29.8	<2.65	<19.7	<2.85	<12.0	<282	<2.35	<2.95	<3.20	<3.40	<3.22
U4-MW-13I	9/11/2023	N	EM13	UMCf	77.1 - 87.1	<2.75	<3.00	<4.03	<29.8	<2.65	<19.7	<2.85	<12.0	<282	<2.35	<2.95	<3.20	<3.40	<3.22
U4-MW-14D	9/14/2023	N	EM13	UMCf	97.3 - 107.3	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-14I	9/14/2023	N	EM13	UMCf	77.3 - 87.3	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-15D	9/13/2023	N	EM13	UMCf	96.0 - 106.0	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787 UJ	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-15DD	9/14/2023	N	EM13	UMCf	120.3 - 130.3	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-15I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.110	<0.120	<0.161	2.14 J	<0.106	<0.787	<0.114	<0.478	13.1 J	<0.0941	<0.118	<0.128	<0.136	<0.129

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B
						1,3-Dichloropropane	1,4-Dichlorobenzene	2,2-Dichloropropane	2-Butanone (MEK)	2-Chlorotoluene	2-Hexanone	4-Chlorotoluene	4-Methyl-2-Pentanone	Acetone	Benzene	Bromobenzene	Bromochloro-methane	Bromodichlor-omethane	Bromoform
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
U4-MW-15S	9/14/2023	N	EM13	UMCf	54.8 - 64.8	<0.110	<0.120	<0.161	6.88 J	<0.106	<0.787	<0.114	<0.478	15.5 J	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-16D	9/15/2023	N	EM13	UMCf	96.8 - 106.8	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	0.318 J	<0.129
U4-MW-16DD	9/14/2023	N	EM13	UMCf	120.8 - 130.8	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-16I	9/11/2023	N	EM13	UMCf	77.0 - 87.0	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-16I	9/11/2023	FD	EM13	UMCf	77.0 - 87.0	<0.110	<0.120	<0.161	<1.19	<0.106	<0.787	<0.114	<0.478	<11.3	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-MW-16S	9/11/2023	N	EM13	UMCf	54.8 - 64.8	<0.110	<0.120	<0.161	16.4	<0.106	<0.787	<0.114	<0.478	32.1 J	<0.0941	<0.118	<0.128	<0.136	<0.129
U4-T3	9/11/2023	N	EM13	N/A	N/A	<0.110	<0.120	<0.161	22.7	<0.106	<0.787	<0.114	<0.478	69.8	<0.0941	<0.118	<0.128	1.29	<0.129

Notes:

FD - Field duplicate

E - Field instrument error.

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.

J+ - The result is an estimated quantity, but the result may be biased high.

N/A - Not Applicable

mg/L - milligrams per liter

µg/L - micrograms per liter

N - Normal field sample

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.

UMCf- Upper Muddy Creek Formation

< - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

-- Not tested.

M-252 damaged/obstructed when checked on June 14, 2023 and September 14, 2023.

