



Annual Water Quality Report for the Neal North Closed CCR Monofill

**Permit 97-SDP-24-20C
Neal North Energy Center
Sergeant Bluff, Iowa**

MidAmerican Energy Company

January 31, 2024

Certification

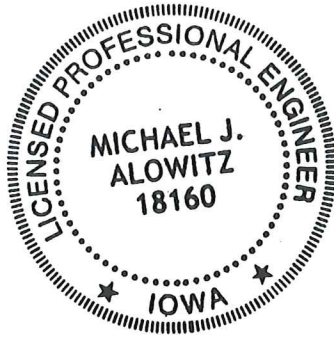
Annual Water Quality Report for the Neal North Closed CCR Monofill

Permit 97-SDP-24-20C

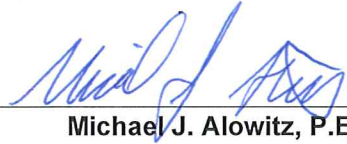
Neal North Energy Center

Sergeant Bluff, Iowa

MidAmerican Energy Company



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.


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Date

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My license renewal date is: December 31, 2024

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Executive Summary

This Annual Water Quality Report (AWQR) has been prepared by GHD on behalf of MidAmerican Energy Company (MidAmerican) for the Neal North Energy Center (Neal North) Closed Coal Combustion Residual (CCR) Monofill (Closed Monofill) located near Sergeant Bluff, Iowa. MidAmerican has previously requested a variance from the Paragraphs 567—103.1(2)f, 567—103.1(4)d, and 567—103.1(4)e of the Iowa Administrative Code (IAC) which were granted in Permit Amendments No. 4 and No. 5, dated November 30, 2016 and March 6, 2017, respectively.

The variance requests were made to match the groundwater monitoring and reporting requirements established under the Federal CCR rule (40 CFR Part 257). Although the Closed Monofill is not subject to the Federal CCR rules, GHD prepared this AWQR for the closed Neal North Monofill to generally reflect the Federal CCR rule monitoring and reporting requirements for consistency in the monitoring and reporting requirements used for the active Neal North Monofill and the requirements of the Hydrologic Monitoring System Plan prepared for the Closed Monofill. The closed portion of the Neal North Monofill was originally permitted under Permit 97-SDP-12-95P; the closed portion of the Monofill has since been assigned Permit 97-SDP-24-20C and the active Monofill cells retained the original permit number. The purpose of this AWQR is to summarize results of the groundwater quality monitoring events completed in March 2023 (detection monitoring) and September 2023 (assessment monitoring) at the Closed Monofill.

The groundwater monitoring network consists of 38 monitoring wells. Groundwater elevation data were collected from the 38 wells, and groundwater samples were collected from 10 of the 38 monitoring wells. The 10 sampled monitoring wells are screened at the water table. Sampling was conducted using dedicated bladder pumps to purge water and collect samples using low-flow sampling techniques. Groundwater samples were analyzed for the parameters specified in 40 CFR Part 257 Appendix III and Appendix IV analytes for the assessment monitoring event and Appendix III for the one detection monitoring event.

The predominant site-wide flow direction is southwest, toward the Missouri River. The Closed Monofill completed baseline monitoring events in June 2022 and conducted detection monitoring in September 2022 and March 2023. September 2023 was the first assessment monitoring event at the Closed Monofill. No changes to the monitoring network or sampling procedures are necessary to evaluate groundwater quality upgradient and downgradient of the Closed Monofill.

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Acronyms/Abbreviations

AL = Action Level

AWQR = Annual Water Quality Report

BGS = Below ground surface

CCR = Coal combustion residue

CFR = Code of Federal Regulations

CL = Control Limit ($M \pm 2SD$)

Closed Monofill = Neal North Closed CCR Monofill

Eurofins = Eurofins Environment Testing North Central, LLC

ft/ft = Feet per foot

GWPS = Groundwater Protection Standard

HMSP = Hydrologic System Monitoring Plan

IAC = Iowa Administrative Code

IDNR = Iowa Department of Natural Resources

K = Geometric mean hydraulic conductivity

m/day = Meter per day

MCL = EPA Maximum Contaminant Level

Methods Certification = Groundwater Statistical Methods Certification

MidAmerican = MidAmerican Energy Company

mg/L = Milligrams per liter

N/A = Not available/not applicable

NC = No Change

Neal North = Neal North Energy Center

ORP = Oxidation-reduction potential

PVC = Polyvinyl chloride

QA/QC = Quality control/quality assurance

RL = Reporting Limit

SS = Statewide Standard

SSI = Statistically significant increase

TDS = Total Dissolved Solids

USEPA = United States Environmental Protection Agency

UTL = Upper tolerance limit

V = Average horizontal linear velocity

1. Introduction

This Annual Water Quality Report (AWQR) has been prepared by GHD on behalf of MidAmerican Energy Company (MidAmerican) for the Neal North Energy Center (Neal North) Closed Coal Combustion Residual (CCR) Monofill (Closed Monofill) located near Sergeant Bluff, Iowa. MidAmerican previously requested a variance from the Paragraphs 567—103.1(2)f, 567—103.1(4)d, and 567—103.1(4)e of the Iowa Administrative Code (IAC) which were granted in Permit Amendments No. 4 and No. 5, dated November 30, 2016 and March 6, 2017, respectively. The variance requests were made to match the groundwater monitoring and reporting requirements established under the Federal CCR rule (40 CFR Part 257). Although the Closed Monofill is not subject to the Federal CCR rule, GHD prepared this AWQR for the closed Neal North Monofill to generally reflect the Federal CCR rule monitoring and reporting requirements for consistency in the monitoring and reporting requirements used for the active Neal North Monofill and the requirements of the Hydrologic Monitoring System Plan (HMSP; GHD, 2020) prepared for the Closed Monofill. The closed portion of the Neal North Monofill was originally permitted under Permit 97 SDP-12-95P; the closed portion of the Monofill has since been assigned Permit 97-SDP-24-20C and the active Monofill cells retained the original permit number. The purpose of this AWQR is to summarize results of the groundwater quality monitoring events completed in March 2023 (detection monitoring), September 2023 (assessment monitoring), and December 2023 (verification) at the Closed Monofill.

The Closed Monofill is located predominantly in the NW $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 30 Township 87N, Range 47W (East Cell) and the E $\frac{1}{2}$ of the SE $\frac{1}{4}$ of Section 25 Township 87N Range 48W (West Cell). Portions extend to the S $\frac{1}{4}$ of the SW $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Section 30 Township 87N Range 47W (East Cell) and to the SE $\frac{1}{4}$ of the SE $\frac{1}{4}$ of the NE $\frac{1}{2}$ of Section 25 Township 87N Range 48W (West Cell). The Site Location Map (Figure 1.1) also shows the location of MidAmerican's Neal South Energy Center facility. The Closed Monofill extent and monitoring well locations are shown on Figure 1.2.

Groundwater monitoring has routinely been conducted at the Monofill since 1996 when a network of 20 monitoring wells was installed. Additional monitoring wells were installed around the now-active Monofill areas in 2006, 2009, and 2015, creating the monitoring well network now in place at the Neal North Monofill. Prior to the Federal CCR rule, groundwater monitoring was conducted annually, and findings were documented in AWQRs submitted to the Iowa Department of Natural Resources (IDNR).

The uppermost aquifer at the Closed Monofill is the water table aquifer. Perched groundwater has been encountered at multiple locations and is included in the groundwater monitoring plan. In general, the subsurface geology at the Closed Monofill includes a layer of fine-grained materials (silts and clays) overlying predominately fine sand with some sand and gravel at depth. A layer of clay up to 55 feet thick has been found at the location of monitoring wells MW-17/MW-18, MW-19/MW-20, MW-21/MW-22, and MW-31/MW-32. Although bedrock was not encountered during hydrogeological investigations, bedrock was encountered at 137 feet below ground surface (BGS) near the Neal North generating unit during the installation of a water well.

2. Sampling Protocol

2.1 Groundwater Monitoring Network

The groundwater monitoring network consists of 38 monitoring wells (Table 1). Groundwater elevation data were collected from the 38 wells, and groundwater samples were collected from 10 of the 38 monitoring wells (Table 2). The 10 sampled monitoring wells are screened at the water table (approximately 17-29 BGS) in the alluvial aquifer. Horizontal spacing between the downgradient alluvial aquifer monitoring wells ranges from approximately 300 to 400 feet. The groundwater monitoring network includes monitoring wells used for collection of groundwater samples

and for gauging groundwater elevations. Groundwater samples are used to assess potential impacts of the Closed Monofill on surrounding groundwater. Groundwater elevation data are used to identify upgradient and downgradient monitoring points and to determine the potential influence of the Missouri River on groundwater conditions.

All monitoring wells in the groundwater monitoring system consist of 2-inch nominal inner-diameter polyvinyl chloride (PVC) casing and screen. Monitoring well construction included placement of clean silica sand in the screened interval and an annular seal of bentonite to the near surface. Monitoring well surface completions consist of either a lockable stick-up surface casing set in a concrete pad and placement of protective bollards in locations where traffic may be of concern, or a flushmount cover with a watertight well plug in high traffic areas where a stick-up well is not suitable. Review of monitoring records and well inspections indicate the monitoring wells have been operated and maintained adequately to meet the design specifications of the monitoring program.

2.2 Monitoring Well Inspection

During each sampling event, the monitoring wells were visually inspected and any deficient conditions of the monitoring wells were noted. The monitoring wells are subject to regular maintenance and performance evaluations as shown in Table 3. Wells are maintained with a well cap and a lockable protective casing. Observations include the condition of the protective casing/vault and surrounding ground surface. All wells were found to be in generally good condition, with no issues affecting well or sample integrity. Due to the surrounding topography, sediment has accumulated on top of some of the monitoring well pads. The sediment will be removed to inspect well pads during the next monitoring event.

On an annual basis, the total well depth of each well in the monitoring network is measured to evaluate the well condition and potential sediment accumulation in the well. Total well depth measurements from the 2023 total depth measurements are presented in Table 4. If screen occlusion greater than 10 percent is determined to be present, the well will be redeveloped prior to the next sampling event. All sampled well screens were at or below the 10 percent criterion.

2.3 Sample Collection

Sampling was conducted using dedicated bladder pumps to purge water and collect samples using low-flow sampling techniques.

Prior to sample collection, the temperature, conductivity, pH, oxidation-reduction potential (ORP), dissolved oxygen, and turbidity of the purge water were measured using a calibrated multiparameter water quality instrument and flow cell. The readings were recorded using the multiparameter meter data logger, on well sampling records, or in a field notebook. Upon stabilization, unfiltered samples were collected in laboratory-supplied containers. Copies of the groundwater sampling records for the 2023 monitoring events are included in Appendix A. During the 2023 monitoring events, field duplicate samples were collected from monitoring wells MW-1R and MW-223S for quality assurance/quality control (QA/QC) purposes.

2.4 Analytical Parameters

Groundwater samples were analyzed for the parameters specified in 40 CFR Part 257 Appendix III and Appendix IV analytes (Table 5) for the September 2023 assessment monitoring event and Appendix III for the March 2023 detection event. The verification sampling event in December 2023 was analyzed for a subset of the Appendix III and IV analytes. The majority of the laboratory analyses were conducted by Eurofins Environment Testing North Central, LLC (Eurofins) in Cedar Falls, Iowa; the radium 226/228 analyses were conducted by Eurofins in St. Louis, Missouri. Analyses were conducted by the laboratory in accordance with the procedures and methods described in the United States Environmental Protection Agency (USEPA) Manual SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (September 1986)," as updated and/or in accordance with other approved testing procedures. Eurofins provided prepared sample containers for each monitoring event. Analytical reports from each sampling event report total (i.e., unfiltered) sample results in accordance with the Federal CCR rule.

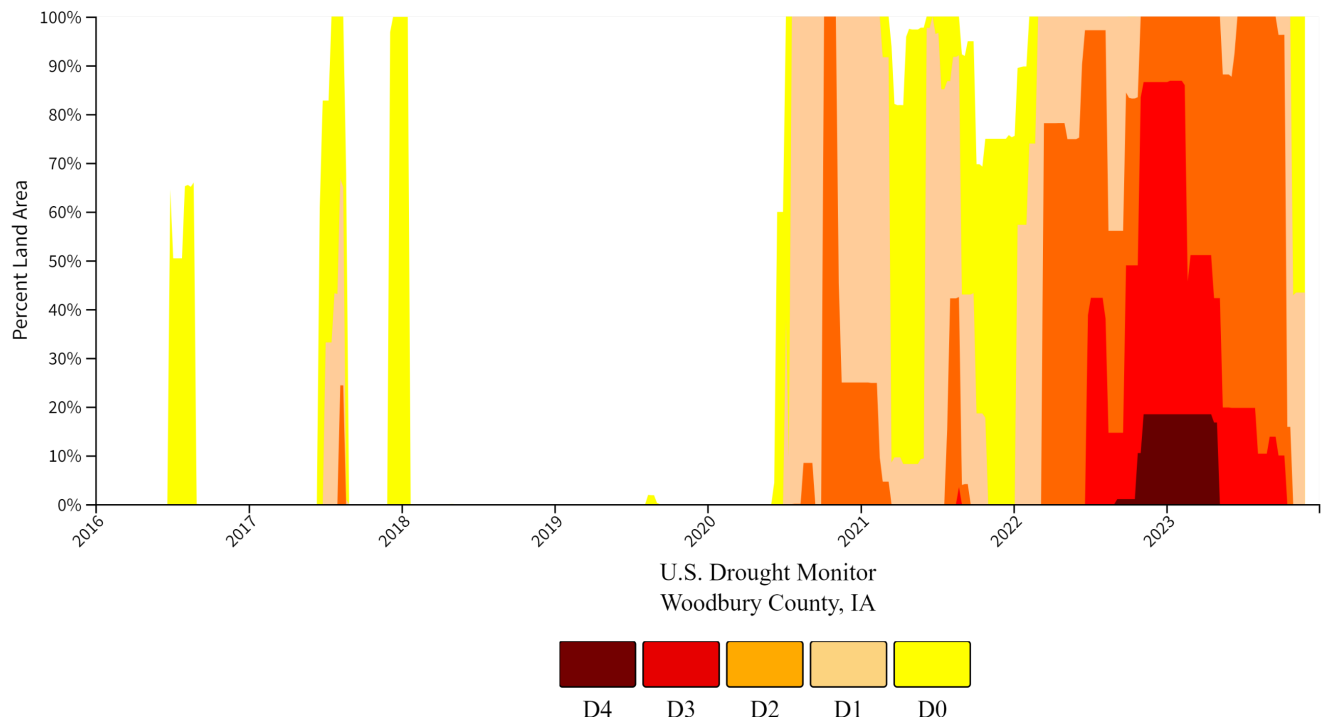
Table 2 summarizes the sample history for each monitoring well and the analyte list used for each event.

Following receipt of the final laboratory analytical reports from each round of sampling, GHD completed an analytical data quality assessment and validation for the groundwater and field quality assurance samples collected during the baseline monitoring events. Based on these assessments, the data are acceptable for use as reported by the laboratories.

3. Groundwater Flow Conditions

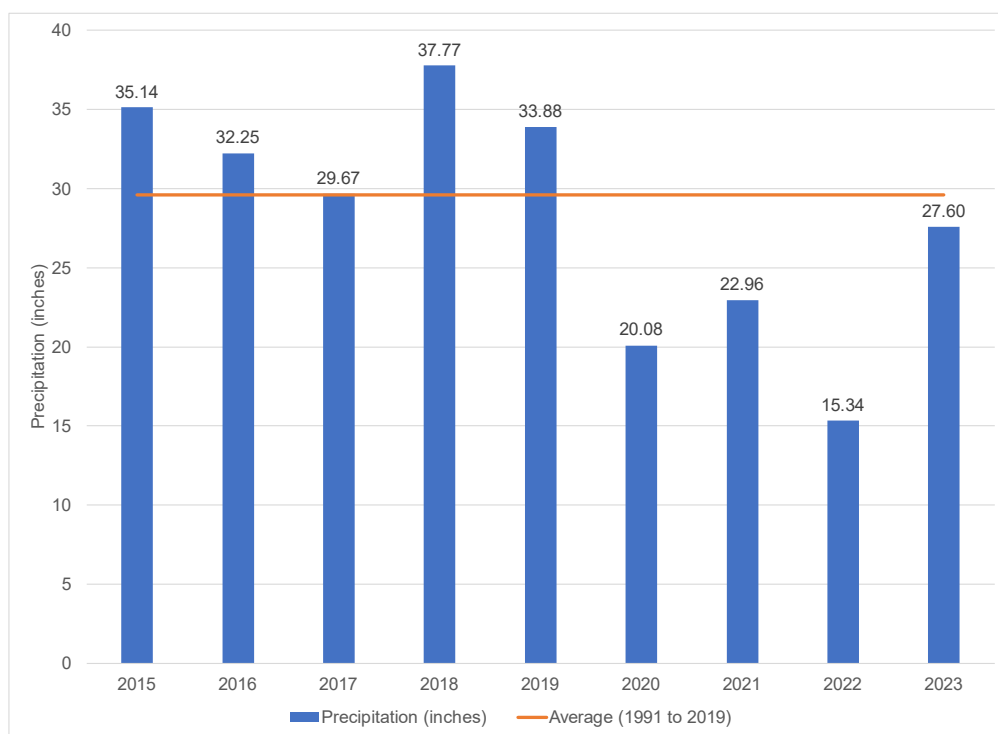
3.1 Drought Conditions

The groundwater levels at Neal North have been declining over the last few years due to drought conditions affecting the area. Drought conditions for Woodbury County from 2016 through November 28, 2023 reported by the U.S. Drought Monitor are shown on Inset 1. In mid-2020, 100 percent of the area of Woodbury County was recorded as D0 Abnormally Dry, which then intensified into D1 Moderate Drought and then D2 Severe Drought for a period of time. In early 2021, approximately 80 percent of Woodbury County was in drought. Since early 2022, the entire county has been reported as at least D1 Moderate Drought, with significant periods of time where all or most of the county is in D2 Severe Drought or D3 Extreme Drought. During late 2022 and early 2023, almost 20% of the county, including Neal North, was reported as D4 Exceptional Drought.



Inset 1. Drought conditions for Woodbury County. <https://www.drought.gov/states/iowa/county/Woodbury>

The annual precipitation for the Sioux City area is shown on Inset 2. The average annual rainfall (1991 through 2019) at Sioux City, Iowa is 29.6 inches. Rainfall was near normal from 2015 through 2019. However, beginning in 2020 through 2023, rainfall has been below the annual average.



Inset 2. Annual precipitation in Sioux City, Iowa, 2016 through December 6, 2023.

<https://hprcc.unl.edu/stationtool/explore.php?sid=USW00014943%27>

Missouri River at Sioux City, IA - 06486000

January 1, 2015 - December 31, 2023

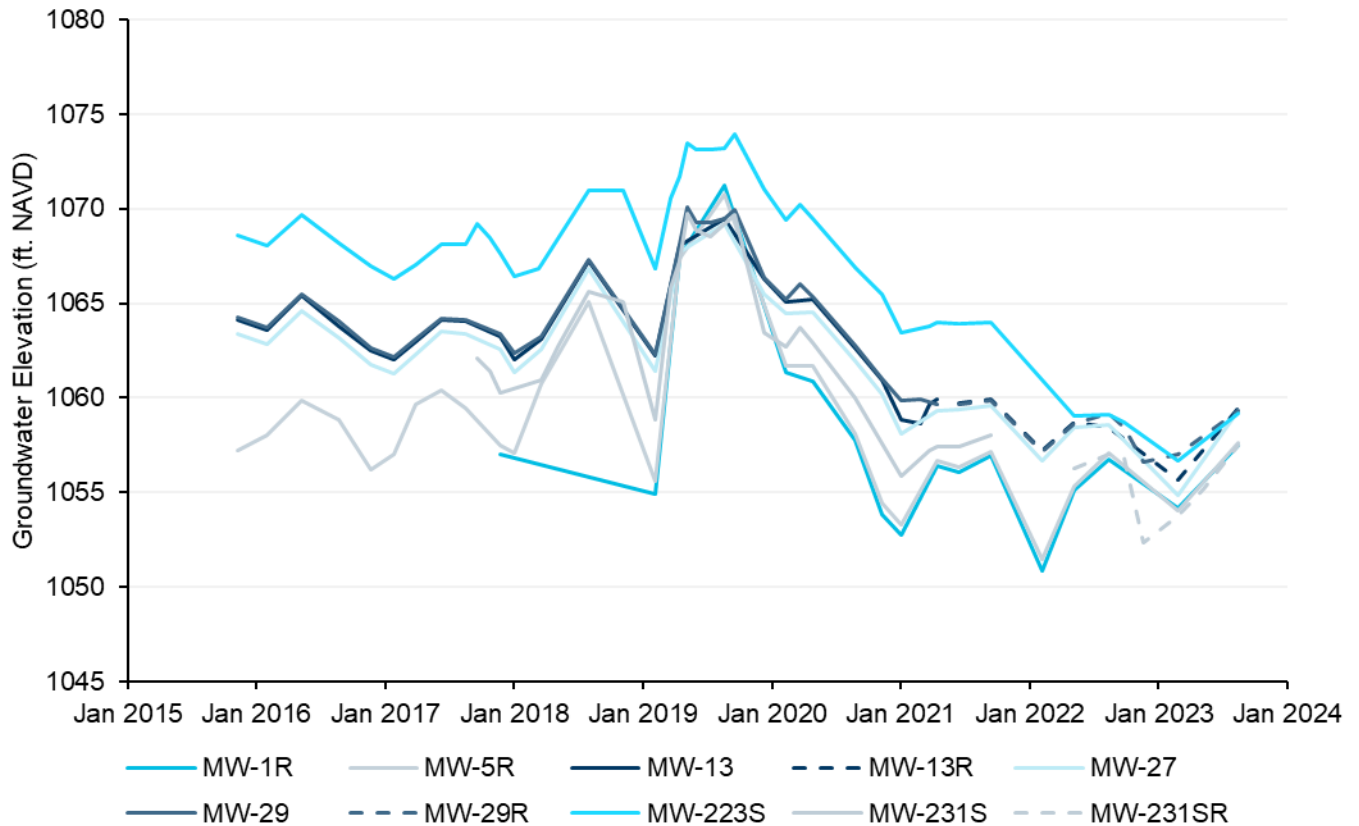
Gage height, feet



Inset 3. Missouri River elevations at Sioux City, Iowa. <https://waterdata.usgs.gov/monitoring-location/06486000/#parameterCode=00065&period=P2742D>

During 2018 and 2019, releases from the Missouri River reservoir system upstream to the site were higher-than average. During 2020 and continuing into 2023, releases into the Missouri River from the reservoir system decreased river stage near the site (Inset 3) and reduced precipitation occurred (Inset 2).

Groundwater elevations are shown on Inset 4 for select monitoring wells at Neal North. The highest observed groundwater elevations occurred in 2019 and have been on a generally decreasing trend since that time, corresponding with below average precipitation in the area and reduced flows in the Missouri River.



Inset 4. Hydrograph for select wells at Neal North.

3.2 Horizontal Groundwater Flow

Groundwater levels were measured at each of the monitoring wells included in the monitoring network during each semiannual monitoring event. Many of the Closed Monofill groundwater monitoring wells are in a nested pair with one shallow and one deep well, as illustrated on Figure 1.2. Table 4 presents groundwater elevations measured in wells during the March and September 2023 monitoring events. A groundwater flow map was prepared using water level measurements from each semiannual monitoring event for both the shallow and deep portions of the alluvial aquifer (Figures 3.1 through 3.4).

The groundwater contour maps show the groundwater flow direction in the shallow portion of the alluvial aquifer and the localized effect that an area of low permeability materials may have on the groundwater flow direction, provided on Figures 3.1 and 3.3. Higher groundwater elevations are observed in areas of low permeability sediments that result in local variations in flow directions. However, the predominant site-wide flow direction is west-southwest, toward the Missouri River. Groundwater mounding is observed around monitoring wells MW-19 and MW-21.

Figures 3.2 and 3.4 illustrate the southwesterly groundwater flow direction in the deeper portion of the alluvial aquifer. MW-20 is screened in fine-grained material, whereas other deep alluvial aquifer monitoring wells are screened in sand. For this reason, MW-20 was excluded from development of the deep alluvial groundwater contours (Figures 3.2

and 3.4). Groundwater flow in the shallow and deep portions of the alluvial aquifer is generally southwest, toward the Missouri River.

3.3 Horizontal Gradient and Groundwater Flow Velocity

Hydraulic conductivity estimates for the shallow alluvial aquifer at the Neal North Monofill range from a low of approximately 0.3 meter per day (m/day) to 12.0 m/day (MWH, 2006). Hydraulic conductivity estimates for the deep alluvial aquifer at the Neal North Monofill range from a low of approximately 2.4 m/day to 28.4 m/day (MWH, 2006). The geometric mean hydraulic conductivity for the shallow and deep portions of the alluvial aquifer is 2.3 m/day and 12.2 m/day, respectively (MWH, 2006).

The average horizontal linear groundwater velocity for both portions of the alluvial aquifer was estimated based on hydraulic conductivity, horizontal gradient, and the estimated porosity of the formation using the following equation:

$$V = Ki/n$$

Where V equals the average horizontal linear velocity; K equals the geometric mean hydraulic conductivity (2.3 m/day and 12.2 m/day for shallow and deep portions of the aquifer, respectively); i equals the average horizontal hydraulic gradient; and n equals the effective porosity (estimated at 0.3).

In order to consistently assess groundwater horizontal gradient and flow velocity, gradient was determined between well pairs that have been observed to consistently lie along flow paths. In the shallow portion of the alluvial aquifer, the horizontal gradient was estimated along the groundwater flow path between monitoring wells MW-13R and MW-11R. The gradient in the deeper portion of the alluvial aquifer was determined between monitoring wells MW-30 and MW-6 for March and September 2023 monitoring events.

During the two 2023 gauging events at the Neal North CCR Monofill, the average linear groundwater velocity was estimated to range between 0.005 m/day (approximately 6 feet per year) during the September 2023 monitoring event and 0.010 m/day (approximately 12 feet per year) during the March 2023 monitoring events in the shallow portion of the alluvial aquifer. The average linear groundwater velocity in the deeper portion of the alluvial aquifer was estimated to range between 0.023 m/day (approximately 28 feet per year) during the September 2023 monitoring event and 0.037 m/day (approximately 45 feet per year) during the March 2023 monitoring event.

3.4 Vertical Hydraulic Gradient

Water levels measured in monitoring well pairs during the 2023 monitoring events were used to calculate vertical hydraulic gradient using the equation listed below.

$$\frac{\text{Water Elevation in Deep Well} - \text{Water Elevation in Shallow Well}}{\text{Elevation of Middle of Saturated Zone of Shallow Well Screen} - \text{Elevation of Middle of Saturated Zone of Deep Well Screen}}$$

The difference in groundwater elevations between nested pairs of wells ranged from 0.01 to 0.35 feet at wells pairs MW-3R/MW-4, MW-5R/MW-6, MW-11/MW-12, MW-13/MW-14, MW-23/ MW-24, MW-27/MW-28, MW-29/MW-30, and MW-56/MW-57, to often in excess of several feet at well pairs MW-19/MW-20, MW-21/MW-22, MW-25/MW-26, and MW-31/MW-32, locations where shallow wells were screened in low conductivity sediments. The maximum difference of 11.32 feet was observed at the MW-19/MW-20 well pair during the March 2023 gauging event.

Vertical hydraulic gradients generally ranged from -0.004 feet/foot (ft/ft) downward to 0.019 ft/ft upward during recent gauging events at most locations with nested well pairs. However, downward gradients greater than -0.1 ft/ft were observed in several locations with significant deposits of shallow, poorly drained low permeability materials; in these locations, shallow groundwater levels were elevated relative to the surrounding higher permeability alluvial aquifer (MW-19/MW-20, MW-21/MW-22, MW-25/MW-26, and MW-31/MW-32), with downward gradients as high as -0.371 ft/ft.

3.5 Monitoring Well Network Assessment

The Closed Monofill monitoring network meets the Federal CCR rule requirements of having at least one upgradient monitoring well and three downgradient monitoring wells, and the groundwater monitoring network meets the design and construction requirements of 40 CFR §257.91. Shallow alluvial aquifer monitoring wells MW-13R, MW-27, MW-29R, MW-223S, and MW-231SR have been identified as upgradient background sampling locations.

3.6 Leachate and Landfill Gas

The Closed Monofill does not have a leachate collection system or landfill gas monitoring (Table 11 and Table 12).

4. Groundwater Monitoring

Groundwater sample collection records are provided in Appendix A and the associated laboratory analytical reports are provided in Appendix B. Appendix C includes time series graphs of concentration versus time for each analyte in the current monitoring program. Analytical results for groundwater samples collected during the eight baseline monitoring events (September 2020 through June 2022) are summarized in Table D.1. The analytical results from the 2023 monitoring events are summarized in Table D.2. These tables, as well as Tables D.3 through D.6, are provided in Appendix D. Further analysis of data from the Closed CCR Monofill is presented in Table 5 through Table 10 and is discussed throughout this section.

Following the assessment and reporting requirements under the Federal CCR rule, the groundwater monitoring data are subjected to statistical evaluation to demonstrate compliance with monitoring goals. Evaluation components include:

- Statistical summaries for the data sets obtained (on a per-well, per-parameter basis)
- Preparation of trend plots (concentration vs. time)
- Inter-well comparisons (downgradient vs. upgradient background)
- Intra-well comparisons (vs. baseline conditions at a given well)

The statistical methods used in these evaluation steps for the Neal North Monofill are presented in the Groundwater Statistical Methods Certification (Methods Certification) (GHD, 2017). The procedures in the Methods Certification were selected in accordance with the Federal CCR rule, utilizing methodology presented in the USEPA's *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance* (Unified Guidance) (USEPA, 2009). The present evaluation utilizes the statistical methods presented therein to evaluate monitoring data from groundwater samples collected during the 2023 detection, assessment, and verification monitoring events.

Baseline monitoring under the Federal CCR rule occurred at the Neal North Closed Monofill during eight monitoring events conducted between September 2020 and June 2022. These first eight events represent the selected baseline period required for both inter-well and intra-well comparisons. Although the Closed Monofill shares the same upgradient background wells with the Neal North Impoundment 3B and Active Monofill, a new baseline monitoring period was completed (September 2020 and June 2022) to coincide with the initiation of sampling under the 2020 HMSP for the Closed Monofill.

4.1 Statistical Analysis Approach

The initial eight rounds of baseline groundwater monitoring data were collected and analyzed for the 40 CFR Part 257 Appendix III and IV constituents (Table 5). One constituent (fluoride) is listed in both the Appendix III and IV constituent lists in the Federal CCR rule. In the present evaluation, fluoride has been included with the Appendix III parameters, and is not duplicated again with the other Appendix IV parameters in the various figures and tables of results.

The baseline and 2023 detection, assessment, and verification monitoring data for the Neal North Closed Monofill are presented in Tables D.1 and D.2, respectively. Statistical summary information for each data set is provided along with trend analysis results in Tables D.3 (inter-well baseline) and Table D.4 (intra-well baseline).

Groundwater monitoring at the Neal North Closed Monofill is currently conducted under Assessment Monitoring status per the Federal CCR rule. In March 2023, the Closed Monofill was being sampled under the Detection Monitoring program per the Federal CCR rule. As such, the seven Appendix III (Detection Monitoring) constituents were analyzed in March 2023. In September 2023 both the Appendix III and Appendix IV (Assessment Monitoring) constituents were analyzed due to identification of SSIs following the March 2023 monitoring. The Closed Monofill is not in an IDNR Groundwater Quality Assessment program. No SSLs were reported and no trend analyses were conducted (Table 10).

No single method of statistical analysis is appropriate for each groundwater constituent dataset; instead, the statistical methods selected for use are dependent upon the data and distributions and should consider the specific constituents and the nature of local hydrogeologic conditions. Depending on characteristics of the site and the groundwater monitoring data, a mix of inter-well (comparison vs. upgradient background conditions) and intra-well (comparison vs. baseline) tests may be warranted. The statistical methods used for the inter-well and intra-well approaches are selected based on these factors as well as consideration of natural temporal or spatial variability of the concentrations of the groundwater constituents. Substantial natural spatial variability may necessitate intra-well methods. This statistical analysis was completed using both inter-well and intra-well approaches for the purpose of determining if a statistically significant increase (SSI) relative to baseline concentrations has occurred at the Neal North Closed Monofill.

A preliminary statistical analysis of baseline data was conducted to initially assess the constituent data and determine the most appropriate statistical approach(es) for the data. The data were examined for outliers, the percentage of non-detect values, and to determine the statistical data distribution. Time series plots, box plots of upgradient background data, and maps were used to evaluate the potential presence of temporal or spatial variations in constituent concentrations.

All of the Appendix III and IV constituents occur naturally in the environment. For constituents that occur naturally and may vary substantially in concentration across the monitoring network due to natural hydrogeologic or geochemical factors (i.e., exhibiting spatial variability), an inter-well analysis is not appropriate. Constituent concentrations greater than upgradient background conditions might be incorrectly attributed to impact from the Neal North Closed Monofill, when the differences are actually natural and unrelated to the Neal North Closed Monofill due to locally varying distributions of groundwater constituents. In such cases, an intra-well approach is appropriate.

4.1.1 Spatial Variability

The concentration of naturally occurring constituents such as the Appendix III and IV constituents can be affected by the presence of differing aquifer material or geochemistry between monitoring well locations. At the Neal North Monofill, the uppermost groundwater occurs in alluvial deposits, which consist primarily of sands with finer-grained silts and clays. The natural geochemistry of groundwater can vary between these zones and affect the detected concentrations of natural constituents. In the case of the Neal North Monofill, these differing geological materials are intersected by the screened zones of the monitoring wells and may result in spatial variability for some constituents. Box plots, provided in the 2022 AWQR (GHD, 2023), were used to evaluate spatial variability between the upgradient wells.

The presence of spatial variability among the Neal North Closed Monofill upgradient wells (MW-13R, MW-27, MW-29R, MW-223S, and MW-231SR) is evident for many detected constituents during the new baseline period. If no spatial variability is present, the mean and distribution between the upgradient wells would be similar. In contrast, there is strong evidence of spatial variability between wells where interquartile ranges do not overlap, in particular:

- MW-13R and MW-223S appear to have lower concentrations of boron than MW-29R, MW-27, and MW-231SR
- MW-223S has lower concentrations of calcium, TDS, and lithium than MW-13R, MW-27, MW-29R, and MW-231SR

- MW-231SR has higher sulfate than MW-13R, MW-27, MW-29R, and MW-223S
- MW-223S has higher pH than MW-13R, MW-27, MW-29R, and MW-231SR
- MW-27 and MW-231SR has lower barium concentrations than MW-13R, MW-29R, and MW-223S

For these constituents, there are observed substantial differences in constituent concentrations in groundwater between the upgradient background wells (MW-13R, MW-27, MW-29R, MW-223S, and MW-231SR). This spatial variability invalidates inter-well comparisons for downgradient wells, since observed differences between downgradient and upgradient conditions could be due to natural variability or could be due to effects of the Neal North Closed Monofill. An inter-well comparison could not distinguish between these two possibilities.

4.1.2 Temporal Variability

The Federal CCR rule considers the occurrence of temporal trends in groundwater monitoring data. Where trends are observed, the statistical method selected must take these into account.

For inter-well baseline Upper Tolerance Limits (UTLs), where data from upgradient wells (MW-13R, MW-27, MW-29R, MW-223S, and MW-231SR) were combined, trends were assessed using the Regional Kendall test. This test is a modified Seasonal Kendall test described in detail in USEPA, 2009, Section 14.3.4, substituting the individual wells in the place of the separate seasons. In the test, individual Mann-Kendall statistics are calculated for each analyte at each well separately, and then summed to perform the overall test.

For these constituents, the statistically significant trends impact or invalidate inter-well comparisons, since the statistical methods presented in the Federal CCR rule (40 CFR 257.93 (f)) assume no trends are present in the upgradient data. Further analysis of temporal variability is provided in Section 4.2.1.

4.1.3 Summary of Statistical Analysis Approach

The statistical analysis included both inter-well and intra-well approaches for the purpose of determining if SSIs in constituent concentrations in groundwater have occurred at the Neal North Closed Monofill. This approach could change as additional data are collected during future monitoring. If new information warrants such a change, a modification to the statistical approach will be recommended for one or more constituents and/or monitoring wells.

4.2 Assessment of Baseline Data

Per the Methods Certification, each of the baseline data sets was subjected to initial screening and assumption checking, considering the following items:

- The presence of censored data (i.e., percentage of non-detect results)
- The observed data distribution (i.e., normal, gamma, lognormal, or unknown)
- The presence of statistical outliers
- Consideration of field duplicate results

The specific methods employed are described in the Methods Certification. The assumption-checking results for each data set (constituent by well) are presented in Table D.4.

4.2.1 Stability Assessment/Baseline Period Trend Analysis

The assessment of temporal trends is included as a precursor to intra-well and inter-well comparisons, as the statistical methods for these comparisons assume that a stable condition is present in the reference data set (i.e., the baseline period for intra-well comparisons, and the upgradient background data set for inter-well comparisons). Where a trend is identified, the comparison procedures must be adjusted to take this into account. Trend tests may also be used as an alternative intra-well comparison procedure when other methods are not appropriate (as noted at the beginning of Section 17.3 of the Unified Guidance [USEPA, 2009]).

The Methods Certification selects two statistical procedures for evaluating trends in the baseline data, namely:

- i. The Mann-Kendall Trend Test
- ii. The Theil-Sen Median Slope (for data sets identified as having a statistically significant temporal trend by the Mann-Kendall Test)

The applicability and methodology for these procedures are discussed in the Methods Certification. In carrying out the trend tests, a target significance level of 0.05 (i.e., 95 percent confidence) was selected. This significance level is applied on a per-location, per-parameter basis, for all suitable data sets. The Federal CCR rule (40 CFR 257.93 (g)(2)) specifies that a significance level no lower than 0.01 (99 percent confidence) may be applied for individual comparisons, with an overall (site-wide) minimum significance level of 0.05. For current trend screening purposes, a significance level of 0.05 was selected to increase the statistical power of detecting potential trends with data sets containing only eight baseline samples (which is the number of baseline events specified in the Federal CCR rule). Non-detects were accommodated as described in the Methods Certification, considering these to be tied and lower than non-detects in the Mann-Kendall Test, and conservatively substituting the detection limit where needed for calculating the Theil-Sen median slope.

The baseline data sets presented in Table D.1 were subjected to trend testing as described above. The results of these tests are presented, along with summary statistics, in Table D.4. The trend test findings are also included on trend plots, which are presented in Appendix C, Figures 1 through 10. Note that in the trend plots, field duplicate results are included as discrete points, but in the trend analyses these were averaged prior to trend calculations.

There are a total of 210 baseline data sets that were considered (21 monitoring constituents at each of the 10 wells). Out of these, 74 data sets are comprised entirely of non-detect results. These occur mainly for the following constituents:

- Antimony (all 10 wells)
- Beryllium (all 10 wells)
- Chromium (all 10 wells)
- Fluoride (5 wells)
- Lead (7 wells)
- Mercury (all 10 wells)
- Selenium (7 wells)
- Thallium (8 wells)

Additional constituents with at least one well having no detected results during baseline sampling are arsenic (1 well), cadmium and molybdenum (3 wells each).

There are 23 baseline period data sets containing one or more detected results but having a non-detect frequency greater than 50 percent and were therefore not subjected to trend testing.

The remaining 113 data sets were subjected to trend analysis using the Mann-Kendall Test. The majority of the tests (103 of 113 data sets, or 91 percent) indicated that no statistically significant trends over time were present during the baseline period. Four (4) decreasing trends and six (6) increasing trends were found.

Increasing trends were found for the following wells/constituents:

- Chloride at MW-1R, MW-13R, MW-27, MW-29R, MW-223S, and MW-231SR

Decreasing trends were found for the following wells/constituents:

- Boron at MW-27
- Cobalt at MW-1R and MW-3R
- TDS at MW-3R

Additionally, there are several data sets noted where there is less confidence of a trend over time (having statistical confidence less than 95 percent but greater than 90 percent), as noted in the comments in Table D.4.

Where trends have been identified in a baseline data set, the methods for intra-well and inter-well comparisons performed below were adjusted to account for non-stationarity during the baseline period.

4.2.2 Inter-well Comparisons – Upgradient Background Values

The Federal CCR rule provides a list of alternate statistical procedures applicable to inter-well and intra-well comparisons (see 40 CFR §257.93(f)). In the Methods Certification, the use of upper tolerance limits (UTLs) was selected as being appropriate for assessment of groundwater monitoring data for the Neal North Closed Monofill. A UTL is a statistically-based limit above which a given sample measurement is unlikely to occur if conditions are consistent with the reference population. For inter-well comparisons, the reference population is the data set of constituent concentrations in upgradient background well(s). Since there are five upgradient background wells (MW-13R, MW-27, MW-29R, MW-223S, and MW-231SR), the data from these five wells have been pooled to calculate the upgradient background UTLs for each constituent.

Statistical UTLs have two descriptive parameters: (i) their coverage; and (ii) their confidence. Coverage refers to the percentage of the reference population that is within the tolerance limit. For example, if a coverage of 0.99 is selected, then 99 percent of the reference population will be within the tolerance limit (which in the case of a one-sided UTL, represents the 99th percentile of the reference population). Confidence refers to the probability that the specified coverage based on the samples collected will include the true value from the entire population. For example, if a 95 percent confidence level is selected, then there is no more than a 5 percent probability that the calculated UTL will not provide the selected coverage (e.g., true 99th percentile) of the population.

In Section 5 of the Methods Certification, two type of UTLs are specified:

- i. A 95/95 UTL, which has a coverage of 0.95 (i.e., 95th percentile) with 95 percent confidence
- ii. iA 99/95 UTL, which has a coverage of 0.99 (i.e., 99th percentile) with 95 percent confidence

Comparisons against these UTLs are to be interpreted as follows:

- a. If a given future observation exceeds a 95/95 UTL, but not a 99/95 UTL, the next regularly scheduled monitoring event will be used as the verification resample for determining an SSI.
- b. If a given future observation exceeds both the 95/95 and 99/95 UTLs, then a verification resample or other appropriate response will be undertaken prior to the next regularly scheduled monitoring event.

An SSI is only identified after an original sample and its verification resample (either the next regularly-scheduled sample or a special verification sample) exceed the given UTL.

Calculations of UTLs for inter-well comparisons were completed using the logic and methodology presented in USEPA's Technical Guide for its ProUCL software (USEPA, 2022, version 5.2). The results of the inter-well UTL calculations are provided in Table D.3.

4.2.3 Intra-well Comparisons – Well-specific Baseline Values

As noted in the Methods Certification, the statistical methods (i.e., UTLs) for intra-well comparisons are analogous to those for inter-well comparisons. In this case, the reference population is the data set of constituent concentrations in a given well observed during the baseline period. Calculation of the upgradient background 95/95 UTL and 99/95 UTL values is performed using the same methods used for the inter-well comparisons.

Where temporal trends were identified over the baseline period, tolerance limits are not calculated (due to violation of the statistical assumptions of the UTL calculations) and a baseline range is provided as a reference. For such data sets, future sample results are to be compared both against the baseline range and what would be expected based on the observed trend over the baseline period.

The calculated updated intra-well baseline values (UTLs) for each constituent at each well are provided in Table D.4.

4.3 Evaluation of 2023 Detection Monitoring Data

4.3.1 Appendix III Analytes

The Appendix III constituent data sets from sampling conducted during 2023 (one detection and one assessment event) are presented in Table 8 and Table D.2 and summarized below. The historical and current Appendix III monitoring data is compared against the background level and GWPS in Table 9.

- Boron. No MCL has been established for boron. The maximum boron concentration detected in 2023 was 0.606 milligrams per liter (mg/L) at MW-19 (September 2023).
- Calcium. No MCL has been established for calcium. The maximum calcium concentration detected in 2023 was 523 mg/L at well MW-21 (April 2023).
- Chloride. No MCL has been established for chloride. The maximum chloride concentration detected in the 2023 monitoring events was 61.9 mg/L at downgradient location MW-1R (September 2023).
- Fluoride. The MCL for fluoride is 4.0 mg/L. All wells were below the associated reporting limit (0.500 mg/L in March/April 2023 and 1.00 mg/L in September 2023) except MW-21, MW-223S, and background well MW-231SR in March/April 2023. The maximum detected concentration was 0.791 mg/L at downgradient well MW-21, which is below the MCL.
- pH. No MCL has been established for pH. The lowest and highest pH measurement recorded in 2023 were 6.7 J at MW-19 (April and September 2023) and MW-21 (September 2023) and 7.5 J at upgradient monitoring well MW-223S (September 2023), respectively.
- Sulfate. No MCL has been established for sulfate. The maximum sulfate concentration detected in 2023 was 1,610 mg/L at MW-21 (April 2023).
- Total Dissolved Solids (TDS). No MCL has been established for TDS. The maximum TDS concentration in 2023 was 3,110 mg/L at MW-21 (September 2023).

4.3.2 Appendix IV Analytes

September 2023 was the first assessment monitoring event at the Closed CCR Monofill. In the assessment monitoring program, Appendix IV analytes are analyzed along with Appendix III analytes. The September 2023 Appendix IV results, as well as March 2023 results from upgradient wells, are presented in Table 8 and Table D.2 and summarized below. The historical and current Appendix IV monitoring data is compared against the background level and GWPS in Table 9.

- Antimony. Antimony was not detected above the method reporting limit (0.00200 mg/L) or the established MCL (0.006 mg/L) in samples from any monitoring well during the 2023 monitoring events.
- Arsenic. The site-specific Groundwater Protection Standard (GWPS) for arsenic is the maximum background concentration (0.0512 mg/L) because the background concentration is higher than arsenic MCL of 0.010 mg/L. Arsenic was detected at all wells during the 2023 monitoring events, except at MW-21 in September 2023. The maximum concentration detected was 0.0616 J+ mg/L at background well MW-27, which is above the site-specific GWPS.
- Barium. The MCL for barium is 2.0 mg/L. Barium was detected in all of the monitored wells in 2023 with a maximum concentration of 0.382 mg/L (duplicate) at upgradient location MW-223S in March 2023, which is below the MCL.
- Beryllium. Beryllium was not detected above the method reporting limit (0.00100 mg/L) or the established MCL (0.004 mg/L) in samples from any monitoring well during the 2023 monitoring events.
- Cadmium. The method reporting limit for cadmium is 0.000100 mg/L (0.000200 mg/L at some wells in 2023) and the MCL is 0.005 mg/L. Cadmium was not detected above the reporting limit at any wells except background well MW-13R (0.000211 mg/L) in March 2023, as well as background well MW-27 (0.000207 J+ mg/L) and downgradient well MW-21 (0.000346 mg/L) in September 2023. All concentrations were below the MCL.