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Table 5
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Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B
						Bromomethane	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	cis-1,2-Dichloroethene	cis-1,3-Dichloropropene	Dibromochlor-omethane	Dibromomethane	Dichlorodifluor-omethane	Diisopropyl Ether (DIPE)	Ethyl Tert-Butyl Ether (ETBE)	Ethylbenzene
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
M-251-100	9/14/2023	N	EM13	UMCf	92.5 - 102.5	<0.605	<0.128	<0.116	<0.192	2,340	<0.960	<0.126	<0.111	1.36	<0.122	<0.374	<0.105	<0.101	<0.137
M-251-60	9/14/2023	N	EM13	UMCf	52.3 - 62.3	<0.605	<0.128	<0.116	<0.192	22.2	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
M-252	9/19/2023	N	EM13	UMCf	132.3 - 142.3	<0.605	<0.128	<0.116	<0.192	<0.111	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-E-01I	9/11/2023	N	EM13	UMCf	74.6 - 89.6	<3.03	<0.640	<0.580	<0.960	101	<4.80	<0.630	<0.555	<0.700	<0.610	<1.87	<0.525	<0.505	<0.685
U4-E-02I	9/11/2023	N	EM13	UMCf	74.4 - 89.4	<0.605	<0.128	<0.116	<0.192	198	<0.960	<0.126	<0.111	0.179 J	<0.122	<0.374	<0.105	16.6	0.184 J
U4-E-03D	9/11/2023	N	EM13	UMCf	95.1 - 110.1	<0.605	2.88	<0.116	<0.192	3,570	<0.960	<0.126	<0.111	2.11	<0.122	<0.374	<0.105	<0.101	<0.137
U4-E-06I	9/11/2023	N	EM13	UMCf	73.2 - 88.2	<0.605	0.612 J	<0.116	<0.192	1,470	<0.960	<0.126	<0.111	0.340 J	<0.122	<0.374	<0.105	7.88	<0.137
U4-E-07I	9/11/2023	N	EM13	UMCf	74.7 - 89.7	<0.605	2.21	<0.116	<0.192	3,620	<0.960	<0.126	<0.111	1.30	<0.122	<0.374	<0.105	0.286 J	<0.137
U4-MW-01D	9/14/2023	N	EM13	UMCf	96.7 - 106.7	<0.605	<0.128	<0.116	<0.192	671	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-01DD	9/14/2023	N	EM13	UMCf	119.9 - 129.9	<0.605	<0.128	<0.116	<0.192	417	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-01I	9/14/2023	N	EM13	UMCf	76.7 - 86.7	<0.605	<0.128	<0.116	<0.192	969	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-01S	9/15/2023	N	EM13	UMCf	54.7 - 64.7	<0.605	<0.128	<0.116	<0.192	35.0	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-02D	9/11/2023	N	EM13	UMCf	95.0 - 110.0	<0.605	3.41	<0.116	<0.192	8,840	<0.960	<0.126	<0.111	2.71	0.152 J	<0.374	<0.105	<0.101	<0.137
U4-MW-02I	9/11/2023	N	EM13	UMCf	75.0 - 90.0	<0.605	0.320 J	<0.116	<0.192	1,270 J	<0.960	<0.126	<0.111	0.410 J	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-02I	9/11/2023	FD	EM13	UMCf	75.0 - 90.0	<0.605	0.722 J	<0.116	<0.192	2,040 J	<0.960	<0.126	<0.111	0.669 J	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-03D	9/14/2023	N	EM13	UMCf	96.6 - 106.6	<0.605	<0.128	<0.116	<0.192	2,150	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-03DD	9/14/2023	N	EM13	UMCf	119.7 - 129.7	<0.605	<0.128	<0.116	<0.192	2.98 J	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-03I	9/11/2023	N	EM13	UMCf	76.6 - 86.6	<0.605	1.43	<0.116	<0.192	1,470 J	<0.960	<0.126	<0.111	0.877 J	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-03I	9/11/2023	FD	EM13	UMCf	76.6 - 86.6	<0.605	1.17	<0.116	<0.192	912 J	<0.960	<0.126	<0.111	1.00 J	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-03S	9/14/2023	N	EM13	UMCf	54.5 - 64.5	<0.605	<0.128	<0.116	<0.192	81.5	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-04D	9/15/2023	N	EM13	UMCf	97.0 - 107.0	<0.605	<0.128	<0.116	<0.192	1,430	<0.960	<0.126	<0.111	0.612 J	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-04I	9/14/2023	N	EM13	UMCf	76.8 - 86.8	<0.605	<0.128	<0.116	<0.192	3,860	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-05D	9/12/2023	N	EM13	UMCf	98.2 - 108.2	<15.1	<3.20	<2.90	<4.80	756	<24.0	<3.15	<2.78	<3.50	<3.05	<9.35	<2.63	<2.53	<3.43
U4-MW-05I	9/13/2023	N	EM13	UMCf	76.6 - 86.6	<0.605	0.192 J	<0.116	<0.192	985	<0.960	<0.126	<0.111	0.560 J	0.225 J	<0.374	<0.105	<0.101	<0.137
U4-MW-06D	9/13/2023	N	EM13	UMCf	97.1 - 107.1	<0.605	<0.128	<0.116	<0.192	1,650	<0.960	<0.126	<0.111	1.32	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-06I	9/12/2023	N	EM13	UMCf	76.5 - 86.5	<30.3	<6.40	<5.80	<9.60	2,620	<48.0	<6.30	<5.55	<7.00	<6.10	<18.7	<5.25	<5.05	<6.85
U4-MW-07D	9/13/2023	N	EM13	UMCf	96.8 - 106.5	<0.605	0.698 J	<0.116	<0.192	1,940	<0.960	<0.126	<0.111	0.754 J	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-07I	9/13/2023	N	EM13	UMCf	76.8 - 86.8	<0.605	<0.128	<0.116	<0.192	1,600	<0.960	<0.126	<0.111	0.511 J	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-08D	9/13/2023	N	EM13	UMCf	98.6 - 108.6	<0.605	3.03	<0.116	<0.192	7,970	<0.960	<0.126	<0.111	1.83	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-08DD	9/14/2023	N	EM13	UMCf	119.8 - 129.8	<0.605	<0.128	<0.116	<0.192	64.9	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-08I	9/13/2023	N	EM13	UMCf	78.0 - 88.0	<0.605	1.84	<0.116	<0.192	3,410	<0.960	<0.126	<0.111	1.34	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-08S	9/13/2023	N	EM13	UMCf	54.9 - 64.9	<0.605	<0.128	<0.116	<0.192	<0.111	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-08S	9/13/2023	FD	EM13	UMCf	54.9 - 64.9	<0.605	<0.128	<0.116	<0.192	<0.111	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-09D	9/12/2023	N	EM13	UMCf	96.9 - 106.9	<0.605	<0.128	<0.116	<0.192	609 J	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-09DD	9/13/2023	N	EM13	UMCf	119.8 - 129.8	<0.605	<0.128	<0.116	<0.192	24.0	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-09I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.605	<0.128	<0.116	<0.192	849 J	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-09S	9/13/2023	N	EM13	UMCf	55.3 - 65.3	<0.605	<0.128	<0.116	<0.192	47.0	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-10D	9/13/2023	N	EM13	UMCf	96.9 - 106.9	<0.605	<0.128	<0.116	<0.192	52.5	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-10I	9/13/2023	N	EM13	UMCf	77.1 - 87.1	<0.605	<0.128	<0.116	<0.192	30.1	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-11D	9/13/2023	N	EM13	UMCf	97.4 - 107.4	<0.605	1.98	<0.116	<0.192	5,440	<0.960	<0.126	<0.111	0.523 J	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-11I	9/13/2023	N	EM13	UMCf	77.0 - 87.0	<0.605	0.597 J	<0.116	<0.192	2,190	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-11I	9/13/2023	FD	EM13	UMCf	77.0 - 87.0	<0.605	0.753 J	<0.116	<0.192	2,110	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-12D	9/12/2023	N	EM13	UMCf	97.1 - 107.1	<30.3	<6.40	<5.80	<9.60	888	<48.0	<6.30	<5.55	<7.00	<6.10	<18.7	<5.25	<5.05	<6.85
U4-MW-12I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.605	<0.128	<0.116	<0.192	181 J	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-13D	9/11/2023	N	EM13	UMCf	98.2 - 108.2	<15.1	<3.20	<2.90	<4.80	716	<24.0	<3.15	<2.78	<3.50	<3.05	<9.35	<2.63	<2.53	<3.43
U4-MW-13I	9/11/2023	N	EM13	UMCf	77.1 - 87.1	<15.1	<3.20	<2.90	<4.80	805	<24.0	<3.15	<2.78	<3.50	<3.05	<9.35	<2.63	<2.53	<3.43
U4-MW-14D	9/14/2023	N	EM13	UMCf	97.3 - 107.3	<0.605	<0.128	<0.116	<0.192	120	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-14I	9/14/2023	N	EM13	UMCf	77.3 - 87.3	<0.605	<0.128	<0.116	<0.192	122	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-15D	9/13/2023	N	EM13	UMCf	96.0 - 106.0	<0.605	0.136 J	<0.116	<0.192	144	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-15DD	9/14/2023	N	EM13	UMCf	120.3 - 130.3	<0.605	<0.128	<0.116	<0.192	<0.111	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-15I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.605	<0.128	<0.116	<0.192	214 J	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B
						Bromomethane	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	cis-1,2-Dichloroethene	cis-1,3-Dichloropropene	Dibromochlor-omethane	Dibromomethane	Dichlorodifluor-omethane	Diisopropyl Ether (DIPE)	Ethyl Tert-Butyl Ether (ETBE)	Ethylbenzene
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
U4-MW-15S	9/14/2023	N	EM13	UMCf	54.8 - 64.8	<0.605	<0.128	<0.116	<0.192	<0.111	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-16D	9/15/2023	N	EM13	UMCf	96.8 - 106.8	<0.605	<0.128	<0.116	<0.192	1,470	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-16DD	9/14/2023	N	EM13	UMCf	120.8 - 130.8	<0.605	<0.128	<0.116	<0.192	23.2	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-16I	9/11/2023	N	EM13	UMCf	77.0 - 87.0	<0.605	<0.128	<0.116	<0.192	1,440	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-16I	9/11/2023	FD	EM13	UMCf	77.0 - 87.0	<0.605	<0.128	<0.116	<0.192	1,420	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-MW-16S	9/11/2023	N	EM13	UMCf	54.8 - 64.8	<0.605	<0.128	<0.116	<0.192	<0.111	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	<0.101	<0.137
U4-T3	9/11/2023	N	EM13	N/A	N/A	<0.605	<0.128	<0.116	<0.192	911	<0.960	<0.126	<0.111	<0.140	<0.122	<0.374	<0.105	13.0	<0.137