- Chromium. Chromium was not detected above the method reporting limit (0.00500 mg/L) or the established MCL (0.1 mg/L) in any monitoring well during the 2023 monitoring events.
- Cobalt. No MCL has been established for cobalt; the GWPS established under 40 CFR §257.95(h)(2) for cobalt is 0.006 mg/L. The maximum concentration detected was 0.0067 mg/L at MW-19 in September 2023, which is above the GWPS.
- Lead. No MCL has been established for lead; the GWPS established under 40 CFR §257.95(h)(2) for lead is 0.015 mg/L. All wells were below the method reporting limit (0.000500 mg/L), except background wells MW-13R (0.000593 mg/L, March 2023) and MW-27 (0.000513 J+ mg/L, September 2023), which were below the GWPS.
- Lithium. No MCL has been established for lithium; the GWPS established under 40 CFR §257.95(h)(2) for lithium is 0.040 mg/L; and the background concentration in groundwater is 0.205 mg/L. Since the site-specific background concentration is higher than the 40 CFR §257.95(h)(2) value for lithium, the site-specific GWPS for lithium is 0.205 mg/L. Lithium was detected in all wells during the 2023 monitoring events. The maximum concentration detected was 0.301 mg/L at MW-21 (September 2023), which is above the background concentration. The September 2023 result of 0.234 mg/L lithium at MW-19 also exceeds the site-specific GWPS.
- Mercury. Mercury was not detected above the method reporting limit (0.000200 mg/L) or the established MCL (0.002 mg/L) in samples from any monitoring well during the 2023 monitoring events.
- Molybdenum. No MCL has been established for molybdenum; the GWPS established under 40 CFR §257.95(h)(2) for molybdenum is 0.100 mg/L. Molybdenum was detected in the majority of wells during 2023, except at MW-27 (March 2023), MW-19 (September 2023), and MW-21 (September 2023). The maximum concentration detected was at MW-1R (duplicate), which had a concentration of 0.00517 mg/L in September 2023. This concentration is below the GWPS.
- Radium 226 and 228 (combined). Radium 226 and 228 (combined) was not detected above the established MCL of 5 picocuries per liter (pCi/L) in any of the wells during the 2023 monitoring events. Radium 226 and 228 (combined) was detected in all wells during all monitoring events in 2023 except at MW-27, MW-223S, and MW-231SR in March 2023. The highest concentration detected during the 2023 events was 1.88 pCi/L at MW-1R (duplicate) in September 2023.
- Selenium. The MCL for selenium is 0.05 mg/L. Selenium concentrations were below the method reporting limit (0.00500 mg/L) at all wells during the 2023 monitoring events.
- Thallium. The MCL for thallium is 0.002 mg/L. All wells were below the method reporting limit (0.00100 mg/L) for thallium except background locations MW-13R (0.00146 mg/L) and MW-231SR (0.00147 mg/L), which were both below the MCL.

4.3.3 Inter-well Comparisons (vs. Upgradient Background)

Inter-well comparisons of current monitoring data are conducted by comparing monitoring data from the 2023 sampling events to the upgradient background UTLs derived from the baseline period data (September 2020 through June 2022). These comparisons are presented in Table D.5. A further comparison of newly identified as well as ongoing inter-well background exceedances are presented in Table 6 and Table 7, respectively.

The results of the inter-well comparisons identify observations at three of the five downgradient monitoring wells where the 2023 monitoring events had a constituent concentration or measurement outside of baseline conditions represented by the upgradient background wells (MW-13R, MW-27, MW-29R, MW-223S, and MW-231SR). These include:

- Boron at MW-1R, MW-19, and MW-21
- Cadmium at MW-21
- Calcium at MW-19 and MW-21
- Cobalt at MW-19
- Fluoride at MW-21
- Lithium at MW-21

- Molybdenum at MW-1R
- pH at MW-19 and MW-21
- Sulfate at MW-19 and MW-21
- TDS at MW-19 and MW-21

Several concentrations exceeding the inter-well background were confirmed with two successive samples above the UTL. The exceptions were:

Boron at MW-21 – the sample collected in September 2023 exceeded the baseline UTL, which was not confirmed in the December 2023 sample.

Fluoride at MW-21 – the exceeding result observed in April 2023 was not confirmed in September 2023.

Remaining unconfirmed SSIs observed during the September 2023 sampling event (boron and molybdenum at MW-1R; cobalt at MW-19; cadmium and lithium at MW-21) will be confirmed during the next sampling event.

4.3.4 Intra-well Comparisons (vs. Well-Specific Baseline Values)

Intra-well comparisons of current monitoring data are conducted by comparing monitoring results from the 2023 sampling events to the baseline period (September 2020 through June 2022) UTLs for each given well. These comparisons are presented in Table D.6.

The results of the intra-well comparisons indicate that the Appendix III and IV constituent concentrations were not above those observed during the baseline period with a few exceptions. These include:

- Boron at MW-223S (upgradient)
- Calcium at MW-223S (upgradient)
- Arsenic at MW-231SR (upgradient)
- Barium at MW-27 (upgradient)
- Cadmium at MW-27 (upgradient) and MW-21
- Lead at MW-13 (upgradient) and MW-27 (upgradient)
- Molybdenum at MW-27 (upgradient) and MW-231SR (upgradient)
- Thallium at MW-13 (upgradient) and MW-231SR (upgradient)

All exceedances of intra-well baseline values were at upgradient locations except cadmium at MW-21. Of these SSIs, boron at MW-223S and arsenic at MW-231SR are confirmed with two successive samples above the UTL. Unverified SSIs that did not exceed in the immediately following sampling event include:

- Calcium at MW-223S
- Lead at MW-13
- Molybdenum at MW-231SR
- Thallium at MW-13 and MW-231SR

The remaining unconfirmed SSIs will be verified during the next sampling event.

5. Conclusions and Recommendations

5.1 Groundwater Flow and Evaluation of the Monitoring Network

Groundwater flow in the shallow and deep portions of the alluvial aquifer in the vicinity of the Neal North Monofill is predominantly to the west-southwest, toward the Missouri River. The shallow alluvial groundwater contour maps (Figures 3.1 and 3.3) show the localized effect an area of low permeability materials may have on the groundwater flow direction.

The groundwater flow evaluation (see Figures 3.1 through 3.4) indicates the monitoring network is sufficient and has appropriately located upgradient and downgradient well locations. The predominant flow direction was observed to be to the southwest, toward the Missouri River.

5.2 Groundwater Quality

A statistical evaluation of groundwater monitoring data collected during the baseline period (September 2020 to June 2022) has been conducted in accordance with the Federal CCR rule and Unified Guidance for assessing groundwater data (USEPA, 2009). This evaluation was successful in characterizing the baseline data sets, assessing the baseline data for trends, and generating inter-well upgradient background reference values and intra-well baseline values against which future monitoring data may be evaluated.

Additionally, an assessment of monitoring data from samples collected were analyzed for the parameters specified in 40 CFR Part 257 Appendix III and Appendix IV analytes for the monitoring events completed in March and September 2023.

Key results of the evaluation include:

- Constituent concentrations appear to vary between the upgradient background wells. Assessment of the baseline period data indicates significant spatial variability in groundwater collected at different monitoring wells at the site, requiring intra-well comparisons.
- Significant concentration trends over time were observed in some baseline data sets at both downgradient wells and upgradient wells.
- Inter-well baseline values (UTLs) have been calculated from the baseline data for five upgradient background wells (MW-13R, MW-27, MW-29R, MW-223S, and MW-231SR).
- Intra-well baseline values (UTLs) have been calculated on a per-constituent, per-well basis for Appendix III and Appendix IV constituents.
- Assessment of the 2023 monitoring events data indicates that:
 - Inter-well comparisons - The monitoring results at downgradient wells are mainly consistent with upgradient background conditions during the baseline period but remain elevated for one or more constituents at two of five downgradient wells (boron, calcium, pH, sulfate, and/or TDS at MW-19 and MW-21). These SSIs, as well as the unconfirmed SSIs noted in Section 4.3.3, will be assessed by future sampling.
 - Intra-well comparisons – All upgradient locations exceeded their corresponding intra-well baseline value (99/95 UTL) for one or more constituents (boron, arsenic, barium, cadmium, lead, and/or molybdenum) during at least one sampling event in 2023.

5.3 Recommendations

Currently, the Neal North Closed Monofill remains in assessment monitoring. No changes to the monitoring network or sampling procedures are necessary.

6. References

- GHD, 2017. Groundwater Statistical Methods Certification. Neal North CCR Monofill, Permit No. 97-SDP-12-95P, Salix, Iowa, MidAmerican Energy Company. October 17, 2017.
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- MWH, 2006. Hydrogeological Investigation Report, Coal Combustion Residue Monofill, Neal North Generating Facility, Woodbury County, Iowa. December 2006.
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Tables

Table 1

Monitoring Program Summary
2023 Annual Water Quality Report
Neal North Energy Center - Closed CCR Monofill
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Monitoring Well	Formation	Current Monitoring Program	Change for next sampling event	Control Limit Exceedances	Total # of Samples in each monitoring program since December 1, 2015		
					Appendix III	Appendix IV	Corrective Measures
MW-1R	Alluvial Aquifer	Assessment	No Change	N/A	11	9	0
MW-3R	Alluvial Aquifer	Assessment	No Change	N/A	11	9	0
MW-5R	Alluvial Aquifer	Assessment	No Change	N/A	11	9	0
MW-13/13R (Background)	Alluvial Aquifer	Assessment	No Change	N/A	9	9	0
MW-19	Alluvial Aquifer	Assessment	No Change	N/A	11	9	0
MW-21	Alluvial Aquifer	Assessment	No Change	N/A	11	9	0
MW-27 (Background)	Alluvial Aquifer	Assessment	No Change	N/A	11	9	0
MW-29/29R (Background)	Alluvial Aquifer	Assessment	No Change	N/A	9	9	0
MW-223S (Background)	Alluvial Aquifer	Assessment	No Change	N/A	11	9	0
MW-231S/231SR (Background)	Alluvial Aquifer	Assessment	No Change	N/A	11	9	0
Other monitoring points							
MW-4	Deep Portion of Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-6	Deep Portion of Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-7	Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-8	Deep Portion of Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-9	Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-10	Deep Portion of Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-11/11R	Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-12	Deep Portion of Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-14	Deep Portion of Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-15R	Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-16	Deep Portion of Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-17	Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-18	Deep Portion of Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-20	Deep Portion of Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-22	Deep Portion of Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-23/23R	Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-24	Deep Portion of Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-25	Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-26	Deep Portion of Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-28	Deep Portion of Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-30	Deep Portion of Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-31	Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-32	Deep Portion of Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-56	Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-57/57R	Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-58S	Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-59S	Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0
MW-60S	Alluvial Aquifer	Gauging location	No Change	N/A	0	0	0

Comments:

None.

Table 2

Monitoring Program Implementation Schedule
2023 Annual Water Quality Report
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Monitoring Well	Recent Sampling Dates and Constituents					
	9/22/2020 - 9/24/2020	12/9/2020-12/10/2020	2/2/2021-2/4/2021	5/10/2021-5/11/2021	7/13/2021-7/15/2021	10/12/2021-10/14/2021
MW-1R	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-3R	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-5R	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-13/13R	Appendix III and IV	Appendix III and IV	Not Sampled	Not Sampled	Appendix III and IV	Appendix III and IV
MW-19	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-21	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-27	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-29/29R	Appendix III and IV	Appendix III and IV	Not Sampled	Not Sampled	Appendix III and IV	Appendix III and IV
MW-223S	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-231S/231SR	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV

Monitoring Well	Recent Sampling Dates and Constituents				
	3/8/2022-3/11/2022	6/7/2022-6/9/2022	9/12/2022-9/15/2022	3/27-3/29 & 4/3/2023	9/11/2023-9/13/2023
MW-1R	Appendix III and IV	Appendix III and IV	Appendix III	Appendix III	Appendix III and IV
MW-3R	Appendix III and IV	Appendix III and IV	Appendix III	Appendix III	Appendix III and IV
MW-5R	Appendix III and IV	Appendix III and IV	Appendix III	Appendix III	Appendix III and IV
MW-13/13R	Appendix III and IV	Appendix III and IV	Appendix III	Appendix III	Appendix III and IV
MW-19	Appendix III and IV	Appendix III and IV	Appendix III	Appendix III	Appendix III and IV
MW-21	Appendix III and IV	Appendix III and IV	Appendix III	Appendix III	Appendix III and IV
MW-27	Appendix III and IV	Appendix III and IV	Appendix III	Appendix III	Appendix III and IV
MW-29/29R	Appendix III and IV	Appendix III and IV	Appendix III	Appendix III	Appendix III and IV
MW-223S	Appendix III and IV	Appendix III and IV	Appendix III	Appendix III	Appendix III and IV
MW-231S/231SR	Appendix III and IV	Appendix III and IV	Appendix III	Appendix III	Appendix III and IV

Monitoring Well	Upcoming Sampling Dates and Constituents			
	March 2024	September 2024	March 2025	September 2025
MW-1R	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-3R	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-5R	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-13/13R	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-19	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-21	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-27	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-29/29R	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-223S	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV
MW-231S/231SR	Appendix III and IV	Appendix III and IV	Appendix III and IV	Appendix III and IV

Comments:

Appendix III - boron, calcium, chloride, fluoride, pH, sulfate, and total dissolved solids.

Appendix IV - antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, fluoride, lead, lithium, mercury, molybdenum, selenium, thallium, and radium 226 and 228 combined.

Table 3

**Monitoring Well Maintenance and Performance Revaluation Schedule
2023 Annual Water Quality Report
Neal North Energy Center - Closed CCR Monofill
Permit No. 97-SDP-12-95P**

Compliance with:				
	2020	2021	2022	2023
Check well depths (annual)	Completed	Completed	Completed	Completed

Compliance with:				
	2024	2025	2026	2027
Check well depths (annual)	Scheduled	Scheduled	Scheduled	Scheduled

Comments:
None.

Table 4

Monitoring Well Maintenance and Performance Summary
2023 Annual Water Quality Report
Neal North Energy Center - Closed CCR Monofill
Permit No. 97-SDP-12-95P

(includes all wells, underdrains etc.)

Well	Top of Casing	Top of Screen	Total Depth		Date of Measurements		Maximum Depth Discrepancy (ft)
					3/27/2023	9/11/2023	
MW-1R	1077.64	1065.69	37.00	Groundwater Level (ft)	23.49	20.18	-0.17
				Groundwater Elevation (Ft MSL)	1054.15	1057.46	
				Measured Well Depth (ft)	nm	37.17	
				Submerged screen	N	N	
MW-3R	1075.94	1064.34	36.60	Groundwater Level (ft)	21.82	18.25	-0.19
				Groundwater Elevation (Ft MSL)	1054.12	1057.69	
				Measured Well Depth (ft)	nm	36.79	
				Submerged screen	N	N	
MW-4	1076.18	1035.54	45.60	Groundwater Level (ft)	22.11	18.41	-0.27
				Groundwater Elevation (Ft MSL)	1054.07	1057.77	
				Measured Well Depth (ft)	nm	45.87	
				Submerged screen	Y	Y	
MW-5R	1079.54	1067.89	36.70	Groundwater Level (ft)	25.35	21.91	-0.17
				Groundwater Elevation (Ft MSL)	1054.19	1057.63	
				Measured Well Depth (ft)	nm	36.87	
				Submerged screen	N	N	
MW-6	1079.12	1037.25	46.90	Groundwater Level (ft)	24.92	21.48	-0.16
				Groundwater Elevation (Ft MSL)	1054.20	1057.64	
				Measured Well Depth (ft)	nm	47.06	
				Submerged screen	Y	Y	
MW-7	1075.96	1067.51	18.50	Groundwater Level (ft)	dry	dry	-0.14
				Groundwater Elevation (Ft MSL)	dry	dry	
				Measured Well Depth (ft)	nm	18.64	
				Submerged screen	N	N	
MW-8	1075.96	1035.66	45.30	Groundwater Level (ft)	22.46	18.81	0.14
				Groundwater Elevation (Ft MSL)	1053.50	1057.15	
				Measured Well Depth (ft)	nm	45.16	
				Submerged screen	Y	Y	
MW-9	1088.63	1069.98	28.70	Groundwater Level (ft)	dry	dry	-0.17
				Groundwater Elevation (Ft MSL)	dry	dry	
				Measured Well Depth (ft)	nm	28.87	
				Submerged screen	N	N	
MW-10	1088.69	1038.03	55.70	Groundwater Level (ft)	35.86	31.80	0.19
				Groundwater Elevation (Ft MSL)	1052.83	1056.89	
				Measured Well Depth (ft)	nm	55.51	
				Submerged screen	Y	Y	
MW-11R	1091.23	1065.10	41.10	Groundwater Level (ft)	35.88	32.72	0.02
				Groundwater Elevation (Ft MSL)	1055.35	1058.51	
				Measured Well Depth (ft)	nm	41.08	
				Submerged screen	N	N	
MW-12	1089.79	1037.58	57.20	Groundwater Level (ft)	34.11	31.13	0.12
				Groundwater Elevation (Ft MSL)	1055.68	1058.66	
				Measured Well Depth (ft)	nm	57.08	
				Submerged screen	Y	Y	
MW-13R	1089.22	1066.10	38.16	Groundwater Level (ft)	32.10	29.79	0.03
				Groundwater Elevation (Ft MSL)	1057.12	1059.43	
				Measured Well Depth (ft)	nm	38.13	
				Submerged screen	N	N	
MW-14	1087.64	1036.94	55.70	Groundwater Level (ft)	30.40	28.10	0.21
				Groundwater Elevation (Ft MSL)	1057.24	1059.54	
				Measured Well Depth (ft)	nm	55.49	
				Submerged screen	Y	Y	

Table 4

Monitoring Well Maintenance and Performance Summary
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(includes all wells, underdrains etc.)

Well	Top of Casing	Top of Screen	Total Depth		Date of Measurements		Maximum Depth Discrepancy (ft)
					3/27/2023	9/11/2023	
MW-15R	1089.45	1077.25	37.20	Groundwater Level (ft)	32.80	30.22	-0.13
				Groundwater Elevation (Ft MSL)	1056.65	1059.23	
				Measured Well Depth (ft)	nm	37.33	
				Submerged screen	N	N	
MW-16	1089.82	1042.17	52.70	Groundwater Level (ft)	33.21	30.68	-0.14
				Groundwater Elevation (Ft MSL)	1056.61	1059.14	
				Measured Well Depth (ft)	nm	52.84	
				Submerged screen	Y	Y	
MW-17	1088.34	1077.72	25.60	Groundwater Level (ft)	19.95	21.55	0.22
				Groundwater Elevation (Ft MSL)	1068.39	1066.79	
				Measured Well Depth (ft)	nm	25.38	
				Submerged screen	N	N	
MW-18	1088.34	1036.18	57.20	Groundwater Level (ft)	32.95	29.86	0.21
				Groundwater Elevation (Ft MSL)	1055.39	1058.48	
				Measured Well Depth (ft)	nm	56.99	
				Submerged screen	Y	Y	
MW-19	1088.76	1069.85	28.90	Groundwater Level (ft)	15.43	16.03	-0.22
				Groundwater Elevation (Ft MSL)	1073.33	1072.73	
				Measured Well Depth (ft)	nm	29.12	
				Submerged screen	Y	Y	
MW-20	1088.56	1036.85	56.70	Groundwater Level (ft)	26.55	24.95	-0.16
				Groundwater Elevation (Ft MSL)	1062.01	1063.61	
				Measured Well Depth (ft)	nm	56.86	
				Submerged screen	Y	Y	
MW-21	1087.51	1070.90	31.60	Groundwater Level (ft)	23.57	21.98	-0.52
				Groundwater Elevation (Ft MSL)	1063.94	1065.53	
				Measured Well Depth (ft)	nm	32.12	
				Submerged screen	N	N	
MW-22	1087.40	1035.90	56.50	Groundwater Level (ft)	32.72	29.38	-0.86
				Groundwater Elevation (Ft MSL)	1054.68	1058.02	
				Measured Well Depth (ft)	nm	57.36	
				Submerged screen	Y	Y	
MW-23R	1089.13	1062.90	41.25	Groundwater Level (ft)	36.03	32.15	-0.09
				Groundwater Elevation (Ft MSL)	1053.10	1056.98	
				Measured Well Depth (ft)	nm	41.34	
				Submerged screen	N	N	
MW-24	1090.00	1036.20	58.80	Groundwater Level (ft)	36.61	32.75	-0.62
				Groundwater Elevation (Ft MSL)	1053.39	1057.25	
				Measured Well Depth (ft)	nm	59.42	
				Submerged screen	Y	Y	
MW-25	1089.62	1065.90	33.70	Groundwater Level (ft)	27.82	28.84	-0.11
				Groundwater Elevation (Ft MSL)	1061.80	1060.78	
				Measured Well Depth (ft)	nm	33.81	
				Submerged screen	N	N	
MW-26	1089.59	1036.90	57.70	Groundwater Level (ft)	34.77	30.84	-0.10
				Groundwater Elevation (Ft MSL)	1054.82	1058.75	
				Measured Well Depth (ft)	nm	57.80	
				Submerged screen	Y	Y	
MW-27	1087.29	1063.90	33.40	Groundwater Level (ft)	30.58	27.99	-0.07
				Groundwater Elevation (Ft MSL)	1056.71	1059.30	
				Measured Well Depth (ft)	nm	33.47	
				Submerged screen	N	N	

Table 4

Monitoring Well Maintenance and Performance Summary
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(includes all wells, underdrains etc.)

Well	Top of Casing	Top of Screen	Total Depth		Date of Measurements		Maximum Depth Discrepancy (ft)
					3/27/2023	9/11/2023	
MW-28	1087.17	1033.90	58.30	Groundwater Level (ft)	30.46	27.89	-0.37
				Groundwater Elevation (Ft MSL)	1056.71	1059.28	
				Measured Well Depth (ft)	nm	58.67	
				Submerged screen	Y	Y	
MW-29R	1088.92	1068.70	35.20	Groundwater Level (ft)	31.86	29.60	0.05
				Groundwater Elevation (Ft MSL)	1057.06	1059.32	
				Measured Well Depth (ft)	nm	35.15	
				Submerged screen	N	N	
MW-30	1090.13	1040.30	54.80	Groundwater Level (ft)	32.76	30.52	-0.50
				Groundwater Elevation (Ft MSL)	1057.37	1059.61	
				Measured Well Depth (ft)	nm	55.30	
				Submerged screen	Y	Y	
MW-31	1091.78	1068.30	33.50	Groundwater Level (ft)	dry	31.72	-0.24
				Groundwater Elevation (Ft MSL)	dry	1060.06	
				Measured Well Depth (ft)	nm	33.74	
				Submerged screen	N	N	
MW-32	1091.78	1039.30	57.50	Groundwater Level (ft)	35.39	32.77	0.25
				Groundwater Elevation (Ft MSL)	1056.39	1059.01	
				Measured Well Depth (ft)	nm	57.25	
				Submerged screen	Y	Y	
MW-56	1094.60	1027.40	72.20	Groundwater Level (ft)	39.80	36.49	0.32
				Groundwater Elevation (Ft MSL)	1054.80	1058.11	
				Measured Well Depth (ft)	nm	71.88	
				Submerged screen	Y	Y	
MW-57R	1094.61	1061.90	47.75	Groundwater Level (ft)	40.16	36.75	0.04
				Groundwater Elevation (Ft MSL)	1054.45	1057.86	
				Measured Well Depth (ft)	nm	47.71	
				Submerged screen	N	N	
MW-58S	1089.12	1070.38	34.10	Groundwater Level (ft)	32.21	29.79	0.07
				Groundwater Elevation (Ft MSL)	1056.91	1059.33	
				Measured Well Depth (ft)	nm	34.03	
				Submerged screen	N	N	
MW-59S	1090.33	1065.05	40.30	Groundwater Level (ft)	35.60	32.22	0.21
				Groundwater Elevation (Ft MSL)	1054.73	1058.11	
				Measured Well Depth (ft)	nm	40.09	
				Submerged screen	N	N	
MW-60S	1094.85	1064.80	45.10	Groundwater Level (ft)	40.67	37.09	0.07
				Groundwater Elevation (Ft MSL)	1054.18	1057.76	
				Measured Well Depth (ft)	nm	45.03	
				Submerged screen	N	N	
MW-223S	1081.33	1069.59	26.74	Groundwater Level (ft)	24.06	22.18	0.05
				Groundwater Elevation (Ft MSL)	1057.27	1059.15	
				Measured Well Depth (ft)	nm	26.69	
				Submerged screen	N	N	
MW-231SR	1080.09	1066.02	29.07	Groundwater Level (ft)	25.88	22.59	0.05
				Groundwater Elevation (Ft MSL)	1054.21	1057.50	
				Measured Well Depth (ft)	nm	29.02	
				Submerged screen	N	N	

Comments:

nm - no measurement.

Table 5

Background Summary
2023 Annual Water Quality Report
Neal North Energy Center - Closed CCR Monofill
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Interwell Background/Control Limit (MW-13/13R, MW-27, MW-29/29R, MW-223S, and MW-231S/231SR)

Constituent	Units	Samples	Detections	Background level	Statistical Test	Action Level	Source
Appendix III							
Boron	mg/L	36	29	0.386	KM Normal	None	--
Calcium	mg/L	36	36	263.5	Normal	None	--
Chloride	mg/L	36	34	49.37	KM Approx. Lognormal	None	--
Fluoride	mg/L	36	0	< 0.500	Detection Limit	4.0	MCL ^a
pH	mg/L	36	36	7.0 J - 7.9 J	--	None	--
Sulfate	mg/L	36	36	481	WH Approx. Gamma (KM)	None	--
Total Dissolved Solids (TDS)	mg/L	36	36	1206	Normal	None	--
Appendix IV							
Antimony	mg/L	36	0	< 0.00200	Detection Limit	0.006	MCL ^a
Arsenic	mg/L	36	26	< 0.00200 - 0.0512	--	0.01	MCL ^a
Barium	mg/L	36	36	0.0508 - 0.348	--	2.0	MCL ^a
Beryllium	mg/L	36	0	< 0.00100	Detection Limit	0.004	MCL ^a
Cadmium	mg/L	36	5	0.000227	Non-parametric	0.005	MCL ^a
Chromium	mg/L	36	0	< 0.00500	Detection Limit	0.1	MCL ^a
Cobalt	mg/L	36	29	0.00456	KM Approx. Normal	0.006	GWPS ^b
Fluoride	mg/L	36	0	< 0.500	Detection Limit	4.0	MCL ^a
Lead	mg/L	36	0	< 0.000500	Detection Limit	0.015	GWPS ^b
Lithium	mg/L	36	36	0.205	Approx. Normal	0.040	GWPS ^b
Mercury	mg/L	36	0	< 0.000200	Detection Limit	0.002	MCL ^a
Molybdenum	mg/L	36	15	0.00351	KM Approx. Normal	0.100	GWPS ^b
Radium 226 and 228 combined	mg/L	36	30	1.764	KM Normal	5	MCL ^a
Selenium	mg/L	36	7	0.0332	KM Approx. Lognormal	0.05	MCL ^a
Thallium	mg/L	36	1	0.00122	Non-parametric	0.002	MCL ^a

Comments:

^a Maximum contaminant level (MCL).

^b Groundwater protection standard (GWPS) established under 40 CFR 257.95(h)(2).

Table 6

Summary of Well/Detected Constituent Pairs With No Immediately Preceding Control Limit Exceedances

**2023 Annual Water Quality Report
Neal North Energy Center - Closed CCR Monofill
Permit No. 97-SDP-12-95P**

Well	Constituent	Units	Most recent result	Control Limit
MW-1R	Radium-226 & 228	pCi/L	1.32 /1.88	1.76
MW-3R	N/A	--	N/A	N/A
MW-5R	N/A	--	N/A	N/A
MW-19	pH, lab	s.u.	6.7 J	7.0 J - 7.9 J
MW-21	pH, lab	s.u.	6.7 J	7.0 J - 7.9 J
	Cadmium	mg/L	0.000346	0.000227

Comments:

Only one assessment event since baseline, current Appendix IV exceedances are unverified SSIs.

Table 7

Summary of Ongoing and Newly Identified Control Limit Exceedances
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Neal North Energy Center - Closed CCR Monofill
Permit No. 97-SDP-12-95P

Well	Constituent	Units	Most recent result	Background Standard	Groundwater Protection Standard 40 CFR §257.95(h)
MW-1R	Molybdenum	mg/L	0.00489 /0.00517	0.00351	0.100
	Radium-226 & 228	mg/L	1.32 /1.88	1.76	5
MW-3R	N/A	--	N/A	N/A	N/A
MW-5R	Molybdenum	mg/L	0.00393	0.00351	0.100
MW-19	Boron	mg/L	0.606	0.386	None
	Calcium	mg/L	334	264	None
	pH, lab	s.u.	6.7 J	7.0 J - 7.9 J	None
	Sulfate	mg/L	736	481	None
	TDS	mg/L	2360	1206	None
	Cobalt	mg/L	0.0067	0.00456	0.006
	Lithium	mg/L	0.234	0.205	0.040
MW-21	Calcium	mg/L	474	264	None
	pH, lab	s.u.	6.7 J	7.0 J - 7.9 J	None
	Sulfate	mg/L	1550	481	None
	TDS	mg/L	3110	1206	None
	Cadmium	mg/L	0.000346	0.000227	0.005
	Lithium	mg/L	0.301	0.205	0.040

Comments:

Only one assessment event since baseline, current Appendix IV exceedances are unverified SSIs.

Table 8

Analytical Data Summary
2023 Annual Water Quality Report
Neal North Energy Center - Closed CCR Monofill
Permit No. 97-SDP-12-95P

Constituent (CAS #)	Sample Date	Units	MW-1R DwnGrad	MW-3R DwnGrad	MW-5R DwnGrad	MW-13/MW-13R Bkgrnd	MW-19 DwnGrad	MW-21 DwnGrad	MW-27 Bkgrnd	MW-29/MW-29R Bkgrnd	MW-223S Bkgrnd	MW-231S/MW-231SR Bkgrnd
Antimony (7440-36-0) MCL = 0.006	22-Sep-2020	mg/L	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
	9-Dec-2020	mg/L	< 0.00100	< 0.00100 / < 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
	1-Feb-2021	mg/L	< 0.00100	< 0.00100	< 0.00100	--	< 0.00100	< 0.00400	< 0.00100	--	< 0.00100 / < 0.00100	< 0.00100
	10-May-2021	mg/L	< 0.00200	< 0.00200	< 0.00200	--	< 0.00200	< 0.00200	< 0.00200	--	< 0.00200 / < 0.00200	< 0.00200
	12-Jul-2021	mg/L	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200 / < 0.00200	< 0.00200
	5-Oct-2021	mg/L	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200 / < 0.00200	< 0.00200
	8-Mar-2022	mg/L	< 0.00200	< 0.00200	< 0.00200	< 0.00200 / < 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
	7-Jun-2022	mg/L	< 0.00200	< 0.00200	< 0.00200	< 0.00200 / < 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
	12-Sep-2022	mg/L	--	--	--	< 0.00200	--	--	< 0.00200	< 0.00200	< 0.00200 / < 0.00200	< 0.00200
	27-Mar-2023	mg/L	--	--	--	< 0.00200	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	< 0.00200
	29-Mar-2023	mg/L	--	--	--	--	--	--	< 0.00200	< 0.00200	< 0.00200 / < 0.00200	--
	12-Sep-2023	mg/L	--	--	--	< 0.00200	--	--	< 0.00200	< 0.00200	< 0.00200 / < 0.00200	--
Arsenic (7440-38-2) MCL = 0.01	13-Sep-2023	mg/L	< 0.00200 / < 0.00200	< 0.00200	< 0.00200	--	< 0.00200	< 0.00200	--	--	--	< 0.00200
	22-Sep-2020	mg/L	0.0208	0.0314	0.0335	0.00200 U	0.00413	0.00200 U	0.00527	0.00200 U	0.00200 U	0.00200 U
	9-Dec-2020	mg/L	0.0379	0.0368 / 0.0388	0.0279	< 0.00200	< 0.00200	< 0.00200	0.00773	0.00762	0.00206	< 0.00200
	1-Feb-2021	mg/L	0.0226	0.0447	0.0446	--	0.00367	< 0.00200	0.00796	--	0.00220 / 0.00219	< 0.00200
	10-May-2021	mg/L	0.0140	0.0429	0.0337	--	0.00415	< 0.00200	0.0146	--	0.00302 / 0.00347	< 0.00200
	12-Jul-2021	mg/L	0.0191	0.0416	0.0351	0.0382	0.00821	< 0.00200	0.0101	0.0206	0.00403 / 0.00346	< 0.00200
	5-Oct-2021	mg/L	0.0221	0.0448	0.0347	0.0472	0.00523	< 0.00200	0.0202	0.0273	0.00516 / 0.00698	< 0.00200
	8-Mar-2022	mg/L	0.0452	0.0365	0.0378	0.0512 / 0.0498	0.00357	< 0.00200	0.0310	0.0314	0.00929	0.00850
	7-Jun-2022	mg/L	0.0400	0.0348	0.0345	0.0441 / 0.0457	0.00340	< 0.00200	0.0414	0.0320	0.00969	0.00440
	12-Sep-2022	mg/L	--	--	--	0.0459	--	--	0.0359	0.0240	0.0116 / 0.0117	0.0146
	27-Mar-2023	mg/L	--	--	--	0.0510	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	0.0121
	29-Mar-2023	mg/L	--	--	--	--	--	--	0.0513	0.0258	0.0172 / 0.0167	--
Barium (7440-39-3) MCL = 2.0	12-Sep-2023	mg/L	--	--	--	0.0483 J+	--	--	0.0616 J+	0.0233 J+	0.0133 J+ / 0.0132 J+	--
	13-Sep-2023	mg/L	0.0436 / 0.0420	0.0418	0.0283	--	0.00298	< 0.00200	--	--	--	0.00967
	22-Sep-2020	mg/L	0.0668	0.211	0.165	0.119	0.0227	0.0290	0.0847	0.195	0.203	0.0969
	9-Dec-2020	mg/L	0.0958	0.156 / 0.157	0.142	0.221	0.0251	0.0301	0.109	0.226	0.253	0.116
	1-Feb-2021	mg/L	0.0855	0.191	0.195	--	0.0208	0.0280	0.0876	--	0.233 / 0.236	0.0903
	10-May-2021	mg/L	0.0891	0.306	0.206	--	0.0221	0.0561	0.106	--	0.264 / 0.262	0.120
	12-Jul-2021	mg/L	0.0925	0.267	0.182	0.253	0.0214	0.0639	0.109	0.289	0.281 / 0.258	0.0508
	5-Oct-2021	mg/L	0.0884	0.305	0.180	0.236	0.0207	0.0372	0.103	0.271	0.314 / 0.348	0.0875
	8-Mar-2022	mg/L	0.118	0.209	0.278	0.272 / 0.262	0.0230	0.0222	0.107	0.268	0.282	0.125
	7-Jun-2022	mg/L	0.101	0.290	0.161	0.262 / 0.262	0.0229	0.0187	0.123	0.255	0.341	0.115
	12-Sep-2022	mg/L	--	--	--	0.211	--	--	0.124	0.226	0.330 / 0.314	0.133
	27-Mar-2023	mg/L	--	--	--	0.200	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	0.136
Beryllium (7440-41-7) MCL = 0.004	29-Mar-2023	mg/L	--	--	--	--	--	--	0.130	0.261	0.377 / 0.382	--
	12-Sep-2023	mg/L	--	--	--	0.210 J+	--	--	0.164 J+	0.248 J+	0.256 J+ / 0.244 J+	--
	13-Sep-2023	mg/L	0.0966 / 0.0917	0.292	0.100	--	0.0166	0.0139	--	--	--	0.120
	22-Sep-2020	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
	9-Dec-2020	mg/L	< 0.00100	< 0.00100 / < 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
	1-Feb-2021	mg/L	< 0.00100	< 0.00100	< 0.00100	--	< 0.00100	< 0.00100	< 0.00100	--	< 0.00100 / < 0.00100	< 0.00100
	10-May-2021	mg/L	< 0.00100	< 0.00100	< 0.00100	--	< 0.00100	< 0.00100	< 0.00100	--	< 0.00100 / < 0.00100	< 0.00100
	12-Jul-2021	mg/L	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100 / < 0.00100	< 0.00100
	5-Oct-2021	mg/L	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100 / < 0.00100	< 0.00100
	8-Mar-2022	mg/L	< 0.00100	< 0.00100	< 0.00100	< 0.00100 / < 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
	7-Jun-2022	mg/L	< 0.00100	< 0.00100	< 0.00100	< 0.00100 / < 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
	12-Sep-2022	mg/L	--	--	--	< 0.00100	--	--	< 0.00100	< 0.00100	< 0.00100 / < 0.00100	< 0.00100
	27-Mar-2023	mg/L	--	--	--	< 0.00100	--	--	--	--	--	--
Boron (7440-42-8) N/A	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	< 0.00100
	29-Mar-2023	mg/L	--	--	--	--	--	--	< 0.00100	< 0.00100	< 0.00100 / < 0.00100	--
	12-Sep-2023	mg/L	--	--	--	< 0.00100	--	--	< 0.00100	< 0.00100	< 0.00100 / < 0.00100	--
	13-Sep-2023	mg/L	< 0.00100 / < 0.00100	< 0.00100	< 0.00100	--	< 0.00100	< 0.00100	--	--	--	< 0.00100
	22-Sep-2020	mg/L	0.417	0.738	0.233	0.100 U	0.589	0.352	0.302	0.197	0.100 U	0.222
	9-Dec-2020	mg/L	0.402	0.914 / 0.923	0.243	0.139	0.672	0.359	0.305	0.183	< 0.100	0.196
	1-Feb-2021	mg/L	0.398	0.629	0.289	--	0.654	0.391	0.272	--	< 0.100 / < 0.100	0.337
	10-May-2021	mg/L	0.370	0.294	0.177	--	0.701	0.299	0.271	--	< 0.100 / < 0.100	0.291
	12-Jul-2021	mg/L	0.412 J	0.300 J	0.182 J	0.114	0.565 J	0.297 J	0.274	0.230	< 0.100 / < 0.100	0.358
	5-Oct-2021	mg/L	0.342	0.289	0.189	0.134	0.466	0.301	0.243	0.194	0.112 / 0.121	0.415
	8-Mar-2022	mg/L	0.384	0.353	0.287	0.108 / 0.112	0.740	0.474	0.251	0.199	0.103	0.231
	7-Jun-2022	mg/L	0.361	0.338	0.418	0.110 / 0.105	0.634	0.345	0.203	0.144	< 0.100	0.297
	12-Sep-2022	mg/L	0.395 / 0.375	0.327	0.257	0.113	0.619	0.363	0.226	0.143	0.100 / 0.106	0.312
	27-Mar-2023	mg/L	--	--	--	0.138	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	0.500
	29-Mar-2023	mg/L	--	--	--	--	--	--	0.246	0.158	0.140 / 0.137	--
	3-Apr-2023	mg/L	0.331 / 0.336	0.258	0.297	--	0.584	0.329	--	--	--	--
	12-Sep-2023	mg/L	--	--	--	0.122 J+	--	--	0.222 J+	0.184 J+	0.154 J+ / 0.149 J+	--
	13-Sep-2023	mg/L	0.460 / 0.476	0.352	0.427	--	0.606	0.519	--	--	--	0.253
	5-Dec-2023	mg/L	--	--	--	--	--	0.337	--	--	--	--

Table 8

Analytical Data Summary
2023 Annual Water Quality Report
Neal North Energy Center - Closed CCR Monofill
Permit No. 97-SDP-12-95P

Constituent (CAS #)	Sample Date	Units	MW-1R DwnGrad	MW-3R DwnGrad	MW-5R DwnGrad	MW-13/MW-13R Bkgrnd	MW-19 DwnGrad	MW-21 DwnGrad	MW-27 Bkgrnd	MW-29/MW-29R Bkgrnd	MW-223S Bkgrnd	MW-231S/MW-231SR Bkgrnd
Cadmium (7440-43-9) MCL = 0.005	22-Sep-2020	mg/L	0.000100 U	0.000100 U	0.000100 U	0.000100 U	0.000100 U	0.000173	0.000114	0.000100 U	0.000100 U	0.000100 U
	9-Dec-2020	mg/L	< 0.000100	< 0.000100	< 0.000100	0.000227	< 0.000100	< 0.000100	< 0.000100	< 0.000100	0.000123	0.000139
	1-Feb-2021	mg/L	0.000409	0.000776	< 0.000100	--	< 0.000100	< 0.000100	< 0.000100	--	< 0.000100 / < 0.000100	0.000119
	10-May-2021	mg/L	< 0.000100	< 0.000100	< 0.000100	--	< 0.000100	< 0.000100	< 0.000100	--	< 0.000100 / < 0.000100	< 0.000100
	12-Jul-2021	mg/L	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100 / < 0.000100	< 0.000100
	5-Oct-2021	mg/L	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100	0.000121	< 0.000100	< 0.000100	< 0.000100 / < 0.000100	< 0.000100
	8-Mar-2022	mg/L	< 0.000100	< 0.000100	< 0.000100	< 0.000100 / < 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100
	7-Jun-2022	mg/L	< 0.000100	< 0.000100	< 0.000100	< 0.000100 / < 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100
	12-Sep-2022	mg/L	--	--	--	< 0.000100	--	--	< 0.000100	< 0.000100	< 0.000100 / < 0.000100	< 0.000100
	27-Mar-2023	mg/L	--	--	--	0.000211	--	--	--	--	--	< 0.000100
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	--
	29-Mar-2023	mg/L	--	--	--	--	--	--	< 0.000200	< 0.000100	< 0.000100 / < 0.000100	--
	12-Sep-2023	mg/L	--	--	--	< 0.000200	--	--	0.000207 J+	< 0.000200	< 0.000200 / < 0.000200	--
	13-Sep-2023	mg/L	< 0.000200 / < 0.000200	< 0.000200	< 0.000200	--	< 0.000200	0.000346	--	--	--	< 0.000200
Calcium (7440-70-2) N/A	22-Sep-2020	mg/L	127	161	92.8	160	350	341	178	148	104	196
	9-Dec-2020	mg/L	155	157 / 166	112	205	301	438	212	167	127	238
	1-Feb-2021	mg/L	132	129	117	--	349	480	170	--	106 / 105	216
	10-May-2021	mg/L	145	142	126	--	379	188	174	--	120 / 116	234
	12-Jul-2021	mg/L	151	138	112	158	562	265	184	209	112 / 119	294
	5-Oct-2021	mg/L	137	145	109	150	424	397	162	207	126 / 129	215
	8-Mar-2022	mg/L	167	130	175	175 / 172	339	464	166	201	117	191
	7-Jun-2022	mg/L	149	130	158	126 / 129	372	509	118	136	114	178
	12-Sep-2022	mg/L	152 / 155	150	132	137	389	498	162	177	135 / 138	200
	27-Mar-2023	mg/L	--	--	--	130	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	204
	29-Mar-2023	mg/L	--	--	--	--	--	--	158	200	186 / 188	--
	3-Apr-2023	mg/L	182 / 182	154	192	--	415	523	--	--	--	--
	12-Sep-2023	mg/L	--	--	--	135	--	--	169	222	122 / 126	--
	13-Sep-2023	mg/L	153 / 144	143	92.9	--	334	474	--	--	--	172
Chloride (16887-00-6) N/A	22-Sep-2020	mg/L	27.9	20.9	9.02	15.3	19.0	6.61	18.9	10.1	5.12	10.6
	9-Dec-2020	mg/L	28.4	17.3 / 18.6	8.71	15.3	17.4	7.63	28.5	10.6	7.15	12.8
	1-Feb-2021	mg/L	28.4	17.3	9.92	--	19.0	7.30	22.9	--	6.27 / 6.03	9.58
	10-May-2021	mg/L	27.4	19.9	8.33	--	15.9	< 5.00	16.9	--	< 5.00 / < 5.00	6.12
	12-Jul-2021	mg/L	31.7	18.8	8.97	35.9 J-	17.8	6.58	13.1 J-	9.75 J-	6.26 J- / 6.40 J-	9.27 J-
	5-Oct-2021	mg/L	68.0	21.2	8.94	42.1	19.4	6.12	17.7	9.81	5.25 / 5.24	9.62
	8-Mar-2022	mg/L	33.2	7.64	13.1	74.6 / 73.3	16.3	6.88	15.2	12.1	< 5.00	5.37
	7-Jun-2022	mg/L	40.1	10.8	11.3	42.8 / 42.5	17.8	7.11	11.8	12.0	5.58	12.8
	12-Sep-2022	mg/L	62.5 / 64.5	9.83	9.73	16.7	17.8	1.37	12.5	10.6	4.08 / 4.02	5.69
	27-Mar-2023	mg/L	--	--	--	18.9	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	9.32
	29-Mar-2023	mg/L	--	--	--	--	--	--	11.9	11.9	6.06 J / < 1.00 J	--
	3-Apr-2023	mg/L	34.6 / 34.4	10.0	13.7	--	18.0	7.94	--	--	--	--
	12-Sep-2023	mg/L	--	--	--	12.3	--	--	13.9	10.8	4.37 / 5.00	--
	13-Sep-2023	mg/L	61.9 / 61.5	9.02	10.4	--	19.1	8.18	--	--	--	< 1.00
Chromium (7440-47-3) MCL = 0.1	22-Sep-2020	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
	9-Dec-2020	mg/L	< 0.00500	< 0.00500 / < 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
	1-Feb-2021	mg/L	< 0.00500	< 0.00500	< 0.00500	--	< 0.00500	< 0.00500	< 0.00500	--	< 0.00500 / < 0.00500	< 0.00500
	10-May-2021	mg/L	< 0.00500	< 0.00500	< 0.00500	--	< 0.00500	< 0.00500	< 0.00500	--	< 0.00500 / < 0.00500	< 0.00500
	12-Jul-2021	mg/L	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500 / < 0.00500	< 0.00500
	5-Oct-2021	mg/L	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500 / < 0.00500	< 0.00500
	8-Mar-2022	mg/L	< 0.00500	< 0.00500	< 0.00500	< 0.00500 / < 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
	7-Jun-2022	mg/L	< 0.00500	< 0.00500	< 0.00500	< 0.00500 / < 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
	12-Sep-2022	mg/L	--	--	--	< 0.00500	--	--	< 0.00500	< 0.00500	< 0.00500 / < 0.00500	< 0.00500
	27-Mar-2023	mg/L	--	--	--	< 0.00500	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	< 0.00500
	29-Mar-2023	mg/L	--	--	--	--	--	--	< 0.00500	< 0.00500	< 0.00500 / < 0.00500	--
	12-Sep-2023	mg/L	--	--	--	< 0.00500	--	--	< 0.00500	< 0.00500	< 0.00500 / < 0.00500	--
	13-Sep-2023	mg/L	< 0.00500 / < 0.00500	< 0.00500	< 0.00500	--	< 0.00500	< 0.00500	--	--	--	< 0.00500
Cobalt (7440-48-4) GWPS = 0.006	22-Sep-2020	mg/L	0.00104	0.000848	0.000500 U	0.000500 U	0.0107	0.000510	0.00154	0.000500 U	0.000500 U	0.00225
	9-Dec-2020	mg/L	0.000998	0.00155 / 0.00161	0.000604	< 0.000500	0.00389	0.000956	0.00142	0.00269	< 0.000500	< 0.000500
	1-Feb-2021	mg/L	0.000747	0.00131	0.000550	--	0.00890	0.00664	0.00102	--	< 0.000500 / < 0.000500	0.00188
	10-May-2021	mg/L	< 0.000500	0.000526	0.000613	--	0.0103	< 0.000500	0.000977	--	0.000764 / 0.000712	0.00188
	12-Jul-2021	mg/L	0.000595	0.000647	0.000543	0.00335	0.0225	< 0.000500	0.000940	0.00694	0.00104 / 0.000914	0.000539
	5-Oct-2021	mg/L	< 0.000500	< 0.000500	< 0.000500	0.00125	0.0121	< 0.000500	0.000759	0.00442	0.00128 / 0.00118	0.00216
	8-Mar-2022	mg/L	< 0.000500	< 0.000500	0.000730	0.00137 / 0.00141	0.00806	0.00397	0.000666	0.00354	0.000653	0.00351
	7-Jun-2022	mg/L	< 0.000500	< 0.000500	0.000613	0.00110 / 0.00107	0.00845	0.00151	0.000699	0.00254	0.000969	0.00275
	12-Sep-2022	mg/L	--	--	--	0.000940	--	--	0.000650	0.00251	0.000905 / 0.000885	0.00323
	27-Mar-2023	mg/L	--	--	--	0.00105	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	0.00330
	29-Mar-2023	mg/L	--	--	--	--	--	--	0.000561	0.00265	0.00107 / 0.00103	--
	12-Sep-2023	mg/L	--	--	--	0.000806 J+	--	--	0.000978 J+	0.00270 J+	0.000638 J+ / 0.000667 J+	--
	13-Sep-2023	mg/L	< 0.000500 / < 0.000500	< 0.000500	< 0.000500	--	0.00670	0.000983	--	--	--	0.00257