Notes:

FD - Field duplicate

E - Field instrument error.

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.

J+ - The result is an estimated quantity, but the result may be biased high.

N/A - Not Applicable

mg/L - milligrams per liter

µg/L - micrograms per liter

N - Normal field sample

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.

UMCf- Upper Muddy Creek Formation

< - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

-- Not tested.

M-252 damaged/obstructed when checked on June 14, 2023 and September 14, 2023.

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B
						Hexachloro-butadiene	Isopropylbenzene	m,p-Xylene (Sum of Isomers)	Methylene Chloride	Naphthalene	n-Butylbenzene	n-Propylbenzene	o-Xylene	p-Cymene (p-Isopropyltoluene)	sec-Butylbenzene	Styrene	tert-Amyl Methyl Ether	tert-Butyl Alcohol	tert-Butyl Methyl Ether (MTBE)
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
M-251-100	9/14/2023	N	EM13	UMCf	92.5 - 102.5	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
M-251-60	9/14/2023	N	EM13	UMCf	52.3 - 62.3	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
M-252	9/19/2023	N	EM13	UMCf	132.3 - 142.3	<0.337	<0.105	<0.430	<0.430	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-E-01I	9/11/2023	N	EM13	UMCf	74.6 - 89.6	<1.69	<0.525	<2.15	<2.15	<5.00	<0.785	<0.497	<0.870	<0.600	<0.625	<0.590	<0.975	<20.3	<0.505
U4-E-02I	9/11/2023	N	EM13	UMCf	74.4 - 89.4	<0.337	<0.105	<0.430	3.59 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-E-03D	9/11/2023	N	EM13	UMCf	95.1 - 110.1	<0.337	<0.105	<0.430	3.22 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-E-06I	9/11/2023	N	EM13	UMCf	73.2 - 88.2	<0.337	<0.105	<0.430	2.30 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-E-07I	9/11/2023	N	EM13	UMCf	74.7 - 89.7	<0.337	<0.105	<0.430	1.81 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-01D	9/14/2023	N	EM13	UMCf	96.7 - 106.7	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-01DD	9/14/2023	N	EM13	UMCf	119.9 - 129.9	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-01I	9/14/2023	N	EM13	UMCf	76.7 - 86.7	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-01S	9/15/2023	N	EM13	UMCf	54.7 - 64.7	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 R	<0.195	<4.06	<0.101
U4-MW-02D	9/11/2023	N	EM13	UMCf	95.0 - 110.0	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-02I	9/11/2023	N	EM13	UMCf	75.0 - 90.0	<0.337	<0.105	<0.430	5.18	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-02I	9/11/2023	FD	EM13	UMCf	75.0 - 90.0	<0.337	<0.105	<0.430	5.32	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-03D	9/14/2023	N	EM13	UMCf	96.6 - 106.6	<0.337	<0.105	<0.430	2.28 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-03DD	9/14/2023	N	EM13	UMCf	119.7 - 129.7	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-03I	9/11/2023	N	EM13	UMCf	76.6 - 86.6	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-03I	9/11/2023	FD	EM13	UMCf	76.6 - 86.6	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-03S	9/14/2023	N	EM13	UMCf	54.5 - 64.5	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-04D	9/15/2023	N	EM13	UMCf	97.0 - 107.0	<0.337	<0.105	<0.430	0.580 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-04I	9/14/2023	N	EM13	UMCf	76.8 - 86.8	<0.337	<0.105	<0.430	0.693 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-05D	9/12/2023	N	EM13	UMCf	98.2 - 108.2	<8.43	<2.63	<10.7	<10.7	<25.0	<3.93	<2.48	<4.35	<3.00	<3.13	<2.95	<4.88	<102	<2.53
U4-MW-05I	9/13/2023	N	EM13	UMCf	76.6 - 86.6	<0.337	<0.105	<0.430	9.65	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06	<0.101
U4-MW-06D	9/13/2023	N	EM13	UMCf	97.1 - 107.1	<0.337	<0.105	<0.430	4.45 J	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06	<0.101
U4-MW-06I	9/12/2023	N	EM13	UMCf	76.5 - 86.5	<16.9	<5.25	<21.5	<21.5	<50.0	<7.85	<4.97	<8.70	<6.00	<6.25	<5.90	<9.75	<203	<5.05
U4-MW-07D	9/13/2023	N	EM13	UMCf	96.8 - 106.5	<0.337	<0.105	<0.430	5.26	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06	<0.101
U4-MW-07I	9/13/2023	N	EM13	UMCf	76.8 - 86.8	<0.337	<0.105	<0.430	10.5	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06	<0.101