Table 8

Analytical Data Summary
2023 Annual Water Quality Report
Neal North Energy Center - Closed CCR Monofill
Permit No. 97-SDP-12-95P

Constituent (CAS #)	Sample Date	Units	MW-1R DwnGrad	MW-3R DwnGrad	MW-5R DwnGrad	MW-13/MW-13R Bkgrnd	MW-19 DwnGrad	MW-21 DwnGrad	MW-27 Bkgrnd	MW-29/MW-29R Bkgrnd	MW-223S Bkgrnd	MW-231S/MW-231SR Bkgrnd
Fluoride (16984-48-8) MCL = 4.0	22-Sep-2020	mg/L	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
	9-Dec-2020	mg/L	< 0.500	< 0.500 / < 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500
	1-Feb-2021	mg/L	< 0.500	< 0.500	< 0.500	--	< 0.500	< 0.500	< 0.500	--	< 0.500 / < 0.500	< 0.500
	10-May-2021	mg/L	0.808	0.631	0.675	--	< 0.500	< 0.500	< 0.500	--	< 0.500 / < 0.500	< 0.500
	12-Jul-2021	mg/L	< 0.500	< 0.500	< 0.500	< 0.500 J	< 0.500	< 0.500	< 0.500 J	< 0.500 J	< 0.500 J / < 0.500 J	< 0.500 J
	5-Oct-2021	mg/L	< 0.500	< 0.500	< 0.500	< 0.500	2.36	2.85	< 0.500	< 0.500	< 0.100 / < 0.100	< 0.100
	8-Mar-2022	mg/L	< 0.500	< 0.500	< 0.500	< 0.500 / < 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500
	7-Jun-2022	mg/L	< 0.500	< 0.500	< 0.500	< 0.500 / < 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500
	12-Sep-2022	mg/L	< 0.500 / < 0.500	< 0.500	0.652	< 0.500	< 0.500	< 0.100	< 0.500	< 0.500	< 0.100 / < 0.100	< 0.100
	27-Mar-2023	mg/L	--	--	--	< 0.500	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	0.163
	29-Mar-2023	mg/L	--	--	--	--	--	--	< 0.500	< 0.500	< 0.500 / 0.269	--
	3-Apr-2023	mg/L	< 0.500 / < 0.500	< 0.500	< 0.500	--	< 0.500	0.791	--	--	--	--
	12-Sep-2023	mg/L	--	--	--	< 1.00	--	--	< 1.00	< 1.00	< 0.200 / < 1.00	--
Lead (7439-92-1) GWPS = 0.015	13-Sep-2023	mg/L	< 1.00 / < 1.00	< 1.00	< 1.00	--	< 1.00	< 1.00	--	--	--	< 0.200
	22-Sep-2020	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
	9-Dec-2020	mg/L	< 0.000500	< 0.000500 / < 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500
	1-Feb-2021	mg/L	< 0.000500	0.00160	< 0.000500	--	< 0.000500	< 0.000500	< 0.000500	--	< 0.000500 / < 0.000500	< 0.000500
	10-May-2021	mg/L	< 0.000500	< 0.000500	< 0.000500	--	< 0.000500	< 0.000500	< 0.000500	--	< 0.000500 / < 0.000500	< 0.000500
	12-Jul-2021	mg/L	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500 / < 0.000500	< 0.000500
	5-Oct-2021	mg/L	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500 / < 0.000500	< 0.000500
	8-Mar-2022	mg/L	< 0.000500	< 0.000500	< 0.000500	< 0.000500 / < 0.000500	0.000747	0.000899	< 0.000500	< 0.000500	< 0.000500	< 0.000500
	7-Jun-2022	mg/L	< 0.000500	< 0.000500	< 0.000500	< 0.000500 / < 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500
	12-Sep-2022	mg/L	--	--	--	< 0.000500	--	--	< 0.000500	< 0.000500	< 0.000500 / < 0.000500	< 0.000500
	27-Mar-2023	mg/L	--	--	--	0.000593	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	< 0.000500
	29-Mar-2023	mg/L	--	--	--	--	--	--	< 0.000500	< 0.000500	< 0.000500 / < 0.000500	--
	12-Sep-2023	mg/L	--	--	--	< 0.000500	--	--	0.000513 J+	< 0.000500	< 0.000500 / < 0.000500	--
Lithium (7439-93-2) GWPS = 0.040	13-Sep-2023	mg/L	< 0.000500 / < 0.000500	< 0.000500	< 0.000500	--	< 0.000500	< 0.000500	--	--	--	< 0.000500
	22-Sep-2020	mg/L	0.0656	0.0854	0.0565	0.0982	0.222	0.244	0.196	0.0934	0.0418	0.0776
	9-Dec-2020	mg/L	0.0813	0.0982 / 0.0969	0.0649	0.130	0.239	0.316	0.243	0.112	0.0500	0.0929
	1-Feb-2021	mg/L	0.0747	0.0877	0.0695	0.273	0.332	0.187	--	--	0.0517 / 0.0492	0.0952
	10-May-2021	mg/L	0.0711	0.0837	0.0717	0.245	0.188	0.169	--	--	0.0545 / 0.0544	0.100
	12-Jul-2021	mg/L	0.0755	0.0844	0.0697	0.0806	0.300	0.233	0.187	0.131	0.0572 / 0.0584	0.0994
	5-Oct-2021	mg/L	0.0503	0.0615	0.0489	0.0582	0.200	0.208	0.115	0.0865	0.0581 / 0.0544	0.102
	8-Mar-2022	mg/L	0.0812	0.0854	0.0808	0.0900 / 0.0868	0.254	0.334	0.159	0.126	0.0504	0.109
	7-Jun-2022	mg/L	0.0709	0.0793	0.0723	0.0841 / 0.0816	0.254	0.321	0.118	0.101	0.0581	0.0964
	12-Sep-2022	mg/L	--	--	--	0.0830	--	--	0.141	0.103	0.0565 / 0.0572	0.104
	27-Mar-2023	mg/L	--	--	--	0.0873	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	0.110
	29-Mar-2023	mg/L	--	--	--	--	--	--	0.129	0.109	0.0674 / 0.0684	--
	12-Sep-2023	mg/L	--	--	--	0.0880 J+	--	--	0.113 J+	0.118 J+	0.0517 J+ / 0.0504 J+	--
Mercury (7439-97-6) MCL = 0.002	13-Sep-2023	mg/L	0.0600 / 0.0660	0.0763	0.0578	--	0.234	0.301	--	--	--	0.0851
	22-Sep-2020	mg/L	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
	9-Dec-2020	mg/L	< 0.000200	< 0.000200 / < 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200
	1-Feb-2021	mg/L	< 0.000200	< 0.000200	< 0.000200	--	< 0.000200	< 0.000200	< 0.000200	--	< 0.000200 / < 0.000200	< 0.000200
	10-May-2021	mg/L	< 0.000200	< 0.000200	< 0.000200	--	< 0.000200	< 0.000200	< 0.000200	--	< 0.000200 / < 0.000200	< 0.000200
	12-Jul-2021	mg/L	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200 / < 0.000200	< 0.000200
	5-Oct-2021	mg/L	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200 / < 0.000200	< 0.000200
	8-Mar-2022	mg/L	< 0.000200	< 0.000200	< 0.000200	< 0.000200 / < 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200
	7-Jun-2022	mg/L	< 0.000200	< 0.000200	< 0.000200	< 0.000200 / < 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200
	12-Sep-2022	mg/L	--	--	--	< 0.000200	--	--	< 0.000200	< 0.000200	< 0.000200 / < 0.000200	< 0.000200
	27-Mar-2023	mg/L	--	--	--	< 0.000200	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	< 0.000200
	29-Mar-2023	mg/L	--	--	--	--	--	--	< 0.000200	< 0.000200	< 0.000200 / < 0.000200	--
	12-Sep-2023	mg/L	--	--	--	< 0.000200	--	--	< 0.000200	< 0.000200	< 0.000200 / < 0.000200	--
Molybdenum (7439-98-7) GWPS = 0.100	13-Sep-2023	mg/L	< 0.000200 / < 0.000200	< 0.000200	< 0.000200	--	< 0.000200	< 0.000200	--	--	--	< 0.000200
	22-Sep-2020	mg/L	0.00394	0.00200 U	0.00394	0.00231	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
	9-Dec-2020	mg/L	0.00421	< 0.00200 / < 0.00200	0.00394	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200	0.00316	< 0.00200
	1-Feb-2021	mg/L	0.00554	0.00651	0.00448	--	< 0.00200	< 0.00200	< 0.00200	--	0.00221 / 0.00238	0.00200
	10-May-2021	mg/L	0.00527	0.00212	0.00401	--	< 0.00200	< 0.00200	< 0.00200	--	0.00272 / 0.00218	< 0.00200
	12-Jul-2021	mg/L	0.00568	0.00240	0.00423	0.00420	< 0.00200	< 0.00200	< 0.00200	0.00335	0.00258 / 0.00226	< 0.00200
	5-Oct-2021	mg/L	0.00464	0.00210	0.00363	0.00286	< 0.00200	< 0.00200	< 0.00200	< 0.00200	0.00240 / 0.00239	< 0.00200
	8-Mar-2022	mg/L	0.00425	0.00212	0.00355	0.00321 / 0.00309	< 0.00200	< 0.00200	< 0.00200	< 0.00200	0.00246	0.00242
	7-Jun-2022	mg/L	0.00526	0.00219	0.00383	0.00359 / 0.00407	< 0.00200	< 0.00200	< 0.00200	< 0.00200	0.00241	< 0.00200
	12-Sep-2022	mg/L	--	--	--	0.00395	--	--	< 0.00200	< 0.00200	0.00265 / 0.00259	0.00205
	27-Mar-2023	mg/L	--	--	--	0.00492	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	0.00347
	29-Mar-2023	mg/L	--	--	--	--	--	--	< 0.00200	0.00232	0.00288 / 0.00296	--
	12-Sep-2023	mg/L	--	--	--	0.00411 J+	--	--	0.00284 J+	0.00205 J+	0.00291 J+ / 0.00305 J+	--
	13-Sep-2023	mg/L	0.00489 / 0.00517	0.00236	0.00393	--	< 0.00200	< 0.00200	--	--	--	0.00219

Table 8

Analytical Data Summary
2023 Annual Water Quality Report
Neal North Energy Center - Closed CCR Monofill
Permit No. 97-SDP-12-95P

Constituent (CAS #)	Sample Date	Units	MW-1R DwnGrad	MW-3R DwnGrad	MW-5R DwnGrad	MW-13/MW-13R Bkgnd	MW-19 DwnGrad	MW-21 DwnGrad	MW-27 Bkgnd	MW-29/MW-29R Bkgnd	MW-223S Bkgnd	MW-231S/MW-231SR Bkgnd
pH, lab	22-Sep-2020	s.u.	7.3 J	7.2 J	7.3 J	7.2 J	6.7 J	7.2 J	7.0 J	7.0 J	7.5 J	7.1 J
N/A	9-Dec-2020	s.u.	7.2 J	7.1 J / 7.1 J	7.2 J	7.4 J	6.9 J	6.8 J	7.1 J	7.2 J	7.4 J	7.1 J
	1-Feb-2021	s.u.	7.6 J	7.5 J	7.5 J	--	7.1 J	7.2 J	7.1 J	--	7.6 J / 7.6 J	7.2 J
	10-May-2021	s.u.	7.2 J	7.3 J	7.2 J	--	6.7 J	7.1 J	7.0 J	--	7.5 J / 7.6 J	7.2 J
	12-Jul-2021	s.u.	7.3 J	7.4 J	7.3 J	7.2 J	6.7 J	7.0 J	7.1 J	7.0 J	7.5 J / 7.4 J	7.2 J
	5-Oct-2021	s.u.	7.3 J	7.4 J	7.4 J	7.2 J	6.6 J	6.9 J	7.1 J	7.1 J	7.4 J / 7.9 J	7.4 J
	8-Mar-2022	s.u.	7.3 J	7.3 J	7.4 J	7.2 J / 7.2 J	6.8 J	6.8 J	7.3 J	7.2 J	7.4 J	7.4 J
	7-Jun-2022	s.u.	7.2 J	7.3 J	7.2 J	7.3 J / 7.2 J	6.8 J	6.8 J	7.2 J	7.1 J	7.5 J	7.2 J
	12-Sep-2022	s.u.	7.3 J / 7.5 J	8.2 J	7.3 J	7.2 J	7.2 J	7.0 J	7.2 J	7.1 J	7.4 J / 7.5 J	7.1 J
	27-Mar-2023	s.u.	--	--	--	7.3 J	--	--	--	--	--	--
	28-Mar-2023	s.u.	--	--	--	--	--	--	--	--	--	7.2 J
	29-Mar-2023	s.u.	--	--	--	--	--	--	7.1 J	7.1 J	7.4 J / 7.4 J	--
	3-Apr-2023	s.u.	7.2 J / 7.3 J	7.4 J	7.3 J	--	6.7 J	6.8 J	--	--	--	--
	12-Sep-2023	s.u.	--	--	--	7.2 J	--	--	7.1 J	7.0 J	7.4 J / 7.5 J	--
	13-Sep-2023	s.u.	7.2 J / 7.1 J	7.2 J	7.3 J	--	6.7 J	6.7 J	--	--	--	7.1 J
Radium-226 & 228	22-Sep-2020	pCi/L	1.58 ± 0.436	1.15 ± 0.473	0.683 ± 0.537 U	0.595 ± 0.409 U	0.920 ± 0.388	1.17 ± 0.397	1.02 ± 0.453	1.67 ± 0.467	1.37 ± 0.421	0.973 ± 0.416
MCL = 5.0	9-Dec-2020	pCi/L	< 0.460	1.23 / < 0.235	< 0.274	0.735	< 0.383	< 0.471	0.728	0.579	0.497	0.994
	1-Feb-2021	pCi/L	< 0.484	0.764	< -0.0292	--	0.720	< 0.120	0.675	--	< -0.0527 / < 0.0912	< 0.349
	10-May-2021	pCi/L	< -0.0461	0.707	0.732	--	< 0.123	< 0.291	0.573	--	0.618 / 0.808	< 0.429
	12-Jul-2021	pCi/L	0.379	0.878	0.734	1.53	0.662	0.546	0.898	1.79	< 0.270 / 0.658	< 0.291
	5-Oct-2021	pCi/L	< 0.0779	< 0.470	0.669	1.12	0.815	0.696	0.803	0.865	0.698 / 0.785	0.582
	8-Mar-2022	pCi/L	0.757	0.504	0.608	0.794 / 1.16	0.777	0.353	1.14	1.18	0.438	0.925
	7-Jun-2022	pCi/L	0.822	1.15	< 0.491	1.22 / 0.878	< 0.456	0.626	< 0.361	1.33	0.832	0.902
	12-Sep-2022	pCi/L	--	--	--	1.73	--	--	1.15	0.937	0.858 / 1.04	1.23
	27-Mar-2023	pCi/L	--	--	--	1.18	--	--	--	--	--	--
	28-Mar-2023	pCi/L	--	--	--	--	--	--	--	--	--	< 0.362
	29-Mar-2023	pCi/L	--	--	--	--	--	--	< 0.0863	0.842	0.877 / < 0.468	--
	12-Sep-2023	pCi/L	--	--	--	0.996	--	--	1.46	1.15	1.15 / 0.795	--
	13-Sep-2023	pCi/L	1.32 / 1.88	1.46	1.04	--	0.984	1.17	--	--	--	1.48
Selenium (7782-49-2)	22-Sep-2020	mg/L	0.00500 U	0.00500 U	0.00500 U	0.0982	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.0174
MCL = 0.05	9-Dec-2020	mg/L	< 0.00500	< 0.00500 / < 0.00500	< 0.00500	0.111	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	0.0144
	1-Feb-2021	mg/L	< 0.00500	< 0.00500	< 0.00500	--	< 0.00500	< 0.00500	< 0.00500	--	< 0.00500 / < 0.00500	0.0165
	10-May-2021	mg/L	< 0.00500	< 0.00500	< 0.00500	--	< 0.00500	0.0398	< 0.00500	--	< 0.00500 / < 0.00500	< 0.00500
	12-Jul-2021	mg/L	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	0.00549	< 0.00500	< 0.00500	< 0.00500 / < 0.00500	0.00984
	5-Oct-2021	mg/L	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500 / < 0.00500	0.00624
	8-Mar-2022	mg/L	< 0.00500	< 0.00500	< 0.00500	< 0.00500 / < 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
	7-Jun-2022	mg/L	< 0.00500	< 0.00500	< 0.00500	< 0.00500 / < 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
	12-Sep-2022	mg/L	--	--	--	< 0.00500	--	--	< 0.00500	< 0.00500	< 0.00500 / < 0.00500	< 0.00500
	27-Mar-2023	mg/L	--	--	--	< 0.00500	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	< 0.00500
	29-Mar-2023	mg/L	--	--	--	--	--	--	< 0.00500	< 0.00500	< 0.00500 / < 0.00500	--
	12-Sep-2023	mg/L	--	--	--	< 0.00500	--	--	< 0.00500	< 0.00500	< 0.00500 / < 0.00500	--
	13-Sep-2023	mg/L	< 0.00500 / < 0.00500	< 0.00500	< 0.00500	--	< 0.00500	< 0.00500	--	--	--	< 0.00500
Sulfate (14808-79-8)	22-Sep-2020	mg/L	222	241	130	79.0	984	924	199	67.0	32.9	284
N/A	9-Dec-2020	mg/L	220	181 / 186	138	74.9	607	1250	311	69.8	44.9	299
	1-Feb-2021	mg/L	217	145	169	--	851	658	259	--	34.8 / 36.1	331
	10-May-2021	mg/L	242	149	168	--	1000	299	191	--	35.7 / 36.1	287
	12-Jul-2021	mg/L	209	133	124	51.6	1040	393	100	191	43.1 / 43.3	485
	5-Oct-2021	mg/L	204	128	109	47.5	1140	1150	175	172	113 / 113	322
	8-Mar-2022	mg/L	262	157	340	69.5 / 68.4	769	1540	144	185	35.6	127
	7-Jun-2022	mg/L	215	153	315	60.8 / 61.1	911	1530	101	82.3	81.8	305
	12-Sep-2022	mg/L	194 / 198	184	153	56.4	828	1250	111	66.4	64.3 / 65.5	110
	27-Mar-2023	mg/L	--	--	--	68.4	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	176
	29-Mar-2023	mg/L	--	--	--	--	--	--	96.4	121	110 / 113	--
	3-Apr-2023	mg/L	235 / 236	205	318	--	1020	1610	--	--	--	--
	12-Sep-2023	mg/L	--	--	--	58.6	--	--	97.1	205	64.3 / 61.1	--
	13-Sep-2023	mg/L	209 / 213	219	160	--	736	1550	--	--	--	158
Thallium (7440-28-0)	22-Sep-2020	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
MCL = 0.002	9-Dec-2020	mg/L	< 0.00100	< 0.00100 / < 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
	1-Feb-2021	mg/L	< 0.00100	0.00694	< 0.00100	--	< 0.00100	< 0.00100	< 0.00100	--	< 0.00100 / < 0.00100	0.00122
	10-May-2021	mg/L	< 0.00100	< 0.00100	< 0.00100	--	< 0.00100	< 0.00100	< 0.00100	--	< 0.00100 / < 0.00100	< 0.00100
	12-Jul-2021	mg/L	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100 / < 0.00100	< 0.00100
	5-Oct-2021	mg/L	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100 / < 0.00100	< 0.00100
	8-Mar-2022	mg/L	< 0.00100	< 0.00100	< 0.00100	< 0.00100 / < 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
	7-Jun-2022	mg/L	< 0.00100	< 0.00100	< 0.00100	< 0.00100 / < 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100	< 0.00100
	12-Sep-2022	mg/L	--	--	--	< 0.00100	--	--	< 0.00100	< 0.00100	< 0.00100 / < 0.00100	< 0.00100
	27-Mar-2023	mg/L	--	--	--	0.00146	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	0.00147
	29-Mar-2023	mg/L	--	--	--	--	--	--	< 0.00100	< 0.00100	< 0.00100 / < 0.00100	--
	12-Sep-2023	mg/L	--	--	--	< 0.00100	--	--	< 0.00100	< 0.00100	< 0.00100 / < 0.00100	--
	13-Sep-2023	mg/L	< 0.00100 / < 0.00100	< 0.00100	< 0.00100	--	< 0.00100	< 0.00100	--	--	--	< 0.00100

Analytical Data Summary
2023 Annual Water Quality Report
Neal North Energy Center - Closed CCR Monofill
Permit No. 97-SDP-12-95P

Constituent (CAS #)	Sample Date	Units	MW-1R DwnGrad	MW-3R DwnGrad	MW-5R DwnGrad	MW-13/MW-13R Bkgrnd	MW-19 DwnGrad	MW-21 DwnGrad	MW-27 Bkgrnd	MW-29/MW-29R Bkgrnd	MW-223S Bkgrnd	MW-231S/MW-231SR Bkgrnd
Total dissolved solids (TDS)	22-Sep-2020	mg/L	804	894	512	790	2330	2020	496	594	240	824
N/A	9-Dec-2020	mg/L	902	808 / 824	632	862	1570	2520	1160	676	524	1000
	1-Feb-2021	mg/L	830	700	640	--	1970	2790	1030	--	402 / 370	986
	10-May-2021	mg/L	824	692	626	--	2040	730	856	--	408 / 412	948
	12-Jul-2021	mg/L	834	712	528	506	2420	1030	662	856	392 / 352	1200
	5-Oct-2021	mg/L	750	642	470	548	2590	2270	760	826	464 / 470	920
	8-Mar-2022	mg/L	908	614	918	630 / 604	1780	2470	698	808	366	706
	7-Jun-2022	mg/L	816	658	892	606 / 620	1810	2490	622	704	514	932
	12-Sep-2022	mg/L	794 / 828	742	614	518	2030	2510	712	670	476 / 460	710
	27-Mar-2023	mg/L	--	--	--	502	--	--	--	--	--	--
	28-Mar-2023	mg/L	--	--	--	--	--	--	--	--	--	788
	29-Mar-2023	mg/L	--	--	--	--	--	--	634	724	606 / 600	--
	3-Apr-2023	mg/L	934 / 926	756	920	--	2220	3050	--	--	--	--
	12-Sep-2023	mg/L	--	--	--	542	--	--	716	906	456 / 474	--
	13-Sep-2023	mg/L	872 / 860	812	626	--	2360	3110	--	--	--	716

Comments:

Maximum contaminant level (MCL).

N/A - No MCL or GWPS is applicable.

Groundwater protection standard (GWPS) established under 40 CFR 257.95(h)(2).

Table 9

Historic Control Limit & GWPS Exceedances
2023 Annual Water Quality Report
Neal North Energy Center - Closed CCR Monofill
Permit No. 97-SDP-12-95P

Key: gray =CL; black =GWPS		September	December	February	May	July	October	March	June	September	March/April	September
Well	Constituent	2020	2020	2021	2021	2021	2021	2022	2022	2022	2023	2023
MW-1R	Boron											
	Chloride											
	Fluoride											
	Cadmium									na	na	
	Molybdenum									na	na	
	Radium-226 & 228									na	na	
MW-3R	Boron											
	Fluoride											
	pH, lab											
	Cadmium									na	na	
	Lead									na	na	
	Molybdenum									na	na	
MW-5R	Thallium									na	na	
	Boron											
	Fluoride											
MW-13/13R (Background)	Molybdenum									na	na	
	Chloride			ns	ns							
	Lead											
MW-19	Molybdenum			ns	ns							
	Selenium			ns	ns							
	Thallium											
	Boron											
	Calcium											
MW-21	Fluoride											
	pH, lab											
	Sulfate											
	TDS											
	Cobalt									na	na	
	Lead									na	na	
	Lithium									na	na	
	Selenium											
	Arsenic											
	Lead											
MW-27 (Background)	Lithium											
	Cobalt			ns	ns							
	Radium-226 & 228			ns	ns							
MW-29/29R (Background)	Barium											
MW-223S (Background)	Boron											
MW-231S/231SR (Background)	Calcium											
	Sulfate											
	TDS											
	Thallium											

Comments:

Groundwater Protection Standard (GWPS) established under 40 CFR §257.95(h).

ns - MW-13 and MW-29 were not sampled in February or May 2021 due to low water levels.

na - Constituent not analyzed.

Table 10

**Groundwater Quality Assessment Plan Trend Analysis
2023 Annual Water Quality Report
Neal North Energy Center - Closed CCR Monofill
Permit No. 97-SDP-12-95P**

Well	Current SSL	Trend
MW-1R	None	N/A
MW-3R	None	N/A
MW-5R	None	N/A
MW-13/13R (background)	None	N/A
MW-19	None	N/A
MW-21	None	N/A
MW-27 (background)	None	N/A
MW-29/29R (background)	None	N/A
MW-223S (background)	None	N/A
MW-231S/231SR (background)	None	N/A

Comments:

Site is not in an IDNR Groundwater Quality Assessment program.

Table 11

**Leachate Management Summary
2023 Leachate Control System Performance Evaluation Report
Neal North Energy Center - Closed CCR Monofill
Permit No. 97-SDP-12-95P**

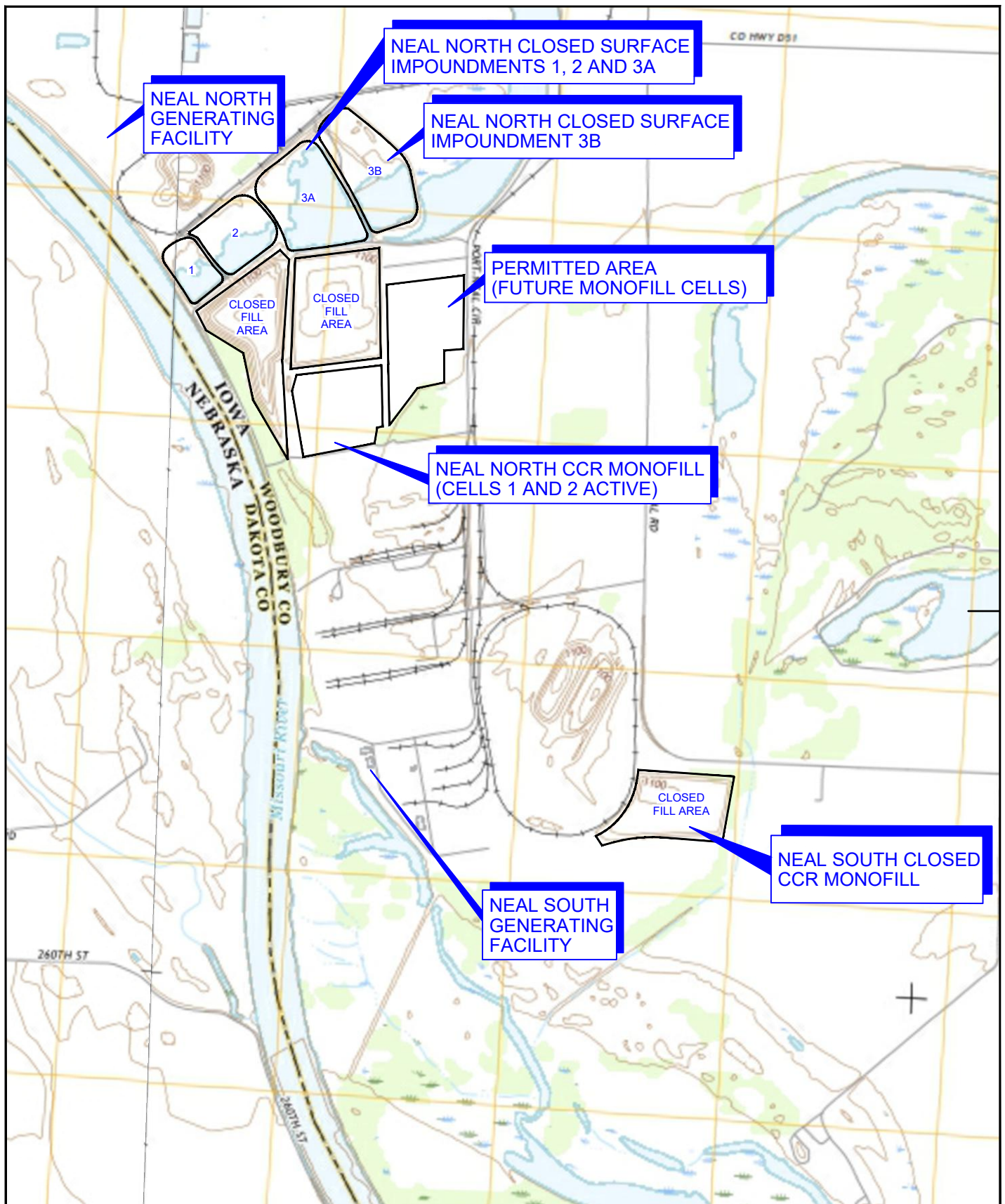
Table 11, Leachate Management Summary, is not applicable to the Closed Neal North Monofill because it does not have a leachate collection system.

Table 12

**Gas Monitoring Summary
2023 Gas Monitoring Report
Neal North Energy Center - Closed CCR Monofill
Permit No. 97-SDP-12-95P**

Table 12, Gas Monitoring Summary, is not applicable to the Closed Neal North Monofill because it is a CCR Monofill.

Figures



Source: USGS QUADRANGLE MAP: SALIX, IOWA (2015) & HOMER, NEBRASKA (2014)

0 1000 2000ft

Coordinate System:
UTM ZONE 17, NAD83

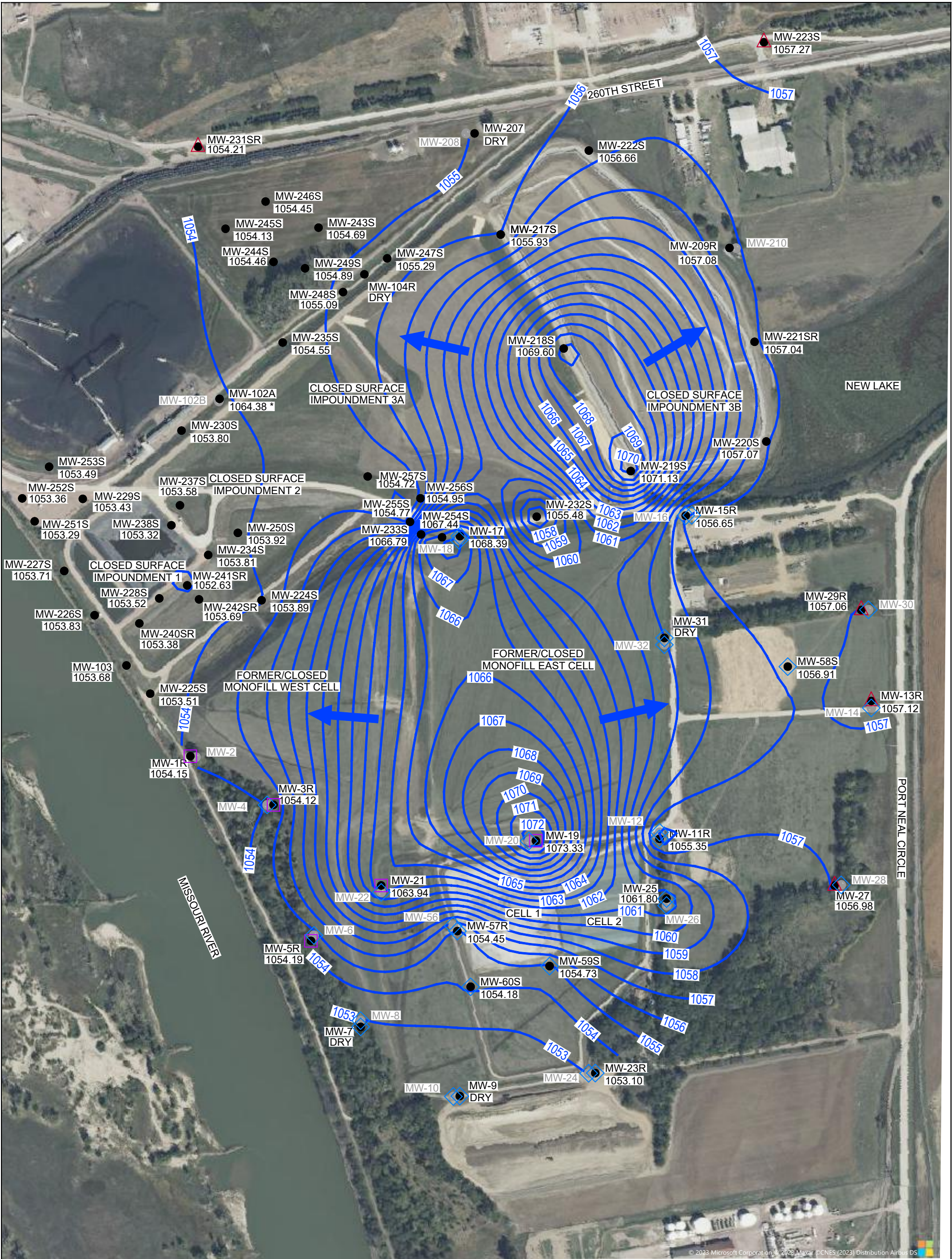


MIDAMERICAN ENERGY COMPANY
NEAL NORTH CCR CLOSED MONOFILL
SERGEANT BLUFF, IOWA

SITE LOCATION MAP

12576482
Dec 18, 2023

FIGURE 1.1



LEGEND

- MW-29R

SHALLOW GROUNDWATER MONITORING WELL

●

MW-30

DEEP GROUNDWATER MONITORING WELL

1057.06

GROUNDWATER ELEVATION (ft. NAVD88)
- 1061

GROUNDWATER CONTOUR (ft. NAVD88)

GROUNDWATER FLOW DIRECTION

GROUNDWATER ELEVATION NOT USED FOR CONTOURING
- △

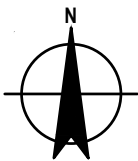
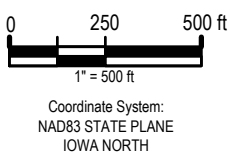
BACKGROUND SAMPLING LOCATION

□

DOWNGRAIDENT SAMPLING LOCATION

◇

GAUGING LOCATION



MIDAMERICAN ENERGY COMPANY
NEAL NORTH CCR CLOSED MONOFILL
SERGEANT BLUFF, IOWA
**SHALLOW ALLUVIAL GROUNDWATER
FLOW MAP**
MARCH 27, 2023

Project No. 12576482
Date December 2023

FIGURE 3.1



LEGEND

- MW-29

MW-30

1056.12

SHALLOW GROUNDWATER MONITORING WELL

DEEP GROUNDWATER MONITORING WELL

GROUNDWATER ELEVATION (ft. NAVD88)

1054

GROUNDWATER CONTOUR (ft NAVD88)

GROUNDWATER FLOW DIRECTION

GROUNDWATER ELEVATION NOT USED FOR CONTOURING

BACKGROUND SAMPLING LOCATION

DOWNGRAIDENT SAMPLING LOCATION

GAUGING LOCATION
-
-
-
- MIDAMERICAN ENERGY COMPANY
NEAL NORTH CCR CLOSED MONOFILL
SERGEANT BLUFF, IOWA
**DEEP ALLUVIAL GROUNDWATER FLOW
MAP**
MARCH 27, 2023
- Project No. 12576482
Date December 2023
- FIGURE 3.2
- Filename: N:\US\Des Moines\Projects\56312576482\Digital_Design\ACAD\Figures\RPT008\12576482-GHD-00-00-RPT-EN-D105_DE-008.dwg
Plot Date: 19 December 2023 5:10 PM



LEGEND

- MW-29

MW-30

1056.12

SHALLOW GROUNDWATER MONITORING WELL

DEEP GROUNDWATER MONITORING WELL

GROUNDWATER ELEVATION (ft. NAVD88)

1061.0

GROUNDWATER CONTOUR (ft NAVD88)

GROUNDWATER FLOW DIRECTION

GROUNDWATER ELEVATION NOT USED FOR CONTOURING

BACKGROUND SAMPLING LOCATION

DOWNGRAIDENT SAMPLING LOCATION

GAUGING LOCATION
-
-
-
- MIDAMERICAN ENERGY COMPANY
NEAL NORTH CCR CLOSED MONOFILL
SERGEANT BLUFF, IOWA
**DEEP ALLUVIAL GROUNDWATER FLOW
MAP**
SEPTEMBER 11, 2023
- Project No. 12576482
Date December 2023
- FIGURE 3.4
- Filename: N:\US\Des Moines\Projects\56312576482\Digital_Design\ACAD\Figures\RPT008\12576482-GHD-00-00-RPT-EN-D106_DE-008.dwg
Plot Date: 19 December 2023 5:12 PM

Appendices

Appendix A

Groundwater Sample Collection Records

Low-Flow Test Report:

Test Date / Time: 4/3/2023 3:38:09 PM
Project: Neal North MW-1R
Operator Name: Paige LaPlant

Location Name: MW-1R Well Diameter: 2 in Casing Type: PVC Screen Length: 25 ft Top of Screen: 11.94 ft Total Depth: 36.95 ft Initial Depth to Water: 23.33 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 34.35 ft Pump Intake From TOC: 36.35 ft Estimated Total Volume Pumped: 6300 ml Flow Cell Volume: 130 ml Final Flow Rate: 100 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 998748
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Test Notes:
Sample time: 1715

Weather Conditions:
Partly cloudy, 55 degrees F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
4/3/2023 3:38 PM	00:00	7.11 pH	14.34 °C	1.42 mS/cm	5.04 mg/L	144.70 NTU	-74.4 mV	23.33 ft	400.00 ml/min
4/3/2023 3:40 PM	02:06	7.21 pH	13.65 °C	1.51 mS/cm	0.87 mg/L	119.35 NTU	-174.1 mV	23.33 ft	100.00 ml/min
4/3/2023 3:42 PM	04:12	7.22 pH	14.19 °C	1.51 mS/cm	0.72 mg/L	85.24 NTU	-189.8 mV	23.33 ft	100.00 ml/min
4/3/2023 3:44 PM	06:18	7.23 pH	14.37 °C	1.51 mS/cm	0.63 mg/L	58.70 NTU	-195.3 mV	23.33 ft	100.00 ml/min
4/3/2023 3:46 PM	08:24	7.24 pH	14.27 °C	1.50 mS/cm	0.60 mg/L	44.60 NTU	-198.0 mV	23.33 ft	100.00 ml/min
4/3/2023 3:48 PM	10:30	7.25 pH	14.26 °C	1.51 mS/cm	0.50 mg/L	37.85 NTU	-200.0 mV	23.33 ft	100.00 ml/min
4/3/2023 3:50 PM	12:36	7.26 pH	14.32 °C	1.50 mS/cm	0.51 mg/L	32.79 NTU	-201.3 mV	23.33 ft	100.00 ml/min
4/3/2023 3:52 PM	14:42	7.26 pH	14.38 °C	1.51 mS/cm	0.49 mg/L	30.23 NTU	-202.1 mV	23.33 ft	100.00 ml/min
4/3/2023 3:54 PM	16:48	7.27 pH	14.37 °C	1.51 mS/cm	0.47 mg/L	25.60 NTU	-202.8 mV	23.33 ft	100.00 ml/min
4/3/2023 3:57 PM	18:54	7.27 pH	14.18 °C	1.51 mS/cm	0.42 mg/L	19.72 NTU	-203.5 mV	23.33 ft	100.00 ml/min
4/3/2023 3:59 PM	21:00	7.27 pH	14.20 °C	1.51 mS/cm	0.35 mg/L	17.78 NTU	-204.1 mV	23.33 ft	100.00 ml/min

4/3/2023 4:01 PM	23:06	7.27 pH	14.26 °C	1.51 mS/cm	0.33 mg/L	15.51 NTU	-204.5 mV	23.33 ft	100.00 ml/min
4/3/2023 4:03 PM	25:12	7.27 pH	14.34 °C	1.51 mS/cm	0.30 mg/L	14.74 NTU	-205.1 mV	23.33 ft	100.00 ml/min
4/3/2023 4:05 PM	27:18	7.27 pH	14.40 °C	1.51 mS/cm	0.27 mg/L	11.21 NTU	-205.7 mV	23.33 ft	100.00 ml/min
4/3/2023 4:07 PM	29:24	7.27 pH	14.41 °C	1.51 mS/cm	0.26 mg/L	12.84 NTU	-206.0 mV	23.33 ft	100.00 ml/min
4/3/2023 4:09 PM	31:30	7.27 pH	14.29 °C	1.51 mS/cm	0.24 mg/L	12.47 NTU	-206.3 mV	23.33 ft	100.00 ml/min
4/3/2023 4:11 PM	33:36	7.27 pH	14.18 °C	1.51 mS/cm	0.23 mg/L	11.42 NTU	-206.5 mV	23.33 ft	100.00 ml/min
4/3/2023 4:13 PM	35:42	7.27 pH	14.19 °C	1.50 mS/cm	0.22 mg/L	9.49 NTU	-206.7 mV	23.33 ft	100.00 ml/min
4/3/2023 4:15 PM	37:48	7.27 pH	14.00 °C	1.51 mS/cm	0.22 mg/L	9.39 NTU	-206.9 mV	23.33 ft	100.00 ml/min
4/3/2023 4:18 PM	39:54	7.28 pH	13.95 °C	1.51 mS/cm	0.21 mg/L	8.64 NTU	-207.1 mV	23.33 ft	100.00 ml/min
4/3/2023 4:20 PM	42:00	7.27 pH	13.89 °C	1.51 mS/cm	0.20 mg/L	12.74 NTU	-207.2 mV	23.33 ft	100.00 ml/min
4/3/2023 4:22 PM	44:06	7.28 pH	13.70 °C	1.51 mS/cm	0.19 mg/L	9.55 NTU	-207.3 mV	23.33 ft	100.00 ml/min
4/3/2023 4:24 PM	46:12	7.28 pH	13.54 °C	1.51 mS/cm	0.19 mg/L	6.83 NTU	-207.2 mV	23.33 ft	100.00 ml/min
4/3/2023 4:26 PM	48:18	7.28 pH	13.39 °C	1.51 mS/cm	0.19 mg/L	6.17 NTU	-207.2 mV	23.33 ft	100.00 ml/min
4/3/2023 4:28 PM	50:24	7.28 pH	13.26 °C	1.51 mS/cm	0.18 mg/L	7.48 NTU	-207.2 mV	23.33 ft	100.00 ml/min
4/3/2023 4:30 PM	52:30	7.28 pH	13.20 °C	1.51 mS/cm	0.18 mg/L	7.49 NTU	-207.0 mV	23.33 ft	100.00 ml/min
4/3/2023 4:32 PM	54:36	7.28 pH	13.09 °C	1.52 mS/cm	0.18 mg/L	6.58 NTU	-207.0 mV	23.33 ft	100.00 ml/min
4/3/2023 4:34 PM	56:42	7.28 pH	13.05 °C	1.52 mS/cm	0.18 mg/L	4.61 NTU	-206.9 mV	23.33 ft	100.00 ml/min

Samples

Sample ID:	Description:
MW1R-GW-0423	Appendix III
DP05-GW-0423	

Low-Flow Test Report:

Test Date / Time: 4/3/2023 2:29:42 PM
Project: Neal North MW-3R
Operator Name: Paige LaPlant

Location Name: MW-3R Well Diameter: 2 in Casing Type: PVC Screen Length: 25 ft Top of Screen: 11.64 ft Total Depth: 36.6 ft Initial Depth to Water: 21.32 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 34 ft Pump Intake From TOC: 36 ft Estimated Total Volume Pumped: 4252.5 ml Flow Cell Volume: 130 ml Final Flow Rate: 125 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 998748
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Test Notes:
Sample time: 1520

Weather Conditions:
Cloudy, 55 degrees F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
4/3/2023 2:29 PM	00:00	7.29 pH	12.74 °C	1.22 mS/cm	1.05 mg/L	36.93 NTU	-166.2 mV	21.32 ft	400.00 ml/min
4/3/2023 2:31 PM	02:06	7.29 pH	13.16 °C	1.22 mS/cm	0.28 mg/L	33.87 NTU	-189.9 mV	21.32 ft	125.00 ml/min
4/3/2023 2:33 PM	04:12	7.30 pH	13.67 °C	1.22 mS/cm	0.31 mg/L	27.37 NTU	-197.1 mV	21.32 ft	125.00 ml/min
4/3/2023 2:36 PM	06:18	7.31 pH	13.76 °C	1.23 mS/cm	0.31 mg/L	31.65 NTU	-200.3 mV	21.32 ft	125.00 ml/min
4/3/2023 2:38 PM	08:24	7.32 pH	13.61 °C	1.23 mS/cm	0.29 mg/L	34.12 NTU	-202.0 mV	21.32 ft	125.00 ml/min
4/3/2023 2:40 PM	10:30	7.32 pH	13.46 °C	1.23 mS/cm	0.27 mg/L	20.91 NTU	-203.0 mV	21.32 ft	125.00 ml/min
4/3/2023 2:42 PM	12:36	7.32 pH	13.57 °C	1.23 mS/cm	0.25 mg/L	20.63 NTU	-204.1 mV	21.32 ft	125.00 ml/min
4/3/2023 2:44 PM	14:42	7.32 pH	13.90 °C	1.23 mS/cm	0.23 mg/L	19.16 NTU	-205.2 mV	21.32 ft	125.00 ml/min
4/3/2023 2:46 PM	16:48	7.32 pH	14.14 °C	1.23 mS/cm	0.22 mg/L	33.25 NTU	-206.2 mV	21.32 ft	125.00 ml/min
4/3/2023 2:48 PM	18:54	7.33 pH	13.96 °C	1.23 mS/cm	0.20 mg/L	30.78 NTU	-206.9 mV	21.32 ft	125.00 ml/min
4/3/2023 2:50 PM	21:00	7.33 pH	13.58 °C	1.23 mS/cm	0.20 mg/L	18.07 NTU	-207.0 mV	21.32 ft	125.00 ml/min