U4-MW-08D	9/13/2023	N	EM13	UMCf	98.6 - 108.6	<0.337	<0.105	<0.430	1.64 J	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06	<0.101
U4-MW-08DD	9/14/2023	N	EM13	UMCf	119.8 - 129.8	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-08I	9/13/2023	N	EM13	UMCf	78.0 - 88.0	<0.337	<0.105	<0.430	5.22	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06 UJ	<0.101
U4-MW-08S	9/13/2023	N	EM13	UMCf	54.9 - 64.9	<0.337	<0.105	<0.430	<0.430	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06	<0.101
U4-MW-08S	9/13/2023	FD	EM13	UMCf	54.9 - 64.9	<0.337	<0.105	<0.430	<0.430	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06	<0.101
U4-MW-09D	9/12/2023	N	EM13	UMCf	96.9 - 106.9	<0.337	<0.105	<0.430	2.81 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-09DD	9/13/2023	N	EM13	UMCf	119.8 - 129.8	<0.337	<0.105	<0.430	1.83 J	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06	<0.101
U4-MW-09I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.337	<0.105	<0.430	3.08 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-09S	9/13/2023	N	EM13	UMCf	55.3 - 65.3	<0.337	<0.105	<0.430	2.16 J	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06	<0.101
U4-MW-10D	9/13/2023	N	EM13	UMCf	96.9 - 106.9	<0.337	<0.105	<0.430	0.930 J	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06	<0.101
U4-MW-10I	9/13/2023	N	EM13	UMCf	77.1 - 87.1	<0.337	<0.105	<0.430	1.26 J	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06	<0.101
U4-MW-11D	9/13/2023	N	EM13	UMCf	97.4 - 107.4	<0.337	<0.105	<0.430	2.98 J	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06	<0.101
U4-MW-11I	9/13/2023	N	EM13	UMCf	77.0 - 87.0	<0.337	<0.105	<0.430	3.48 J	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06	<0.101
U4-MW-11I	9/13/2023	FD	EM13	UMCf	77.0 - 87.0	<0.337	<0.105	<0.430	3.82 J	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06	<0.101
U4-MW-12D	9/12/2023	N	EM13	UMCf	97.1 - 107.1	<16.9	<5.25	<21.5	<21.5	<50.0	<7.85	<4.97	<8.70	<6.00	<6.25	<5.90	<9.75	<203	<5.05
U4-MW-12I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.337	<0.105	<0.430	3.98 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-13D	9/11/2023	N	EM13	UMCf	98.2 - 108.2	<8.43	<2.63	<10.7	<10.7	<25.0	<3.93	<2.48	<4.35	<3.00	<3.13	<2.95	<4.88	<102	<2.53
U4-MW-13I	9/11/2023	N	EM13	UMCf	77.1 - 87.1	<8.43	<2.63	<10.7	<10.7	<25.0	<3.93	<2.48	<4.35	<3.00	<3.13	<2.95	<4.88	<102	<2.53
U4-MW-14D	9/14/2023	N	EM13	UMCf	97.3 - 107.3	<0.337	<0.105	<0.430	0.964 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-14I	9/14/2023	N	EM13	UMCf	77.3 - 87.3	<0.337	<0.105	<0.430	1.40 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-15D	9/13/2023	N	EM13	UMCf	96.0 - 106.0	<0.337	<0.105	<0.430	<0.430	<1.00 UJ	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118 UJ	<0.195	<4.06	<0.101
U4-MW-15DD	9/14/2023	N	EM13	UMCf	120.3 - 130.3	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-15I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.337	<0.105	<0.430	1.08 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B
						Hexachloro-butadiene	Isopropylbenzene	m,p-Xylene (Sum of Isomers)	Methylene Chloride	Naphthalene	n-Butylbenzene	n-Propylbenzene	o-Xylene	p-Cymene (p-Isopropyltoluene)	sec-Butylbenzene	Styrene	tert-Amyl Methyl Ether	tert-Butyl Alcohol	tert-Butyl Methyl Ether (MTBE)
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
U4-MW-15S	9/14/2023	N	EM13	UMCf	54.8 - 64.8	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-16D	9/15/2023	N	EM13	UMCf	96.8 - 106.8	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-16DD	9/14/2023	N	EM13	UMCf	120.8 - 130.8	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-16I	9/11/2023	N	EM13	UMCf	77.0 - 87.0	<0.337	<0.105	<0.430	0.813 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-16I	9/11/2023	FD	EM13	UMCf	77.0 - 87.0	<0.337	<0.105	<0.430	0.932 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-MW-16S	9/11/2023	N	EM13	UMCf	54.8 - 64.8	<0.337	<0.105	<0.430	<0.430	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101
U4-T3	9/11/2023	N	EM13	N/A	N/A	<0.337	<0.105	<0.430	2.71 J	<1.00	<0.157	<0.0993	<0.174	<0.120	<0.125	<0.118	<0.195	<4.06	<0.101