4/3/2023 2:52 PM	23:06	7.33 pH	13.35 °C	1.23 mS/cm	0.19 mg/L	10.46 NTU	-206.9 mV	21.32 ft	125.00 ml/min
4/3/2023 2:54 PM	25:12	7.33 pH	13.32 °C	1.23 mS/cm	0.18 mg/L	6.65 NTU	-207.0 mV	21.32 ft	125.00 ml/min
4/3/2023 2:57 PM	27:18	7.33 pH	13.35 °C	1.23 mS/cm	0.17 mg/L	7.82 NTU	-207.0 mV	21.32 ft	125.00 ml/min
4/3/2023 2:59 PM	29:24	7.33 pH	13.37 °C	1.23 mS/cm	0.17 mg/L	2.87 NTU	-207.3 mV	21.32 ft	125.00 ml/min

Samples

Sample ID:	Description:
MW3R-GW-0423	Appendix III

Low-Flow Test Report:

Test Date / Time: 4/3/2023 1:32:54 PM
Project: Neal North MW-5R
Operator Name: Paige LaPlant

Location Name: MW-5R Well Diameter: 2 in Casing Type: PVC Screen Length: 25 ft Top of Screen: 11.64 ft Total Depth: 36.7 ft Initial Depth to Water: 25.01 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 32.4 ft Pump Intake From TOC: 34.4 ft Estimated Total Volume Pumped: 5000 ml Flow Cell Volume: 130 ml Final Flow Rate: 200 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 998748
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Test Notes:
Sample time: 1410

Weather Conditions:
Partly cloudy, 54 degrees F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
4/3/2023 1:32 PM	00:00	7.17 pH	12.79 °C	1.50 mS/cm	2.23 mg/L	107.44 NTU	-154.1 mV	25.01 ft	200.00 ml/min
4/3/2023 1:34 PM	02:05	7.16 pH	12.72 °C	1.49 mS/cm	1.17 mg/L	50.92 NTU	-174.5 mV	25.01 ft	200.00 ml/min
4/3/2023 1:37 PM	04:10	7.18 pH	12.57 °C	1.49 mS/cm	0.95 mg/L	42.23 NTU	-181.4 mV	25.01 ft	200.00 ml/min
4/3/2023 1:39 PM	06:15	7.19 pH	12.56 °C	1.45 mS/cm	0.92 mg/L	36.89 NTU	-184.5 mV	25.01 ft	200.00 ml/min
4/3/2023 1:41 PM	08:20	7.20 pH	12.62 °C	1.43 mS/cm	0.84 mg/L	25.12 NTU	-186.3 mV	25.01 ft	200.00 ml/min
4/3/2023 1:43 PM	10:25	7.20 pH	12.58 °C	1.42 mS/cm	0.80 mg/L	13.43 NTU	-187.3 mV	25.01 ft	200.00 ml/min
4/3/2023 1:45 PM	12:30	7.20 pH	12.64 °C	1.42 mS/cm	0.79 mg/L	8.84 NTU	-187.3 mV	25.01 ft	200.00 ml/min
4/3/2023 1:47 PM	14:35	7.21 pH	12.69 °C	1.41 mS/cm	0.79 mg/L	11.29 NTU	-187.5 mV	25.01 ft	200.00 ml/min
4/3/2023 1:49 PM	16:40	7.21 pH	12.64 °C	1.42 mS/cm	0.77 mg/L	5.62 NTU	-187.8 mV	25.01 ft	200.00 ml/min
4/3/2023 1:51 PM	18:45	7.22 pH	12.65 °C	1.41 mS/cm	0.72 mg/L	5.38 NTU	-188.2 mV	25.01 ft	200.00 ml/min
4/3/2023 1:53 PM	20:50	7.22 pH	12.50 °C	1.41 mS/cm	0.71 mg/L	7.89 NTU	-188.5 mV	25.01 ft	200.00 ml/min

4/3/2023 1:55 PM	22:55	7.23 pH	12.65 °C	1.40 mS/cm	0.71 mg/L	4.53 NTU	-188.7 mV	25.01 ft	200.00 ml/min
4/3/2023 1:57 PM	25:00	7.23 pH	12.76 °C	1.41 mS/cm	0.67 mg/L	4.84 NTU	-188.8 mV	25.01 ft	200.00 ml/min

Samples

Sample ID:	Description:
MW5R-GW-0423	Appendix III

Low-Flow Test Report:

Test Date / Time: 3/27/2023 4:50:13 PM
Project: Neal North MW-13R
Operator Name: Paige LaPlant

Location Name: MW-13R Well Diameter: 2 in Casing Type: PVC Screen Length: 15 ft Top of Screen: 23.2 ft Total Depth: 38.2 ft Initial Depth to Water: 32.09 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 35.7 ft Pump Intake From TOC: 37.7 ft Estimated Total Volume Pumped: 17780 ml Flow Cell Volume: 130 ml Final Flow Rate: 400 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 998748
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Test Notes:
Sample time: 1750

Weather Conditions:
Sunny, 43 degrees F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
3/27/2023 4:50 PM	00:00	6.96 pH	12.25 °C	0.96 mS/cm	5.09 mg/L	179.20 NTU	-50.5 mV	32.09 ft	400.00 ml/min
3/27/2023 4:52 PM	02:07	7.09 pH	11.68 °C	0.90 mS/cm	0.59 mg/L	139.37 NTU	-204.1 mV	32.09 ft	400.00 ml/min
3/27/2023 4:54 PM	04:14	7.07 pH	11.56 °C	0.91 mS/cm	0.32 mg/L	86.67 NTU	-211.0 mV	32.09 ft	400.00 ml/min
3/27/2023 4:56 PM	06:21	7.06 pH	11.53 °C	0.91 mS/cm	0.26 mg/L	88.29 NTU	-212.5 mV	32.09 ft	400.00 ml/min
3/27/2023 4:58 PM	08:28	7.06 pH	11.52 °C	0.92 mS/cm	0.21 mg/L	62.71 NTU	-213.4 mV	32.09 ft	400.00 ml/min
3/27/2023 5:00 PM	10:35	7.06 pH	11.48 °C	0.92 mS/cm	0.18 mg/L	48.84 NTU	-213.5 mV	32.09 ft	400.00 ml/min
3/27/2023 5:02 PM	12:42	7.07 pH	11.49 °C	0.92 mS/cm	0.16 mg/L	36.29 NTU	-214.1 mV	32.09 ft	400.00 ml/min
3/27/2023 5:05 PM	14:49	7.07 pH	11.43 °C	0.92 mS/cm	0.14 mg/L	25.20 NTU	-214.0 mV	32.09 ft	400.00 ml/min
3/27/2023 5:07 PM	16:56	7.08 pH	11.41 °C	0.93 mS/cm	0.13 mg/L	21.83 NTU	-213.7 mV	32.09 ft	400.00 ml/min
3/27/2023 5:09 PM	19:03	7.08 pH	11.43 °C	0.93 mS/cm	0.12 mg/L	21.07 NTU	-213.1 mV	32.09 ft	400.00 ml/min
3/27/2023 5:11 PM	21:10	7.09 pH	11.48 °C	0.93 mS/cm	0.12 mg/L	17.45 NTU	-213.1 mV	32.09 ft	400.00 ml/min

3/27/2023 5:13 PM	23:17	7.09 pH	11.42 °C	0.93 mS/cm	0.11 mg/L	17.44 NTU	-212.7 mV	32.09 ft	400.00 ml/min
3/27/2023 5:15 PM	25:24	7.09 pH	11.46 °C	0.93 mS/cm	0.10 mg/L	15.79 NTU	-212.4 mV	32.09 ft	400.00 ml/min
3/27/2023 5:17 PM	27:31	7.09 pH	11.35 °C	0.94 mS/cm	0.10 mg/L	12.70 NTU	-212.3 mV	32.09 ft	400.00 ml/min
3/27/2023 5:19 PM	29:38	7.10 pH	11.42 °C	0.94 mS/cm	0.09 mg/L	9.84 NTU	-212.5 mV	32.09 ft	400.00 ml/min
3/27/2023 5:21 PM	31:45	7.11 pH	11.38 °C	0.93 mS/cm	0.08 mg/L	7.82 NTU	-213.0 mV	32.09 ft	400.00 ml/min
3/27/2023 5:24 PM	33:52	7.10 pH	11.40 °C	0.93 mS/cm	0.08 mg/L	7.65 NTU	-212.7 mV	32.09 ft	400.00 ml/min
3/27/2023 5:26 PM	35:59	7.10 pH	11.38 °C	0.94 mS/cm	0.08 mg/L	7.73 NTU	-212.8 mV	32.09 ft	400.00 ml/min
3/27/2023 5:28 PM	38:06	7.11 pH	11.38 °C	0.93 mS/cm	0.07 mg/L	5.04 NTU	-213.1 mV	32.09 ft	400.00 ml/min
3/27/2023 5:30 PM	40:13	7.11 pH	11.36 °C	0.94 mS/cm	0.07 mg/L	5.60 NTU	-212.9 mV	32.09 ft	400.00 ml/min
3/27/2023 5:32 PM	42:20	7.11 pH	11.39 °C	0.94 mS/cm	0.07 mg/L	5.35 NTU	-212.8 mV	32.09 ft	400.00 ml/min
3/27/2023 5:34 PM	44:27	7.11 pH	11.35 °C	0.94 mS/cm	0.07 mg/L	2.91 NTU	-212.8 mV	32.09 ft	400.00 ml/min

Samples

Sample ID:	Description:
MW13R-GW-0323	Appendix III Appendix IV
MS	
MSD	

Low-Flow Test Report:

Test Date / Time: 4/3/2023 12:26:49 PM
Project: Neal North MW-19
Operator Name: Paige LaPlant

Location Name: MW-19 Well Diameter: 2 in Casing Type: PVC Screen Length: 15 ft Top of Screen: 18.6 ft Total Depth: 33.6 ft Initial Depth to Water: 15.41 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 22.6 ft Pump Intake From TOC: 24.6 ft Estimated Total Volume Pumped: 8555 ml Flow Cell Volume: 130 ml Final Flow Rate: 125 ml/min Final Draw Down: 3.88 ft	Instrument Used: Aqua TROLL 600 Serial Number: 998748
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Test Notes:
Sample time: 1315

Weather Conditions:
Cloudy, 45 degrees F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
4/3/2023 12:26 PM	00:00	6.54 pH	12.39 °C	2.89 mS/cm	4.28 mg/L	8.22 NTU	40.9 mV	15.41 ft	400.00 ml/min
4/3/2023 12:28 PM	01:58	6.56 pH	12.02 °C	3.24 mS/cm	0.39 mg/L	12.25 NTU	-53.2 mV	15.41 ft	400.00 ml/min
4/3/2023 12:30 PM	03:56	6.60 pH	11.89 °C	3.30 mS/cm	0.18 mg/L	9.00 NTU	-85.9 mV	15.41 ft	400.00 ml/min
4/3/2023 12:32 PM	05:54	6.58 pH	11.87 °C	2.98 mS/cm	0.14 mg/L	4.82 NTU	-84.9 mV	15.41 ft	400.00 ml/min
4/3/2023 12:34 PM	07:52	6.57 pH	11.85 °C	2.78 mS/cm	0.13 mg/L	3.41 NTU	-75.7 mV	15.41 ft	400.00 ml/min
4/3/2023 12:36 PM	09:50	6.57 pH	11.87 °C	2.59 mS/cm	0.14 mg/L	3.42 NTU	-72.0 mV	15.41 ft	400.00 ml/min
4/3/2023 12:38 PM	11:48	6.59 pH	11.87 °C	2.49 mS/cm	0.28 mg/L	0.50 NTU	-70.4 mV	15.41 ft	400.00 ml/min
4/3/2023 12:40 PM	13:46	6.61 pH	11.83 °C	2.36 mS/cm	0.67 mg/L	0.00 NTU	-68.2 mV	15.41 ft	400.00 ml/min
4/3/2023 12:42 PM	15:44	6.66 pH	11.78 °C	2.56 mS/cm	1.89 mg/L	0.00 NTU	-64.0 mV	15.41 ft	400.00 ml/min
4/3/2023 12:44 PM	17:42	6.66 pH	11.86 °C	2.37 mS/cm	2.24 mg/L	0.00 NTU	-59.6 mV	19.31 ft	125.00 ml/min
4/3/2023 12:46 PM	19:40	6.67 pH	12.11 °C	2.36 mS/cm	2.29 mg/L	2.81 NTU	-56.6 mV	19.31 ft	125.00 ml/min

4/3/2023 12:48 PM	21:38	6.63 pH	12.35 °C	2.51 mS/cm	2.11 mg/L	10.96 NTU	-56.1 mV	19.31 ft	125.00 ml/min
4/3/2023 12:50 PM	23:36	6.61 pH	12.51 °C	2.71 mS/cm	1.87 mg/L	10.42 NTU	-58.6 mV	19.31 ft	125.00 ml/min
4/3/2023 12:52 PM	25:34	6.60 pH	12.50 °C	2.75 mS/cm	1.79 mg/L	5.57 NTU	-60.0 mV	19.31 ft	125.00 ml/min
4/3/2023 12:54 PM	27:32	6.60 pH	12.45 °C	2.72 mS/cm	1.77 mg/L	6.50 NTU	-60.4 mV	19.31 ft	125.00 ml/min
4/3/2023 12:56 PM	29:30	6.60 pH	12.52 °C	2.73 mS/cm	1.76 mg/L	4.75 NTU	-60.4 mV	19.29 ft	125.00 ml/min

Samples

Sample ID:	Description:
MW19-GW-0423	Appendix III

Low-Flow Test Report:

Test Date / Time: 4/3/2023 11:38:37 AM
Project: Neal North MW-21
Operator Name: Paige LaPlant

Location Name: MW-21 Well Diameter: 2 in Casing Type: PVC Screen Length: 15 ft Top of Screen: 8.2 ft Total Depth: 23.2 ft Initial Depth to Water: 23.44 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 27.3 ft Pump Intake From TOC: 29.3 ft Estimated Total Volume Pumped: 2621.667 ml Flow Cell Volume: 130 ml Final Flow Rate: 150 ml/min Final Draw Down: 1.06 ft	Instrument Used: Aqua TROLL 600 Serial Number: 998748
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Test Notes:
Sample time: 1215

Weather Conditions:
Cloudy, 40 degrees F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
4/3/2023 11:38 AM	00:00	6.64 pH	11.83 °C	3.51 mS/cm	2.24 mg/L	2.23 NTU	213.3 mV	23.44 ft	400.00 ml/min
4/3/2023 11:40 AM	02:01	6.62 pH	11.88 °C	3.51 mS/cm	0.98 mg/L	4.64 NTU	213.9 mV	23.44 ft	150.00 ml/min
4/3/2023 11:42 AM	04:02	6.62 pH	11.96 °C	3.51 mS/cm	1.21 mg/L	3.74 NTU	211.9 mV	23.44 ft	150.00 ml/min
4/3/2023 11:44 AM	06:03	6.63 pH	11.94 °C	3.51 mS/cm	1.44 mg/L	2.17 NTU	209.6 mV	23.44 ft	150.00 ml/min
4/3/2023 11:46 AM	08:04	6.63 pH	11.87 °C	3.51 mS/cm	1.55 mg/L	2.42 NTU	207.1 mV	23.44 ft	150.00 ml/min
4/3/2023 11:48 AM	10:05	6.64 pH	11.72 °C	3.52 mS/cm	1.57 mg/L	2.06 NTU	204.8 mV	23.44 ft	150.00 ml/min
4/3/2023 11:50 AM	12:06	6.63 pH	11.56 °C	3.52 mS/cm	1.48 mg/L	2.60 NTU	202.5 mV	23.44 ft	150.00 ml/min
4/3/2023 11:52 AM	14:07	6.63 pH	11.66 °C	3.52 mS/cm	1.41 mg/L	2.97 NTU	200.2 mV	24.50 ft	150.00 ml/min

Samples

Sample ID:	Description:
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Low-Flow Test Report:

Test Date / Time: 3/29/2023 4:39:45 PM
Project: Neal North MW-27
Operator Name: Thao Larson

Location Name: MW-27 Well Diameter: 2 in Casing Type: PVC Screen Length: 10 ft Top of Screen: 23.7 ft Total Depth: 33.7 ft Initial Depth to Water: 29.47 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 29.4 ft Pump Intake From TOC: 31.4 ft Estimated Total Volume Pumped: 2152.5 ml Flow Cell Volume: 130 ml Final Flow Rate: 75 ml/min Final Draw Down: 0.23 ft	Instrument Used: Aqua TROLL 600 Serial Number: 955645
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Test Notes:
Sample time 1825

Weather Conditions:
Sunny 39°F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
3/29/2023 4:39 PM	00:00	7.07 pH	11.37 °C	1.25 mS/cm	4.46 mg/L	64.80 NTU	-200.4 mV	29.47 ft	75.00 ml/min
3/29/2023 4:41 PM	02:03	6.91 pH	10.42 °C	1.23 mS/cm	2.81 mg/L	38.47 NTU	-193.1 mV	29.47 ft	75.00 ml/min
3/29/2023 4:43 PM	04:06	6.83 pH	10.05 °C	1.23 mS/cm	2.41 mg/L	26.78 NTU	-186.6 mV	29.47 ft	75.00 ml/min
3/29/2023 4:45 PM	06:09	6.77 pH	9.81 °C	1.23 mS/cm	2.19 mg/L	21.85 NTU	-182.4 mV	29.72 ft	75.00 ml/min
3/29/2023 4:47 PM	08:12	6.72 pH	9.46 °C	1.32 mS/cm	2.24 mg/L	24.79 NTU	-178.2 mV	29.72 ft	75.00 ml/min
3/29/2023 4:50 PM	10:15	6.70 pH	9.19 °C	1.31 mS/cm	2.26 mg/L	22.32 NTU	-175.3 mV	29.72 ft	75.00 ml/min
3/29/2023 4:52 PM	12:18	6.68 pH	8.96 °C	1.31 mS/cm	2.22 mg/L	17.32 NTU	-174.2 mV	29.72 ft	75.00 ml/min
3/29/2023 4:54 PM	14:21	6.67 pH	8.88 °C	1.31 mS/cm	2.21 mg/L	14.35 NTU	-173.2 mV	29.72 ft	75.00 ml/min
3/29/2023 4:56 PM	16:24	6.67 pH	8.80 °C	1.31 mS/cm	2.13 mg/L	11.67 NTU	-172.9 mV	29.72 ft	75.00 ml/min
3/29/2023 4:58 PM	18:27	6.67 pH	8.85 °C	1.31 mS/cm	2.07 mg/L	10.39 NTU	-172.8 mV	29.72 ft	75.00 ml/min
3/29/2023 5:00 PM	20:30	6.66 pH	8.68 °C	1.31 mS/cm	2.01 mg/L	10.61 NTU	-173.0 mV	29.72 ft	75.00 ml/min

3/29/2023 5:02 PM	22:33	6.68 pH	8.66 °C	1.30 mS/cm	1.98 mg/L	7.89 NTU	-172.8 mV	29.72 ft	75.00 ml/min
3/29/2023 5:04 PM	24:36	6.68 pH	8.81 °C	1.30 mS/cm	1.93 mg/L	8.07 NTU	-173.1 mV	29.72 ft	75.00 ml/min
3/29/2023 5:06 PM	26:39	6.68 pH	8.76 °C	1.30 mS/cm	1.87 mg/L	8.81 NTU	-173.3 mV	29.70 ft	75.00 ml/min
3/29/2023 5:08 PM	28:42	6.69 pH	8.74 °C	1.30 mS/cm	1.87 mg/L	5.73 NTU	-173.7 mV	29.70 ft	75.00 ml/min

Samples

Sample ID:	Description:
MW27-GW-0323	Appendix III and IV

Low-Flow Test Report:

Test Date / Time: 3/28/2023 5:58:20 PM
Project: Neal North MW-29R
Operator Name: Paige LaPlant

Location Name: MW-29R Well Diameter: 2 in Casing Type: PVC Screen Length: 15 ft Top of Screen: 20.2 ft Total Depth: 35.2 ft Initial Depth to Water: 31.77 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 32.7 ft Pump Intake From TOC: 34.7 ft Estimated Total Volume Pumped: 7708.333 ml Flow Cell Volume: 130 ml Final Flow Rate: 100 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 998748
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Test Notes:
Sample time: 0835

Weather Conditions:
Sunny, 50 degrees F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
3/28/2023 5:58 PM	00:00	7.04 pH	13.78 °C	1.22 mS/cm	6.42 mg/L	168.66 NTU	-22.8 mV	31.77 ft	100.00 ml/min
3/28/2023 6:00 PM	02:05	6.91 pH	12.14 °C	1.26 mS/cm	2.62 mg/L	248.99 NTU	-76.2 mV	31.77 ft	100.00 ml/min
3/28/2023 6:02 PM	04:10	6.87 pH	11.72 °C	1.26 mS/cm	1.28 mg/L	228.67 NTU	-90.9 mV	31.77 ft	100.00 ml/min
3/28/2023 6:04 PM	06:15	6.85 pH	11.35 °C	1.26 mS/cm	0.86 mg/L	197.50 NTU	-97.6 mV	31.77 ft	100.00 ml/min
3/28/2023 6:06 PM	08:20	6.85 pH	11.30 °C	1.25 mS/cm	0.71 mg/L	179.82 NTU	-101.1 mV	31.77 ft	100.00 ml/min
3/28/2023 6:08 PM	10:25	6.85 pH	11.16 °C	1.25 mS/cm	0.57 mg/L	167.17 NTU	-103.4 mV	31.77 ft	100.00 ml/min
3/28/2023 6:10 PM	12:30	6.85 pH	11.09 °C	1.24 mS/cm	0.47 mg/L	161.68 NTU	-105.3 mV	31.77 ft	100.00 ml/min
3/28/2023 6:12 PM	14:35	6.85 pH	11.05 °C	1.25 mS/cm	0.42 mg/L	140.55 NTU	-106.7 mV	31.77 ft	100.00 ml/min
3/28/2023 6:15 PM	16:40	6.86 pH	10.98 °C	1.25 mS/cm	0.41 mg/L	121.79 NTU	-107.7 mV	31.77 ft	100.00 ml/min
3/28/2023 6:17 PM	18:45	6.86 pH	10.98 °C	1.25 mS/cm	0.40 mg/L	101.37 NTU	-108.3 mV	31.77 ft	100.00 ml/min
3/28/2023 6:19 PM	20:50	6.87 pH	10.89 °C	1.25 mS/cm	0.40 mg/L	87.34 NTU	-108.5 mV	31.77 ft	100.00 ml/min

3/28/2023 6:21 PM	22:55	6.87 pH	10.74 °C	1.25 mS/cm	0.41 mg/L	79.48 NTU	-108.8 mV	31.77 ft	100.00 ml/min
3/28/2023 6:23 PM	25:00	6.88 pH	10.70 °C	1.25 mS/cm	0.40 mg/L	75.94 NTU	-109.4 mV	31.77 ft	100.00 ml/min
3/28/2023 6:25 PM	27:05	6.88 pH	10.68 °C	1.26 mS/cm	0.39 mg/L	78.14 NTU	-109.6 mV	31.77 ft	100.00 ml/min
3/28/2023 6:27 PM	29:10	6.88 pH	10.74 °C	1.26 mS/cm	0.41 mg/L	67.74 NTU	-109.5 mV	31.77 ft	100.00 ml/min
3/28/2023 6:29 PM	31:15	6.88 pH	10.65 °C	1.26 mS/cm	0.40 mg/L	61.92 NTU	-109.6 mV	31.77 ft	100.00 ml/min
3/28/2023 6:31 PM	33:20	6.89 pH	10.58 °C	1.26 mS/cm	0.42 mg/L	55.23 NTU	-109.3 mV	31.77 ft	100.00 ml/min
3/28/2023 6:33 PM	35:25	6.89 pH	10.55 °C	1.27 mS/cm	0.43 mg/L	44.29 NTU	-109.0 mV	31.77 ft	100.00 ml/min
3/28/2023 6:35 PM	37:30	6.89 pH	10.53 °C	1.27 mS/cm	0.45 mg/L	39.16 NTU	-108.7 mV	31.77 ft	100.00 ml/min
3/28/2023 6:37 PM	39:35	6.89 pH	10.51 °C	1.27 mS/cm	0.46 mg/L	32.28 NTU	-108.4 mV	31.77 ft	100.00 ml/min
3/28/2023 6:40 PM	41:40	6.90 pH	10.52 °C	1.27 mS/cm	0.46 mg/L	31.32 NTU	-108.2 mV	31.77 ft	100.00 ml/min
3/28/2023 6:42 PM	43:45	6.90 pH	10.36 °C	1.28 mS/cm	0.45 mg/L	26.61 NTU	-108.3 mV	31.77 ft	100.00 ml/min
3/28/2023 6:44 PM	45:50	6.90 pH	10.33 °C	1.28 mS/cm	0.44 mg/L	23.61 NTU	-108.6 mV	31.77 ft	100.00 ml/min
3/28/2023 6:46 PM	47:55	6.91 pH	10.33 °C	1.28 mS/cm	0.43 mg/L	25.81 NTU	-108.8 mV	31.77 ft	100.00 ml/min
3/28/2023 6:48 PM	50:00	6.91 pH	10.37 °C	1.28 mS/cm	0.43 mg/L	20.28 NTU	-108.9 mV	31.77 ft	100.00 ml/min
3/28/2023 6:50 PM	52:05	6.91 pH	10.35 °C	1.28 mS/cm	0.44 mg/L	17.17 NTU	-108.9 mV	31.77 ft	100.00 ml/min
3/28/2023 6:52 PM	54:10	6.92 pH	10.27 °C	1.28 mS/cm	0.43 mg/L	15.25 NTU	-109.0 mV	31.77 ft	100.00 ml/min
3/28/2023 6:54 PM	56:15	6.92 pH	10.24 °C	1.28 mS/cm	0.42 mg/L	16.77 NTU	-109.1 mV	31.77 ft	100.00 ml/min
3/28/2023 6:56 PM	58:20	6.92 pH	10.27 °C	1.28 mS/cm	0.43 mg/L	13.19 NTU	-109.1 mV	31.77 ft	100.00 ml/min
3/28/2023 6:58 PM	01:00:25	6.92 pH	10.23 °C	1.28 mS/cm	0.43 mg/L	11.94 NTU	-109.1 mV	31.77 ft	100.00 ml/min
3/28/2023 7:00 PM	01:02:30	6.93 pH	10.22 °C	1.28 mS/cm	0.42 mg/L	11.97 NTU	-109.3 mV	31.77 ft	100.00 ml/min
3/28/2023 7:02 PM	01:04:35	6.93 pH	10.24 °C	1.28 mS/cm	0.41 mg/L	9.92 NTU	-109.5 mV	31.77 ft	100.00 ml/min
3/28/2023 7:05 PM	01:06:40	6.93 pH	10.34 °C	1.28 mS/cm	0.41 mg/L	8.86 NTU	-109.7 mV	31.77 ft	100.00 ml/min
3/28/2023 7:07 PM	01:08:45	6.93 pH	10.22 °C	1.29 mS/cm	0.42 mg/L	7.97 NTU	-109.5 mV	31.77 ft	100.00 ml/min
3/28/2023 7:09 PM	01:10:50	6.94 pH	10.15 °C	1.29 mS/cm	0.42 mg/L	6.73 NTU	-109.4 mV	31.77 ft	100.00 ml/min
3/28/2023 7:11 PM	01:12:55	6.94 pH	10.12 °C	1.29 mS/cm	0.42 mg/L	6.13 NTU	-109.4 mV	31.77 ft	100.00 ml/min
3/28/2023 7:13 PM	01:15:00	6.94 pH	10.16 °C	1.29 mS/cm	0.41 mg/L	5.68 NTU	-109.6 mV	31.77 ft	100.00 ml/min
3/28/2023 7:15 PM	01:17:05	6.94 pH	10.13 °C	1.29 mS/cm	0.40 mg/L	4.66 NTU	-109.8 mV	31.77 ft	100.00 ml/min

Samples

Sample ID:	Description:
MW29R-GW-0323	Appendix III Appendix IV

Low-Flow Test Report:

Test Date / Time: 3/29/2023 9:07:20 AM
Project: Neal North MW-223S
Operator Name: Paige LaPlant

Location Name: MW-223S Well Diameter: 2 in Casing Type: PVC Screen Length: 15 ft Top of Screen: 11.7 ft Total Depth: 26.7 ft Initial Depth to Water: 24 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 22.4 ft Pump Intake From TOC: 24.4 ft Estimated Total Volume Pumped: 4025 ml Flow Cell Volume: 130 ml Final Flow Rate: 75 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 998748
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Test Notes:
Sample time: 1100

Weather Conditions:
Sunny, 25 degrees F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
3/29/2023 9:07 AM	00:00	6.99 pH	5.06 °C	1.08 mS/cm	4.86 mg/L	119.30 NTU	147.1 mV	24.00 ft	75.00 ml/min
3/29/2023 9:09 AM	01:55	7.12 pH	6.15 °C	1.07 mS/cm	1.98 mg/L	65.60 NTU	12.3 mV	24.00 ft	75.00 ml/min
3/29/2023 9:11 AM	03:50	7.18 pH	6.30 °C	1.06 mS/cm	0.96 mg/L	54.95 NTU	-69.7 mV	24.00 ft	75.00 ml/min
3/29/2023 9:13 AM	05:45	7.19 pH	6.47 °C	1.08 mS/cm	0.60 mg/L	68.40 NTU	-105.5 mV	24.00 ft	75.00 ml/min
3/29/2023 9:15 AM	07:40	7.19 pH	6.46 °C	1.07 mS/cm	0.49 mg/L	59.80 NTU	-120.8 mV	24.00 ft	75.00 ml/min
3/29/2023 9:16 AM	09:35	7.19 pH	6.32 °C	1.07 mS/cm	0.47 mg/L	43.25 NTU	-125.8 mV	24.00 ft	75.00 ml/min
3/29/2023 9:18 AM	11:30	7.19 pH	6.17 °C	1.07 mS/cm	0.46 mg/L	54.62 NTU	-128.3 mV	24.00 ft	75.00 ml/min
3/29/2023 9:20 AM	13:25	7.19 pH	6.16 °C	1.08 mS/cm	0.46 mg/L	36.79 NTU	-130.2 mV	24.00 ft	75.00 ml/min
3/29/2023 9:22 AM	15:20	7.20 pH	6.27 °C	1.08 mS/cm	0.46 mg/L	28.60 NTU	-132.2 mV	24.00 ft	75.00 ml/min
3/29/2023 9:24 AM	17:15	7.20 pH	6.20 °C	1.08 mS/cm	0.46 mg/L	26.86 NTU	-133.2 mV	24.00 ft	75.00 ml/min
3/29/2023 9:26 AM	19:10	7.20 pH	6.15 °C	1.08 mS/cm	0.45 mg/L	20.25 NTU	-133.8 mV	24.00 ft	75.00 ml/min

3/29/2023 9:28 AM	21:05	7.20 pH	6.22 °C	1.07 mS/cm	0.45 mg/L	15.28 NTU	-133.7 mV	24.00 ft	75.00 ml/min
3/29/2023 9:30 AM	23:00	7.20 pH	6.18 °C	1.08 mS/cm	0.45 mg/L	13.30 NTU	-134.2 mV	24.00 ft	75.00 ml/min
3/29/2023 9:32 AM	24:55	7.21 pH	6.26 °C	1.08 mS/cm	0.45 mg/L	13.08 NTU	-135.0 mV	24.00 ft	75.00 ml/min
3/29/2023 9:34 AM	26:50	7.21 pH	6.20 °C	1.08 mS/cm	0.45 mg/L	12.13 NTU	-135.3 mV	24.00 ft	75.00 ml/min
3/29/2023 9:36 AM	28:45	7.22 pH	6.03 °C	1.07 mS/cm	0.44 mg/L	14.25 NTU	-135.4 mV	24.00 ft	75.00 ml/min
3/29/2023 9:38 AM	30:40	7.22 pH	6.00 °C	1.08 mS/cm	0.44 mg/L	15.47 NTU	-135.3 mV	24.00 ft	75.00 ml/min
3/29/2023 9:39 AM	32:35	7.22 pH	6.02 °C	1.08 mS/cm	0.44 mg/L	15.03 NTU	-135.4 mV	24.00 ft	75.00 ml/min
3/29/2023 9:41 AM	34:30	7.22 pH	6.13 °C	1.08 mS/cm	0.44 mg/L	17.40 NTU	-135.5 mV	24.00 ft	75.00 ml/min
3/29/2023 9:43 AM	36:25	7.22 pH	6.04 °C	1.07 mS/cm	0.44 mg/L	13.10 NTU	-135.4 mV	24.00 ft	75.00 ml/min
3/29/2023 9:45 AM	38:20	7.22 pH	6.30 °C	1.07 mS/cm	0.44 mg/L	12.79 NTU	-135.5 mV	24.00 ft	75.00 ml/min
3/29/2023 9:47 AM	40:15	7.22 pH	6.40 °C	1.07 mS/cm	0.44 mg/L	10.40 NTU	-135.4 mV	24.00 ft	75.00 ml/min
3/29/2023 9:49 AM	42:10	7.22 pH	6.41 °C	1.07 mS/cm	0.43 mg/L	8.66 NTU	-135.7 mV	24.00 ft	75.00 ml/min
3/29/2023 9:51 AM	44:05	7.23 pH	6.33 °C	1.07 mS/cm	0.43 mg/L	7.34 NTU	-135.9 mV	24.00 ft	75.00 ml/min
3/29/2023 9:53 AM	46:00	7.23 pH	6.34 °C	1.07 mS/cm	0.43 mg/L	7.98 NTU	-135.7 mV	24.00 ft	75.00 ml/min
3/29/2023 9:55 AM	47:55	7.23 pH	6.18 °C	1.07 mS/cm	0.43 mg/L	5.22 NTU	-135.5 mV	24.00 ft	75.00 ml/min
3/29/2023 9:57 AM	49:50	7.23 pH	6.07 °C	1.07 mS/cm	0.42 mg/L	5.05 NTU	-135.1 mV	24.00 ft	75.00 ml/min
3/29/2023 9:59 AM	51:45	7.23 pH	6.10 °C	1.07 mS/cm	0.42 mg/L	5.27 NTU	-135.0 mV	24.00 ft	75.00 ml/min
3/29/2023 10:01 AM	53:40	7.23 pH	6.32 °C	1.07 mS/cm	0.42 mg/L	4.26 NTU	-134.9 mV	24.00 ft	75.00 ml/min

Samples

Sample ID:	Description:
MW231S-GW-0323	MNA Appendix III Appendix IV
DP01-GW-0323	

Low-Flow Test Report:

Test Date / Time: 3/28/2023 1:58:42 PM
Project: Neal North MW-231SR
Operator Name: Paige LaPlant

Location Name: MW-231SR Well Diameter: 2 in Casing Type: PVC Screen Length: 15 ft Top of Screen: 14.07 ft Total Depth: 29.07 ft Initial Depth to Water: 25.78 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 26.57 ft Pump Intake From TOC: 28.57 ft Estimated Total Volume Pumped: 4991.25 ml Flow Cell Volume: 130 ml Final Flow Rate: 75 ml/min Final Draw Down: 0 ft	Instrument Used: Aqua TROLL 600 Serial Number: 998748
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Test Notes:
Sample time: 1550

Weather Conditions:
Sunny, 30 degrees F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
3/28/2023 1:58 PM	00:00	7.09 pH	11.90 °C	1.03 mS/cm	7.45 mg/L	54.54 NTU	28.2 mV	25.78 ft	75.00 ml/min
3/28/2023 2:00 PM	02:01	7.02 pH	11.23 °C	1.24 mS/cm	4.13 mg/L	87.94 NTU	-96.0 mV	25.78 ft	75.00 ml/min
3/28/2023 2:02 PM	04:02	7.01 pH	11.13 °C	1.29 mS/cm	2.68 mg/L	98.50 NTU	-112.4 mV	25.78 ft	75.00 ml/min
3/28/2023 2:04 PM	06:03	7.00 pH	11.21 °C	1.30 mS/cm	2.30 mg/L	112.05 NTU	-115.6 mV	25.78 ft	75.00 ml/min
3/28/2023 2:06 PM	08:04	7.00 pH	11.21 °C	1.30 mS/cm	2.02 mg/L	96.17 NTU	-117.0 mV	25.78 ft	75.00 ml/min
3/28/2023 2:08 PM	10:05	7.00 pH	11.25 °C	1.30 mS/cm	1.87 mg/L	87.62 NTU	-116.5 mV	25.78 ft	75.00 ml/min
3/28/2023 2:10 PM	12:06	7.00 pH	11.41 °C	1.31 mS/cm	1.75 mg/L	91.89 NTU	-115.3 mV	25.78 ft	75.00 ml/min
3/28/2023 2:12 PM	14:07	7.00 pH	11.60 °C	1.31 mS/cm	1.66 mg/L	67.29 NTU	-114.6 mV	25.78 ft	75.00 ml/min
3/28/2023 2:14 PM	16:08	7.00 pH	11.58 °C	1.31 mS/cm	1.59 mg/L	60.00 NTU	-113.3 mV	25.78 ft	75.00 ml/min
3/28/2023 2:16 PM	18:09	7.00 pH	11.52 °C	1.31 mS/cm	1.53 mg/L	59.07 NTU	-112.1 mV	25.78 ft	75.00 ml/min
3/28/2023 2:18 PM	20:10	7.00 pH	11.46 °C	1.30 mS/cm	1.45 mg/L	44.23 NTU	-110.8 mV	25.78 ft	75.00 ml/min

3/28/2023 2:20 PM	22:11	7.00 pH	11.55 °C	1.31 mS/cm	1.44 mg/L	41.00 NTU	-110.1 mV	25.78 ft	75.00 ml/min
3/28/2023 2:22 PM	24:12	7.00 pH	11.59 °C	1.31 mS/cm	1.41 mg/L	42.49 NTU	-109.0 mV	25.78 ft	75.00 ml/min
3/28/2023 2:24 PM	26:13	7.00 pH	11.67 °C	1.31 mS/cm	1.37 mg/L	48.20 NTU	-108.1 mV	25.78 ft	75.00 ml/min
3/28/2023 2:26 PM	28:14	7.00 pH	11.69 °C	1.31 mS/cm	1.32 mg/L	53.57 NTU	-107.2 mV	25.78 ft	75.00 ml/min
3/28/2023 2:28 PM	30:15	7.00 pH	11.60 °C	1.31 mS/cm	1.28 mg/L	57.56 NTU	-106.0 mV	25.78 ft	75.00 ml/min
3/28/2023 2:30 PM	32:16	6.99 pH	11.54 °C	1.31 mS/cm	1.24 mg/L	46.39 NTU	-104.7 mV	25.78 ft	75.00 ml/min
3/28/2023 2:32 PM	34:17	6.99 pH	11.50 °C	1.31 mS/cm	1.18 mg/L	44.62 NTU	-104.1 mV	25.78 ft	75.00 ml/min
3/28/2023 2:35 PM	36:18	6.99 pH	11.60 °C	1.31 mS/cm	1.14 mg/L	32.29 NTU	-103.6 mV	25.78 ft	75.00 ml/min
3/28/2023 2:37 PM	38:19	6.99 pH	11.84 °C	1.31 mS/cm	1.09 mg/L	31.06 NTU	-103.5 mV	25.78 ft	75.00 ml/min
3/28/2023 2:39 PM	40:20	6.99 pH	11.99 °C	1.31 mS/cm	1.06 mg/L	25.37 NTU	-103.5 mV	25.78 ft	75.00 ml/min
3/28/2023 2:41 PM	42:21	6.99 pH	11.82 °C	1.31 mS/cm	1.04 mg/L	25.08 NTU	-102.8 mV	25.78 ft	75.00 ml/min
3/28/2023 2:43 PM	44:22	6.99 pH	11.85 °C	1.31 mS/cm	1.01 mg/L	28.06 NTU	-102.3 mV	25.78 ft	75.00 ml/min
3/28/2023 2:45 PM	46:23	6.99 pH	11.83 °C	1.31 mS/cm	1.00 mg/L	33.03 NTU	-102.4 mV	25.78 ft	75.00 ml/min
3/28/2023 2:47 PM	48:24	6.99 pH	11.80 °C	1.31 mS/cm	0.96 mg/L	26.82 NTU	-102.3 mV	25.78 ft	75.00 ml/min
3/28/2023 2:49 PM	50:25	6.99 pH	11.89 °C	1.31 mS/cm	0.95 mg/L	31.43 NTU	-101.7 mV	25.78 ft	75.00 ml/min
3/28/2023 2:51 PM	52:26	6.99 pH	11.88 °C	1.31 mS/cm	0.93 mg/L	32.13 NTU	-100.6 mV	25.78 ft	75.00 ml/min
3/28/2023 2:53 PM	54:27	6.99 pH	11.96 °C	1.31 mS/cm	0.92 mg/L	25.16 NTU	-100.2 mV	25.78 ft	75.00 ml/min
3/28/2023 2:55 PM	56:28	6.99 pH	11.75 °C	1.31 mS/cm	0.92 mg/L	30.09 NTU	-99.1 mV	25.78 ft	75.00 ml/min
3/28/2023 2:57 PM	58:29	6.99 pH	11.81 °C	1.31 mS/cm	0.91 mg/L	31.61 NTU	-98.1 mV	25.78 ft	75.00 ml/min
3/28/2023 2:59 PM	01:00:30	6.99 pH	11.87 °C	1.31 mS/cm	0.89 mg/L	30.21 NTU	-97.5 mV	25.78 ft	75.00 ml/min
3/28/2023 3:01 PM	01:02:31	6.98 pH	12.04 °C	1.31 mS/cm	0.87 mg/L	24.07 NTU	-97.8 mV	25.78 ft	75.00 ml/min
3/28/2023 3:03 PM	01:04:32	6.98 pH	12.15 °C	1.31 mS/cm	0.85 mg/L	21.65 NTU	-97.7 mV	25.78 ft	75.00 ml/min
3/28/2023 3:05 PM	01:06:33	6.98 pH	12.24 °C	1.31 mS/cm	0.83 mg/L	19.76 NTU	-97.9 mV	25.78 ft	75.00 ml/min

Samples

Sample ID:	Description:
MW231SR-GW-0323	MNA Appendix III Appendix IV

Low-Flow Test Report:

Test Date / Time: 9/12/2023 6:30:16 PM
Project: Neal North MW-1R
Operator Name: Thao Larson

Location Name: MW-1R Well Diameter: 2 in Casing Type: PVC Screen Length: 25 ft Top of Screen: 11.94 ft Total Depth: 36.95 ft Initial Depth to Water: 20.12 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 34.35 ft Pump Intake From TOC: 36.35 ft Estimated Total Volume Pumped: 293014.156 ml Flow Cell Volume: 130 ml Final Flow Rate: 350 ml/min Final Draw Down: 0.02 ft	Instrument Used: Aqua TROLL 600 Serial Number: 1031091
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Test Notes:
Sample time 0830

Weather Conditions:
Sunny 80°F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
9/12/2023 6:30 PM	00:00	7.23 pH	13.63 °C	1.45 mS/cm	0.22 mg/L	628.25 NTU	-241.0 mV	20.12 ft	350.00 ml/min
9/12/2023 6:32 PM	02:06	7.28 pH	12.99 °C	1.45 mS/cm	0.04 mg/L	373.60 NTU	-248.8 mV	20.12 ft	350.00 ml/min
9/12/2023 6:34 PM	04:12	7.25 pH	12.94 °C	1.45 mS/cm	0.02 mg/L	609.38 NTU	-247.4 mV	20.12 ft	350.00 ml/min
9/12/2023 6:36 PM	06:18	7.22 pH	12.94 °C	1.45 mS/cm	0.02 mg/L	544.75 NTU	-246.4 mV	20.12 ft	350.00 ml/min
9/12/2023 6:38 PM	08:24	7.23 pH	12.75 °C	1.45 mS/cm	0.01 mg/L	121.83 NTU	-249.7 mV	20.12 ft	350.00 ml/min
9/12/2023 6:40 PM	10:30	7.23 pH	12.88 °C	1.45 mS/cm	0.01 mg/L	135.33 NTU	-250.7 mV	20.12 ft	350.00 ml/min
9/12/2023 6:42 PM	12:36	7.22 pH	12.85 °C	1.45 mS/cm	0.01 mg/L	1,099.6 NTU	-248.5 mV	20.12 ft	350.00 ml/min
9/12/2023 6:44 PM	14:42	7.22 pH	12.68 °C	1.46 mS/cm	0.24 mg/L	78.15 NTU	-243.4 mV	20.12 ft	350.00 ml/min
9/12/2023 6:47 PM	16:48	7.24 pH	12.68 °C	1.45 mS/cm	0.01 mg/L	85.97 NTU	-248.6 mV	20.12 ft	350.00 ml/min
9/12/2023 6:49 PM	18:54	7.24 pH	12.61 °C	1.45 mS/cm	0.01 mg/L	40.47 NTU	-250.7 mV	20.12 ft	350.00 ml/min
9/12/2023 6:51 PM	21:00	7.25 pH	12.60 °C	1.46 mS/cm	0.00 mg/L	35.31 NTU	-252.0 mV	20.20 ft	350.00 ml/min

9/12/2023 6:53 PM	23:06	7.25 pH	12.66 °C	1.46 mS/cm	0.01 mg/L	9.52 NTU	-252.9 mV	20.20 ft	350.00 ml/min
9/12/2023 6:55 PM	25:12	7.25 pH	12.54 °C	1.46 mS/cm	0.00 mg/L	43.59 NTU	-253.4 mV	20.20 ft	350.00 ml/min
9/12/2023 6:57 PM	27:18	7.26 pH	12.59 °C	1.46 mS/cm	0.00 mg/L	18.02 NTU	-254.2 mV	20.20 ft	350.00 ml/min
9/12/2023 6:59 PM	29:24	7.26 pH	12.61 °C	1.46 mS/cm	0.00 mg/L	11.37 NTU	-254.8 mV	20.20 ft	350.00 ml/min
9/12/2023 7:01 PM	31:30	7.26 pH	12.57 °C	1.46 mS/cm	0.00 mg/L	14.54 NTU	-255.4 mV	20.20 ft	350.00 ml/min
9/12/2023 7:03 PM	33:36	7.27 pH	12.57 °C	1.46 mS/cm	0.00 mg/L	8.18 NTU	-255.8 mV	20.20 ft	350.00 ml/min
9/12/2023 7:05 PM	35:42	7.27 pH	12.52 °C	1.46 mS/cm	0.00 mg/L	8.62 NTU	-256.0 mV	20.20 ft	350.00 ml/min
9/12/2023 7:08 PM	37:48	7.27 pH	12.54 °C	1.47 mS/cm	0.18 mg/L	9.43 NTU	-249.8 mV	20.20 ft	350.00 ml/min
9/12/2023 7:10 PM	39:54	7.27 pH	12.54 °C	1.46 mS/cm	0.00 mg/L	6.38 NTU	-253.0 mV	20.20 ft	350.00 ml/min
9/12/2023 7:12 PM	42:00	7.28 pH	12.46 °C	1.47 mS/cm	0.00 mg/L	6.98 NTU	-254.3 mV	20.14 ft	350.00 ml/min
9/12/2023 7:14 PM	44:06	7.28 pH	12.50 °C	1.47 mS/cm	0.00 mg/L	11.72 NTU	-255.2 mV	20.14 ft	350.00 ml/min
9/12/2023 7:16 PM	46:12	7.28 pH	12.53 °C	1.47 mS/cm	0.10 mg/L	5.93 NTU	-249.2 mV	20.14 ft	350.00 ml/min
9/13/2023 8:27 AM	13:56:55	7.42 pH	15.19 °C	0.00 mS/cm	9.73 mg/L	0.00 NTU	-138.4 mV	20.14 ft	350.00 ml/min
9/13/2023 8:27 AM	13:57:11	7.42 pH	15.19 °C	0.00 mS/cm	9.72 mg/L	0.00 NTU	-137.3 mV	20.14 ft	350.00 ml/min

Samples

Sample ID:	Description:
MW01R-GW-0923	

Low-Flow Test Report:

Test Date / Time: 9/13/2023 10:05:48 AM
Project: Neal North MW-3R
Operator Name: Thao Larson

Location Name: MW-3R Well Diameter: 2 in Casing Type: PVC Screen Length: 25 ft Top of Screen: 11.64 ft Total Depth: 36.6 ft Initial Depth to Water: 18.2 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 34 ft Pump Intake From TOC: 36 ft Estimated Total Volume Pumped: 15953.333 ml Flow Cell Volume: 130 ml Final Flow Rate: 400 ml/min Final Draw Down: 0.02 ft	Instrument Used: Aqua TROLL 600 Serial Number: 1031091
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Test Notes:
Sample time 1055

Weather Conditions:
Sunny 64°F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
9/13/2023 10:05 AM	00:00	7.12 pH	13.87 °C	1.28 mS/cm	5.51 mg/L	68.95 NTU	-176.8 mV	18.20 ft	400.00 ml/min
9/13/2023 10:07 AM	02:06	7.15 pH	12.81 °C	1.22 mS/cm	0.15 mg/L	1.90 NTU	-231.9 mV	18.20 ft	400.00 ml/min
9/13/2023 10:10 AM	04:12	7.18 pH	12.71 °C	1.25 mS/cm	0.05 mg/L	0.00 NTU	-239.4 mV	18.24 ft	400.00 ml/min
9/13/2023 10:12 AM	06:18	7.23 pH	12.57 °C	1.15 mS/cm	0.03 mg/L	38.10 NTU	-245.1 mV	18.24 ft	400.00 ml/min
9/13/2023 10:14 AM	08:24	7.27 pH	12.60 °C	1.25 mS/cm	0.02 mg/L	55.53 NTU	-248.4 mV	18.24 ft	400.00 ml/min
9/13/2023 10:16 AM	10:29	7.28 pH	12.68 °C	1.26 mS/cm	0.80 mg/L	86.90 NTU	-247.7 mV	18.24 ft	400.00 ml/min
9/13/2023 10:18 AM	12:35	7.28 pH	12.60 °C	1.26 mS/cm	0.10 mg/L	83.41 NTU	-247.3 mV	18.24 ft	400.00 ml/min
9/13/2023 10:20 AM	14:41	7.29 pH	12.64 °C	1.26 mS/cm	0.01 mg/L	41.90 NTU	-249.6 mV	18.24 ft	400.00 ml/min
9/13/2023 10:22 AM	16:47	7.29 pH	12.59 °C	1.26 mS/cm	0.01 mg/L	28.17 NTU	-250.6 mV	18.24 ft	400.00 ml/min
9/13/2023 10:24 AM	18:53	7.29 pH	12.64 °C	1.26 mS/cm	0.01 mg/L	26.45 NTU	-251.4 mV	18.24 ft	400.00 ml/min
9/13/2023 10:26 AM	20:59	7.29 pH	12.69 °C	1.25 mS/cm	0.00 mg/L	12.03 NTU	-252.2 mV	18.24 ft	400.00 ml/min

9/13/2023 10:28 AM	23:05	7.28 pH	12.61 °C	1.25 mS/cm	0.00 mg/L	13.46 NTU	-252.2 mV	18.24 ft	400.00 ml/min
9/13/2023 10:30 AM	25:11	7.28 pH	12.69 °C	1.25 mS/cm	0.00 mg/L	15.91 NTU	-252.7 mV	18.24 ft	400.00 ml/min
9/13/2023 10:33 AM	27:17	7.27 pH	12.70 °C	1.25 mS/cm	0.00 mg/L	6.81 NTU	-252.2 mV	18.21 ft	400.00 ml/min
9/13/2023 10:35 AM	29:23	7.27 pH	12.67 °C	1.25 mS/cm	0.00 mg/L	16.91 NTU	-252.5 mV	18.21 ft	400.00 ml/min
9/13/2023 10:37 AM	31:29	7.27 pH	12.75 °C	1.24 mS/cm	0.00 mg/L	3.12 NTU	-252.7 mV	18.21 ft	400.00 ml/min
9/13/2023 10:39 AM	33:35	7.25 pH	12.65 °C	1.24 mS/cm	0.00 mg/L	13.81 NTU	-251.0 mV	18.22 ft	400.00 ml/min
9/13/2023 10:41 AM	35:41	7.26 pH	12.86 °C	1.23 mS/cm	0.00 mg/L	1.05 NTU	-251.7 mV	18.22 ft	400.00 ml/min
9/13/2023 10:43 AM	37:47	7.26 pH	12.91 °C	1.23 mS/cm	0.00 mg/L	1.40 NTU	-251.6 mV	18.22 ft	400.00 ml/min
9/13/2023 10:45 AM	39:53	7.24 pH	12.86 °C	1.22 mS/cm	0.00 mg/L	0.00 NTU	-250.0 mV	18.22 ft	400.00 ml/min

Samples

Sample ID:	Description:
MW03R-GW-0923	

Low-Flow Test Report:

Test Date / Time: 9/13/2023 11:15:53 AM
Project: Neal North MW-5R
Operator Name: Thao Larson

Location Name: MW-5R Well Diameter: 2 in Casing Type: PVC Screen Length: 25 ft Top of Screen: 11.64 ft Total Depth: 36.7 ft Initial Depth to Water: 21.91 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 32.4 ft Pump Intake From TOC: 34.4 ft Estimated Total Volume Pumped: 3125 ml Flow Cell Volume: 130 ml Final Flow Rate: 300 ml/min Final Draw Down: 0.04 ft	Instrument Used: Aqua TROLL 600 Serial Number: 1031091
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Test Notes:
Sample time 1135

Weather Conditions:
Sunny 64°F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
9/13/2023 11:15 AM	00:00	7.24 pH	14.90 °C	1.08 mS/cm	3.31 mg/L	47.93 NTU	-196.8 mV	21.91 ft	300.00 ml/min
9/13/2023 11:17 AM	02:05	7.13 pH	13.95 °C	1.00 mS/cm	0.15 mg/L	11.54 NTU	-222.4 mV	21.91 ft	300.00 ml/min
9/13/2023 11:20 AM	04:10	7.18 pH	13.77 °C	0.99 mS/cm	0.05 mg/L	4.68 NTU	-231.7 mV	21.91 ft	300.00 ml/min
9/13/2023 11:22 AM	06:15	7.25 pH	13.61 °C	0.98 mS/cm	0.04 mg/L	4.24 NTU	-239.2 mV	21.99 ft	300.00 ml/min
9/13/2023 11:24 AM	08:20	7.28 pH	13.60 °C	0.98 mS/cm	0.03 mg/L	1.11 NTU	-242.9 mV	21.99 ft	300.00 ml/min
9/13/2023 11:26 AM	10:25	7.29 pH	13.68 °C	0.97 mS/cm	0.02 mg/L	3.09 NTU	-244.8 mV	21.95 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW05R-GW-0923	

Low-Flow Test Report:

Test Date / Time: 9/12/2023 11:28:12 AM
Project: Neal North MW-13R
Operator Name: Thao Larson

Location Name: MW-13R Well Diameter: 2 in Casing Type: PVC Screen Length: 15 ft Top of Screen: 23.2 ft Total Depth: 38.2 ft Initial Depth to Water: 29.78 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 35.7 ft Pump Intake From TOC: 37.7 ft Estimated Total Volume Pumped: 21378.334 ml Flow Cell Volume: 130 ml Final Flow Rate: 250 ml/min Final Draw Down: 0.03 ft	Instrument Used: Aqua TROLL 600 Serial Number: 1031091
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Test Notes:
Sample time 1315

Weather Conditions:
Sunny 52°F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
9/12/2023 11:28 AM	00:00	6.99 pH	13.24 °C	0.90 mS/cm	0.39 mg/L	33.23 NTU	-202.3 mV	29.78 ft	350.00 ml/min
9/12/2023 11:30 AM	02:07	7.06 pH	12.95 °C	0.91 mS/cm	0.08 mg/L	24.81 NTU	-208.8 mV	29.78 ft	350.00 ml/min
9/12/2023 11:32 AM	04:14	7.16 pH	12.94 °C	0.91 mS/cm	0.04 mg/L	55.42 NTU	-215.6 mV	29.78 ft	350.00 ml/min
9/12/2023 11:34 AM	06:21	7.18 pH	12.87 °C	0.91 mS/cm	0.03 mg/L	56.48 NTU	-216.9 mV	29.81 ft	350.00 ml/min
9/12/2023 11:36 AM	08:28	7.18 pH	12.97 °C	0.92 mS/cm	0.03 mg/L	28.36 NTU	-217.7 mV	29.81 ft	350.00 ml/min
9/12/2023 11:38 AM	10:35	7.18 pH	12.86 °C	0.92 mS/cm	0.02 mg/L	21.11 NTU	-218.2 mV	29.81 ft	350.00 ml/min
9/12/2023 11:40 AM	12:42	7.18 pH	12.95 °C	0.92 mS/cm	0.02 mg/L	20.88 NTU	-218.5 mV	29.81 ft	350.00 ml/min
9/12/2023 11:43 AM	14:49	7.16 pH	12.89 °C	0.92 mS/cm	0.02 mg/L	26.39 NTU	-217.9 mV	29.81 ft	350.00 ml/min
9/12/2023 11:45 AM	16:56	7.16 pH	12.95 °C	0.92 mS/cm	0.02 mg/L	30.15 NTU	-217.8 mV	29.81 ft	350.00 ml/min
9/12/2023 11:47 AM	19:03	7.14 pH	12.88 °C	0.92 mS/cm	0.02 mg/L	32.68 NTU	-216.8 mV	29.81 ft	350.00 ml/min
9/12/2023 11:49 AM	21:10	7.15 pH	12.93 °C	0.93 mS/cm	0.02 mg/L	30.30 NTU	-217.3 mV	29.81 ft	350.00 ml/min

9/12/2023 11:51 AM	23:17	7.14 pH	12.93 °C	0.93 mS/cm	0.01 mg/L	29.87 NTU	-216.7 mV	29.81 ft	250.00 ml/min
9/12/2023 11:53 AM	25:24	7.13 pH	13.18 °C	0.93 mS/cm	0.02 mg/L	26.41 NTU	-216.7 mV	29.81 ft	250.00 ml/min
9/12/2023 11:55 AM	27:31	7.14 pH	13.35 °C	0.93 mS/cm	0.02 mg/L	25.77 NTU	-217.4 mV	29.81 ft	250.00 ml/min
9/12/2023 11:57 AM	29:38	7.12 pH	13.24 °C	0.93 mS/cm	0.03 mg/L	22.74 NTU	-216.1 mV	29.81 ft	250.00 ml/min
9/12/2023 11:59 AM	31:45	7.13 pH	13.34 °C	0.93 mS/cm	0.02 mg/L	23.78 NTU	-216.4 mV	29.81 ft	250.00 ml/min
9/12/2023 12:02 PM	33:52	7.09 pH	13.25 °C	0.93 mS/cm	0.02 mg/L	20.28 NTU	-214.3 mV	29.81 ft	250.00 ml/min
9/12/2023 12:04 PM	35:59	7.12 pH	13.45 °C	0.93 mS/cm	0.02 mg/L	19.57 NTU	-216.1 mV	29.81 ft	250.00 ml/min
9/12/2023 12:06 PM	38:06	7.06 pH	13.37 °C	0.93 mS/cm	0.02 mg/L	18.29 NTU	-213.1 mV	29.81 ft	250.00 ml/min
9/12/2023 12:08 PM	40:13	7.12 pH	13.39 °C	0.92 mS/cm	0.02 mg/L	16.08 NTU	-216.8 mV	29.81 ft	250.00 ml/min
9/12/2023 12:10 PM	42:20	7.08 pH	13.46 °C	0.92 mS/cm	0.02 mg/L	27.12 NTU	-214.3 mV	29.81 ft	250.00 ml/min
9/12/2023 12:12 PM	44:27	7.13 pH	13.51 °C	0.93 mS/cm	0.45 mg/L	32.23 NTU	-210.1 mV	29.81 ft	250.00 ml/min
9/12/2023 12:14 PM	46:34	7.10 pH	13.55 °C	0.93 mS/cm	0.06 mg/L	28.09 NTU	-210.2 mV	29.81 ft	250.00 ml/min
9/12/2023 12:16 PM	48:41	7.08 pH	13.35 °C	0.93 mS/cm	0.02 mg/L	20.29 NTU	-210.1 mV	29.81 ft	250.00 ml/min
9/12/2023 12:19 PM	50:48	7.11 pH	13.56 °C	0.93 mS/cm	0.01 mg/L	17.28 NTU	-212.7 mV	29.81 ft	250.00 ml/min
9/12/2023 12:21 PM	52:55	7.07 pH	13.37 °C	0.93 mS/cm	0.01 mg/L	13.30 NTU	-211.2 mV	29.81 ft	250.00 ml/min
9/12/2023 12:23 PM	55:02	7.11 pH	13.56 °C	0.93 mS/cm	0.01 mg/L	12.69 NTU	-213.7 mV	29.81 ft	250.00 ml/min
9/12/2023 12:25 PM	57:09	7.05 pH	13.38 °C	0.93 mS/cm	0.01 mg/L	10.49 NTU	-210.9 mV	29.81 ft	250.00 ml/min
9/12/2023 12:27 PM	59:16	7.10 pH	13.50 °C	0.93 mS/cm	0.01 mg/L	8.89 NTU	-214.0 mV	29.81 ft	250.00 ml/min
9/12/2023 12:29 PM	01:01:23	7.07 pH	13.49 °C	0.93 mS/cm	0.01 mg/L	7.94 NTU	-212.1 mV	29.81 ft	250.00 ml/min
9/12/2023 12:31 PM	01:03:30	7.10 pH	13.54 °C	0.93 mS/cm	0.01 mg/L	9.07 NTU	-214.1 mV	29.81 ft	250.00 ml/min
9/12/2023 12:33 PM	01:05:37	7.11 pH	13.55 °C	0.93 mS/cm	0.01 mg/L	9.15 NTU	-215.1 mV	29.81 ft	250.00 ml/min
9/12/2023 12:35 PM	01:07:44	7.08 pH	13.42 °C	0.93 mS/cm	0.01 mg/L	7.05 NTU	-213.2 mV	29.81 ft	250.00 ml/min
9/12/2023 12:38 PM	01:09:51	7.11 pH	13.49 °C	0.93 mS/cm	0.01 mg/L	6.22 NTU	-214.9 mV	29.81 ft	250.00 ml/min
9/12/2023 12:40 PM	01:11:58	7.07 pH	13.36 °C	0.93 mS/cm	0.01 mg/L	6.67 NTU	-212.5 mV	29.81 ft	250.00 ml/min
9/12/2023 12:42 PM	01:14:05	7.11 pH	13.45 °C	0.93 mS/cm	0.01 mg/L	6.31 NTU	-214.7 mV	29.81 ft	250.00 ml/min
9/12/2023 12:44 PM	01:16:12	7.06 pH	13.47 °C	0.93 mS/cm	0.01 mg/L	5.86 NTU	-212.2 mV	29.81 ft	250.00 ml/min

Samples

Sample ID:	Description:
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MW13R-GW-0923	
MW13R-GW-0923 MS	
MW13R-GW-0923 MSD	

Low-Flow Test Report:

Test Date / Time: 9/13/2023 1:10:08 PM
Project: Neal North MW-19
Operator Name: Paige LaPlant

Location Name: MW-19 Well Diameter: 2 in Casing Type: PVC Screen Length: 10 ft Top of Screen: 18.9 ft Total Depth: 28.9 ft Initial Depth to Water: 16.03 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 22.6 ft Pump Intake From TOC: 24.6 ft Estimated Total Volume Pumped: 6222.917 ml Flow Cell Volume: 130 ml Final Flow Rate: 125 ml/min Final Draw Down: 4.29 ft	Instrument Used: Aqua TROLL 600 Serial Number: 809048
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Test Notes:
Sample time: 1430

Weather Conditions:
Sunny, 80 degrees F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
9/13/2023 1:10 PM	00:00	6.47 pH	17.14 °C	3.59 mS/cm	4.24 mg/L	5.29 NTU	51.4 mV	16.03 ft	125.00 ml/min
9/13/2023 1:12 PM	01:58	6.41 pH	13.95 °C	4.32 mS/cm	0.33 mg/L	6.53 NTU	7.9 mV	16.03 ft	125.00 ml/min
9/13/2023 1:14 PM	03:56	6.46 pH	13.32 °C	4.23 mS/cm	0.14 mg/L	48.22 NTU	-29.7 mV	16.03 ft	125.00 ml/min
9/13/2023 1:16 PM	05:54	6.46 pH	13.31 °C	4.11 mS/cm	0.09 mg/L	95.31 NTU	-46.5 mV	16.03 ft	125.00 ml/min
9/13/2023 1:18 PM	07:52	6.45 pH	13.20 °C	3.92 mS/cm	0.08 mg/L	62.09 NTU	-46.5 mV	16.03 ft	125.00 ml/min
9/13/2023 1:19 PM	09:50	6.42 pH	13.03 °C	3.62 mS/cm	0.07 mg/L	56.01 NTU	-30.0 mV	16.03 ft	125.00 ml/min
9/13/2023 1:21 PM	11:48	6.39 pH	12.94 °C	3.39 mS/cm	0.08 mg/L	54.22 NTU	-17.5 mV	16.03 ft	125.00 ml/min
9/13/2023 1:23 PM	13:46	6.39 pH	12.95 °C	3.22 mS/cm	0.07 mg/L	60.86 NTU	-12.0 mV	16.03 ft	125.00 ml/min
9/13/2023 1:25 PM	15:44	6.40 pH	13.00 °C	3.07 mS/cm	0.18 mg/L	49.38 NTU	-8.4 mV	16.03 ft	125.00 ml/min
9/13/2023 1:27 PM	17:42	6.42 pH	12.93 °C	2.89 mS/cm	0.55 mg/L	22.99 NTU	-7.9 mV	16.03 ft	125.00 ml/min
9/13/2023 1:29 PM	19:40	6.44 pH	12.93 °C	2.76 mS/cm	1.46 mg/L	29.93 NTU	-7.0 mV	19.30 ft	125.00 ml/min

9/13/2023 1:31 PM	21:38	6.51 pH	13.00 °C	2.42 mS/cm	3.14 mg/L	12.16 NTU	0.9 mV	19.30 ft	125.00 ml/min
9/13/2023 1:33 PM	23:36	6.48 pH	13.03 °C	2.57 mS/cm	3.37 mg/L	16.80 NTU	0.7 mV	19.30 ft	125.00 ml/min
9/13/2023 1:35 PM	25:34	6.49 pH	13.04 °C	2.56 mS/cm	2.62 mg/L	21.27 NTU	-0.4 mV	19.30 ft	125.00 ml/min
9/13/2023 1:37 PM	27:32	6.49 pH	13.02 °C	2.57 mS/cm	2.12 mg/L	22.13 NTU	-0.4 mV	19.30 ft	125.00 ml/min
9/13/2023 1:39 PM	29:30	6.50 pH	13.01 °C	2.56 mS/cm	1.85 mg/L	15.29 NTU	0.0 mV	19.30 ft	125.00 ml/min
9/13/2023 1:41 PM	31:28	6.50 pH	12.96 °C	2.56 mS/cm	1.63 mg/L	15.89 NTU	0.6 mV	19.30 ft	125.00 ml/min
9/13/2023 1:43 PM	33:26	6.51 pH	12.94 °C	2.56 mS/cm	1.47 mg/L	7.50 NTU	1.2 mV	19.30 ft	125.00 ml/min
9/13/2023 1:45 PM	35:24	6.51 pH	12.96 °C	2.56 mS/cm	1.41 mg/L	8.04 NTU	1.3 mV	19.30 ft	125.00 ml/min
9/13/2023 1:47 PM	37:22	6.51 pH	12.91 °C	2.57 mS/cm	1.30 mg/L	11.20 NTU	1.7 mV	19.30 ft	125.00 ml/min
9/13/2023 1:49 PM	39:20	6.51 pH	13.00 °C	2.58 mS/cm	1.24 mg/L	10.99 NTU	1.4 mV	19.30 ft	125.00 ml/min
9/13/2023 1:50 PM	39:57	6.51 pH	13.15 °C	2.70 mS/cm	1.26 mg/L	3.30 NTU	1.2 mV	19.30 ft	125.00 ml/min
9/13/2023 1:52 PM	41:55	6.52 pH	13.14 °C	2.60 mS/cm	1.05 mg/L	0.68 NTU	0.9 mV	19.85 ft	125.00 ml/min
9/13/2023 1:54 PM	43:53	6.52 pH	13.10 °C	2.60 mS/cm	0.62 mg/L	0.37 NTU	0.5 mV	19.85 ft	125.00 ml/min
9/13/2023 1:55 PM	45:51	6.53 pH	12.95 °C	2.59 mS/cm	0.47 mg/L	0.35 NTU	-0.1 mV	19.85 ft	125.00 ml/min
9/13/2023 1:57 PM	47:49	6.54 pH	12.99 °C	2.59 mS/cm	0.38 mg/L	0.28 NTU	-0.7 mV	19.85 ft	125.00 ml/min
9/13/2023 1:59 PM	49:47	6.54 pH	13.08 °C	2.61 mS/cm	0.32 mg/L	0.00 NTU	-1.2 mV	20.32 ft	125.00 ml/min

Samples

Sample ID:	Description:
MW19-GW-0923	1L plastic w/ nitric x2 1L plastic unpreserved x1 250mL plastic w/ nitric x1 250L plastic unpreserved x1

Low-Flow Test Report:

Test Date / Time: 9/13/2023 12:21:41 PM
Project: Neal North MW-21
Operator Name: Thao Larson

Location Name: MW-21 Well Diameter: 2 in Casing Type: PVC Screen Length: 15 ft Top of Screen: 16.6 ft Total Depth: 31.6 ft Initial Depth to Water: 21.92 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 27.3 ft Pump Intake From TOC: 29.3 ft Estimated Total Volume Pumped: 3025 ml Flow Cell Volume: 130 ml Final Flow Rate: 300 ml/min Final Draw Down: 1.11 ft	Instrument Used: Aqua TROLL 600 Serial Number: 1031091
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Test Notes:
Sample time 1245

Weather Conditions:
Sunny 64°F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
9/13/2023 12:21 PM	00:00	6.69 pH	15.50 °C	3.59 mS/cm	3.00 mg/L	0.00 NTU	-31.6 mV	21.92 ft	300.00 ml/min
9/13/2023 12:23 PM	02:01	6.53 pH	13.45 °C	3.71 mS/cm	0.30 mg/L	0.00 NTU	-14.4 mV	21.92 ft	300.00 ml/min
9/13/2023 12:25 PM	04:02	6.59 pH	13.18 °C	3.70 mS/cm	0.26 mg/L	0.00 NTU	-13.8 mV	21.92 ft	300.00 ml/min
9/13/2023 12:27 PM	06:03	6.59 pH	13.04 °C	3.68 mS/cm	0.22 mg/L	0.00 NTU	-10.7 mV	21.92 ft	300.00 ml/min
9/13/2023 12:29 PM	08:04	6.59 pH	12.94 °C	3.68 mS/cm	0.18 mg/L	0.00 NTU	-8.3 mV	23.03 ft	300.00 ml/min
9/13/2023 12:31 PM	10:05	6.62 pH	12.97 °C	3.68 mS/cm	0.28 mg/L	0.00 NTU	-7.5 mV	23.03 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW21-GW-0923	

Low-Flow Test Report:

Test Date / Time: 9/12/2023 1:43:47 PM
Project: Neal North MW-27
Operator Name: Thao Larson

Location Name: MW-27 Well Diameter: 2 in Casing Type: PVC Screen Length: 10 ft Top of Screen: 23.7 ft Total Depth: 33.7 ft Initial Depth to Water: 27.96 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 29.4 ft Pump Intake From TOC: 31.4 ft Estimated Total Volume Pumped: 3573.333 ml Flow Cell Volume: 130 ml Final Flow Rate: 100 ml/min Final Draw Down: 0.45 ft	Instrument Used: Aqua TROLL 600 Serial Number: 1031091
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Test Notes:
Sample time 1435

Weather Conditions:
Sunny 75°F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
9/12/2023 1:43 PM	00:00	7.08 pH	17.52 °C	1.24 mS/cm	4.50 mg/L	35.57 NTU	-200.8 mV	27.96 ft	100.00 ml/min
9/12/2023 1:45 PM	02:03	6.98 pH	15.08 °C	1.26 mS/cm	0.85 mg/L	32.61 NTU	-210.7 mV	28.22 ft	100.00 ml/min
9/12/2023 1:47 PM	04:06	7.02 pH	14.63 °C	1.26 mS/cm	0.38 mg/L	41.40 NTU	-216.3 mV	28.33 ft	100.00 ml/min
9/12/2023 1:49 PM	06:09	6.98 pH	14.78 °C	1.26 mS/cm	0.28 mg/L	33.86 NTU	-216.8 mV	28.33 ft	100.00 ml/min
9/12/2023 1:51 PM	08:12	6.96 pH	14.73 °C	1.26 mS/cm	0.23 mg/L	23.59 NTU	-216.7 mV	28.33 ft	100.00 ml/min
9/12/2023 1:54 PM	10:15	6.96 pH	15.11 °C	1.26 mS/cm	0.21 mg/L	24.08 NTU	-217.8 mV	28.33 ft	100.00 ml/min
9/12/2023 1:56 PM	12:18	6.96 pH	15.54 °C	1.25 mS/cm	0.21 mg/L	29.71 NTU	-218.7 mV	28.33 ft	100.00 ml/min
9/12/2023 1:58 PM	14:21	6.98 pH	15.17 °C	1.26 mS/cm	0.20 mg/L	28.63 NTU	-219.2 mV	28.39 ft	100.00 ml/min
9/12/2023 2:00 PM	16:24	7.00 pH	15.12 °C	1.26 mS/cm	0.21 mg/L	24.59 NTU	-220.1 mV	28.39 ft	100.00 ml/min
9/12/2023 2:02 PM	18:27	7.01 pH	15.67 °C	1.26 mS/cm	0.20 mg/L	25.00 NTU	-221.4 mV	28.39 ft	100.00 ml/min
9/12/2023 2:04 PM	20:30	7.02 pH	15.81 °C	1.26 mS/cm	0.19 mg/L	20.84 NTU	-222.7 mV	28.39 ft	100.00 ml/min

9/12/2023 2:05 PM	22:04	7.06 pH	16.81 °C	1.24 mS/cm	2.69 mg/L	22.25 NTU	-246.7 mV	28.39 ft	100.00 ml/min
9/12/2023 2:07 PM	24:07	7.06 pH	15.50 °C	1.25 mS/cm	0.29 mg/L	15.56 NTU	-232.7 mV	28.39 ft	100.00 ml/min
9/12/2023 2:09 PM	26:10	7.07 pH	15.66 °C	1.26 mS/cm	0.21 mg/L	14.30 NTU	-230.9 mV	28.41 ft	100.00 ml/min
9/12/2023 2:11 PM	27:32	7.07 pH	15.65 °C	1.25 mS/cm	0.20 mg/L	14.16 NTU	-230.0 mV	28.41 ft	100.00 ml/min
9/12/2023 2:13 PM	29:35	7.08 pH	16.17 °C	1.25 mS/cm	1.19 mg/L	12.29 NTU	-226.2 mV	28.41 ft	100.00 ml/min
9/12/2023 2:15 PM	31:38	7.08 pH	15.56 °C	1.25 mS/cm	0.26 mg/L	8.42 NTU	-227.0 mV	28.41 ft	100.00 ml/min
9/12/2023 2:17 PM	33:41	7.08 pH	15.50 °C	1.25 mS/cm	0.20 mg/L	6.36 NTU	-228.0 mV	28.41 ft	100.00 ml/min
9/12/2023 2:19 PM	35:44	7.08 pH	15.07 °C	1.25 mS/cm	0.19 mg/L	5.46 NTU	-227.7 mV	28.41 ft	100.00 ml/min

Samples

Sample ID:	Description:
MW27-GW-0923	

Low-Flow Test Report:

Test Date / Time: 9/12/2023 10:33:26 AM
Project: Neal North MW-29R
Operator Name: Thao Larson

Location Name: MW-29R Well Diameter: 2 in Casing Type: PVC Screen Length: 15 ft Top of Screen: 20.2 ft Total Depth: 35.2 ft Initial Depth to Water: 29.59 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 32.7 ft Pump Intake From TOC: 34.7 ft Estimated Total Volume Pumped: 6250 ml Flow Cell Volume: 130 ml Final Flow Rate: 250 ml/min Final Draw Down: 0.05 ft	Instrument Used: Aqua TROLL 600 Serial Number: 1031091
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Test Notes:
Sample time 1110

Weather Conditions:
Sunny 52°F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
9/12/2023 10:33 AM	00:00	6.76 pH	13.81 °C	1.40 mS/cm	1.69 mg/L	64.64 NTU	-183.6 mV	29.59 ft	250.00 ml/min
9/12/2023 10:35 AM	02:05	6.81 pH	13.24 °C	1.41 mS/cm	0.96 mg/L	76.71 NTU	-181.1 mV	29.59 ft	250.00 ml/min
9/12/2023 10:37 AM	04:10	6.90 pH	13.20 °C	1.42 mS/cm	0.79 mg/L	44.17 NTU	-188.6 mV	29.59 ft	250.00 ml/min
9/12/2023 10:39 AM	06:15	6.91 pH	13.02 °C	1.43 mS/cm	0.80 mg/L	31.16 NTU	-191.5 mV	29.62 ft	250.00 ml/min
9/12/2023 10:41 AM	08:20	6.90 pH	12.98 °C	1.43 mS/cm	0.15 mg/L	26.21 NTU	-190.8 mV	29.62 ft	250.00 ml/min
9/12/2023 10:43 AM	10:25	6.91 pH	12.93 °C	1.43 mS/cm	0.09 mg/L	16.88 NTU	-194.6 mV	29.62 ft	250.00 ml/min
9/12/2023 10:45 AM	12:30	6.92 pH	12.81 °C	1.44 mS/cm	0.09 mg/L	15.38 NTU	-197.4 mV	29.62 ft	250.00 ml/min
9/12/2023 10:48 AM	14:35	6.92 pH	12.90 °C	1.44 mS/cm	0.09 mg/L	12.61 NTU	-197.9 mV	29.62 ft	250.00 ml/min
9/12/2023 10:50 AM	16:40	6.93 pH	12.88 °C	1.44 mS/cm	0.09 mg/L	10.02 NTU	-198.4 mV	29.62 ft	250.00 ml/min
9/12/2023 10:52 AM	18:45	6.94 pH	12.74 °C	1.44 mS/cm	0.09 mg/L	8.65 NTU	-199.4 mV	29.62 ft	250.00 ml/min
9/12/2023 10:54 AM	20:50	6.94 pH	12.83 °C	1.44 mS/cm	0.10 mg/L	7.85 NTU	-199.3 mV	29.62 ft	250.00 ml/min

9/12/2023 10:56 AM	22:55	6.94 pH	12.87 °C	1.45 mS/cm	0.10 mg/L	5.55 NTU	-199.2 mV	29.64 ft	250.00 ml/min
9/12/2023 10:58 AM	25:00	6.94 pH	12.75 °C	1.44 mS/cm	0.10 mg/L	4.67 NTU	-199.7 mV	29.64 ft	250.00 ml/min

Samples

Sample ID:	Description:
MW29R-GW-0923	

Low-Flow Test Report:

Test Date / Time: 9/12/2023 3:18:09 PM
Project: Neal North MW-223S
Operator Name: Thao Larson

Location Name: MW-223S Well Diameter: 2 in Casing Type: PVC Screen Length: 15 ft Top of Screen: 11.7 ft Total Depth: 26.7 ft Initial Depth to Water: 22.15 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 22.4 ft Pump Intake From TOC: 24.4 ft Estimated Total Volume Pumped: 2683.333 ml Flow Cell Volume: 130 ml Final Flow Rate: 100 ml/min Final Draw Down: 0.04 ft	Instrument Used: Aqua TROLL 600 Serial Number: 1031091
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Test Notes:
Sample time 1620

Weather Conditions:
Sunny 72°F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
9/12/2023 3:18 PM	00:00	6.96 pH	20.12 °C	0.85 mS/cm	1.68 mg/L	272.65 NTU	-155.0 mV	22.15 ft	100.00 ml/min
9/12/2023 3:20 PM	01:55	6.97 pH	18.05 °C	0.79 mS/cm	0.31 mg/L	355.56 NTU	-163.0 mV	22.15 ft	100.00 ml/min
9/12/2023 3:21 PM	03:50	7.04 pH	17.08 °C	0.78 mS/cm	0.11 mg/L	261.56 NTU	-175.2 mV	22.15 ft	100.00 ml/min
9/12/2023 3:23 PM	05:45	7.16 pH	17.04 °C	0.78 mS/cm	0.09 mg/L	174.38 NTU	-188.0 mV	22.19 ft	100.00 ml/min
9/12/2023 3:25 PM	07:40	7.18 pH	17.14 °C	0.78 mS/cm	0.08 mg/L	112.74 NTU	-193.1 mV	22.19 ft	100.00 ml/min
9/12/2023 3:27 PM	09:35	7.20 pH	16.88 °C	0.78 mS/cm	0.09 mg/L	81.33 NTU	-196.9 mV	22.19 ft	100.00 ml/min
9/12/2023 3:29 PM	11:30	7.20 pH	16.92 °C	0.78 mS/cm	0.09 mg/L	57.25 NTU	-197.5 mV	22.19 ft	100.00 ml/min
9/12/2023 3:31 PM	13:25	7.21 pH	17.12 °C	0.78 mS/cm	0.09 mg/L	74.88 NTU	-197.4 mV	22.19 ft	100.00 ml/min
9/12/2023 3:33 PM	15:20	7.25 pH	17.39 °C	0.78 mS/cm	1.75 mg/L	44.86 NTU	-194.2 mV	22.19 ft	100.00 ml/min
9/12/2023 3:35 PM	17:15	7.20 pH	17.11 °C	0.78 mS/cm	0.25 mg/L	53.74 NTU	-195.1 mV	22.19 ft	100.00 ml/min
9/12/2023 3:37 PM	19:10	7.21 pH	17.29 °C	0.78 mS/cm	0.15 mg/L	28.27 NTU	-197.6 mV	22.19 ft	100.00 ml/min

9/12/2023 3:39 PM	21:05	7.21 pH	17.17 °C	0.78 mS/cm	0.11 mg/L	24.75 NTU	-199.5 mV	22.19 ft	100.00 ml/min
9/12/2023 3:41 PM	23:00	7.20 pH	16.68 °C	0.78 mS/cm	0.10 mg/L	10.34 NTU	-198.8 mV	22.19 ft	100.00 ml/min
9/12/2023 3:43 PM	24:55	7.20 pH	16.38 °C	0.77 mS/cm	0.10 mg/L	16.45 NTU	-197.4 mV	22.19 ft	100.00 ml/min
9/12/2023 3:44 PM	26:50	7.21 pH	16.10 °C	0.77 mS/cm	0.10 mg/L	13.88 NTU	-199.0 mV	22.19 ft	100.00 ml/min

Samples

Sample ID:	Description:
MW223S-GW-0923	
DP01-GW-0923	

Low-Flow Test Report:

Test Date / Time: 9/13/2023 9:07:15 AM
Project: Neal North MW-231SR
Operator Name: Thao Larson

Location Name: MW-231SR Well Diameter: 2 in Casing Type: PVC Screen Length: 15 ft Top of Screen: 14.07 ft Total Depth: 29.07 ft Initial Depth to Water: 22.56 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 26.57 ft Pump Intake From TOC: 28.57 ft Estimated Total Volume Pumped: 3025 ml Flow Cell Volume: 130 ml Final Flow Rate: 300 ml/min Final Draw Down: 0.02 ft	Instrument Used: Aqua TROLL 600 Serial Number: 1031091
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Test Notes:
Sample time 0930

Weather Conditions:
Sunny 58°F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
9/13/2023 9:07 AM	00:00	7.01 pH	13.61 °C	1.13 mS/cm	1.02 mg/L	4.55 NTU	-211.9 mV	22.56 ft	300.00 ml/min
9/13/2023 9:09 AM	02:01	6.98 pH	13.26 °C	1.10 mS/cm	0.08 mg/L	4.89 NTU	-214.1 mV	22.56 ft	300.00 ml/min
9/13/2023 9:11 AM	04:02	6.98 pH	13.22 °C	1.07 mS/cm	0.04 mg/L	8.08 NTU	-213.2 mV	22.56 ft	300.00 ml/min
9/13/2023 9:13 AM	06:03	6.99 pH	13.15 °C	1.11 mS/cm	0.03 mg/L	2.79 NTU	-212.2 mV	22.56 ft	300.00 ml/min
9/13/2023 9:15 AM	08:04	7.00 pH	13.14 °C	1.12 mS/cm	0.02 mg/L	0.00 NTU	-211.7 mV	22.58 ft	300.00 ml/min
9/13/2023 9:17 AM	10:05	7.00 pH	13.11 °C	1.12 mS/cm	0.03 mg/L	0.00 NTU	-210.6 mV	22.58 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW231SR-GW-0923	

Low-Flow Test Report:

Test Date / Time: 12/5/2023 11:09:35 AM
Project: Neal North MW-21
Operator Name: Paige Richards

Location Name: MW-21 Well Diameter: 2 in Casing Type: PVC Screen Length: 15 ft Top of Screen: 16.6 ft Total Depth: 31.6 ft Initial Depth to Water: 22.98 ft	Pump Type: Solinst Model 407 Bladder Pump Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing Tubing Inner Diameter: 0.125 in Tubing Length: 27.3 ft Pump Intake From TOC: 29.3 ft Estimated Total Volume Pumped: 2924.167 ml Flow Cell Volume: 130 ml Final Flow Rate: 350 ml/min Final Draw Down: 1.16 ft	Instrument Used: Aqua TROLL 600 Serial Number: 876572
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Test Notes:
Sample time: 1125

Weather Conditions:
Sunny, 35 degrees F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
12/5/2023 11:09 AM	00:00	6.58 pH	10.90 °C	3.26 mS/cm	1.98 mg/L	7.25 NTU	234.3 mV	22.98 ft	400.00 ml/min
12/5/2023 11:11 AM	02:01	6.60 pH	10.74 °C	3.25 mS/cm	0.29 mg/L	0.00 NTU	214.9 mV	22.98 ft	350.00 ml/min
12/5/2023 11:13 AM	04:02	6.61 pH	10.96 °C	3.25 mS/cm	0.20 mg/L	0.00 NTU	223.9 mV	22.98 ft	350.00 ml/min
12/5/2023 11:15 AM	06:03	6.63 pH	11.04 °C	3.26 mS/cm	0.37 mg/L	0.18 NTU	213.9 mV	22.98 ft	350.00 ml/min
12/5/2023 11:17 AM	08:04	6.64 pH	11.05 °C	3.27 mS/cm	0.39 mg/L	0.04 NTU	217.1 mV	24.14 ft	350.00 ml/min

Samples

Sample ID:	Description:
MW21-GW-1223	250mL plastic w/ nitric x1
MS	250mL plastic w/ nitric x1
MSD	250mL plastic w/ nitric x1

Appendix B

Laboratory Analytical Reports

ANALYTICAL REPORT

PREPARED FOR

Attn: Kevin Armstrong
GHD Services Inc.
11228 Aurora Avenue
Des Moines, Iowa 50322-7905

Generated 5/3/2023 12:17:02 PM

JOB DESCRIPTION

MEC Neal North-Background

JOB NUMBER

310-252280-1

Eurofins Cedar Falls

Job Notes

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of Eurofins Environment Testing North Central, LLC and its client. All questions regarding this report should be directed to the Eurofins Environment Testing North Central, LLC Project Manager who has signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization



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Case Narrative

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Job ID: 310-252280-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-252280-1

Receipt

The samples were received on 3/29/2023 9:25 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 1.0°C, 1.3°C and 1.4°C

HPLC/IC

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

Metals

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

General Chemistry

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

Narrative

Job Narrative 310-252280-2

Receipt

The samples were received on 3/29/2023 9:25 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 1.0°C, 1.3°C and 1.4°C

Gas Flow Proportional Counter

Method 9315_Ra226: Radium-226 batch 606031Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.MW13R-GW-0323 (310-252280-1), MW13R-GW-0323 (310-252280-1[MS]), MW13R-GW-0323 (310-252280-1[MSD]), (LCS 160-606031/2-A), (LCSD 160-606031/24-A) and (MB 160-606031/1-A)

Method 9315_Ra226: Radium-226 batch 606317Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.MW231SR-GW-0323 (310-252280-2), (LCS 160-606317/2-A), (MB 160-606317/1-A), (400-235302-A-11-A) and (400-235302-A-11-C DU)

Method 9320_Ra228: Radium-228 batch 606038The LCS recovered at (130%). The limits in our LIMS system at 75-125 reflect the requirements of a regulatory agency that represents a large amount of our work. However the samples associated with this LCS are not from this agency and are therefore held to our in-house statistical limits of (62-148%) per method requirements. The LCS passes, no further action is required (LCSD 160-606038/24-A)

Method 9320_Ra228: Radium-228 batch 606038Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.MW13R-GW-0323 (310-252280-1), MW13R-GW-0323 (310-252280-1[MS]), MW13R-GW-0323 (310-252280-1[MSD]), (LCS 160-606038/2-A), (LCSD 160-606038/24-A) and (MB 160-606038/1-A)

Method 9320_Ra228: Radium-228 batch 606318Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.MW231SR-GW-0323 (310-252280-2), (LCS 160-606318/2-A), (MB 160-606318/1-A), (400-235302-A-11-D) and (400-235302-A-11-E DU)

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

Case Narrative

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Job ID: 310-252280-1 (Continued)

Laboratory: Eurofins Cedar Falls (Continued)

Rad

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

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Sample Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-252280-1	MW13R-GW-0323	Water	03/27/23 17:50	03/29/23 09:25
310-252280-2	MW231SR-GW-0323	Water	03/28/23 15:50	03/29/23 09:25

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Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Client Sample ID: MW13R-GW-0323

Lab Sample ID: 310-252280-1

Date Collected: 03/27/23 17:50

Matrix: Water

Date Received: 03/29/23 09:25

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	18.9		5.00		mg/L			04/04/23 15:45	5
Fluoride	<0.500		0.500		mg/L			04/04/23 15:45	5
Sulfate	68.4		5.00		mg/L			04/04/23 15:45	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		03/30/23 09:30	03/31/23 02:50	1
Arsenic	0.0510		0.00200		mg/L		03/30/23 09:30	03/31/23 02:50	1
Barium	0.200		0.00200		mg/L		03/30/23 09:30	03/31/23 02:50	1
Beryllium	<0.00100		0.00100		mg/L		03/30/23 09:30	03/31/23 02:50	1
Boron	0.138		0.100		mg/L		03/30/23 09:30	03/31/23 02:50	1
Cadmium	0.000211		0.000100		mg/L		03/30/23 09:30	03/31/23 02:50	1
Calcium	130		0.500		mg/L		03/30/23 09:30	03/31/23 02:50	1
Chromium	<0.00500		0.00500		mg/L		03/30/23 09:30	03/31/23 02:50	1
Cobalt	0.00105		0.000500		mg/L		03/30/23 09:30	03/31/23 02:50	1
Lithium	0.0873		0.0100		mg/L		03/30/23 09:30	03/31/23 02:50	1
Lead	0.000593		0.000500		mg/L		03/30/23 09:30	03/31/23 02:50	1
Molybdenum	0.00492		0.00200		mg/L		03/30/23 09:30	03/31/23 02:50	1
Selenium	<0.00500		0.00500		mg/L		03/30/23 09:30	03/31/23 02:50	1
Thallium	0.00146		0.00100		mg/L		03/30/23 09:30	03/31/23 02:50	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/04/23 12:41	04/05/23 13:23	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	502		50.0		mg/L			03/30/23 08:54	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.3	HF	0.1		SU			03/29/23 11:33	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.281		0.151	0.153	1.00	0.176	pCi/L	04/04/23 13:56	04/27/23 20:44	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.4		30 - 110					04/04/23 13:56	04/27/23 20:44	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.902		0.348	0.358	1.00	0.425	pCi/L	04/04/23 14:37	04/26/23 11:49	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.4		30 - 110					04/04/23 14:37	04/26/23 11:49	1
Y Carrier	87.5		30 - 110					04/04/23 14:37	04/26/23 11:49	1

Eurofins Cedar Falls

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Client Sample ID: MW13R-GW-0323
Date Collected: 03/27/23 17:50
Date Received: 03/29/23 09:25

Lab Sample ID: 310-252280-1
Matrix: Water

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.18		0.379	0.389	5.00	0.425	pCi/L		04/28/23 13:20	1

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Client Sample ID: MW231SR-GW-0323

Lab Sample ID: 310-252280-2

Date Collected: 03/28/23 15:50

Matrix: Water

Date Received: 03/29/23 09:25

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	9.32		1.00		mg/L			03/29/23 15:36	1
Nitrate as N	<0.100		0.100		mg/L			03/29/23 15:36	1
Fluoride	0.163		0.100		mg/L			03/29/23 15:36	1
Sulfate	176		10.0		mg/L			03/30/23 12:58	10