Notes:

FD - Field duplicate

E - Field instrument error.

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.

J+ - The result is an estimated quantity, but the result may be biased high.

N/A - Not Applicable

mg/L - milligrams per liter

µg/L - micrograms per liter

N - Normal field sample

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.

UMCf- Upper Muddy Creek Formation

< - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

-- Not tested.

M-252 damaged/obstructed when checked on June 14, 2023 and September 14, 2023.

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G
						tert-Butylbenzene	Tetrachloroethene (PCE)	Toluene	trans-1,2-Dichloroethene	trans-1,3-Dichloropropene	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl Chloride	Xylenes, Total	3-Methylbutanoic Acid	Acetic Acid	Butyric Acid	Formic Acid	Hexanoic Acid
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L
M-251-100	9/14/2023	N	EM13	UMCf	92.5 - 102.5	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	<0.061	<0.12	<0.058	<0.055	<0.058 UJ
M-251-60	9/14/2023	N	EM13	UMCf	52.3 - 62.3	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
M-252	9/19/2023	N	EM13	UMCf	132.3 - 142.3	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-E-01I	9/11/2023	N	EM13	UMCf	74.6 - 89.6	<0.635	<1.50	<1.39	<0.745	<0.590	<0.950	<0.800	<1.17	<0.870	----	----	----	----	----
U4-E-02I	9/11/2023	N	EM13	UMCf	74.4 - 89.4	<0.127	<0.300	2.67	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-E-03D	9/11/2023	N	EM13	UMCf	95.1 - 110.1	<0.127	0.471 J	2.08	<0.149	<0.118	0.623 J	<0.160	<0.234	<0.174	----	----	----	----	----
U4-E-06I	9/11/2023	N	EM13	UMCf	73.2 - 88.2	<0.127	<0.300	0.863 J	<0.149	<0.118	0.263 J	<0.160	<0.234	<0.174	----	----	----	----	----
U4-E-07I	9/11/2023	N	EM13	UMCf	74.7 - 89.7	<0.127	0.479 J	<0.278	<0.149	<0.118	0.614 J	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-01D	9/14/2023	N	EM13	UMCf	96.7 - 106.7	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-01DD	9/14/2023	N	EM13	UMCf	119.9 - 129.9	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-01I	9/14/2023	N	EM13	UMCf	76.7 - 86.7	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-01S	9/15/2023	N	EM13	UMCf	54.7 - 64.7	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-02D	9/11/2023	N	EM13	UMCf	95.0 - 110.0	<0.127	<0.300	<0.278	<0.149	<0.118	0.609 J	<0.160	<0.234	<0.174	<0.061	28.8	<0.058	<0.055	<0.058 UJ
U4-MW-02I	9/11/2023	N	EM13	UMCf	75.0 - 90.0	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	<0.061	122 J	75.4 J	<0.055	<0.058 UJ
U4-MW-02I	9/11/2023	FD	EM13	UMCf	75.0 - 90.0	<0.127	<0.300	<0.278	<0.149	<0.118	0.223 J	<0.160	<0.234	<0.174	<0.061	213 J	91.0 J	<0.055	<0.058 UJ
U4-MW-03D	9/14/2023	N	EM13	UMCf	96.6 - 106.6	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-03DD	9/14/2023	N	EM13	UMCf	119.7 - 129.7	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-03I	9/11/2023	N	EM13	UMCf	76.6 - 86.6	<0.127	<0.300	<0.278	<0.149	<0.118	0.190 J	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-03I	9/11/2023	FD	EM13	UMCf	76.6 - 86.6	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-03S	9/14/2023	N	EM13	UMCf	54.5 - 64.5	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-04D	9/15/2023	N	EM13	UMCf	97.0 - 107.0	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-04I	9/14/2023	N	EM13	UMCf	76.8 - 86.8	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-05D	9/12/2023	N	EM13	UMCf	98.2 - 108.2	<3.18	<7.50	<6.95	<3.73	<2.95	<4.75	<4.00	<5.85	<4.35	<0.061	111	21.9	<0.055	<0.058 UJ
U4-MW-05I	9/13/2023	N	EM13	UMCf	76.6 - 86.6	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	<0.061	145	<0.058	<0.055	<0.058 UJ
U4-MW-06D	9/13/2023	N	EM13	UMCf	97.1 - 107.1	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-06I	9/12/2023	N	EM13	UMCf	76.5 - 86.5	<6.35	<15.0	<13.9	<7.45	<5.90	<9.50	<8.00	<11.7	<8.70	----	----	----	----	----