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		03/30/23 09:30	03/31/23 03:06	1
Arsenic	0.0121		0.00200		mg/L		03/30/23 09:30	03/31/23 03:06	1
Barium	0.136		0.00200		mg/L		03/30/23 09:30	03/31/23 03:06	1
Beryllium	<0.00100		0.00100		mg/L		03/30/23 09:30	03/31/23 03:06	1
Boron	0.500		0.100		mg/L		03/30/23 09:30	03/31/23 03:06	1
Cadmium	<0.000100		0.000100		mg/L		03/30/23 09:30	03/31/23 03:06	1
Calcium	204		0.500		mg/L		03/30/23 09:30	03/31/23 03:06	1
Chromium	<0.00500		0.00500		mg/L		03/30/23 09:30	03/31/23 03:06	1
Cobalt	0.00330		0.000500		mg/L		03/30/23 09:30	03/31/23 03:06	1
Lithium	0.110		0.0100		mg/L		03/30/23 09:30	03/31/23 03:06	1
Lead	<0.000500		0.000500		mg/L		03/30/23 09:30	03/31/23 03:06	1
Molybdenum	0.00347		0.00200		mg/L		03/30/23 09:30	03/31/23 03:06	1
Selenium	<0.00500		0.00500		mg/L		03/30/23 09:30	03/31/23 03:06	1
Thallium	0.00147		0.00100		mg/L		03/30/23 09:30	03/31/23 03:06	1
Iron	10.7		0.100		mg/L		03/30/23 09:30	03/31/23 03:06	1
Manganese	1.24		0.0100		mg/L		03/30/23 09:30	03/31/23 03:06	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	10.8		0.100		mg/L		04/04/23 09:25	04/04/23 17:22	1
Manganese	1.31		0.0100		mg/L		04/04/23 09:25	04/04/23 17:22	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/04/23 12:41	04/05/23 13:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates (SW846 9060A)	2.44		1.00		mg/L			04/11/23 20:46	1
Total Dissolved Solids (SM 2540C)	788		50.0		mg/L			03/30/23 08:54	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.2	HF	0.1		SU			03/29/23 11:35	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.281		0.122	0.125	1.00	0.131	pCi/L	04/06/23 09:24	05/02/23 09:58	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.1		30 - 110					04/06/23 09:24	05/02/23 09:58	1

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Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Client Sample ID: MW231SR-GW-0323

Lab Sample ID: 310-252280-2

Date Collected: 03/28/23 15:50

Matrix: Water

Date Received: 03/29/23 09:25

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0810	U	0.351	0.351	1.00	0.625	pCi/L	04/06/23 10:02	04/28/23 12:30	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.1		30 - 110					04/06/23 10:02	04/28/23 12:30	1
Y Carrier	88.6		30 - 110					04/06/23 10:02	04/28/23 12:30	1

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.362	U	0.372	0.373	5.00	0.625	pCi/L		05/02/23 14:17	1

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-383023/3

Matrix: Water

Analysis Batch: 383023

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			03/29/23 10:10	1
Fluoride	<0.100		0.100		mg/L			03/29/23 10:10	1
Sulfate	<1.00		1.00		mg/L			03/29/23 10:10	1

Lab Sample ID: LCS 310-383023/31

Matrix: Water

Analysis Batch: 383023

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.764		mg/L		98	90 - 110
Fluoride	2.00	2.193		mg/L		110	90 - 110
Sulfate	10.0	10.23		mg/L		102	90 - 110

Lab Sample ID: MB 310-383493/3

Matrix: Water

Analysis Batch: 383493

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			04/04/23 15:17	1
Fluoride	<0.100		0.100		mg/L			04/04/23 15:17	1
Sulfate	<1.00		1.00		mg/L			04/04/23 15:17	1

Lab Sample ID: LCS 310-383493/4

Matrix: Water

Analysis Batch: 383493

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.859		mg/L		99	90 - 110
Fluoride	2.00	2.154		mg/L		108	90 - 110
Sulfate	10.0	10.41		mg/L		104	90 - 110

Lab Sample ID: 310-252280-1 MS

Matrix: Water

Analysis Batch: 383493

Client Sample ID: MW13R-GW-0323

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	18.9		25.0	41.42		mg/L		90	80 - 120
Fluoride	<0.500		5.00	5.317		mg/L		100	80 - 120
Sulfate	68.4		25.0	92.39		mg/L		96	80 - 120

Lab Sample ID: 310-252280-1 MSD

Matrix: Water

Analysis Batch: 383493

Client Sample ID: MW13R-GW-0323

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	18.9		25.0	41.54		mg/L		90	80 - 120	0	15
Fluoride	<0.500		5.00	5.396		mg/L		102	80 - 120	1	15
Sulfate	68.4		25.0	92.69		mg/L		97	80 - 120	0	15

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QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-382646/1-A
Matrix: Water
Analysis Batch: 382841

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 382646

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		03/30/23 09:30	03/31/23 02:43	1
Arsenic	<0.00200		0.00200		mg/L		03/30/23 09:30	03/31/23 02:43	1
Barium	<0.00200		0.00200		mg/L		03/30/23 09:30	03/31/23 02:43	1
Beryllium	<0.00100		0.00100		mg/L		03/30/23 09:30	03/31/23 02:43	1
Boron	<0.100		0.100		mg/L		03/30/23 09:30	03/31/23 02:43	1
Cadmium	<0.000100		0.000100		mg/L		03/30/23 09:30	03/31/23 02:43	1
Calcium	<0.500		0.500		mg/L		03/30/23 09:30	03/31/23 02:43	1
Chromium	<0.00500		0.00500		mg/L		03/30/23 09:30	03/31/23 02:43	1
Cobalt	<0.000500		0.000500		mg/L		03/30/23 09:30	03/31/23 02:43	1
Lithium	<0.0100		0.0100		mg/L		03/30/23 09:30	03/31/23 02:43	1
Lead	<0.000500		0.000500		mg/L		03/30/23 09:30	03/31/23 02:43	1
Molybdenum	<0.00200		0.00200		mg/L		03/30/23 09:30	03/31/23 02:43	1
Selenium	<0.00500		0.00500		mg/L		03/30/23 09:30	03/31/23 02:43	1
Thallium	<0.00100		0.00100		mg/L		03/30/23 09:30	03/31/23 02:43	1
Iron	<0.100		0.100		mg/L		03/30/23 09:30	03/31/23 02:43	1
Manganese	<0.0100		0.0100		mg/L		03/30/23 09:30	03/31/23 02:43	1

Lab Sample ID: LCS 310-382646/2-A
Matrix: Water
Analysis Batch: 382841

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 382646

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	0.200	0.2044		mg/L		102	80 - 120
Arsenic	0.200	0.2056		mg/L		103	80 - 120
Barium	0.100	0.09487		mg/L		95	80 - 120
Beryllium	0.100	0.1082		mg/L		108	80 - 120
Boron	0.200	0.2188		mg/L		109	80 - 120
Cadmium	0.100	0.08928		mg/L		89	80 - 120
Calcium	2.00	2.033		mg/L		102	80 - 120
Chromium	0.100	0.1009		mg/L		101	80 - 120
Cobalt	0.100	0.1063		mg/L		106	80 - 120
Lithium	0.200	0.2049		mg/L		102	80 - 120
Lead	0.200	0.2044		mg/L		102	80 - 120
Molybdenum	0.200	0.1920		mg/L		96	80 - 120
Selenium	0.400	0.3927		mg/L		98	80 - 120
Thallium	0.200	0.2097		mg/L		105	80 - 120
Iron	0.200	0.2031		mg/L		102	80 - 120
Manganese	0.100	0.08899		mg/L		89	80 - 120

Lab Sample ID: 310-252280-1 MS
Matrix: Water
Analysis Batch: 382841

Client Sample ID: MW13R-GW-0323
Prep Type: Total/NA
Prep Batch: 382646

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	<0.00200		0.200	0.2249		mg/L		112	75 - 125
Arsenic	0.0510		0.200	0.2671		mg/L		108	75 - 125
Barium	0.200		0.100	0.3021		mg/L		103	75 - 125
Beryllium	<0.00100		0.100	0.1144		mg/L		114	75 - 125
Boron	0.138		0.200	0.3613		mg/L		112	75 - 125

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QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 310-252280-1 MS

Matrix: Water

Analysis Batch: 382841

Client Sample ID: MW13R-GW-0323

Prep Type: Total/NA

Prep Batch: 382646

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Cadmium	0.000211		0.100	0.08900		mg/L		89	75 - 125
Calcium	130		2.00	132.1	4	mg/L		118	75 - 125
Chromium	<0.00500		0.100	0.1024		mg/L		102	75 - 125
Cobalt	0.00105		0.100	0.1074		mg/L		106	75 - 125
Lithium	0.0873		0.200	0.3129		mg/L		113	75 - 125
Lead	0.000593		0.200	0.2142		mg/L		107	75 - 125
Molybdenum	0.00492		0.200	0.2140		mg/L		105	75 - 125
Selenium	<0.00500		0.400	0.4214		mg/L		105	75 - 125
Thallium	0.00146		0.200	0.2180		mg/L		108	75 - 125

Lab Sample ID: 310-252280-1 MSD

Matrix: Water

Analysis Batch: 382841

Client Sample ID: MW13R-GW-0323

Prep Type: Total/NA

Prep Batch: 382646

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Antimony	<0.00200		0.200	0.2303		mg/L		115	75 - 125	2	20
Arsenic	0.0510		0.200	0.2723		mg/L		111	75 - 125	2	20
Barium	0.200		0.100	0.3043		mg/L		105	75 - 125	1	20
Beryllium	<0.00100		0.100	0.1161		mg/L		116	75 - 125	1	20
Boron	0.138		0.200	0.3639		mg/L		113	75 - 125	1	20
Cadmium	0.000211		0.100	0.08957		mg/L		89	75 - 125	1	20
Calcium	130		2.00	134.0	4	mg/L		212	75 - 125	1	20
Chromium	<0.00500		0.100	0.1033		mg/L		103	75 - 125	1	20
Cobalt	0.00105		0.100	0.1102		mg/L		109	75 - 125	3	20
Lithium	0.0873		0.200	0.3203		mg/L		116	75 - 125	2	20
Lead	0.000593		0.200	0.2159		mg/L		108	75 - 125	1	20
Molybdenum	0.00492		0.200	0.2180		mg/L		107	75 - 125	2	20
Selenium	<0.00500		0.400	0.4269		mg/L		106	75 - 125	1	20
Thallium	0.00146		0.200	0.2202		mg/L		109	75 - 125	1	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-383162/1-A

Matrix: Water

Analysis Batch: 383319

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 383162

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/04/23 12:41	04/05/23 13:06	1

Lab Sample ID: LCS 310-383162/2-A

Matrix: Water

Analysis Batch: 383319

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 383162

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001771		mg/L		106	80 - 120

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QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: 310-252280-1 MS

Matrix: Water

Analysis Batch: 383319

Client Sample ID: MW13R-GW-0323

Prep Type: Total/NA

Prep Batch: 383162

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	<0.000200		0.00167	0.001521		mg/L		91	80 - 120

Lab Sample ID: 310-252280-1 MSD

Matrix: Water

Analysis Batch: 383319

Client Sample ID: MW13R-GW-0323

Prep Type: Total/NA

Prep Batch: 383162

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	<0.000200		0.00167	0.001535		mg/L		92	80 - 120	1	20

Method: 9060A - Organic Carbon, Total (TOC)

Lab Sample ID: MB 500-707330/4

Matrix: Water

Analysis Batch: 707330

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates	<1.00		1.00		mg/L			04/11/23 20:19	1

Lab Sample ID: LCS 500-707330/5

Matrix: Water

Analysis Batch: 707330

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Organic Carbon - Duplicates	50.0	48.68		mg/L		97	86 - 116

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 310-382697/1

Matrix: Water

Analysis Batch: 382697

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			03/30/23 08:54	1

Lab Sample ID: LCS 310-382697/2

Matrix: Water

Analysis Batch: 382697

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	910.0		mg/L		91	90 - 110

Lab Sample ID: 310-252280-1 DU

Matrix: Water

Analysis Batch: 382697

Client Sample ID: MW13R-GW-0323

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	502		506.0		mg/L		0.8	20

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QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-382593/1
Matrix: Water
Analysis Batch: 382593

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
pH	7.00	7.1		SU		101	98 - 102

Lab Sample ID: 310-252280-1 DU
Matrix: Water
Analysis Batch: 382593

Client Sample ID: MW13R-GW-0323
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.3	HF	7.3		SU		0.1	20

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-606031/1-A
Matrix: Water
Analysis Batch: 609050

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 606031

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.01132	U	0.115	0.115	1.00	0.226	pCi/L	04/04/23 13:56	04/27/23 20:38	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.4		30 - 110					04/04/23 13:56	04/27/23 20:38	1

Lab Sample ID: LCS 160-606031/2-A
Matrix: Water
Analysis Batch: 609050

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 606031

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-226	11.3	10.12		1.19	1.00	0.215	pCi/L	89	70 - 113
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	96.5		30 - 110						

Lab Sample ID: LCSD 160-606031/24-A
Matrix: Water
Analysis Batch: 609154

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 606031

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium-226	11.3	10.12		1.19	1.00	0.197	pCi/L	89	70 - 113	0	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	98.5		30 - 110								

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QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Method: 9315 - Radium-226 (GFPC) (Continued)

Lab Sample ID: MB 160-606317/1-A

Matrix: Water

Analysis Batch: 609638

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 606317

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.03949	U	0.0840	0.0841	1.00	0.152	pCi/L	04/06/23 09:24	05/02/23 08:07	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	89.1		30 - 110					04/06/23 09:24	05/02/23 08:07	1

Lab Sample ID: LCS 160-606317/2-A

Matrix: Water

Analysis Batch: 609638

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 606317

Analyte		Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-226		11.3	10.79		1.18	1.00	0.148	pCi/L	95	70 - 113
Carrier	LCS %Yield	LCS Qualifier	Limits							
Ba Carrier	87.1		30 - 110							

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-606038/1-A

Matrix: Water

Analysis Batch: 608870

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 606038

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.3684	U	0.288	0.290	1.00	0.438	pCi/L	04/04/23 14:37	04/26/23 11:43	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.4		30 - 110					04/04/23 14:37	04/26/23 11:43	1
Y Carrier	83.0		30 - 110					04/04/23 14:37	04/26/23 11:43	1

Lab Sample ID: LCS 160-606038/2-A

Matrix: Water

Analysis Batch: 608870

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 606038

Analyte		Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-228		8.00	9.345		1.26	1.00	0.441	pCi/L	117	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits							
Ba Carrier	96.5		30 - 110							
Y Carrier	80.7		30 - 110							

Eurofins Cedar Falls

QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Method: 9320 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCSD 160-606038/24-A
Matrix: Water
Analysis Batch: 608926

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 606038

Analyte		Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium-228		8.00	10.38		1.33	1.00	0.463	pCi/L	130	75 - 125	0.40	1
	LCSD	LCSD										
Carrier	%Yield	Qualifier	Limits									
Ba Carrier	98.5		30 - 110									
Y Carrier	85.2		30 - 110									

Lab Sample ID: MB 160-606318/1-A
Matrix: Water
Analysis Batch: 609233

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 606318

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.1234	U	0.309	0.309	1.00	0.545	pCi/L	04/06/23 10:02	04/28/23 12:29	1
	MB	MB								
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	89.1		30 - 110					04/06/23 10:02	04/28/23 12:29	1
Y Carrier	83.0		30 - 110					04/06/23 10:02	04/28/23 12:29	1

Lab Sample ID: LCS 160-606318/2-A
Matrix: Water
Analysis Batch: 609233

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 606318

Analyte		Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-228		8.00	8.106		1.16	1.00	0.473	pCi/L	101	75 - 125
	LCS	LCS								
Carrier	%Yield	Qualifier	Limits							
Ba Carrier	87.1		30 - 110							
Y Carrier	83.7		30 - 110							

QC Association Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

HPLC/IC

Analysis Batch: 383023

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252280-2	MW231SR-GW-0323	Total/NA	Water	9056A	
310-252280-2	MW231SR-GW-0323	Total/NA	Water	9056A	
MB 310-383023/3	Method Blank	Total/NA	Water	9056A	
LCS 310-383023/31	Lab Control Sample	Total/NA	Water	9056A	

Analysis Batch: 383493

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252280-1	MW13R-GW-0323	Total/NA	Water	9056A	
MB 310-383493/3	Method Blank	Total/NA	Water	9056A	
LCS 310-383493/4	Lab Control Sample	Total/NA	Water	9056A	
310-252280-1 MS	MW13R-GW-0323	Total/NA	Water	9056A	
310-252280-1 MSD	MW13R-GW-0323	Total/NA	Water	9056A	

Metals

Prep Batch: 382646

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252280-1	MW13R-GW-0323	Total/NA	Water	3005A	
310-252280-2	MW231SR-GW-0323	Total/NA	Water	3005A	
MB 310-382646/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-382646/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-252280-1 MS	MW13R-GW-0323	Total/NA	Water	3005A	
310-252280-1 MSD	MW13R-GW-0323	Total/NA	Water	3005A	

Analysis Batch: 382841

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252280-1	MW13R-GW-0323	Total/NA	Water	6020B	382646
310-252280-2	MW231SR-GW-0323	Total/NA	Water	6020B	382646
MB 310-382646/1-A	Method Blank	Total/NA	Water	6020B	382646
LCS 310-382646/2-A	Lab Control Sample	Total/NA	Water	6020B	382646
310-252280-1 MS	MW13R-GW-0323	Total/NA	Water	6020B	382646
310-252280-1 MSD	MW13R-GW-0323	Total/NA	Water	6020B	382646

Prep Batch: 383060

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252280-2	MW231SR-GW-0323	Dissolved	Water	3005A	

Prep Batch: 383162

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252280-1	MW13R-GW-0323	Total/NA	Water	7470A	
310-252280-2	MW231SR-GW-0323	Total/NA	Water	7470A	
MB 310-383162/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-383162/2-A	Lab Control Sample	Total/NA	Water	7470A	
310-252280-1 MS	MW13R-GW-0323	Total/NA	Water	7470A	
310-252280-1 MSD	MW13R-GW-0323	Total/NA	Water	7470A	

Analysis Batch: 383234

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252280-2	MW231SR-GW-0323	Dissolved	Water	6020B	383060

Eurofins Cedar Falls

QC Association Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Metals

Analysis Batch: 383319

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252280-1	MW13R-GW-0323	Total/NA	Water	7470A	383162
310-252280-2	MW231SR-GW-0323	Total/NA	Water	7470A	383162
MB 310-383162/1-A	Method Blank	Total/NA	Water	7470A	383162
LCS 310-383162/2-A	Lab Control Sample	Total/NA	Water	7470A	383162
310-252280-1 MS	MW13R-GW-0323	Total/NA	Water	7470A	383162
310-252280-1 MSD	MW13R-GW-0323	Total/NA	Water	7470A	383162

General Chemistry

Analysis Batch: 382593

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252280-1	MW13R-GW-0323	Total/NA	Water	SM 4500 H+ B	
310-252280-2	MW231SR-GW-0323	Total/NA	Water	SM 4500 H+ B	
LCS 310-382593/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-252280-1 DU	MW13R-GW-0323	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 382697

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252280-1	MW13R-GW-0323	Total/NA	Water	SM 2540C	
310-252280-2	MW231SR-GW-0323	Total/NA	Water	SM 2540C	
MB 310-382697/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-382697/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-252280-1 DU	MW13R-GW-0323	Total/NA	Water	SM 2540C	

Analysis Batch: 707330

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252280-2	MW231SR-GW-0323	Total/NA	Water	9060A	
MB 500-707330/4	Method Blank	Total/NA	Water	9060A	
LCS 500-707330/5	Lab Control Sample	Total/NA	Water	9060A	

Rad

Prep Batch: 606031

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252280-1	MW13R-GW-0323	Total/NA	Water	PrecSep-21	
MB 160-606031/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-606031/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-606031/24-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 606038

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252280-1	MW13R-GW-0323	Total/NA	Water	PrecSep_0	
MB 160-606038/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-606038/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-606038/24-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Prep Batch: 606317

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252280-2	MW231SR-GW-0323	Total/NA	Water	PrecSep-21	
MB 160-606317/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-606317/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	

Eurofins Cedar Falls

QC Association Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Rad

Prep Batch: 606318

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252280-2	MW231SR-GW-0323	Total/NA	Water	PrecSep_0	
MB 160-606318/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-606318/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

Lab Chronicle

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Client Sample ID: MW13R-GW-0323

Lab Sample ID: 310-252280-1

Date Collected: 03/27/23 17:50

Matrix: Water

Date Received: 03/29/23 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	383493	QTZ5	EET CF	04/04/23 15:45
Total/NA	Prep	3005A			382646	QTZ5	EET CF	03/30/23 09:30
Total/NA	Analysis	6020B		1	382841	A6US	EET CF	03/31/23 02:50
Total/NA	Prep	7470A			383162	XXW3	EET CF	04/04/23 12:41
Total/NA	Analysis	7470A		1	383319	XXW3	EET CF	04/05/23 13:23
Total/NA	Analysis	SM 2540C		1	382697	WZC8	EET CF	03/30/23 08:54
Total/NA	Analysis	SM 4500 H+ B		1	382593	W9YR	EET CF	03/29/23 11:33
Total/NA	Prep	PrecSep-21			606031	DJP	EET SL	04/04/23 13:56
Total/NA	Analysis	9315		1	609152	FLC	EET SL	04/27/23 20:44
Total/NA	Prep	PrecSep_0			606038	DJP	EET SL	04/04/23 14:37
Total/NA	Analysis	9320		1	608926	FLC	EET SL	04/26/23 11:49
Total/NA	Analysis	Ra226_Ra228		1	609264	EMH	EET SL	04/28/23 13:20

Client Sample ID: MW231SR-GW-0323

Lab Sample ID: 310-252280-2

Date Collected: 03/28/23 15:50

Matrix: Water

Date Received: 03/29/23 09:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	383023	QTZ5	EET CF	03/29/23 15:36
Total/NA	Analysis	9056A		10	383023	QTZ5	EET CF	03/30/23 12:58
Dissolved	Prep	3005A			383060	DHM5	EET CF	04/04/23 09:25
Dissolved	Analysis	6020B		1	383234	A6US	EET CF	04/04/23 17:22
Total/NA	Prep	3005A			382646	QTZ5	EET CF	03/30/23 09:30
Total/NA	Analysis	6020B		1	382841	A6US	EET CF	03/31/23 03:06
Total/NA	Prep	7470A			383162	XXW3	EET CF	04/04/23 12:41
Total/NA	Analysis	7470A		1	383319	XXW3	EET CF	04/05/23 13:30
Total/NA	Analysis	9060A		1	707330	BC	EET CHI	04/11/23 20:46
Total/NA	Analysis	SM 2540C		1	382697	WZC8	EET CF	03/30/23 08:54
Total/NA	Analysis	SM 4500 H+ B		1	382593	W9YR	EET CF	03/29/23 11:35
Total/NA	Prep	PrecSep-21			606317	DJP	EET SL	04/06/23 09:24
Total/NA	Analysis	9315		1	609636	FLC	EET SL	05/02/23 09:58
Total/NA	Prep	PrecSep_0			606318	DJP	EET SL	04/06/23 10:02
Total/NA	Analysis	9320		1	609233	FLC	EET SL	04/28/23 12:30
Total/NA	Analysis	Ra226_Ra228		1	609692	SCB	EET SL	05/02/23 14:17

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
6020B	3005A	Water	Lithium

Laboratory: Eurofins Chicago

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2903	04-29-23
Georgia	State	N/A	04-30-23
Georgia (DW)	State	939	04-30-23
Hawaii	State	NA	04-29-23
Illinois	NELAP	IL00035	04-29-23
Indiana	State	C-IL-02	04-29-23
Iowa	State	082	05-01-24
Kansas	NELAP	E-10161	10-31-23
Kentucky (UST)	State	AI # 108083	04-29-23
Kentucky (WW)	State	KY90023	12-31-22 *
Louisiana (All)	NELAP	02046	06-30-23
Mississippi	State	NA	04-30-23
North Carolina (WW/SW)	State	291	12-31-23
North Dakota	State	R-194	04-30-23
Oklahoma	State	8908	08-31-23
South Carolina	State	77001003	04-29-23
USDA	US Federal Programs	P330-18-00018	02-11-24
Wisconsin	State	999580010	08-31-23
Wyoming	State	8TMS-Q	04-30-23

Laboratory: Eurofins St. Louis

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	373	12-01-24

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
7470A	Mercury (CVAA)	SW846	EET CF
9060A	Organic Carbon, Total (TOC)	SW846	EET CHI
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET CF
SM 4500 H+ B	pH	SM	EET CF
3005A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

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

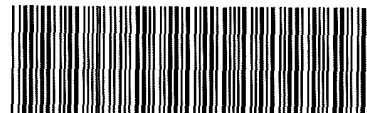
Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200



Environment Testing
America



310-252280 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>GHD</u>			
City/State:	CITY	STATE <u>IA</u>	Project:
Receipt Information			
Date/Time Received:	DATE <u>3/29/23</u>	TIME <u>0925</u>	Received By: <u>[Signature]</u>
Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?		☒ Yes ☐ No	If yes: Cooler ID: _____
Multiple Coolers?		☒ Yes ☐ No	If yes: Cooler # <u>1</u> of <u>3</u>
Cooler Custody Seals Present?		☒ Yes ☐ No	If yes: Cooler custody seals intact? ☒ Yes ☐ No
Sample Custody Seals Present?		☐ Yes ☒ No	If yes: Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?		☐ Yes ☒ No	If yes: Which VOA samples are in cooler? ↓
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>+0.1</u>	
Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>1.3</u>		Corrected Temp (°C): <u>1.4</u>	
Sample Container Temperature			
Container(s) used:	CONTAINER 1		CONTAINER 2
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>GHD</u>			
City/State:	CITY	STATE	Project:
<u>IA</u>			
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>3/29/23</u>	<u>0725</u>	<u>n</u>
Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?		☒ Yes ☐ No	If yes: Cooler ID: _____
Multiple Coolers?		☒ Yes ☐ No	If yes: Cooler # <u>2</u> of <u>3</u>
Cooler Custody Seals Present?		☒ Yes ☐ No	If yes: Cooler custody seals intact? ☒ Yes ☐ No
Sample Custody Seals Present?		☐ Yes ☒ No	If yes: Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?		☐ Yes ☐ No	If yes: Which VOA samples are in cooler? ↓
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID:		Correction Factor (°C):	
<u>T</u>		<u>10.1</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):		Corrected Temp (°C):	
<u>0.9</u>		<u>1.0</u>	
Sample Container Temperature			
Container(s) used:	CONTAINER 1		CONTAINER 2
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Environment Testing
America

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Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>GHD</u>			
City/State:	CITY	STATE	Project:
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>3/29/23</u>	<u>0925</u>	<u>[Signature]</u>
Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?		☒ Yes ☐ No	If yes: Cooler ID: _____
Multiple Coolers?		☒ Yes ☐ No	If yes: Cooler # <u>3</u> of <u>3</u>
Cooler Custody Seals Present?		☒ Yes ☐ No	If yes: Cooler custody seals intact? ☐ Yes ☐ No
Sample Custody Seals Present?		☐ Yes ☒ No	If yes: Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?		☐ Yes ☒ No	If yes: Which VOA samples are in cooler? ↓
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID:		Correction Factor (°C):	
<u>T</u>		<u>+0.1</u>	
* Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):		Corrected Temp (°C):	
<u>2</u>		<u>1.3</u>	
Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>		<u>CONTAINER 2</u>
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Client Information Client Contact: Kevin Armstrong Company: GHGD Services Inc. Address: 11228 Aurora Avenue City: Des Moines State: IA, Zip: 50322-7905 Phone: 515-414-3935 (Tel) Email: Kevin.Armstrong@ghd.com Project Name: MEC Neal North-Background Site: Neal North CCR		Due Date Requested: TAT Requested (days): Standard Compliance Project: ☐ Yes ☒ No PO #: 340-004187 WO #: 12576482-001 Project #: 31007314 SOW #: 12576482-001		Sampler: PAUL LAPLAUT Phone: 712-8989031 E-Mail: Shirley.Thompson@et.eurofinsus.com State of Origin: Iowa		Lab PM: Thompson, Shirley J State of Origin: Iowa		Carier Tracking No(s): 310-78764-22173 1 Page: Page 1 of 1 Job #:											
Analysis Requested																			
Sample Identification MW13R-GW-0323 MW22Z-GW-0323 MW29R-GW-0923 MW223S-GW-0323 MW231SR-GW-0323 DP04-GW-0923		Sample Date 3/21/23 3/28/23 3/28/23 3/28/23 3/28/23 3/28/23		Sample Time 1750 1550 1550 1550 1550 1550		Sample Type G G G G G G		Matrix (W=Water, S=Solid, O=Organic, A=Air) Water Water Water Water Water Water		Field Filtered Sample (Yes or No) Yes Yes Yes Yes Yes Yes		Perform MS/MSD (Yes or No) Yes Yes Yes Yes Yes Yes		9316_Ra226 - Standard Target List 9320_Ra228 - Standard Target List 9066A_ORGFM_28D - Chloride, Fluoride & Sulfate 6020B_7470A - Appendix III and IV Metals 2540C_Calcd, SM4500_H+ 9066A_ORGFM_28D 6020B - Dissolved Fe and Mn (field-filtered) 9066A - TOC Duplicates 9066A_ORGFM_48H SHORT HOLD		Total Number of Containers 15 9		Special Instructions/Note: MW-223S MW-231SR SHORT HOLD	
Possible Hazard Identification ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological										Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) ☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months									
Empty Kit Relinquished by Relinquished by: PAUL LAPLAUT Relinquished by: Relinquished by:										Special Instructions/QC Requirements: Method of Shipment: _____ Date: _____ Received by: _____ Date/Time: _____ Received by: _____ Date/Time: _____ Received by: _____ Date/Time: _____									
Relinquished by: PAUL LAPLAUT Relinquished by: Relinquished by:										Relinquished by: PAUL LAPLAUT Relinquished by: Relinquished by:									
Custody Seals Intact: ☐ Yes ☐ No Custody Seal No										Cooler Temperature(s) °C and Other Remarks:									

3019 Venture Way
Cedar Falls IA 50613
Phone 319-277 2401 Fax 319-277-2425

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[illegible]

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-252280-1

SDG Number:

Login Number: 252280

List Number: 1

Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-252280-1

SDG Number:

Login Number: 252280

List Number: 3

Creator: Hernandez, Stephanie

List Source: Eurofins Chicago

List Creation: 03/30/23 12:28 PM

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	2.8
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Tracer/Carrier Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252280-1

Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	
310-252280-1	MW13R-GW-0323	94.4	
310-252280-2	MW231SR-GW-0323	90.1	
LCS 160-606031/2-A	Lab Control Sample	96.5	
LCS 160-606317/2-A	Lab Control Sample	87.1	
LCSD 160-606031/24-A	Lab Control Sample Dup	98.5	
MB 160-606031/1-A	Method Blank	95.4	
MB 160-606317/1-A	Method Blank	89.1	
Tracer/Carrier Legend			
Ba = Ba Carrier			

Method: 9320 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)
310-252280-1	MW13R-GW-0323	94.4	87.5
310-252280-2	MW231SR-GW-0323	90.1	88.6
LCS 160-606038/2-A	Lab Control Sample	96.5	80.7
LCS 160-606318/2-A	Lab Control Sample	87.1	83.7
LCSD 160-606038/24-A	Lab Control Sample Dup	98.5	85.2
MB 160-606038/1-A	Method Blank	95.4	83.0
MB 160-606318/1-A	Method Blank	89.1	83.0
Tracer/Carrier Legend			
Ba = Ba Carrier			
Y = Y Carrier			

ANALYTICAL REPORT

PREPARED FOR

Attn: Kevin Armstrong
GHD Services Inc.
11228 Aurora Avenue
Des Moines, Iowa 50322-7905

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JOB DESCRIPTION

MEC Neal North-Background

JOB NUMBER

310-252374-1

Eurofins Cedar Falls

Job Notes

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Authorization



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Authorized for release by
Meredith Liechti, Service Center Manager
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(319)277-2401

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Case Narrative

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Job ID: 310-252374-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-252374-1

Receipt

The samples were received on 3/30/2023 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 4 coolers at receipt time were 0.7°C, 0.8°C, 1.6°C and 1.9°C

HPLC/IC

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

Metals

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

General Chemistry

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

Narrative

Job Narrative 310-252374-2

Receipt

The samples were received on 3/30/2023 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 4 coolers at receipt time were 0.7°C, 0.8°C, 1.6°C and 1.9°C

Gas Flow Proportional Counter

Method 9315_Ra226: Radium-226 batch 606633Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.MW29R-GW-0323 (310-252374-1), MW223S-GW-0323 (310-252374-2), DP01-GW-0323 (310-252374-3), (LCS 160-606633/2-A), (MB 160-606633/1-A), (310-252375-E-7-A), (310-252375-E-7-B MS) and (310-252375-E-7-C MSD)

Method 9320_Ra228: Radium-228 batch 606636The LCS recovered at (129%). The limits in our LIMS system at 75-125 reflect the requirements of a regulatory agency that represents a large amount of our work. However the samples associated with this LCS are not from this agency and are therefore held to our in-house statistical limits of (62-148%) per method requirements. The LCS passes, no further action is required (LCS 160-606636/2-A)

Method 9320_Ra228: Radium-228 batch 606636Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.MW29R-GW-0323 (310-252374-1), MW223S-GW-0323 (310-252374-2), DP01-GW-0323 (310-252374-3), (LCS 160-606636/2-A), (MB 160-606636/1-A), (310-252375-E-7-D), (310-252375-E-7-E MS) and (310-252375-E-7-F MSD)

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

Rad

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

Sample Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-252374-1	MW29R-GW-0323	Water	03/29/23 08:35	03/30/23 09:30
310-252374-2	MW223S-GW-0323	Water	03/29/23 11:00	03/30/23 09:30
310-252374-3	DP01-GW-0323	Water	03/29/23 00:00	03/30/23 09:30

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Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Client Sample ID: MW29R-GW-0323

Lab Sample ID: 310-252374-1

Date Collected: 03/29/23 08:35

Matrix: Water

Date Received: 03/30/23 09:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	11.9		5.00		mg/L			04/04/23 19:03	5
Fluoride	<0.500		0.500		mg/L			04/04/23 19:03	5
Sulfate	121		5.00		mg/L			04/04/23 19:03	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		04/04/23 09:25	04/04/23 17:31	1
Arsenic	0.0258		0.00200		mg/L		04/04/23 09:25	04/04/23 17:31	1
Barium	0.261		0.00200		mg/L		04/04/23 09:25	04/04/23 17:31	1
Beryllium	<0.00100		0.00100		mg/L		04/04/23 09:25	04/04/23 17:31	1
Boron	0.158		0.100		mg/L		04/04/23 09:25	04/04/23 17:31	1
Cadmium	<0.000100		0.000100		mg/L		04/04/23 09:25	04/04/23 17:31	1
Calcium	200		0.500		mg/L		04/04/23 09:25	04/04/23 17:31	1
Chromium	<0.00500		0.00500		mg/L		04/04/23 09:25	04/04/23 17:31	1
Cobalt	0.00265		0.000500		mg/L		04/04/23 09:25	04/04/23 17:31	1
Lithium	0.109		0.0100		mg/L		04/04/23 09:25	04/04/23 17:31	1
Lead	<0.000500		0.000500		mg/L		04/04/23 09:25	04/04/23 17:31	1
Molybdenum	0.00232		0.00200		mg/L		04/04/23 09:25	04/04/23 17:31	1
Selenium	<0.00500		0.00500		mg/L		04/04/23 09:25	04/04/23 17:31	1
Thallium	<0.00100		0.00100		mg/L		04/04/23 09:25	04/04/23 17:31	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/04/23 12:41	04/05/23 13:53	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	724		50.0		mg/L			04/03/23 15:42	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.1	HF	0.1		SU			03/30/23 12:08	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.269		0.175	0.177	1.00	0.229	pCi/L	04/10/23 09:38	05/02/23 07:57	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.4		30 - 110					04/10/23 09:38	05/02/23 07:57	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.573	U	0.402	0.406	1.00	0.609	pCi/L	04/10/23 10:47	05/01/23 12:33	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.4		30 - 110					04/10/23 10:47	05/01/23 12:33	1
Y Carrier	82.6		30 - 110					04/10/23 10:47	05/01/23 12:33	1

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Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Client Sample ID: MW29R-GW-0323
Date Collected: 03/29/23 08:35
Date Received: 03/30/23 09:30

Lab Sample ID: 310-252374-1
Matrix: Water

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.842		0.438	0.443	5.00	0.609	pCi/L		05/02/23 12:04	1

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Client Sample ID: MW223S-GW-0323

Lab Sample ID: 310-252374-2

Date Collected: 03/29/23 11:00

Matrix: Water

Date Received: 03/30/23 09:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			03/30/23 18:10	1
Nitrate as N	<0.100		0.100		mg/L			03/30/23 18:10	1
Fluoride	0.269		0.100		mg/L			03/30/23 18:10	1
Sulfate	113		5.00		mg/L			03/31/23 11:28	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		04/04/23 09:25	04/04/23 17:34	1
Arsenic	0.0172		0.00200		mg/L		04/04/23 09:25	04/04/23 17:34	1
Barium	0.377		0.00200		mg/L		04/04/23 09:25	04/04/23 17:34	1
Beryllium	<0.00100		0.00100		mg/L		04/04/23 09:25	04/04/23 17:34	1
Boron	0.140		0.100		mg/L		04/04/23 09:25	04/04/23 17:34	1
Cadmium	<0.000100		0.000100		mg/L		04/04/23 09:25	04/04/23 17:34	1
Calcium	186		0.500		mg/L		04/04/23 09:25	04/04/23 17:34	1
Chromium	<0.00500		0.00500		mg/L		04/04/23 09:25	04/04/23 17:34	1
Cobalt	0.00107		0.000500		mg/L		04/04/23 09:25	04/04/23 17:34	1
Lithium	0.0684		0.0100		mg/L		04/04/23 09:25	04/04/23 17:34	1
Lead	<0.000500		0.000500		mg/L		04/04/23 09:25	04/04/23 17:34	1
Molybdenum	0.00296		0.00200		mg/L		04/04/23 09:25	04/04/23 17:34	1
Selenium	<0.00500		0.00500		mg/L		04/04/23 09:25	04/04/23 17:34	1
Thallium	<0.00100		0.00100		mg/L		04/04/23 09:25	04/04/23 17:34	1
Iron	5.90		0.100		mg/L		04/04/23 09:25	04/04/23 17:34	1
Manganese	4.44		0.0500		mg/L		04/04/23 09:25	04/07/23 13:38	5

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	5.05		0.100		mg/L		04/05/23 08:50	04/05/23 21:15	1
Manganese	4.30		0.0100		mg/L		04/05/23 08:50	04/05/23 21:15	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/04/23 12:41	04/05/23 13:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates (SW846 9060A)	2.59		1.00		mg/L			04/12/23 03:45	1
Total Dissolved Solids (SM 2540C)	600		50.0		mg/L			04/03/23 15:42	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.4	HF	0.1		SU			03/30/23 12:07	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.332		0.200	0.202	1.00	0.263	pCi/L	04/10/23 09:38	05/02/23 08:00	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.4		30 - 110					04/10/23 09:38	05/02/23 08:00	1

Eurofins Cedar Falls

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Client Sample ID: MW223S-GW-0323

Lab Sample ID: 310-252374-2

Date Collected: 03/29/23 11:00

Matrix: Water

Date Received: 03/30/23 09:30

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.137	U	0.290	0.291	1.00	0.510	pCi/L	04/10/23 10:47	05/01/23 12:33	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.4		30 - 110					04/10/23 10:47	05/01/23 12:33	1
Y Carrier	82.2		30 - 110					04/10/23 10:47	05/01/23 12:33	1

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.468	U	0.352	0.354	5.00	0.510	pCi/L		05/02/23 12:04	1

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Client Sample ID: DP01-GW-0323

Lab Sample ID: 310-252374-3

Date Collected: 03/29/23 00:00

Matrix: Water

Date Received: 03/30/23 09:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	6.06		5.00		mg/L			04/04/23 19:17	5
Fluoride	<0.500		0.500		mg/L			04/04/23 19:17	5
Sulfate	110		5.00		mg/L			04/04/23 19:17	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		04/04/23 09:25	04/04/23 17:37	1
Arsenic	0.0167		0.00200		mg/L		04/04/23 09:25	04/04/23 17:37	1
Barium	0.382		0.00200		mg/L		04/04/23 09:25	04/04/23 17:37	1
Beryllium	<0.00100		0.00100		mg/L		04/04/23 09:25	04/04/23 17:37	1
Boron	0.137		0.100		mg/L		04/04/23 09:25	04/04/23 17:37	1
Cadmium	<0.000100		0.000100		mg/L		04/04/23 09:25	04/04/23 17:37	1
Calcium	188		0.500		mg/L		04/04/23 09:25	04/04/23 17:37	1
Chromium	<0.00500		0.00500		mg/L		04/04/23 09:25	04/04/23 17:37	1
Cobalt	0.00103		0.000500		mg/L		04/04/23 09:25	04/04/23 17:37	1
Lithium	0.0674		0.0100		mg/L		04/04/23 09:25	04/04/23 17:37	1
Lead	<0.000500		0.000500		mg/L		04/04/23 09:25	04/04/23 17:37	1
Molybdenum	0.00288		0.00200		mg/L		04/04/23 09:25	04/04/23 17:37	1
Selenium	<0.00500		0.00500		mg/L		04/04/23 09:25	04/04/23 17:37	1
Thallium	<0.00100		0.00100		mg/L		04/04/23 09:25	04/04/23 17:37	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/04/23 12:41	04/05/23 13:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	606		50.0		mg/L			04/03/23 15:42	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.4	HF	0.1		SU			03/30/23 12:09	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.420		0.231	0.235	1.00	0.306	pCi/L	04/10/23 09:38	05/02/23 08:01	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.4		30 - 110					04/10/23 09:38	05/02/23 08:01	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.458	U	0.370	0.372	1.00	0.572	pCi/L	04/10/23 10:47	05/01/23 12:33	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.4		30 - 110					04/10/23 10:47	05/01/23 12:33	1
Y Carrier	82.2		30 - 110					04/10/23 10:47	05/01/23 12:33	1

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Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Client Sample ID: DP01-GW-0323

Lab Sample ID: 310-252374-3

Date Collected: 03/29/23 00:00

Matrix: Water

Date Received: 03/30/23 09:30

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228										
Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.877		0.436	0.440	5.00	0.572	pCi/L		05/02/23 12:04	1

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-383009/3

Matrix: Water

Analysis Batch: 383009

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			03/30/23 13:55	1
Fluoride	<0.100		0.100		mg/L			03/30/23 13:55	1
Sulfate	<1.00		1.00		mg/L			03/30/23 13:55	1

Lab Sample ID: LCS 310-383009/4

Matrix: Water

Analysis Batch: 383009

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.786		mg/L		98	90 - 110
Fluoride	2.00	2.176		mg/L		109	90 - 110
Sulfate	10.0	10.28		mg/L		103	90 - 110

Lab Sample ID: MB 310-383493/3

Matrix: Water

Analysis Batch: 383493

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			04/04/23 15:17	1
Fluoride	<0.100		0.100		mg/L			04/04/23 15:17	1
Sulfate	<1.00		1.00		mg/L			04/04/23 15:17	1

Lab Sample ID: LCS 310-383493/4

Matrix: Water

Analysis Batch: 383493

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.859		mg/L		99	90 - 110
Fluoride	2.00	2.154		mg/L		108	90 - 110
Sulfate	10.0	10.41		mg/L		104	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: 310-252374-3 DU

Matrix: Water

Analysis Batch: 383234

Client Sample ID: DP01-GW-0323

Prep Type: Total/NA

Prep Batch: 383060

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	<0.00200		<0.00200		mg/L		NC	20
Arsenic	0.0167		0.01596		mg/L		5	20
Barium	0.382		0.3754		mg/L		2	20
Beryllium	<0.00100		<0.00100		mg/L		NC	20
Boron	0.137		0.1309		mg/L		5	20
Cadmium	<0.000100		<0.000100		mg/L		NC	20
Calcium	188		185.4		mg/L		1	20
Chromium	<0.00500		<0.00500		mg/L		NC	20
Cobalt	0.00103		0.001015		mg/L		2	20
Lithium	0.0674		0.06675		mg/L		0.9	20
Lead	<0.000500		<0.000500		mg/L		NC	20
Molybdenum	0.00288		0.002718		mg/L		6	20

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QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 310-252374-3 DU

Matrix: Water

Analysis Batch: 383234

Client Sample ID: DP01-GW-0323

Prep Type: Total/NA

Prep Batch: 383060

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Selenium	<0.00500		<0.00500		mg/L		NC	20
Thallium	<0.00100		<0.00100		mg/L		NC	20

Lab Sample ID: MB 310-383194/1-A

Matrix: Water

Analysis Batch: 383395

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 383194

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<0.100		0.100		mg/L		04/05/23 08:50	04/05/23 19:51	1
Manganese	<0.0100		0.0100		mg/L		04/05/23 08:50	04/05/23 19:51	1

Lab Sample ID: LCS 310-383194/2-A

Matrix: Water

Analysis Batch: 383395

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 383194

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	0.200	0.2000		mg/L		100	80 - 120
Manganese	0.100	0.09679		mg/L		97	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-383162/1-A

Matrix: Water

Analysis Batch: 383319

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 383162

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/04/23 12:41	04/05/23 13:06	1

Lab Sample ID: LCS 310-383162/2-A

Matrix: Water

Analysis Batch: 383319

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 383162

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001771		mg/L		106	80 - 120

Method: 9060A - Organic Carbon, Total (TOC)

Lab Sample ID: MB 500-707330/28

Matrix: Water

Analysis Batch: 707330

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Duplicates	<1.00		1.00		mg/L			04/12/23 02:37	1

Lab Sample ID: LCS 500-707330/29

Matrix: Water

Analysis Batch: 707330

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Organic Carbon - Duplicates	50.0	49.72		mg/L		99	86 - 116

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QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 310-383053/1
Matrix: Water
Analysis Batch: 383053

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			04/03/23 15:42	1

Lab Sample ID: LCS 310-383053/2
Matrix: Water
Analysis Batch: 383053

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	948.0		mg/L		95	90 - 110

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-382747/1
Matrix: Water
Analysis Batch: 382747

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
pH	7.00	7.0		SU		100	98 - 102

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-606633/1-A
Matrix: Water
Analysis Batch: 609636

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 606633

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.03862	U	0.116	0.116	1.00	0.221	pCi/L	04/10/23 09:38	05/02/23 07:58	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.7		30 - 110					04/10/23 09:38	05/02/23 07:58	1

Lab Sample ID: LCS 160-606633/2-A
Matrix: Water
Analysis Batch: 609636

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 606633

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-226	11.3	11.00		1.33	1.00	0.198	pCi/L	97	70 - 113
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	88.6		30 - 110						