U4-MW-07D	9/13/2023	N	EM13	UMCf	96.8 - 106.5	<0.127	<0.300	4.23	<0.149	<0.118	0.220 J	<0.160	<0.234	<0.174	<0.061	174	54.0	<0.055	<0.058 UJ
U4-MW-07I	9/13/2023	N	EM13	UMCf	76.8 - 86.8	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	<0.061	330	207	<0.055	<0.058 UJ
U4-MW-08D	9/13/2023	N	EM13	UMCf	98.6 - 108.6	<0.127	<0.300	<0.278	<0.149	<0.118	1.09	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-08DD	9/14/2023	N	EM13	UMCf	119.8 - 129.8	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-08I	9/13/2023	N	EM13	UMCf	78.0 - 88.0	<0.127	0.405 J	<0.278	<0.149	<0.118	0.649 J	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-08S	9/13/2023	N	EM13	UMCf	54.9 - 64.9	<0.127	<0.300	1.64 J+	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-08S	9/13/2023	FD	EM13	UMCf	54.9 - 64.9	<0.127	<0.300	1.60 J+	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-09D	9/12/2023	N	EM13	UMCf	96.9 - 106.9	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-09DD	9/13/2023	N	EM13	UMCf	119.8 - 129.8	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-09I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-09S	9/13/2023	N	EM13	UMCf	55.3 - 65.3	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-10D	9/13/2023	N	EM13	UMCf	96.9 - 106.9	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-10I	9/13/2023	N	EM13	UMCf	77.1 - 87.1	<0.127	<0.300	6.13	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-11D	9/13/2023	N	EM13	UMCf	97.4 - 107.4	<0.127	<0.300	<0.278	<0.149	<0.118	0.637 J	<0.160	<0.234	<0.174	<0.061	<0.12	<0.058	<0.055	<0.058 UJ
U4-MW-11I	9/13/2023	N	EM13	UMCf	77.0 - 87.0	<0.127	<0.300	<0.278	<0.149	<0.118	0.306 J	<0.160	<0.234	<0.174	<0.061	<0.12	<0.058	<0.055	<0.058 UJ
U4-MW-11I	9/13/2023	FD	EM13	UMCf	77.0 - 87.0	<0.127	<0.300	<0.278	<0.149	<0.118	0.362 J	<0.160	<0.234	<0.174	<0.061	<0.12	<0.058	<0.055	<0.058 UJ
U4-MW-12D	9/12/2023	N	EM13	UMCf	97.1 - 107.1	<6.35	<15.0	<13.9	<7.45	<5.90	<9.50	<8.00	<11.7	<8.70	<0.061	10.9	<0.058	<0.055	<0.058 UJ
U4-MW-12I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	<0.061	3.5	<0.058	<0.055	<0.058 UJ
U4-MW-13D	9/11/2023	N	EM13	UMCf	98.2 - 108.2	<3.18	<7.50	<6.95	<3.73	<2.95	<4.75	<4.00	<5.85	<4.35	<0.061	7.4	<0.058	<0.055	<0.058 UJ
U4-MW-13I	9/11/2023	N	EM13	UMCf	77.1 - 87.1	<3.18	<7.50	<6.95	<3.73	<2.95	<4.75	<4.00	<5.85	<4.35	<0.061	<0.12	<0.058	<0.055	<0.058 UJ
U4-MW-14D	9/14/2023	N	EM13	UMCf	97.3 - 107.3	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-14I	9/14/2023	N	EM13	UMCf	77.3 - 87.3	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-15D	9/13/2023	N	EM13	UMCf	96.0 - 106.0	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-15DD	9/14/2023	N	EM13	UMCf	120.3 - 130.3	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-15I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Organic Compounds by SW8260B	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G
						tert-Butylbenzene	Tetrachloroethene (PCE)	Toluene	trans-1,2-Dichloroethene	trans-1,3-Dichloropropene	Trichloroethene (TCE)	Trichlorofluoromethane	Vinyl Chloride	Xylenes, Total	3-Methylbutanoic Acid	Acetic Acid	Butyric Acid	Formic Acid	Hexanoic Acid
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L
U4-MW-15S	9/14/2023	N	EM13	UMCf	54.8 - 64.8	<0.127	<0.300	61.9	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-16D	9/15/2023	N	EM13	UMCf	96.8 - 106.8	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-16DD	9/14/2023	N	EM13	UMCf	120.8 - 130.8	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-16I	9/11/2023	N	EM13	UMCf	77.0 - 87.0	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-16I	9/11/2023	FD	EM13	UMCf	77.0 - 87.0	<0.127	<0.300	<0.278	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-MW-16S	9/11/2023	N	EM13	UMCf	54.8 - 64.8	<0.127	<0.300	0.417 J	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----
U4-T3	9/11/2023	N	EM13	N/A	N/A	<0.127	<0.300	1.83	<0.149	<0.118	<0.190	<0.160	<0.234	<0.174	----	----	----	----	----