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QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-606636/1-A
Matrix: Water
Analysis Batch: 609533

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 606636

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.1946	U	0.258	0.258	1.00	0.546	pCi/L	04/10/23 10:47	05/01/23 12:32	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.7		30 - 110					04/10/23 10:47	05/01/23 12:32	1
Y Carrier	80.7		30 - 110					04/10/23 10:47	05/01/23 12:32	1

Lab Sample ID: LCS 160-606636/2-A
Matrix: Water
Analysis Batch: 609533

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 606636

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-228	7.99	10.33		1.40	1.00	0.547	pCi/L	129	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	88.6		30 - 110						
Y Carrier	83.7		30 - 110						

QC Association Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

HPLC/IC

Analysis Batch: 383009

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252374-2	MW223S-GW-0323	Total/NA	Water	9056A	
310-252374-2	MW223S-GW-0323	Total/NA	Water	9056A	
MB 310-383009/3	Method Blank	Total/NA	Water	9056A	
LCS 310-383009/4	Lab Control Sample	Total/NA	Water	9056A	

Analysis Batch: 383493

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252374-1	MW29R-GW-0323	Total/NA	Water	9056A	
310-252374-3	DP01-GW-0323	Total/NA	Water	9056A	
MB 310-383493/3	Method Blank	Total/NA	Water	9056A	
LCS 310-383493/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 383060

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252374-1	MW29R-GW-0323	Total/NA	Water	3005A	
310-252374-2	MW223S-GW-0323	Total/NA	Water	3005A	
310-252374-3	DP01-GW-0323	Total/NA	Water	3005A	
310-252374-3 DU	DP01-GW-0323	Total/NA	Water	3005A	

Prep Batch: 383162

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252374-1	MW29R-GW-0323	Total/NA	Water	7470A	
310-252374-2	MW223S-GW-0323	Total/NA	Water	7470A	
310-252374-3	DP01-GW-0323	Total/NA	Water	7470A	
MB 310-383162/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-383162/2-A	Lab Control Sample	Total/NA	Water	7470A	

Prep Batch: 383194

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252374-2	MW223S-GW-0323	Dissolved	Water	3005A	
MB 310-383194/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-383194/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 383234

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252374-1	MW29R-GW-0323	Total/NA	Water	6020B	383060
310-252374-2	MW223S-GW-0323	Total/NA	Water	6020B	383060
310-252374-3	DP01-GW-0323	Total/NA	Water	6020B	383060
310-252374-3 DU	DP01-GW-0323	Total/NA	Water	6020B	383060

Analysis Batch: 383319

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252374-1	MW29R-GW-0323	Total/NA	Water	7470A	383162
310-252374-2	MW223S-GW-0323	Total/NA	Water	7470A	383162
310-252374-3	DP01-GW-0323	Total/NA	Water	7470A	383162
MB 310-383162/1-A	Method Blank	Total/NA	Water	7470A	383162
LCS 310-383162/2-A	Lab Control Sample	Total/NA	Water	7470A	383162

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QC Association Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Metals

Analysis Batch: 383395

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252374-2	MW223S-GW-0323	Dissolved	Water	6020B	383194
MB 310-383194/1-A	Method Blank	Total/NA	Water	6020B	383194
LCS 310-383194/2-A	Lab Control Sample	Total/NA	Water	6020B	383194

Analysis Batch: 383659

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252374-2	MW223S-GW-0323	Total/NA	Water	6020B	383060

General Chemistry

Analysis Batch: 382747

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252374-1	MW29R-GW-0323	Total/NA	Water	SM 4500 H+ B	
310-252374-2	MW223S-GW-0323	Total/NA	Water	SM 4500 H+ B	
310-252374-3	DP01-GW-0323	Total/NA	Water	SM 4500 H+ B	
LCS 310-382747/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 383053

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252374-1	MW29R-GW-0323	Total/NA	Water	SM 2540C	
310-252374-2	MW223S-GW-0323	Total/NA	Water	SM 2540C	
310-252374-3	DP01-GW-0323	Total/NA	Water	SM 2540C	
MB 310-383053/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-383053/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Analysis Batch: 707330

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252374-2	MW223S-GW-0323	Total/NA	Water	9060A	
MB 500-707330/28	Method Blank	Total/NA	Water	9060A	
LCS 500-707330/29	Lab Control Sample	Total/NA	Water	9060A	

Rad

Prep Batch: 606633

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252374-1	MW29R-GW-0323	Total/NA	Water	PrecSep-21	
310-252374-2	MW223S-GW-0323	Total/NA	Water	PrecSep-21	
310-252374-3	DP01-GW-0323	Total/NA	Water	PrecSep-21	
MB 160-606633/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-606633/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	

Prep Batch: 606636

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252374-1	MW29R-GW-0323	Total/NA	Water	PrecSep_0	
310-252374-2	MW223S-GW-0323	Total/NA	Water	PrecSep_0	
310-252374-3	DP01-GW-0323	Total/NA	Water	PrecSep_0	
MB 160-606636/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-606636/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Client Sample ID: MW29R-GW-0323

Lab Sample ID: 310-252374-1

Date Collected: 03/29/23 08:35

Matrix: Water

Date Received: 03/30/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	383493	QTZ5	EET CF	04/04/23 19:03
Total/NA	Prep	3005A			383060	DHM5	EET CF	04/04/23 09:25
Total/NA	Analysis	6020B		1	383234	A6US	EET CF	04/04/23 17:31
Total/NA	Prep	7470A			383162	XXW3	EET CF	04/04/23 12:41
Total/NA	Analysis	7470A		1	383319	XXW3	EET CF	04/05/23 13:53
Total/NA	Analysis	SM 2540C		1	383053	ENB7	EET CF	04/03/23 15:42
Total/NA	Analysis	SM 4500 H+ B		1	382747	W9YR	EET CF	03/30/23 12:08
Total/NA	Prep	PrecSep-21			606633	KAC	EET SL	04/10/23 09:38
Total/NA	Analysis	9315		1	609636	FLC	EET SL	05/02/23 07:57
Total/NA	Prep	PrecSep_0			606636	KAC	EET SL	04/10/23 10:47
Total/NA	Analysis	9320		1	609533	FLC	EET SL	05/01/23 12:33
Total/NA	Analysis	Ra226_Ra228		1	609668	SCB	EET SL	05/02/23 12:04

Client Sample ID: MW223S-GW-0323

Lab Sample ID: 310-252374-2

Date Collected: 03/29/23 11:00

Matrix: Water

Date Received: 03/30/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	383009	QTZ5	EET CF	03/30/23 18:10
Total/NA	Analysis	9056A		5	383009	QTZ5	EET CF	03/31/23 11:28
Dissolved	Prep	3005A			383194	DHM5	EET CF	04/05/23 08:50
Dissolved	Analysis	6020B		1	383395	A6US	EET CF	04/05/23 21:15
Total/NA	Prep	3005A			383060	DHM5	EET CF	04/04/23 09:25
Total/NA	Analysis	6020B		1	383234	A6US	EET CF	04/04/23 17:34
Total/NA	Prep	3005A			383060	DHM5	EET CF	04/04/23 09:25
Total/NA	Analysis	6020B		5	383659	A6US	EET CF	04/07/23 13:38
Total/NA	Prep	7470A			383162	XXW3	EET CF	04/04/23 12:41
Total/NA	Analysis	7470A		1	383319	XXW3	EET CF	04/05/23 13:55
Total/NA	Analysis	9060A		1	707330	BC	EET CHI	04/12/23 03:45
Total/NA	Analysis	SM 2540C		1	383053	ENB7	EET CF	04/03/23 15:42
Total/NA	Analysis	SM 4500 H+ B		1	382747	W9YR	EET CF	03/30/23 12:07
Total/NA	Prep	PrecSep-21			606633	KAC	EET SL	04/10/23 09:38
Total/NA	Analysis	9315		1	609637	FLC	EET SL	05/02/23 08:00
Total/NA	Prep	PrecSep_0			606636	KAC	EET SL	04/10/23 10:47
Total/NA	Analysis	9320		1	609533	FLC	EET SL	05/01/23 12:33
Total/NA	Analysis	Ra226_Ra228		1	609668	SCB	EET SL	05/02/23 12:04

Client Sample ID: DP01-GW-0323

Lab Sample ID: 310-252374-3

Date Collected: 03/29/23 00:00

Matrix: Water

Date Received: 03/30/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	383493	QTZ5	EET CF	04/04/23 19:17

Eurofins Cedar Falls

Lab Chronicle

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Client Sample ID: DP01-GW-0323

Lab Sample ID: 310-252374-3

Date Collected: 03/29/23 00:00

Matrix: Water

Date Received: 03/30/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			383060	DHM5	EET CF	04/04/23 09:25
Total/NA	Analysis	6020B		1	383234	A6US	EET CF	04/04/23 17:37
Total/NA	Prep	7470A			383162	XXW3	EET CF	04/04/23 12:41
Total/NA	Analysis	7470A		1	383319	XXW3	EET CF	04/05/23 13:57
Total/NA	Analysis	SM 2540C		1	383053	ENB7	EET CF	04/03/23 15:42
Total/NA	Analysis	SM 4500 H+ B		1	382747	W9YR	EET CF	03/30/23 12:09
Total/NA	Prep	PrecSep-21			606633	KAC	EET SL	04/10/23 09:38
Total/NA	Analysis	9315		1	609637	FLC	EET SL	05/02/23 08:01
Total/NA	Prep	PrecSep_0			606636	KAC	EET SL	04/10/23 10:47
Total/NA	Analysis	9320		1	609533	FLC	EET SL	05/01/23 12:33
Total/NA	Analysis	Ra226_Ra228		1	609668	SCB	EET SL	05/02/23 12:04

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	04-12-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
6020B	3005A	Water	Lithium

Laboratory: Eurofins Chicago

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2903	04-29-23
Georgia	State	N/A	04-30-23
Georgia (DW)	State	939	04-30-23
Hawaii	State	NA	04-29-23
Illinois	NELAP	IL00035	04-29-23
Indiana	State	C-IL-02	04-29-23
Iowa	State	082	05-01-24
Kansas	NELAP	E-10161	10-31-23
Kentucky (UST)	State	AI # 108083	04-29-23
Kentucky (WW)	State	KY90023	12-31-22 *
Louisiana (All)	NELAP	02046	06-30-23
Mississippi	State	NA	04-30-23
North Carolina (WW/SW)	State	291	12-31-23
North Dakota	State	R-194	04-30-23
Oklahoma	State	8908	08-31-23
South Carolina	State	77001003	04-29-23
USDA	US Federal Programs	P330-18-00018	02-11-24
Wisconsin	State	999580010	08-31-23
Wyoming	State	8TMS-Q	04-30-23

Laboratory: Eurofins St. Louis

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	373	12-01-24

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
-----------------	-------------	--------	---------

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
7470A	Mercury (CVAA)	SW846	EET CF
9060A	Organic Carbon, Total (TOC)	SW846	EET CHI
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET CF
SM 4500 H+ B	pH	SM	EET CF
3005A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

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

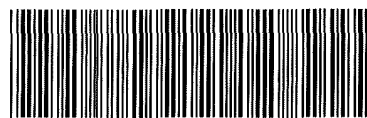
Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200



Environment Testing
America



310-252374 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>GHD</u>			
City/State:	CITY: <u> </u>	STATE: <u>TX</u>	Project: <u> </u>
Receipt Information			
Date/Time Received:	DATE: <u>3/30/23</u>	TIME: <u>0930</u>	Received By: <u>R</u>
Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: <u> </u>			
Condition of Cooler/Containers			
Sample(s) received in Cooler?		☒ Yes ☐ No	If yes: Cooler ID: <u>14</u>
Multiple Coolers?		☒ Yes ☐ No	If yes: Cooler # <u>1</u> of <u> </u>
Cooler Custody Seals Present?		☒ Yes ☐ No	If yes: Cooler custody seals intact? ☒ Yes ☐ No
Sample Custody Seals Present?		☐ Yes ☒ No	If yes: Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?		☐ Yes ☒ No	If yes: Which VOA samples are in cooler? <u>↓</u>
Temperature Record			
Coolant: ☐ Wet Ice ☐ Blue ice ☐ Dry Ice ☐ Other: <u> </u> ☐ NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>-0.1</u>	
Temp Blank: Temperature <u> </u> If no temp blank or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>0.6</u>		Corrected Temp (°C): <u>0.7</u>	
Sample Container Temperature			
Container(s) used:	CONTAINER 1		CONTAINER 2
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>GHD</u>			
City/State:	CITY	STATE	Project:
Receipt Information			
Date/Time Received:	DATE <u>3/30/23</u>	TIME <u>0930</u>	Received By: <u>[Signature]</u>
Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler? ☒ Yes ☐ No If yes: Cooler ID: _____			
Multiple Coolers? ☒ Yes ☐ No If yes: Cooler # <u>2</u> of <u>4</u>			
Cooler Custody Seals Present? ☒ Yes ☐ No If yes: Cooler custody seals intact? ☒ Yes ☐ No			
Sample Custody Seals Present? ☐ Yes ☒ No If yes: Sample custody seals intact? ☐ Yes ☐ No			
Trip Blank Present? ☐ Yes ☒ No If yes: Which VOA samples are in cooler? ↓			
Temperature Record			
Coolant: ☒ Wet Ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>+0.1</u>	
Temp Blank Temperature: If no temp blank or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>1.5</u>		Corrected Temp (°C): <u>1.6</u>	
Sample Container Temperature			
Container(s) used:	CONTAINER 1		CONTAINER 2
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Environment Testing
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Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>GHD</u>			
City/State: <u>CITY</u>		STATE	Project:
Receipt Information			
Date/Time Received:	DATE <u>3/30/23</u>	TIME <u>0930</u>	Received By: <u>[Signature]</u>
Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?		☒ Yes ☐ No	If yes: Cooler ID: _____
Multiple Coolers?		☒ Yes ☐ No	If yes: Cooler # <u>3</u> of <u>4</u>
Cooler Custody Seals Present?		☒ Yes ☐ No	If yes: Cooler custody seals intact? ☒ Yes ☐ No
Sample Custody Seals Present?		☐ Yes ☒ No	If yes: Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?		☐ Yes ☒ No	If yes: Which VOA samples are in cooler? ↓
Temperature Record			
Coolant: ☒ Wet Ice ☐ Blue Ice ☐ Dry Ice ☐ Other: _____ ☐ NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>+0.1</u>	
Temp Blank Temperature: If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>1.8</u>		Corrected Temp (°C): <u>1.9</u>	
Sample Container Temperature			
Container(s) used:	CONTAINER 1		CONTAINER 2
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with log in			
Additional Comments			



Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>GHD</u>			
City/State:	CITY	STATE	Project:
Receipt Information			
Date/Time Received:	DATE <u>3/30/23</u>	TIME <u>0930</u>	Received By: <u>[Signature]</u>
Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?		If yes: Cooler ID:	
☒ Yes ☐ No			
Multiple Coolers?		If yes: Cooler # <u>4</u> of <u>4</u>	
☒ Yes ☐ No			
Cooler Custody Seals Present?		If yes: Cooler custody seals intact?	
☒ Yes ☐ No		☒ Yes ☐ No	
Sample Custody Seals Present?		If yes: Sample custody seals intact?	
☐ Yes ☒ No		☐ Yes ☐ No	
Trip Blank Present?		If yes: Which VOA samples are in cooler? ↓	
☐ Yes ☒ No			
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>0.1</u>	
Temp Blank Temperature: If no temp blank or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>0.7</u>		Corrected Temp (°C): <u>0.8</u>	
Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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3019 Venture Way
Cedar Falls IA 50613
Phone 319-277-2401 Fax 319-277-2425

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Ver 06/08/2021 5/3/2023

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-252374-1

Login Number: 252374

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Homolar, Dana J

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-252374-1

Login Number: 252374

List Number: 3

Creator: Hernandez, Stephanie

List Source: Eurofins Chicago

List Creation: 03/31/23 02:06 PM

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	2.1
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Tracer/Carrier Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252374-1

Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	
310-252374-1	MW29R-GW-0323	90.4	
310-252374-2	MW223S-GW-0323	91.4	
310-252374-3	DP01-GW-0323	90.4	
LCS 160-606633/2-A	Lab Control Sample	88.6	
MB 160-606633/1-A	Method Blank	94.7	
Tracer/Carrier Legend			
Ba = Ba Carrier			

Method: 9320 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)
310-252374-1	MW29R-GW-0323	90.4	82.6
310-252374-2	MW223S-GW-0323	91.4	82.2
310-252374-3	DP01-GW-0323	90.4	82.2
LCS 160-606636/2-A	Lab Control Sample	88.6	83.7
MB 160-606636/1-A	Method Blank	94.7	80.7
Tracer/Carrier Legend			
Ba = Ba Carrier			
Y = Y Carrier			

ANALYTICAL REPORT

PREPARED FOR

Attn: Kevin Armstrong
GHD Services Inc.
11228 Aurora Avenue
Des Moines, Iowa 50322-7905

Generated 5/5/2023 10:57:29 AM

JOB DESCRIPTION

MEC Neal North-Background
Neal North CCR Qtrly

JOB NUMBER

310-252541-1

Eurofins Cedar Falls

Job Notes

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of Eurofins Environment Testing North Central, LLC and its client. All questions regarding this report should be directed to the Eurofins Environment Testing North Central, LLC Project Manager who has signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization



Generated
5/5/2023 10:57:29 AM

Authorized for release by
Meredith Liechti, Service Center Manager
meredith.liechti@et.eurofinsus.com
(319)277-2401

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Case Narrative

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252541-1

Job ID: 310-252541-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-252541-1

Receipt

The sample was received on 3/31/2023 4:15 PM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 2.0°C

HPLC/IC

Method 9056A_ORGFM_28D: The following sample was diluted due to the nature of the sample matrix: MW27-GW-0323 (310-252541-1). Elevated reporting limits (RLs) are provided chloride.

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

Metals

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

General Chemistry

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

Narrative

Job Narrative 310-252541-2

Receipt

The sample was received on 3/31/2023 4:15 PM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 2.0°C

Gas Flow Proportional Counter

Method 9315_Ra226: Radium-226 Prep Batch 160-606900 Insufficient sample volume was available to perform a sample duplicate for the following samples: MW27-GW-0323 (310-252541-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method 9315_Ra226: Radium-226 batch 606900 Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW27-GW-0323 (310-252541-1), (LCS 160-606900/2-A), (LCSD 160-606900/3-A) and (MB 160-606900/1-A)

Method 9320_Ra228: Radium-228 batch 606901 Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW27-GW-0323 (310-252541-1), (LCS 160-606901/2-A), (LCSD 160-606901/3-A) and (MB 160-606901/1-A)

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

Rad

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

Sample Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252541-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-252541-1	MW27-GW-0323	Ground Water	03/29/23 18:25	03/31/23 16:15

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Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252541-1

Client Sample ID: MW27-GW-0323

Lab Sample ID: 310-252541-1

Date Collected: 03/29/23 18:25

Matrix: Ground Water

Date Received: 03/31/23 16:15

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	11.9		5.00		mg/L			04/06/23 22:18	5
Fluoride	<0.500		0.500		mg/L			04/06/23 22:18	5
Sulfate	96.4		5.00		mg/L			04/06/23 22:18	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		04/04/23 09:25	04/04/23 18:06	1
Arsenic	0.0513		0.00200		mg/L		04/04/23 09:25	04/04/23 18:06	1
Barium	0.130		0.00200		mg/L		04/04/23 09:25	04/04/23 18:06	1
Beryllium	<0.00100		0.00100		mg/L		04/04/23 09:25	04/04/23 18:06	1
Boron	0.246		0.100		mg/L		04/04/23 09:25	04/04/23 18:06	1
Cadmium	<0.000200		0.000200		mg/L		04/04/23 09:25	04/04/23 18:06	1
Calcium	158		0.500		mg/L		04/04/23 09:25	04/04/23 18:06	1
Chromium	<0.00500		0.00500		mg/L		04/04/23 09:25	04/04/23 18:06	1
Cobalt	0.000561		0.000500		mg/L		04/04/23 09:25	04/04/23 18:06	1
Lithium	0.129		0.0100		mg/L		04/04/23 09:25	04/04/23 18:06	1
Lead	<0.000500		0.000500		mg/L		04/04/23 09:25	04/04/23 18:06	1
Molybdenum	<0.00200		0.00200		mg/L		04/04/23 09:25	04/04/23 18:06	1
Selenium	<0.00500		0.00500		mg/L		04/04/23 09:25	04/04/23 18:06	1
Thallium	<0.00100		0.00100		mg/L		04/04/23 09:25	04/04/23 18:06	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/05/23 12:46	04/06/23 13:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	634		50.0		mg/L			04/03/23 15:42	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.1	HF	0.1		SU			03/31/23 18:51	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0601	U	0.167	0.167	1.00	0.310	pCi/L	04/11/23 10:38	05/03/23 09:23	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	84.3		30 - 110					04/11/23 10:38	05/03/23 09:23	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0262	U	0.282	0.282	1.00	0.529	pCi/L	04/11/23 11:04	05/02/23 12:10	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	84.3		30 - 110					04/11/23 11:04	05/02/23 12:10	1
Y Carrier	83.4		30 - 110					04/11/23 11:04	05/02/23 12:10	1

Eurofins Cedar Falls

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252541-1

Client Sample ID: MW27-GW-0323
Date Collected: 03/29/23 18:25
Date Received: 03/31/23 16:15

Lab Sample ID: 310-252541-1
Matrix: Ground Water

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.0863	U	0.328	0.328	5.00	0.529	pCi/L		05/03/23 17:07	1

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252541-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252541-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-384368/3

Matrix: Water

Analysis Batch: 384368

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			04/06/23 17:36	1
Fluoride	<0.100		0.100		mg/L			04/06/23 17:36	1
Sulfate	<1.00		1.00		mg/L			04/06/23 17:36	1

Lab Sample ID: LCS 310-384368/4

Matrix: Water

Analysis Batch: 384368

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.873		mg/L		99	90 - 110
Sulfate	10.0	10.43		mg/L		104	90 - 110

Lab Sample ID: LCS 310-384368/41

Matrix: Water

Analysis Batch: 384368

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	2.00	2.047		mg/L		102	90 - 110

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-383282/1-A

Matrix: Water

Analysis Batch: 383501

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 383282

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/05/23 12:46	04/06/23 12:51	1

Lab Sample ID: LCS 310-383282/2-A

Matrix: Water

Analysis Batch: 383501

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 383282

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001666		mg/L		100	80 - 120

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 310-383053/1

Matrix: Water

Analysis Batch: 383053

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			04/03/23 15:42	1

Lab Sample ID: LCS 310-383053/2

Matrix: Water

Analysis Batch: 383053

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	948.0		mg/L		95	90 - 110

Eurofins Cedar Falls

QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252541-1

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-382938/1
Matrix: Water
Analysis Batch: 382938

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
pH	7.00	7.0		SU		101	98 - 102

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-606900/1-A
Matrix: Water
Analysis Batch: 609833

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 606900

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.03030	U	0.0877	0.0877	1.00	0.213	pCi/L	04/11/23 10:38	05/03/23 09:10	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.7		30 - 110					04/11/23 10:38	05/03/23 09:10	1

Lab Sample ID: LCS 160-606900/2-A
Matrix: Water
Analysis Batch: 609833

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 606900

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-226	11.3	9.659		1.18	1.00	0.222	pCi/L	85	70 - 113
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	96.7		30 - 110						

Lab Sample ID: LCSD 160-606900/3-A
Matrix: Water
Analysis Batch: 609833

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 606900

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium-226	11.3	9.895		1.23	1.00	0.324	pCi/L	87	70 - 113	0.1	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	91.6		30 - 110								

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-606901/1-A
Matrix: Water
Analysis Batch: 609637

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 606901

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.06950	U	0.299	0.299	1.00	0.538	pCi/L	04/11/23 11:04	05/02/23 12:06	1

Eurofins Cedar Falls

QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252541-1

Method: 9320 - Radium-228 (GFPC) (Continued)

Lab Sample ID: MB 160-606901/1-A
Matrix: Water
Analysis Batch: 609637

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 606901

	MB	MB	
Carrier	%Yield	Qualifier	Limits
Ba Carrier	93.7		30 - 110
Y Carrier	84.5		30 - 110

Prepared	Analyzed	Dil Fac
04/11/23 11:04	05/02/23 12:06	1
04/11/23 11:04	05/02/23 12:06	1

Lab Sample ID: LCS 160-606901/2-A
Matrix: Water
Analysis Batch: 609637

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 606901

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-228	7.99	9.453		1.26	1.00	0.447	pCi/L	118	75 - 125

	LCS	LCS	
Carrier	%Yield	Qualifier	Limits
Ba Carrier	96.7		30 - 110
Y Carrier	84.9		30 - 110

Lab Sample ID: LCSD 160-606901/3-A
Matrix: Water
Analysis Batch: 609637

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 606901

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium-228	7.99	8.820		1.25	1.00	0.612	pCi/L	110	75 - 125	0.25	1

	LCSD	LCSD	
Carrier	%Yield	Qualifier	Limits
Ba Carrier	91.6		30 - 110
Y Carrier	80.4		30 - 110

QC Association Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252541-1

HPLC/IC

Analysis Batch: 384368

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252541-1	MW27-GW-0323	Total/NA	Ground Water	9056A	
MB 310-384368/3	Method Blank	Total/NA	Water	9056A	
LCS 310-384368/4	Lab Control Sample	Total/NA	Water	9056A	
LCS 310-384368/41	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 383060

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252541-1	MW27-GW-0323	Total/NA	Ground Water	3005A	

Analysis Batch: 383234

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252541-1	MW27-GW-0323	Total/NA	Ground Water	6020B	383060

Prep Batch: 383282

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252541-1	MW27-GW-0323	Total/NA	Ground Water	7470A	
MB 310-383282/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-383282/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 383501

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252541-1	MW27-GW-0323	Total/NA	Ground Water	7470A	383282
MB 310-383282/1-A	Method Blank	Total/NA	Water	7470A	383282
LCS 310-383282/2-A	Lab Control Sample	Total/NA	Water	7470A	383282

General Chemistry

Analysis Batch: 382938

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252541-1	MW27-GW-0323	Total/NA	Ground Water	SM 4500 H+ B	
LCS 310-382938/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 383053

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252541-1	MW27-GW-0323	Total/NA	Ground Water	SM 2540C	
MB 310-383053/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-383053/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Rad

Prep Batch: 606900

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252541-1	MW27-GW-0323	Total/NA	Ground Water	PrecSep-21	
MB 160-606900/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-606900/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-606900/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 606901

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252541-1	MW27-GW-0323	Total/NA	Ground Water	PrecSep_0	

Eurofins Cedar Falls

QC Association Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252541-1

Rad (Continued)

Prep Batch: 606901 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 160-606901/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-606901/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-606901/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252541-1

Client Sample ID: MW27-GW-0323

Lab Sample ID: 310-252541-1

Date Collected: 03/29/23 18:25

Matrix: Ground Water

Date Received: 03/31/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	384368	QTZ5	EET CF	04/06/23 22:18
Total/NA	Prep	3005A			383060	DHM5	EET CF	04/04/23 09:25
Total/NA	Analysis	6020B		1	383234	A6US	EET CF	04/04/23 18:06
Total/NA	Prep	7470A			383282	XXW3	EET CF	04/05/23 12:46
Total/NA	Analysis	7470A		1	383501	XXW3	EET CF	04/06/23 13:34
Total/NA	Analysis	SM 2540C		1	383053	ENB7	EET CF	04/03/23 15:42
Total/NA	Analysis	SM 4500 H+ B		1	382938	DN3P	EET CF	03/31/23 18:51
Total/NA	Prep	PrecSep-21			606900	KAC	EET SL	04/11/23 10:38
Total/NA	Analysis	9315		1	609835	FLC	EET SL	05/03/23 09:23
Total/NA	Prep	PrecSep_0			606901	KAC	EET SL	04/11/23 11:04
Total/NA	Analysis	9320		1	609638	FLC	EET SL	05/02/23 12:10
Total/NA	Analysis	Ra226_Ra228		1	610033	EMH	EET SL	05/03/23 17:07

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252541-1

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
6020B	3005A	Ground Water	Lithium

Laboratory: Eurofins St. Louis

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	373	12-01-24

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
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Method Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252541-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
7470A	Mercury (CVAA)	SW846	EET CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET CF
SM 4500 H+ B	pH	SM	EET CF
3005A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF

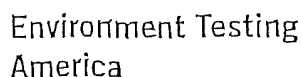
Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

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

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401



310-252541 Chain of Custody

Cooler/Sample Receipt and Temperature

- 1
- 2
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- 10
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- 14

Client Information		Sampler: <u>PAIGE LAPINAOT</u>		Lab P.M.: Thompson, Shirley J		Carrier Tracking No(s):		COC No: 310-78764-22173 1								
Client Contact: Kevin Armstrong		Phone: 712-898-91031		E-Mail: Shirley.Thompson@et.eurofins.com		State of Origin: Iowa		Page: Page 1 of 1								
Company: GHD Services Inc.		PWSID:						Job #:								
Address: 11228 Aurora Avenue		Due Date Requested:						Preservation Codes:								
City: Des Moines		TAT Requested (days): Standard						A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:								
State Zip: IA, 50322-7905		Compliance Project: ☐ Yes ☐ No						M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Y - Trizma Z - other (specify)								
Phone: 515-414-3935(Tel)		PO #: 340-004187						Special Instructions/Note: MW-223S MW-231SR SHORT HOLD								
Email: Kevin.Armstrong@ghd.com		WO #: 12576482-001														
Project Name: MEC Neal North-Background		Project #: 31007314														
Site: Neal North CCR		SSOW#: 12576482-001														
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Water, Sealed, On-Vial, A-Air)	Field Filtered Sample (Yes or No)	Performance MS/MSD (Yes or No)	9316_Ra226 - Standard Target List	9320_Ra226 - Standard Target List	9656_ORGFM_28D - Chloride, Fluoride & Sulfate	6020B_7470A - Appendix III and IV Metals	2540C_Calcd, SM4500_H+	9656_ORGFM_28D	6020B - Dissolved Fe and Mn (field-filtered)	9656A_ORGFM_48H SHORT HOLD	Total Number of Containers
MW19R-GW-0029				G	Water	N	X	X	X	X	X	X	X	X	X	X
MW27-GW-0323		3/29/23	1815	G	Water	N	N	X	X	X	X	X	X	X	X	5
MW29R-GW-0029				G	Water	N	X	X	X	X	X	X	X	X	X	
MW223S-GW-0323				G	Water	Y	X	X	X	X	X	X	X	X	X	
MW231SR-GW-0323				G	Water	Y	X	X	X	X	X	X	X	X	X	
DP01-GW-0029				G	Water	N	X	X	X	X	X	X	X	X	X	
Possible Hazard Identification		Poison B	Unknown	Radiological	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)											
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Deliverable Requested I, II, III, IV, Other (specify)					☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months											
Empty Kit Relinquished by		Date:	Time:	Special Instructions/QC Requirements:												
Relinquished by: <u>PAIGE LAPINAOT</u>		Date/Time: 3/31/23 1300	Company: GHD	Received by: <u>PAIGE LAPINAOT</u>												
Relinquished by:		Date/Time:	Company:	Received by: <u>ST</u>												
Relinquished by:		Date/Time:	Company:	Received by:												
Custody Seals Intact: ☐ Yes ☐ No		Custody Seal No		Cooler Temperature(s) °C and Other Remarks:												

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-252541-1

Login Number: 252541

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Tucker, Sarah L

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Tracer/Carrier Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North-Background

Job ID: 310-252541-1

Method: 9315 - Radium-226 (GFPC)

Matrix: Ground Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	
310-252541-1	MW27-GW-0323	84.3	
Tracer/Carrier Legend			
Ba = Ba Carrier			

Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	
LCS 160-606900/2-A	Lab Control Sample	96.7	
LCSD 160-606900/3-A	Lab Control Sample Dup	91.6	
MB 160-606900/1-A	Method Blank	93.7	
Tracer/Carrier Legend			
Ba = Ba Carrier			

Method: 9320 - Radium-228 (GFPC)

Matrix: Ground Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)
310-252541-1	MW27-GW-0323	84.3	83.4
Tracer/Carrier Legend			
Ba = Ba Carrier			
Y = Y Carrier			

Method: 9320 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)
LCS 160-606901/2-A	Lab Control Sample	96.7	84.9
LCSD 160-606901/3-A	Lab Control Sample Dup	91.6	80.4
MB 160-606901/1-A	Method Blank	93.7	84.5
Tracer/Carrier Legend			
Ba = Ba Carrier			
Y = Y Carrier			

ANALYTICAL REPORT

PREPARED FOR

Attn: Kevin Armstrong
GHD Services Inc.
11228 Aurora Avenue
Des Moines, Iowa 50322-7905

Generated 4/13/2023 5:23:37 PM

JOB DESCRIPTION

Neal North Closed CCR Monofill IDNR

JOB NUMBER

310-252847-1

Eurofins Cedar Falls

Job Notes

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of Eurofins Environment Testing North Central, LLC and its client. All questions regarding this report should be directed to the Eurofins Environment Testing North Central, LLC Project Manager who has signed this report.

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Authorization



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Case Narrative

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill IDNR

Job ID: 310-252847-1

Job ID: 310-252847-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-252847-1

Comments

No additional comments.

Receipt

The samples were received on 4/5/2023 4:30 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were -1.0° C and 0.6° C.

HPLC/IC

Method 9056A: The following samples were diluted due to the nature of the sample matrix: MW01R-GW-0323 (310-252847-1), MW03R-GW-0323 (310-252847-2), MW05R-GW-0323 (310-252847-3), MW19-GW-0323 (310-252847-4) and DP05-GW-0323 (310-252847-6). Elevated reporting limits (RLs) are provided.

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

Metals

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

General Chemistry

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

Sample Summary

Client: GHD Services Inc.

Job ID: 310-252847-1

Project/Site: Neal North Closed CCR Monofill IDNR

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-252847-1	MW01R-GW-0323	Water	04/03/23 17:15	04/05/23 16:30
310-252847-2	MW03R-GW-0323	Water	04/03/23 15:20	04/05/23 16:30
310-252847-3	MW05R-GW-0323	Water	04/03/23 14:10	04/05/23 16:30
310-252847-4	MW19-GW-0323	Water	04/03/23 13:15	04/05/23 16:30
310-252847-5	MW21-GW-0323	Water	04/03/23 12:15	04/05/23 16:30
310-252847-6	DP05-GW-0323	Water	04/03/23 00:00	04/05/23 16:30

Client Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill IDNR

Job ID: 310-252847-1

Client Sample ID: MW01R-GW-0323

Lab Sample ID: 310-252847-1

Date Collected: 04/03/23 17:15

Matrix: Water

Date Received: 04/05/23 16:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	34.6		5.00		mg/L			04/10/23 20:57	5
Fluoride	<0.500		0.500		mg/L			04/11/23 14:00	5
Sulfate	235		5.00		mg/L			04/11/23 14:00	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.331		0.100		mg/L		04/07/23 08:25	04/10/23 18:35	1
Calcium	182		0.500		mg/L		04/07/23 08:25	04/07/23 20:51	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	926		50.0		mg/L			04/06/23 13:01	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.3	HF	0.1		SU			04/05/23 21:01	1

Client Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill IDNR

Job ID: 310-252847-1

Client Sample ID: MW03R-GW-0323

Lab Sample ID: 310-252847-2

Date Collected: 04/03/23 15:20

Matrix: Water

Date Received: 04/05/23 16:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	10.0		5.00		mg/L			04/10/23 21:11	5
Fluoride	<0.500		0.500		mg/L			04/11/23 14:14	5
Sulfate	205		5.00		mg/L			04/11/23 14:14	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.258		0.100		mg/L		04/07/23 08:25	04/10/23 18:38	1
Calcium	154		0.500		mg/L		04/07/23 08:25	04/07/23 20:53	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	756		50.0		mg/L			04/06/23 13:01	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.4	HF	0.1		SU			04/05/23 21:06	1

Client Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill IDNR

Job ID: 310-252847-1

Client Sample ID: MW05R-GW-0323

Lab Sample ID: 310-252847-3

Date Collected: 04/03/23 14:10

Matrix: Water

Date Received: 04/05/23 16:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	13.7		5.00		mg/L			04/10/23 21:25	5
Fluoride	<0.500		0.500		mg/L			04/11/23 14:28	5
Sulfate	318		5.00		mg/L			04/11/23 14:28	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.297		0.100		mg/L		04/07/23 08:25	04/10/23 18:42	1
Calcium	192		0.500		mg/L		04/07/23 08:25	04/07/23 20:56	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	920		50.0		mg/L			04/06/23 13:01	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.3	HF	0.1		SU			04/05/23 21:08	1

Client Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill IDNR

Job ID: 310-252847-1

Client Sample ID: MW19-GW-0323

Lab Sample ID: 310-252847-4

Date Collected: 04/03/23 13:15

Matrix: Water

Date Received: 04/05/23 16:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	18.0		5.00		mg/L			04/10/23 22:07	5
Fluoride	<0.500		0.500		mg/L			04/10/23 22:07	5
Sulfate	1020		20.0		mg/L			04/11/23 14:42	20

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.584		0.100		mg/L		04/07/23 08:25	04/10/23 18:45	1
Calcium	415		0.500		mg/L		04/07/23 08:25	04/07/23 21:19	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	2220		250		mg/L			04/06/23 13:01	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	6.7	HF	0.1		SU			04/05/23 21:10	1

Client Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill IDNR

Job ID: 310-252847-1

Client Sample ID: MW21-GW-0323

Lab Sample ID: 310-252847-5

Date Collected: 04/03/23 12:15

Matrix: Water

Date Received: 04/05/23 16:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	7.94		5.00		mg/L			04/10/23 22:22	5
Fluoride	0.791		0.500		mg/L			04/10/23 22:22	5
Sulfate	1610		20.0		mg/L			04/11/23 14:56	20

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.329		0.100		mg/L		04/07/23 08:25	04/10/23 18:53	1
Calcium	523		2.00		mg/L		04/07/23 08:25	04/10/23 18:50	4

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	3050		250		mg/L			04/06/23 13:01	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	6.8	HF	0.1		SU			04/05/23 21:11	1

Client Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill IDNR

Job ID: 310-252847-1

Client Sample ID: DP05-GW-0323

Lab Sample ID: 310-252847-6

Date Collected: 04/03/23 00:00

Matrix: Water

Date Received: 04/05/23 16:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	34.4		5.00		mg/L			04/10/23 22:36	5
Fluoride	<0.500		0.500		mg/L			04/10/23 22:36	5
Sulfate	236		5.00		mg/L			04/10/23 22:36	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.336		0.100		mg/L		04/07/23 08:25	04/10/23 18:57	1
Calcium	182		0.500		mg/L		04/07/23 08:25	04/07/23 21:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	934		50.0		mg/L			04/06/23 13:01	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.2	HF	0.1		SU			04/05/23 21:12	1

Definitions/Glossary

Client: GHD Services Inc.

Job ID: 310-252847-1

Project/Site: Neal North Closed CCR Monofill IDNR

Qualifiers

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill IDNR

Job ID: 310-252847-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-384051/3

Matrix: Water

Analysis Batch: 384051

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			04/10/23 16:58	1

Lab Sample ID: MB 310-384051/35

Matrix: Water

Analysis Batch: 384051

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	<0.100		0.100		mg/L			04/11/23 10:57	1
Sulfate	<1.00		1.00		mg/L			04/11/23 10:57	1

Lab Sample ID: LCS 310-384051/36

Matrix: Water

Analysis Batch: 384051

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	2.00	2.180		mg/L		109	90 - 110
Sulfate	10.0	10.52		mg/L		105	90 - 110

Lab Sample ID: LCS 310-384051/4

Matrix: Water

Analysis Batch: 384051

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.900		mg/L		99	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-383505/1-A

Matrix: Water

Analysis Batch: 383761

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 383505

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	<0.500		0.500		mg/L		04/07/23 08:25	04/07/23 19:42	1

Lab Sample ID: MB 310-383505/1-A

Matrix: Water

Analysis Batch: 383866

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 383505

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	<0.100		0.100		mg/L		04/07/23 08:25	04/10/23 17:33	1

Lab Sample ID: LCS 310-383505/2-A

Matrix: Water

Analysis Batch: 383761

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 383505

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Calcium	2.00	1.927		mg/L		96	80 - 120

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QC Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill IDNR

Job ID: 310-252847-1

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 310-383505/2-A
Matrix: Water
Analysis Batch: 383866

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 383505

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Boron	0.200	0.1801		mg/L		90	80 - 120

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 310-383468/1
Matrix: Water
Analysis Batch: 383468

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			04/06/23 13:01	1

Lab Sample ID: LCS 310-383468/2
Matrix: Water
Analysis Batch: 383468

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	974.0		mg/L		97	90 - 110

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-383344/1
Matrix: Water
Analysis Batch: 383344

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
pH	7.00	7.1		SU		101	98 - 102

Lab Sample ID: 310-252847-1 DU
Matrix: Water
Analysis Batch: 383344

Client Sample ID: MW01R-GW-0323
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.3	HF	7.2		SU		0.3	20

QC Association Summary

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill IDNR

Job ID: 310-252847-1

HPLC/IC

Analysis Batch: 384051

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252847-1	MW01R-GW-0323	Total/NA	Water	9056A	
310-252847-1	MW01R-GW-0323	Total/NA	Water	9056A	
310-252847-2	MW03R-GW-0323	Total/NA	Water	9056A	
310-252847-2	MW03R-GW-0323	Total/NA	Water	9056A	
310-252847-3	MW05R-GW-0323	Total/NA	Water	9056A	
310-252847-3	MW05R-GW-0323	Total/NA	Water	9056A	
310-252847-4	MW19-GW-0323	Total/NA	Water	9056A	
310-252847-4	MW19-GW-0323	Total/NA	Water	9056A	
310-252847-5	MW21-GW-0323	Total/NA	Water	9056A	
310-252847-5	MW21-GW-0323	Total/NA	Water	9056A	
310-252847-6	DP05-GW-0323	Total/NA	Water	9056A	
MB 310-384051/3	Method Blank	Total/NA	Water	9056A	
MB 310-384051/35	Method Blank	Total/NA	Water	9056A	
LCS 310-384051/36	Lab Control Sample	Total/NA	Water	9056A	
LCS 310-384051/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 383505

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252847-1	MW01R-GW-0323	Total/NA	Water	3005A	
310-252847-2	MW03R-GW-0323	Total/NA	Water	3005A	
310-252847-3	MW05R-GW-0323	Total/NA	Water	3005A	
310-252847-4	MW19-GW-0323	Total/NA	Water	3005A	
310-252847-5	MW21-GW-0323	Total/NA	Water	3005A	
310-252847-6	DP05-GW-0323	Total/NA	Water	3005A	
MB 310-383505/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-383505/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 383761

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252847-1	MW01R-GW-0323	Total/NA	Water	6020B	383505
310-252847-2	MW03R-GW-0323	Total/NA	Water	6020B	383505
310-252847-3	MW05R-GW-0323	Total/NA	Water	6020B	383505
310-252847-4	MW19-GW-0323	Total/NA	Water	6020B	383505
310-252847-6	DP05-GW-0323	Total/NA	Water	6020B	383505
MB 310-383505/1-A	Method Blank	Total/NA	Water	6020B	383505
LCS 310-383505/2-A	Lab Control Sample	Total/NA	Water	6020B	383505

Analysis Batch: 383866

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252847-1	MW01R-GW-0323	Total/NA	Water	6020B	383505
310-252847-2	MW03R-GW-0323	Total/NA	Water	6020B	383505
310-252847-3	MW05R-GW-0323	Total/NA	Water	6020B	383505
310-252847-4	MW19-GW-0323	Total/NA	Water	6020B	383505
310-252847-5	MW21-GW-0323	Total/NA	Water	6020B	383505
310-252847-5	MW21-GW-0323	Total/NA	Water	6020B	383505
310-252847-6	DP05-GW-0323	Total/NA	Water	6020B	383505
MB 310-383505/1-A	Method Blank	Total/NA	Water	6020B	383505
LCS 310-383505/2-A	Lab Control Sample	Total/NA	Water	6020B	383505

Eurofins Cedar Falls

QC Association Summary

Client: GHD Services Inc.