Notes:

FD - Field duplicate

E - Field instrument error.

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.

J+ - The result is an estimated quantity, but the result may be biased high.

N/A - Not Applicable

mg/L - milligrams per liter

µg/L - micrograms per liter

N - Normal field sample

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.

UMCf- Upper Muddy Creek Formation

< - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

-- Not tested.

M-252 damaged/obstructed when checked on June 14, 2023 and September 14, 2023.

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G
						i-Hexanoic Acid	Lactic Acid	Pentanoic Acid	Propionic Acid	Pyruvic Acid
						mg/L	mg/L	mg/L	mg/L	mg/L
M-251-100	9/14/2023	N	EM13	UMCf	92.5 - 102.5	<0.056 UJ	29.2	<0.056 UJ	<0.053	<0.060
M-251-60	9/14/2023	N	EM13	UMCf	52.3 - 62.3	----	----	----	----	----
M-252	9/19/2023	N	EM13	UMCf	132.3 - 142.3	----	----	----	----	----
U4-E-01I	9/11/2023	N	EM13	UMCf	74.6 - 89.6	----	----	----	----	----
U4-E-02I	9/11/2023	N	EM13	UMCf	74.4 - 89.4	----	----	----	----	----
U4-E-03D	9/11/2023	N	EM13	UMCf	95.1 - 110.1	----	----	----	----	----
U4-E-06I	9/11/2023	N	EM13	UMCf	73.2 - 88.2	----	----	----	----	----
U4-E-07I	9/11/2023	N	EM13	UMCf	74.7 - 89.7	----	----	----	----	----
U4-MW-01D	9/14/2023	N	EM13	UMCf	96.7 - 106.7	----	----	----	----	----
U4-MW-01DD	9/14/2023	N	EM13	UMCf	119.9 - 129.9	----	----	----	----	----
U4-MW-01I	9/14/2023	N	EM13	UMCf	76.7 - 86.7	----	----	----	----	----
U4-MW-01S	9/15/2023	N	EM13	UMCf	54.7 - 64.7	----	----	----	----	----
U4-MW-02D	9/11/2023	N	EM13	UMCf	95.0 - 110.0	<0.056 UJ	<0.053	<0.056 UJ	<0.053	<0.060
U4-MW-02I	9/11/2023	N	EM13	UMCf	75.0 - 90.0	<0.056 UJ	11.8	<0.056 UJ	21.1 J	<0.060
U4-MW-02I	9/11/2023	FD	EM13	UMCf	75.0 - 90.0	<0.056 UJ	<0.053	<0.056 UJ	<0.053 UJ	<0.060
U4-MW-03D	9/14/2023	N	EM13	UMCf	96.6 - 106.6	----	----	----	----	----
U4-MW-03DD	9/14/2023	N	EM13	UMCf	119.7 - 129.7	----	----	----	----	----
U4-MW-03I	9/11/2023	N	EM13	UMCf	76.6 - 86.6	----	----	----	----	----
U4-MW-03I	9/11/2023	FD	EM13	UMCf	76.6 - 86.6	----	----	----	----	----
U4-MW-03S	9/14/2023	N	EM13	UMCf	54.5 - 64.5	----	----	----	----	----
U4-MW-04D	9/15/2023	N	EM13	UMCf	97.0 - 107.0	----	----	----	----	----
U4-MW-04I	9/14/2023	N	EM13	UMCf	76.8 - 86.8	----	----	----	----	----
U4-MW-05D	9/12/2023	N	EM13	UMCf	98.2 - 108.2	<0.056 UJ	12.0	<0.056 UJ	18.9	3.2
U4-MW-05I	9/13/2023	N	EM13	UMCf	76.6 - 86.6	<0.056 UJ	32.9	<0.056 UJ	<0.053	<0.060
U4-MW-06D	9/13/2023	N	EM13	UMCf	97.1 - 107.1	----	----	----	----	----
U4-MW-06I	9/12/2023	N	EM13	UMCf	76.5 - 86.5	----	----	----	----	----
U4-MW-07D	9/13/2023	N	EM13	UMCf	96.8 - 106.5	<0.056 UJ	43.0	<0.056 UJ	47.2	<0.060
U4-MW-07I	9/13/2023	N	EM13	UMCf	76.8 - 86.8	<0.056 UJ	38.4	<0.056 UJ	157	<0.060
U4-MW-08D	9/13/2023	N	EM13	UMCf	98.6 - 108.6	----	----	----	----	----
U4-MW-08DD	9/14/2023	N	EM13	UMCf	119.8 - 129.8	----	----	----	----	----
U4-MW-08I	9/13/2023	N	EM13	UMCf	78.0 - 88.0	----	----	----	----	----
U4-MW-08S	9/13/2023	N	EM13	UMCf	54.9 - 64.9	----	----	----	----	----
U4-MW-08S	9/13/2023	FD	EM13	UMCf	54.9 - 64.9	----	----	----	----	----
U4-MW-09D	9/12/2023	N	EM13	UMCf	96.9 - 106.9	----	----	----	----	----
U4-MW-09DD	9/13/2023	N	EM13	UMCf	119.8 - 129.8	----	----	----	----	----
U4-MW-09I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	----	----	----	----	----
U4-MW-09S	9/13/2023	N	EM13	UMCf	55.3 - 65.3	----	----	----	----	----
U4-MW-10D	9/13/2023	N	EM13	UMCf	96.9 - 106.9	----	----	----	----	----
U4-MW-10I	9/13/2023	N	EM13	UMCf	77.1 - 87.1	----	----	----	----	----
U4-MW-11D	9/13/2023	N	EM13	UMCf	97.4 - 107.4	<0.056 UJ	<0.053	<0.056 UJ	<0.053	<0.060
U4-MW-11I	9/13/2023	N	EM13	UMCf	77.0 - 87.0	<0.056 UJ	30.1	<0.056 UJ	<0.053	<0.060
U4-MW-11I	9/13/2023	FD	EM13	UMCf	77.0 - 87.0	<0.056 UJ	44.6	<0.056 UJ	<0.053	<0.060
U4-MW-12D	9/12/2023	N	EM13	UMCf	97.1 - 107.1	<0.056 UJ	6.1	<0.056 UJ	<0.053	<0.060
U4-MW-12I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	<0.056 UJ	10.6	<0.056 UJ	<0.053	<0.060
U4-MW-13D	9/11/2023	N	EM13	UMCf	98.2 - 108.2	<0.056 UJ	4.9	<0.056 UJ	<0.053	<0.060
U4-MW-13I	9/11/2023	N	EM13	UMCf	77.1 - 87.1	<0.056 UJ	<0.053	<0.056 UJ	<0.053	<0.060
U4-MW-14D	9/14/2023	N	EM13	UMCf	97.3 - 107.3	----	----	----	----	----
U4-MW-14I	9/14/2023	N	EM13	UMCf	77.3 - 87.3	----	----	----	----	----
U4-MW-15D	9/13/2023	N	EM13	UMCf	96.0 - 106.0	----	----	----	----	----
U4-MW-15DD	9/14/2023	N	EM13	UMCf	120.3 - 130.3	----	----	----	----	----
U4-MW-15I	9/12/2023	N	EM13	UMCf	76.8 - 86.8	----	----	----	----	----

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Table 5
Groundwater Analytical Results
Unit 4 Source Area Bioremediation Treatability Study

Well	Sample Date	QC Type	Event	Screened Lithology	Screened Interval	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G	Volatile Fatty Acids by AM23G
						i-Hexanoic Acid	Lactic Acid	Pentanoic Acid	Propionic Acid	Pyruvic Acid
						mg/L	mg/L	mg/L	mg/L	mg/L
U4-MW-15S	9/14/2023	N	EM13	UMCf	54.8 - 64.8	----	----	----	----	----
U4-MW-16D	9/15/2023	N	EM13	UMCf	96.8 - 106.8	----	----	----	----	----
U4-MW-16DD	9/14/2023	N	EM13	UMCf	120.8 - 130.8	----	----	----	----	----
U4-MW-16I	9/11/2023	N	EM13	UMCf	77.0 - 87.0	----	----	----	----	----
U4-MW-16I	9/11/2023	FD	EM13	UMCf	77.0 - 87.0	----	----	----	----	----
U4-MW-16S	9/11/2023	N	EM13	UMCf	54.8 - 64.8	----	----	----	----	----
U4-T3	9/11/2023	N	EM13	N/A	N/A	----	----	----	----	----

Notes:

FD - Field duplicate

E - Field instrument error.

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.

J+ - The result is an estimated quantity, but the result may be biased high.

N/A - Not Applicable

mg/L - milligrams per liter

µg/L - micrograms per liter

N - Normal field sample

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.

UMCf- Upper Muddy Creek Formation

< - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

-- Not tested.

M-252 damaged/obstructed when checked on June 14, 2023 and September 14, 2023.