Job ID: 310-252847-1

Project/Site: Neal North Closed CCR Monofill IDNR

General Chemistry

Analysis Batch: 383344

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252847-1	MW01R-GW-0323	Total/NA	Water	SM 4500 H+ B	
310-252847-2	MW03R-GW-0323	Total/NA	Water	SM 4500 H+ B	
310-252847-3	MW05R-GW-0323	Total/NA	Water	SM 4500 H+ B	
310-252847-4	MW19-GW-0323	Total/NA	Water	SM 4500 H+ B	
310-252847-5	MW21-GW-0323	Total/NA	Water	SM 4500 H+ B	
310-252847-6	DP05-GW-0323	Total/NA	Water	SM 4500 H+ B	
LCS 310-383344/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-252847-1 DU	MW01R-GW-0323	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 383468

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-252847-1	MW01R-GW-0323	Total/NA	Water	SM 2540C	
310-252847-2	MW03R-GW-0323	Total/NA	Water	SM 2540C	
310-252847-3	MW05R-GW-0323	Total/NA	Water	SM 2540C	
310-252847-4	MW19-GW-0323	Total/NA	Water	SM 2540C	
310-252847-5	MW21-GW-0323	Total/NA	Water	SM 2540C	
310-252847-6	DP05-GW-0323	Total/NA	Water	SM 2540C	
MB 310-383468/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-383468/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Lab Chronicle

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill IDNR

Job ID: 310-252847-1

Client Sample ID: MW01R-GW-0323

Lab Sample ID: 310-252847-1

Date Collected: 04/03/23 17:15

Matrix: Water

Date Received: 04/05/23 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	384051	QTZ5	EET CF	04/10/23 20:57
Total/NA	Analysis	9056A		5	384051	QTZ5	EET CF	04/11/23 14:00
Total/NA	Prep	3005A			383505	QTZ5	EET CF	04/07/23 08:25
Total/NA	Analysis	6020B		1	383866	ZRI4	EET CF	04/10/23 18:35
Total/NA	Prep	3005A			383505	QTZ5	EET CF	04/07/23 08:25
Total/NA	Analysis	6020B		1	383761	ZRI4	EET CF	04/07/23 20:51
Total/NA	Analysis	SM 2540C		1	383468	ENB7	EET CF	04/06/23 13:01
Total/NA	Analysis	SM 4500 H+ B		1	383344	ZJX4	EET CF	04/05/23 21:01

Client Sample ID: MW03R-GW-0323

Lab Sample ID: 310-252847-2

Date Collected: 04/03/23 15:20

Matrix: Water

Date Received: 04/05/23 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	384051	QTZ5	EET CF	04/10/23 21:11
Total/NA	Analysis	9056A		5	384051	QTZ5	EET CF	04/11/23 14:14
Total/NA	Prep	3005A			383505	QTZ5	EET CF	04/07/23 08:25
Total/NA	Analysis	6020B		1	383866	ZRI4	EET CF	04/10/23 18:38
Total/NA	Prep	3005A			383505	QTZ5	EET CF	04/07/23 08:25
Total/NA	Analysis	6020B		1	383761	ZRI4	EET CF	04/07/23 20:53
Total/NA	Analysis	SM 2540C		1	383468	ENB7	EET CF	04/06/23 13:01
Total/NA	Analysis	SM 4500 H+ B		1	383344	ZJX4	EET CF	04/05/23 21:06

Client Sample ID: MW05R-GW-0323

Lab Sample ID: 310-252847-3

Date Collected: 04/03/23 14:10

Matrix: Water

Date Received: 04/05/23 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	384051	QTZ5	EET CF	04/10/23 21:25
Total/NA	Analysis	9056A		5	384051	QTZ5	EET CF	04/11/23 14:28
Total/NA	Prep	3005A			383505	QTZ5	EET CF	04/07/23 08:25
Total/NA	Analysis	6020B		1	383866	ZRI4	EET CF	04/10/23 18:42
Total/NA	Prep	3005A			383505	QTZ5	EET CF	04/07/23 08:25
Total/NA	Analysis	6020B		1	383761	ZRI4	EET CF	04/07/23 20:56
Total/NA	Analysis	SM 2540C		1	383468	ENB7	EET CF	04/06/23 13:01
Total/NA	Analysis	SM 4500 H+ B		1	383344	ZJX4	EET CF	04/05/23 21:08

Client Sample ID: MW19-GW-0323

Lab Sample ID: 310-252847-4

Date Collected: 04/03/23 13:15

Matrix: Water

Date Received: 04/05/23 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	384051	QTZ5	EET CF	04/10/23 22:07
Total/NA	Analysis	9056A		20	384051	QTZ5	EET CF	04/11/23 14:42

Eurofins Cedar Falls

Lab Chronicle

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill IDNR

Job ID: 310-252847-1

Client Sample ID: MW19-GW-0323

Lab Sample ID: 310-252847-4

Date Collected: 04/03/23 13:15

Matrix: Water

Date Received: 04/05/23 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			383505	QTZ5	EET CF	04/07/23 08:25
Total/NA	Analysis	6020B		1	383866	ZRI4	EET CF	04/10/23 18:45
Total/NA	Prep	3005A			383505	QTZ5	EET CF	04/07/23 08:25
Total/NA	Analysis	6020B		1	383761	ZRI4	EET CF	04/07/23 21:19
Total/NA	Analysis	SM 2540C		1	383468	ENB7	EET CF	04/06/23 13:01
Total/NA	Analysis	SM 4500 H+ B		1	383344	ZJX4	EET CF	04/05/23 21:10

Client Sample ID: MW21-GW-0323

Lab Sample ID: 310-252847-5

Date Collected: 04/03/23 12:15

Matrix: Water

Date Received: 04/05/23 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	384051	QTZ5	EET CF	04/10/23 22:22
Total/NA	Analysis	9056A		20	384051	QTZ5	EET CF	04/11/23 14:56
Total/NA	Prep	3005A			383505	QTZ5	EET CF	04/07/23 08:25
Total/NA	Analysis	6020B		4	383866	ZRI4	EET CF	04/10/23 18:50
Total/NA	Prep	3005A			383505	QTZ5	EET CF	04/07/23 08:25
Total/NA	Analysis	6020B		1	383866	ZRI4	EET CF	04/10/23 18:53
Total/NA	Analysis	SM 2540C		1	383468	ENB7	EET CF	04/06/23 13:01
Total/NA	Analysis	SM 4500 H+ B		1	383344	ZJX4	EET CF	04/05/23 21:11

Client Sample ID: DP05-GW-0323

Lab Sample ID: 310-252847-6

Date Collected: 04/03/23 00:00

Matrix: Water

Date Received: 04/05/23 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	384051	QTZ5	EET CF	04/10/23 22:36
Total/NA	Prep	3005A			383505	QTZ5	EET CF	04/07/23 08:25
Total/NA	Analysis	6020B		1	383866	ZRI4	EET CF	04/10/23 18:57
Total/NA	Prep	3005A			383505	QTZ5	EET CF	04/07/23 08:25
Total/NA	Analysis	6020B		1	383761	ZRI4	EET CF	04/07/23 21:25
Total/NA	Analysis	SM 2540C		1	383468	ENB7	EET CF	04/06/23 13:01
Total/NA	Analysis	SM 4500 H+ B		1	383344	ZJX4	EET CF	04/05/23 21:12

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Eurofins Cedar Falls

Accreditation/Certification Summary

Client: GHD Services Inc.

Job ID: 310-252847-1

Project/Site: Neal North Closed CCR Monofill IDNR

Laboratory: Eurofins Cedar Falls

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-23

1

2

3

4

5

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11

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13

Method Summary

Client: GHD Services Inc.

Job ID: 310-252847-1

Project/Site: Neal North Closed CCR Monofill IDNR

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET CF
SM 4500 H+ B	pH	SM	EET CF
3005A	Preparation, Total Metals	SW846	EET CF

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

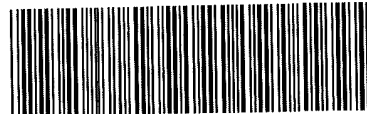
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401



Environment Testing
America



310-252847 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>6 HD</u>			
City/State:	CITY <u>Des Moines</u>	STATE <u>IA</u>	Project:
Receipt Information			
Date/Time Received:	DATE <u>4-5-23</u>	TIME <u>1630</u>	Received By: <u>PR</u>
Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☒ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?		☒ Yes ☐ No	If yes: Cooler ID: _____
Multiple Coolers?		☒ Yes ☐ No	If yes: Cooler # <u>1</u> of <u>2</u>
Cooler Custody Seals Present?		☒ Yes ☐ No	If yes: Cooler custody seals intact? ☒ Yes ☐ No
Sample Custody Seals Present?		☐ Yes ☒ No	If yes: Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?		☐ Yes ☒ No	If yes: Which VOA samples are in cooler? ↓
Temperature Record			
Coolant: ☒ Wet Ice ☐ Blue Ice ☐ Dry Ice ☐ Other: _____ ☐ NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>+0.1</u>	
Temp Blank Temperature: If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>-1.1</u>		Corrected Temp (°C): <u>-1.0</u>	
Sample Container Temperature			
Container(s) used:	CONTAINER 1		CONTAINER 2
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging/septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>GH</u>			
City/State:	CITY <u>Des Moines</u>	STATE <u>IA</u>	Project:
Receipt Information			
Date/Time Received:	DATE <u>4-5-23</u>	TIME <u>1630</u>	Received By: <u>PM</u>
Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☒ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?		☒ Yes ☐ No	If yes: Cooler ID: _____
Multiple Coolers?		☒ Yes ☐ No	If yes: Cooler # <u>2</u> of <u>2</u>
Cooler Custody Seals Present?		☒ Yes ☐ No	If yes: Cooler custody seals intact? ☒ Yes ☐ No
Sample Custody Seals Present?		☐ Yes ☒ No	If yes: Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?		☐ Yes ☒ No	If yes: Which VOA samples are in cooler? ↓
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>+0.1</u>	
Temp Blank Temperature: If no temp blank or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>—</u>		Corrected Temp (°C): <u>—</u>	
Sample Container Temperature			
Container(s) used:	CONTAINER 1 <u>PI 250 mL</u>		CONTAINER 2
Uncorrected Temp (°C):	<u>0.5</u>		
Corrected Temp (°C):	<u>0.6</u>		
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-252847-1

SDG Number:

Login Number: 252847

List Number: 1

Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

PREPARED FOR

Attn: Kevin Armstrong
GHD Services Inc.
11228 Aurora Avenue
Des Moines, Iowa 50322-7905
Generated 12/1/2023 4:45:01 PM Revision 2

JOB DESCRIPTION

MEC Neal North - Background

JOB NUMBER

310-264651-1

Eurofins Cedar Falls

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization



Authorized for release by
Meredith Liechti, Service Center Manager
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(319)277-2401

Generated
12/1/2023 4:45:01 PM
Revision 2

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Case Narrative

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Job ID: 310-264651-1

Laboratory: Eurofins Cedar Falls

Narrative

**Job Narrative
310-264651-1**

REVISION

The report being provided is a revision of the original report sent on 10/13/2023. The report (revision 2) is being revised due to include all requested analytes (boron, calcium, and radium inadvertently left out of previous report.

Report revision history

Revision 1 - 11/16/2023 - Reason - This report has been revised due to carryover of Thallium during the initial sample analyses; the lab re-ran the sample and thallium was determined to be non-detect.

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.

Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The samples were received on 9/13/2023 9:10 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 3.4°C and 5.8°C

HPLC/IC

Method 9056A_ORGFM_28D: The following samples were diluted due to the nature of the sample matrix: MW13R-GW-0923 (310-264651-1), MW27-GW-0923 (310-264651-2), MW29R-GW-0923 (310-264651-3) and DP01-GW-0923 (310-264651-5). Elevated reporting limits (RLs) are provided.

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

Metals

Method 6020B: The low level check standard recovery associated with batch 310-400784 is outside the acceptance criteria for the following analyte(s): Antimony.

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

General Chemistry

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

Narrative

**Job Narrative
310-264651-2**

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Case Narrative

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Job ID: 310-264651-1 (Continued)

Laboratory: Eurofins Cedar Falls (Continued)

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method. Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The samples were received on 9/13/2023 9:10 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 3.4°C and 5.8°C

Gas Flow Proportional Counter

Method 9315_Ra226: Radium-226 batch 628685 Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW13R-GW-0923 (310-264651-1), MW13R-GW-0923 (310-264651-1[MS]), MW13R-GW-0923 (310-264651-1[MSD]), MW27-GW-0923 (310-264651-2), MW29R-GW-0923 (310-264651-3), MW223S-GW-0923 (310-264651-4), DP01-GW-0923 (310-264651-5), (LCS 160-628685/2-A) and (MB 160-628685/1-A)

Method 9320_Ra228: Radium-228 batch 628686 Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW13R-GW-0923 (310-264651-1), MW13R-GW-0923 (310-264651-1[MS]), MW13R-GW-0923 (310-264651-1[MSD]), MW27-GW-0923 (310-264651-2), MW29R-GW-0923 (310-264651-3), MW223S-GW-0923 (310-264651-4), DP01-GW-0923 (310-264651-5), (LCS 160-628686/2-A) and (MB 160-628686/1-A)

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

Rad

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

Narrative

Job Narrative 310-264651-3

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method. Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The samples were received on 9/13/2023 9:10 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 3.4°C and 5.8°C

HPLC/IC

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

Sample Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-264651-1	MW13R-GW-0923	Water	09/12/23 13:15	09/13/23 09:10
310-264651-2	MW27-GW-0923	Water	09/12/23 14:35	09/13/23 09:10
310-264651-3	MW29R-GW-0923	Water	09/12/23 11:00	09/13/23 09:10
310-264651-4	MW223S-GW-0923	Water	09/12/23 16:20	09/13/23 09:10
310-264651-5	DP01-GW-0923	Water	09/12/23 00:00	09/13/23 09:10

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Client Sample ID: MW13R-GW-0923

Lab Sample ID: 310-264651-1

Date Collected: 09/12/23 13:15

Matrix: Water

Date Received: 09/13/23 09:10

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	12.3		5.00		mg/L			09/19/23 22:08	5
Fluoride	<1.00		1.00		mg/L			09/19/23 22:08	5
Sulfate	58.6		5.00		mg/L			09/19/23 22:08	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	F1 F2	0.00200		mg/L		09/15/23 09:30	09/26/23 21:07	1
Arsenic	0.0483	F1	0.00200		mg/L		09/15/23 09:30	09/26/23 21:07	1
Barium	0.210	F1	0.00200		mg/L		09/15/23 09:30	09/26/23 21:07	1
Beryllium	<0.00100	F1 F2	0.00100		mg/L		09/15/23 09:30	09/26/23 21:07	1
Cadmium	<0.000200	F1 F2	0.000200		mg/L		09/15/23 09:30	09/26/23 21:07	1
Chromium	<0.00500	F1 F2	0.00500		mg/L		09/15/23 09:30	09/26/23 21:07	1
Cobalt	0.000806	F1 F2	0.000500		mg/L		09/15/23 09:30	09/26/23 21:07	1
Lithium	0.0880	F1	0.0100		mg/L		09/15/23 09:30	09/26/23 21:07	1
Lead	<0.000500	F1 F2	0.000500		mg/L		09/15/23 09:30	09/26/23 21:07	1
Molybdenum	0.00411	F1 F2	0.00200		mg/L		09/15/23 09:30	09/26/23 21:07	1
Selenium	<0.00500	F1 F2	0.00500		mg/L		09/15/23 09:30	09/26/23 21:07	1
Thallium	<0.00100		0.00100		mg/L		09/15/23 09:30	09/26/23 21:07	1
Calcium	135		0.500		mg/L		09/15/23 09:30	09/26/23 21:07	1
Boron	0.122	F1	0.100		mg/L		09/15/23 09:30	09/26/23 21:07	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/20/23 10:48	09/21/23 11:09	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	542		50.0		mg/L			09/14/23 15:18	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.2	HF	1.0		SU			09/13/23 12:27	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.293		0.118	0.121	1.00	0.134	pCi/L	09/19/23 10:13	10/12/23 09:16	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.1		30 - 110					09/19/23 10:13	10/12/23 09:16	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.703		0.370	0.375	1.00	0.511	pCi/L	09/19/23 10:17	10/06/23 11:39	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.1		30 - 110					09/19/23 10:17	10/06/23 11:39	1
Y Carrier	80.7		30 - 110					09/19/23 10:17	10/06/23 11:39	1

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Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Client Sample ID: MW13R-GW-0923

Lab Sample ID: 310-264651-1

Date Collected: 09/12/23 13:15

Matrix: Water

Date Received: 09/13/23 09:10

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.996		0.388	0.394	5.00	0.511	pCi/L		10/12/23 14:53	1

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Client Sample ID: MW27-GW-0923

Lab Sample ID: 310-264651-2

Date Collected: 09/12/23 14:35

Matrix: Water

Date Received: 09/13/23 09:10

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	13.9		5.00		mg/L			09/19/23 22:44	5
Fluoride	<1.00		1.00		mg/L			09/19/23 22:44	5
Sulfate	97.1		5.00		mg/L			09/19/23 22:44	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/15/23 09:30	09/26/23 21:14	1
Arsenic	0.0616		0.00200		mg/L		09/15/23 09:30	09/22/23 22:38	1
Barium	0.164		0.00200		mg/L		09/15/23 09:30	09/26/23 21:14	1
Beryllium	<0.00100		0.00100		mg/L		09/15/23 09:30	09/26/23 21:14	1
Cadmium	0.000207		0.000200		mg/L		09/15/23 09:30	09/22/23 22:38	1
Chromium	<0.00500		0.00500		mg/L		09/15/23 09:30	09/22/23 22:38	1
Cobalt	0.000978		0.000500		mg/L		09/15/23 09:30	09/22/23 22:38	1
Lithium	0.113		0.0100		mg/L		09/15/23 09:30	09/26/23 21:14	1
Lead	0.000513		0.000500		mg/L		09/15/23 09:30	09/26/23 21:14	1
Molybdenum	0.00284		0.00200		mg/L		09/15/23 09:30	09/26/23 21:14	1
Selenium	<0.00500		0.00500		mg/L		09/15/23 09:30	09/22/23 22:38	1
Thallium	<0.00100		0.00100		mg/L		11/13/23 09:45	11/14/23 00:00	1
Calcium	169		0.500		mg/L		09/15/23 09:30	09/26/23 21:14	1
Boron	0.222		0.100		mg/L		09/15/23 09:30	09/26/23 21:14	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/20/23 10:48	09/21/23 11:15	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	716		50.0		mg/L			09/14/23 15:18	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.1	HF	1.0		SU			09/13/23 12:29	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.265		0.119	0.121	1.00	0.140	pCi/L	09/19/23 10:13	10/12/23 09:16	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.8		30 - 110					09/19/23 10:13	10/12/23 09:16	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.20		0.474	0.487	1.00	0.606	pCi/L	09/19/23 10:17	10/06/23 11:39	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.8		30 - 110					09/19/23 10:17	10/06/23 11:39	1
Y Carrier	80.4		30 - 110					09/19/23 10:17	10/06/23 11:39	1

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Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Client Sample ID: MW27-GW-0923

Lab Sample ID: 310-264651-2

Date Collected: 09/12/23 14:35

Matrix: Water

Date Received: 09/13/23 09:10

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.46		0.489	0.502	5.00	0.606	pCi/L		10/12/23 14:53	1

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Client Sample ID: MW29R-GW-0923

Lab Sample ID: 310-264651-3

Date Collected: 09/12/23 11:00

Matrix: Water

Date Received: 09/13/23 09:10

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	10.8		5.00		mg/L			09/19/23 22:56	5
Fluoride	<1.00		1.00		mg/L			09/19/23 22:56	5
Sulfate	205		5.00		mg/L			09/19/23 22:56	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/15/23 09:30	09/26/23 21:16	1
Arsenic	0.0233		0.00200		mg/L		09/15/23 09:30	09/22/23 22:41	1
Barium	0.248		0.00200		mg/L		09/15/23 09:30	09/26/23 21:16	1
Beryllium	<0.00100		0.00100		mg/L		09/15/23 09:30	09/26/23 21:16	1
Cadmium	<0.000200		0.000200		mg/L		09/15/23 09:30	09/22/23 22:41	1
Chromium	<0.00500		0.00500		mg/L		09/15/23 09:30	09/22/23 22:41	1
Cobalt	0.00270		0.000500		mg/L		09/15/23 09:30	09/22/23 22:41	1
Lithium	0.118		0.0100		mg/L		09/15/23 09:30	09/26/23 21:16	1
Lead	<0.000500		0.000500		mg/L		09/15/23 09:30	09/26/23 21:16	1
Molybdenum	0.00205		0.00200		mg/L		09/15/23 09:30	09/26/23 21:16	1
Selenium	<0.00500		0.00500		mg/L		09/15/23 09:30	09/22/23 22:41	1
Thallium	<0.00100		0.00100		mg/L		09/15/23 09:30	09/26/23 21:16	1
Calcium	222		0.500		mg/L		09/15/23 09:30	09/26/23 21:16	1
Boron	0.184		0.100		mg/L		09/15/23 09:30	09/26/23 21:16	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/18/23 10:53	09/19/23 12:58	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	906		50.0		mg/L			09/15/23 15:00	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.0	HF	1.0		SU			09/13/23 12:30	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.312		0.124	0.127	1.00	0.139	pCi/L	09/19/23 10:13	10/12/23 09:16	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.2		30 - 110					09/19/23 10:13	10/12/23 09:16	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.841		0.431	0.438	1.00	0.603	pCi/L	09/19/23 10:17	10/06/23 11:39	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.2		30 - 110					09/19/23 10:17	10/06/23 11:39	1
Y Carrier	78.5		30 - 110					09/19/23 10:17	10/06/23 11:39	1

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Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Client Sample ID: MW29R-GW-0923

Lab Sample ID: 310-264651-3

Date Collected: 09/12/23 11:00

Matrix: Water

Date Received: 09/13/23 09:10

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.15		0.448	0.456	5.00	0.603	pCi/L		10/12/23 14:53	1

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Client Sample ID: MW223S-GW-0923

Lab Sample ID: 310-264651-4

Date Collected: 09/12/23 16:20

Matrix: Water

Date Received: 09/13/23 09:10

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4.37		1.00		mg/L			09/13/23 12:49	1
Nitrate as N	<0.200		0.200		mg/L			09/13/23 12:49	1
Fluoride	<0.200		0.200		mg/L			09/13/23 12:49	1
Sulfate	64.3		1.00		mg/L			09/13/23 12:49	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/15/23 09:30	09/26/23 21:18	1
Arsenic	0.0133		0.00200		mg/L		09/15/23 09:30	09/22/23 22:59	1
Barium	0.256		0.00200		mg/L		09/15/23 09:30	09/26/23 21:18	1
Beryllium	<0.00100		0.00100		mg/L		09/15/23 09:30	09/26/23 21:18	1
Cadmium	<0.000200		0.000200		mg/L		09/15/23 09:30	09/22/23 22:59	1
Chromium	<0.00500		0.00500		mg/L		09/15/23 09:30	09/26/23 21:18	1
Cobalt	0.000667		0.000500		mg/L		09/15/23 09:30	09/22/23 22:59	1
Lithium	0.0517		0.0100		mg/L		09/15/23 09:30	09/26/23 21:18	1
Lead	<0.000500		0.000500		mg/L		09/15/23 09:30	09/26/23 21:18	1
Molybdenum	0.00305		0.00200		mg/L		09/15/23 09:30	09/26/23 21:18	1
Selenium	<0.00500		0.00500		mg/L		09/15/23 09:30	09/22/23 22:59	1
Thallium	<0.00100		0.00100		mg/L		09/15/23 09:30	09/26/23 21:18	1
Calcium	126		0.500		mg/L		09/15/23 09:30	09/26/23 21:18	1
Boron	0.149		0.100		mg/L		09/15/23 09:30	09/26/23 21:18	1
Iron	2.96		0.100		mg/L		09/15/23 09:30	09/22/23 22:59	1
Manganese	2.59		0.0100		mg/L		09/15/23 09:30	09/22/23 22:59	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	2.72		0.100		mg/L		10/02/23 09:45	10/03/23 22:03	1
Manganese	2.75		0.0100		mg/L		10/02/23 09:45	10/03/23 22:03	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/18/23 10:53	09/19/23 13:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Quad (SW846 9060A)	2.32		1.00		mg/L			09/27/23 02:13	1
Total Dissolved Solids (SM 2540C)	474		50.0		mg/L			09/15/23 15:00	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.5	HF	1.0		SU			09/13/23 12:31	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.293		0.119	0.122	1.00	0.133	pCi/L	09/19/23 10:13	10/12/23 09:16	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.7		30 - 110					09/19/23 10:13	10/12/23 09:16	1

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Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Client Sample ID: MW223S-GW-0923

Lab Sample ID: 310-264651-4

Date Collected: 09/12/23 16:20

Matrix: Water

Date Received: 09/13/23 09:10

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.855		0.413	0.421	1.00	0.563	pCi/L	09/19/23 10:17	10/06/23 11:39	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.7		30 - 110					09/19/23 10:17	10/06/23 11:39	1
Y Carrier	79.3		30 - 110					09/19/23 10:17	10/06/23 11:39	1

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.15		0.430	0.438	5.00	0.563	pCi/L		10/12/23 14:53	1

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Client Sample ID: DP01-GW-0923

Lab Sample ID: 310-264651-5

Date Collected: 09/12/23 00:00

Matrix: Water

Date Received: 09/13/23 09:10

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5.00		5.00		mg/L			09/19/23 23:08	5
Fluoride	<1.00		1.00		mg/L			09/19/23 23:08	5
Sulfate	61.1		5.00		mg/L			09/19/23 23:08	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/15/23 09:30	09/26/23 21:20	1
Arsenic	0.0132		0.00200		mg/L		09/15/23 09:30	09/22/23 23:02	1
Barium	0.244		0.00200		mg/L		09/15/23 09:30	09/26/23 21:20	1
Beryllium	<0.00100		0.00100		mg/L		09/15/23 09:30	09/26/23 21:20	1
Cadmium	<0.000200		0.000200		mg/L		09/15/23 09:30	09/22/23 23:02	1
Chromium	<0.00500		0.00500		mg/L		09/15/23 09:30	09/26/23 21:20	1
Cobalt	0.000638		0.000500		mg/L		09/15/23 09:30	09/22/23 23:02	1
Lithium	0.0504		0.0100		mg/L		09/15/23 09:30	09/26/23 21:20	1
Lead	<0.000500		0.000500		mg/L		09/15/23 09:30	09/26/23 21:20	1
Molybdenum	0.00291		0.00200		mg/L		09/15/23 09:30	09/26/23 21:20	1
Selenium	<0.00500		0.00500		mg/L		09/15/23 09:30	09/22/23 23:02	1
Thallium	<0.00100		0.00100		mg/L		09/15/23 09:30	09/26/23 21:20	1
Calcium	122		0.500		mg/L		09/15/23 09:30	09/26/23 21:20	1
Boron	0.154		0.100		mg/L		09/15/23 09:30	09/26/23 21:20	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/18/23 10:53	09/19/23 13:02	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	456		50.0		mg/L			09/15/23 15:00	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.4	HF	1.0		SU			09/13/23 12:32	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.377		0.124	0.128	1.00	0.121	pCi/L	09/19/23 10:13	10/12/23 09:16	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.7		30 - 110					09/19/23 10:13	10/12/23 09:16	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.418	U	0.429	0.431	1.00	0.697	pCi/L	09/19/23 10:17	10/06/23 11:40	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.7		30 - 110					09/19/23 10:17	10/06/23 11:40	1
Y Carrier	80.4		30 - 110					09/19/23 10:17	10/06/23 11:40	1

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Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Client Sample ID: DP01-GW-0923

Lab Sample ID: 310-264651-5

Date Collected: 09/12/23 00:00

Matrix: Water

Date Received: 09/13/23 09:10

Method: TAL-STL Ra226_Ra228 - Combined Radium-226 and Radium-228

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.795		0.447	0.450	5.00	0.697	pCi/L		10/12/23 14:53	1

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
E	Result exceeded calibration range.
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits

General Chemistry

Qualifier	Qualifier Description
HF	Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-399707/3

Matrix: Water

Analysis Batch: 399707

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			09/13/23 09:59	1
Fluoride	<0.200		0.200		mg/L			09/13/23 09:59	1
Sulfate	<1.00		1.00		mg/L			09/13/23 09:59	1

Lab Sample ID: LCS 310-399707/4

Matrix: Water

Analysis Batch: 399707

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.881		mg/L		99	90 - 110
Fluoride	2.00	2.025		mg/L		101	90 - 110
Sulfate	10.0	10.10		mg/L		101	90 - 110

Lab Sample ID: MB 310-400119/3

Matrix: Water

Analysis Batch: 400119

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			09/19/23 21:19	1
Fluoride	<0.200		0.200		mg/L			09/19/23 21:19	1
Sulfate	<1.00		1.00		mg/L			09/19/23 21:19	1

Lab Sample ID: LCS 310-400119/4

Matrix: Water

Analysis Batch: 400119

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.771		mg/L		98	90 - 110
Fluoride	2.00	1.941		mg/L		97	90 - 110
Sulfate	10.0	10.20		mg/L		102	90 - 110

Lab Sample ID: 310-264651-1 MS

Matrix: Water

Analysis Batch: 400119

Client Sample ID: MW13R-GW-0923

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	12.3		25.0	33.95		mg/L		86	80 - 120
Fluoride	<1.00		5.00	4.804		mg/L		96	80 - 120
Sulfate	58.6		25.0	82.25		mg/L		95	80 - 120

Lab Sample ID: 310-264651-1 MSD

Matrix: Water

Analysis Batch: 400119

Client Sample ID: MW13R-GW-0923

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	12.3		25.0	33.90		mg/L		86	80 - 120	0	15
Fluoride	<1.00		5.00	4.829		mg/L		97	80 - 120	1	15
Sulfate	58.6		25.0	81.57		mg/L		92	80 - 120	1	15

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QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-399610/1-A

Matrix: Water

Analysis Batch: 400784

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 399610

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/15/23 09:30	09/26/23 20:49	1
Arsenic	<0.00200		0.00200		mg/L		09/15/23 09:30	09/26/23 20:49	1
Barium	<0.00200		0.00200		mg/L		09/15/23 09:30	09/26/23 20:49	1
Beryllium	<0.00100		0.00100		mg/L		09/15/23 09:30	09/26/23 20:49	1
Cadmium	<0.000200		0.000200		mg/L		09/15/23 09:30	09/26/23 20:49	1
Chromium	<0.00500		0.00500		mg/L		09/15/23 09:30	09/26/23 20:49	1
Cobalt	<0.000500		0.000500		mg/L		09/15/23 09:30	09/26/23 20:49	1
Lithium	<0.0100		0.0100		mg/L		09/15/23 09:30	09/26/23 20:49	1
Lead	<0.000500		0.000500		mg/L		09/15/23 09:30	09/26/23 20:49	1
Molybdenum	<0.00200		0.00200		mg/L		09/15/23 09:30	09/26/23 20:49	1
Selenium	<0.00500		0.00500		mg/L		09/15/23 09:30	09/26/23 20:49	1
Thallium	<0.00100		0.00100		mg/L		09/15/23 09:30	09/26/23 20:49	1
Calcium	<0.500		0.500		mg/L		09/15/23 09:30	09/26/23 20:49	1
Boron	<0.100		0.100		mg/L		09/15/23 09:30	09/26/23 20:49	1

Lab Sample ID: LCS 310-399610/2-A

Matrix: Water

Analysis Batch: 400784

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 399610

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	0.200	0.2391		mg/L		120	80 - 120
Arsenic	0.200	0.2243		mg/L		112	80 - 120
Barium	0.100	0.1149		mg/L		115	80 - 120
Beryllium	0.100	0.1161		mg/L		116	80 - 120
Cadmium	0.100	0.1121		mg/L		112	80 - 120
Chromium	0.100	0.1166		mg/L		117	80 - 120
Cobalt	0.100	0.1184		mg/L		118	80 - 120
Lithium	0.200	0.2330		mg/L		117	80 - 120
Lead	0.200	0.2227		mg/L		111	80 - 120
Molybdenum	0.200	0.2212		mg/L		111	80 - 120
Selenium	0.400	0.4386		mg/L		110	80 - 120
Thallium	0.200	0.1801		mg/L		90	80 - 120
Calcium	2.00	1.965		mg/L		98	80 - 120
Boron	0.200	0.2280		mg/L		114	80 - 120

Lab Sample ID: 310-264651-1 MS

Matrix: Water

Analysis Batch: 400784

Client Sample ID: MW13R-GW-0923

Prep Type: Total/NA

Prep Batch: 399610

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	<0.00200	F1 F2	0.200	0.4290	F1	mg/L		214	75 - 125
Arsenic	0.0483	F1	0.200	0.3840	F1	mg/L		168	75 - 125
Barium	0.210	F1	0.100	0.3691	F1	mg/L		159	75 - 125
Beryllium	<0.00100	F1 F2	0.100	0.1728	F1	mg/L		173	75 - 125
Cadmium	<0.000200	F1 F2	0.100	0.1651	F1	mg/L		165	75 - 125
Chromium	<0.00500	F1 F2	0.100	0.1706	F1	mg/L		171	75 - 125
Cobalt	0.000806	F1 F2	0.100	0.1714	F1	mg/L		171	75 - 125
Lithium	0.0880	F1	0.200	0.4377	F1	mg/L		175	75 - 125
Lead	<0.000500	F1 F2	0.200	0.3532	F1	mg/L		177	75 - 125

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QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 310-264651-1 MS

Matrix: Water

Analysis Batch: 400784

Client Sample ID: MW13R-GW-0923

Prep Type: Total/NA

Prep Batch: 399610

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Molybdenum	0.00411	F1 F2	0.200	0.3442	F1	mg/L		170	75 - 125
Selenium	<0.00500	F1 F2	0.400	0.6631	E F1	mg/L		166	75 - 125
Thallium	<0.00100		0.200	0.2458		mg/L		123	75 - 125
Calcium	135		2.00	135.5	4	mg/L		48	75 - 125
Boron	0.122	F1	0.200	0.4459	F1	mg/L		162	75 - 125

Lab Sample ID: 310-264651-1 MSD

Matrix: Water

Analysis Batch: 400784

Client Sample ID: MW13R-GW-0923

Prep Type: Total/NA

Prep Batch: 399610

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Antimony	<0.00200	F1 F2	0.200	0.2969	F1 F2	mg/L		148	75 - 125	36	20
Arsenic	0.0483	F1	0.200	0.3157	F1	mg/L		134	75 - 125	20	20
Barium	0.210	F1	0.100	0.3459	F1	mg/L		136	75 - 125	7	20
Beryllium	<0.00100	F1 F2	0.100	0.1375	F1 F2	mg/L		137	75 - 125	23	20
Cadmium	<0.000200	F1 F2	0.100	0.1315	F1 F2	mg/L		131	75 - 125	23	20
Chromium	<0.00500	F1 F2	0.100	0.1351	F1 F2	mg/L		135	75 - 125	23	20
Cobalt	0.000806	F1 F2	0.100	0.1350	F1 F2	mg/L		134	75 - 125	24	20
Lithium	0.0880	F1	0.200	0.3621	F1	mg/L		137	75 - 125	19	20
Lead	<0.000500	F1 F2	0.200	0.2688	F1 F2	mg/L		134	75 - 125	27	20
Molybdenum	0.00411	F1 F2	0.200	0.2757	F1 F2	mg/L		136	75 - 125	22	20
Selenium	<0.00500	F1 F2	0.400	0.5279	E F1 F2	mg/L		132	75 - 125	23	20
Thallium	<0.00100		0.200	0.2029		mg/L		101	75 - 125	19	20
Calcium	135		2.00	136.1	4	mg/L		77	75 - 125	0	20
Boron	0.122	F1	0.200	0.3866	F1	mg/L		132	75 - 125	14	20

Lab Sample ID: MB 310-400959/1-A

Matrix: Water

Analysis Batch: 401411

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 400959

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<0.100		0.100		mg/L		10/02/23 09:45	10/03/23 20:55	1
Manganese	<0.0100		0.0100		mg/L		10/02/23 09:45	10/03/23 20:55	1

Lab Sample ID: LCS 310-400959/2-A

Matrix: Water

Analysis Batch: 401411

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 400959

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	0.200	0.1934		mg/L		97	80 - 120
Manganese	0.100	0.09122		mg/L		91	80 - 120

Lab Sample ID: MB 310-405697/1-A

Matrix: Water

Analysis Batch: 405899

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 405697

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	<0.00100		0.00100		mg/L		11/13/23 09:45	11/14/23 00:25	1
Calcium	<0.500		0.500		mg/L		11/13/23 09:45	11/14/23 00:25	1
Boron	<0.100		0.100		mg/L		11/13/23 09:45	11/14/23 00:25	1

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QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: LCS 310-405697/2-A
Matrix: Water
Analysis Batch: 405898

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405697

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Calcium	2.00	1.838		mg/L		92	80 - 120
Boron	0.200	0.1906		mg/L		95	80 - 120

Lab Sample ID: LCS 310-405697/2-A
Matrix: Water
Analysis Batch: 405899

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405697

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Thallium	0.200	0.1832		mg/L		92	80 - 120
Calcium	2.00	1.771		mg/L		89	80 - 120
Boron	0.200	0.2020		mg/L		101	80 - 120

Lab Sample ID: 310-264651-2 DU
Matrix: Water
Analysis Batch: 405898

Client Sample ID: MW27-GW-0923
Prep Type: Total/NA
Prep Batch: 405697

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Thallium	<0.00100		<0.00100		mg/L		NC	20
Calcium	157		155.5		mg/L		1	20
Boron	0.228		0.2200		mg/L		4	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-399842/1-A
Matrix: Water
Analysis Batch: 399998

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 399842

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/18/23 10:52	09/19/23 12:04	1

Lab Sample ID: LCS 310-399842/2-A
Matrix: Water
Analysis Batch: 399998

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 399842

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001626		mg/L		98	80 - 120

Lab Sample ID: MB 310-400098/1-A
Matrix: Water
Analysis Batch: 400261

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 400098

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/20/23 10:48	09/21/23 10:43	1

Lab Sample ID: LCS 310-400098/2-A
Matrix: Water
Analysis Batch: 400261

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 400098

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001646		mg/L		99	80 - 120

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QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: 310-264651-1 MS

Matrix: Water

Analysis Batch: 400261

Client Sample ID: MW13R-GW-0923

Prep Type: Total/NA

Prep Batch: 400098

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits	
Mercury	<0.000200		0.00167	0.001686		mg/L		101	80 - 120	

Lab Sample ID: 310-264651-1 MSD

Matrix: Water

Analysis Batch: 400261

Client Sample ID: MW13R-GW-0923

Prep Type: Total/NA

Prep Batch: 400098

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Mercury	<0.000200		0.00167	0.001764		mg/L		106	80 - 120	5	20

Method: 9060A - Organic Carbon, Total (TOC)

Lab Sample ID: MB 500-734239/6

Matrix: Water

Analysis Batch: 734239

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Quad	<1.00		1.00		mg/L			09/26/23 16:43	1

Lab Sample ID: LCS 500-734239/7

Matrix: Water

Analysis Batch: 734239

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits	
Total Organic Carbon - Quad	50.0	49.64		mg/L		99	86 - 116	

Lab Sample ID: 310-264651-4 MS

Matrix: Water

Analysis Batch: 734239

Client Sample ID: MW223S-GW-0923

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits	
Total Organic Carbon - Quad	2.32		50.0	51.74		mg/L		99	75 - 125	

Lab Sample ID: 310-264651-4 MSD

Matrix: Water

Analysis Batch: 734239

Client Sample ID: MW223S-GW-0923

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Total Organic Carbon - Quad	2.32		50.0	51.75		mg/L		99	75 - 125	0	20

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 310-399601/1

Matrix: Water

Analysis Batch: 399601

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			09/14/23 15:18	1

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QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: LCS 310-399601/2

Matrix: Water

Analysis Batch: 399601

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	976.0		mg/L		98	90 - 110

Lab Sample ID: 310-264651-1 DU

Matrix: Water

Analysis Batch: 399601

Client Sample ID: MW13R-GW-0923

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	542		534.0		mg/L		1	20

Lab Sample ID: MB 310-399731/1

Matrix: Water

Analysis Batch: 399731

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			09/15/23 15:00	1

Lab Sample ID: LCS 310-399731/2

Matrix: Water

Analysis Batch: 399731

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	986.0		mg/L		99	90 - 110

Lab Sample ID: 310-264651-3 DU

Matrix: Water

Analysis Batch: 399731

Client Sample ID: MW29R-GW-0923

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	906		886.0		mg/L		2	20

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-399444/1

Matrix: Water

Analysis Batch: 399444

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
pH	7.00	7.0		SU		100	98 - 102

Lab Sample ID: 310-264651-1 DU

Matrix: Water

Analysis Batch: 399444

Client Sample ID: MW13R-GW-0923

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.2	HF	7.2		SU		0.1	20

Eurofins Cedar Falls

QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-628685/1-A

Matrix: Water

Analysis Batch: 631441

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 628685

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.009616	U	0.0482	0.0482	1.00	0.0995	pCi/L	09/19/23 10:13	10/11/23 18:56	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	92.7		30 - 110					09/19/23 10:13	10/11/23 18:56	1

Lab Sample ID: LCS 160-628685/2-A

Matrix: Water

Analysis Batch: 631441

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 628685

Analyte		Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-226		11.3	10.42		1.12	1.00	0.130	pCi/L	92	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits							
Ba Carrier	92.4		30 - 110							

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-628686/1-A

Matrix: Water

Analysis Batch: 631028

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 628686

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.4081	U	0.339	0.341	1.00	0.529	pCi/L	09/19/23 10:17	10/06/23 11:35	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	92.7		30 - 110					09/19/23 10:17	10/06/23 11:35	1
Y Carrier	82.6		30 - 110					09/19/23 10:17	10/06/23 11:35	1

Lab Sample ID: LCS 160-628686/2-A

Matrix: Water

Analysis Batch: 631028

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 628686

Analyte		Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-228		7.82	8.773		1.23	1.00	0.468	pCi/L	112	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits							
Ba Carrier	92.4		30 - 110							
Y Carrier	80.7		30 - 110							

Eurofins Cedar Falls

QC Association Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

HPLC/IC

Analysis Batch: 399707

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-4	MW223S-GW-0923	Total/NA	Water	9056A	
MB 310-399707/3	Method Blank	Total/NA	Water	9056A	
LCS 310-399707/4	Lab Control Sample	Total/NA	Water	9056A	

Analysis Batch: 400119

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-1	MW13R-GW-0923	Total/NA	Water	9056A	
310-264651-2	MW27-GW-0923	Total/NA	Water	9056A	
310-264651-3	MW29R-GW-0923	Total/NA	Water	9056A	
310-264651-5	DP01-GW-0923	Total/NA	Water	9056A	
MB 310-400119/3	Method Blank	Total/NA	Water	9056A	
LCS 310-400119/4	Lab Control Sample	Total/NA	Water	9056A	
310-264651-1 MS	MW13R-GW-0923	Total/NA	Water	9056A	
310-264651-1 MSD	MW13R-GW-0923	Total/NA	Water	9056A	

Metals

Prep Batch: 399610

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-1	MW13R-GW-0923	Total/NA	Water	3005A	
310-264651-2	MW27-GW-0923	Total/NA	Water	3005A	
310-264651-3	MW29R-GW-0923	Total/NA	Water	3005A	
310-264651-4	MW223S-GW-0923	Total/NA	Water	3005A	
310-264651-5	DP01-GW-0923	Total/NA	Water	3005A	
MB 310-399610/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-399610/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-264651-1 MS	MW13R-GW-0923	Total/NA	Water	3005A	
310-264651-1 MSD	MW13R-GW-0923	Total/NA	Water	3005A	

Prep Batch: 399842

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-3	MW29R-GW-0923	Total/NA	Water	7470A	
310-264651-4	MW223S-GW-0923	Total/NA	Water	7470A	
310-264651-5	DP01-GW-0923	Total/NA	Water	7470A	
MB 310-399842/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-399842/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 399998

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-3	MW29R-GW-0923	Total/NA	Water	7470A	399842
310-264651-4	MW223S-GW-0923	Total/NA	Water	7470A	399842
310-264651-5	DP01-GW-0923	Total/NA	Water	7470A	399842
MB 310-399842/1-A	Method Blank	Total/NA	Water	7470A	399842
LCS 310-399842/2-A	Lab Control Sample	Total/NA	Water	7470A	399842

Prep Batch: 400098

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-1	MW13R-GW-0923	Total/NA	Water	7470A	
310-264651-2	MW27-GW-0923	Total/NA	Water	7470A	
MB 310-400098/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-400098/2-A	Lab Control Sample	Total/NA	Water	7470A	

Eurofins Cedar Falls

QC Association Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Metals (Continued)

Prep Batch: 400098 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-1 MS	MW13R-GW-0923	Total/NA	Water	7470A	
310-264651-1 MSD	MW13R-GW-0923	Total/NA	Water	7470A	

Analysis Batch: 400261

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-1	MW13R-GW-0923	Total/NA	Water	7470A	400098
310-264651-2	MW27-GW-0923	Total/NA	Water	7470A	400098
MB 310-400098/1-A	Method Blank	Total/NA	Water	7470A	400098
LCS 310-400098/2-A	Lab Control Sample	Total/NA	Water	7470A	400098
310-264651-1 MS	MW13R-GW-0923	Total/NA	Water	7470A	400098
310-264651-1 MSD	MW13R-GW-0923	Total/NA	Water	7470A	400098

Analysis Batch: 400466

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-2	MW27-GW-0923	Total/NA	Water	6020B	399610
310-264651-3	MW29R-GW-0923	Total/NA	Water	6020B	399610
310-264651-4	MW223S-GW-0923	Total/NA	Water	6020B	399610
310-264651-5	DP01-GW-0923	Total/NA	Water	6020B	399610

Analysis Batch: 400784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-1	MW13R-GW-0923	Total/NA	Water	6020B	399610
310-264651-2	MW27-GW-0923	Total/NA	Water	6020B	399610
310-264651-3	MW29R-GW-0923	Total/NA	Water	6020B	399610
310-264651-4	MW223S-GW-0923	Total/NA	Water	6020B	399610
310-264651-5	DP01-GW-0923	Total/NA	Water	6020B	399610
MB 310-399610/1-A	Method Blank	Total/NA	Water	6020B	399610
LCS 310-399610/2-A	Lab Control Sample	Total/NA	Water	6020B	399610
310-264651-1 MS	MW13R-GW-0923	Total/NA	Water	6020B	399610
310-264651-1 MSD	MW13R-GW-0923	Total/NA	Water	6020B	399610

Prep Batch: 400959

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-4	MW223S-GW-0923	Dissolved	Water	3005A	
MB 310-400959/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-400959/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 401411

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-4	MW223S-GW-0923	Dissolved	Water	6020B	400959
MB 310-400959/1-A	Method Blank	Total/NA	Water	6020B	400959
LCS 310-400959/2-A	Lab Control Sample	Total/NA	Water	6020B	400959

Prep Batch: 405697

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-2	MW27-GW-0923	Total/NA	Water	3005A	
MB 310-405697/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-405697/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-264651-2 DU	MW27-GW-0923	Total/NA	Water	3005A	

Eurofins Cedar Falls

QC Association Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Metals

Analysis Batch: 405898

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-2	MW27-GW-0923	Total/NA	Water	6020B	405697
LCS 310-405697/2-A	Lab Control Sample	Total/NA	Water	6020B	405697
310-264651-2 DU	MW27-GW-0923	Total/NA	Water	6020B	405697

Analysis Batch: 405899

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-405697/1-A	Method Blank	Total/NA	Water	6020B	405697
LCS 310-405697/2-A	Lab Control Sample	Total/NA	Water	6020B	405697

General Chemistry

Analysis Batch: 399444

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-1	MW13R-GW-0923	Total/NA	Water	SM 4500 H+ B	
310-264651-2	MW27-GW-0923	Total/NA	Water	SM 4500 H+ B	
310-264651-3	MW29R-GW-0923	Total/NA	Water	SM 4500 H+ B	
310-264651-4	MW223S-GW-0923	Total/NA	Water	SM 4500 H+ B	
310-264651-5	DP01-GW-0923	Total/NA	Water	SM 4500 H+ B	
LCS 310-399444/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-264651-1 DU	MW13R-GW-0923	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 399601

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-1	MW13R-GW-0923	Total/NA	Water	SM 2540C	
310-264651-2	MW27-GW-0923	Total/NA	Water	SM 2540C	
MB 310-399601/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-399601/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-264651-1 DU	MW13R-GW-0923	Total/NA	Water	SM 2540C	

Analysis Batch: 399731

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-3	MW29R-GW-0923	Total/NA	Water	SM 2540C	
310-264651-4	MW223S-GW-0923	Total/NA	Water	SM 2540C	
310-264651-5	DP01-GW-0923	Total/NA	Water	SM 2540C	
MB 310-399731/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-399731/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-264651-3 DU	MW29R-GW-0923	Total/NA	Water	SM 2540C	

Analysis Batch: 734239

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-4	MW223S-GW-0923	Total/NA	Water	9060A	
MB 500-734239/6	Method Blank	Total/NA	Water	9060A	
LCS 500-734239/7	Lab Control Sample	Total/NA	Water	9060A	
310-264651-4 MS	MW223S-GW-0923	Total/NA	Water	9060A	
310-264651-4 MSD	MW223S-GW-0923	Total/NA	Water	9060A	

Rad

Prep Batch: 628685

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-1	MW13R-GW-0923	Total/NA	Water	PrecSep-21	
310-264651-2	MW27-GW-0923	Total/NA	Water	PrecSep-21	

Eurofins Cedar Falls

QC Association Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Rad (Continued)

Prep Batch: 628685 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-3	MW29R-GW-0923	Total/NA	Water	PrecSep-21	
310-264651-4	MW223S-GW-0923	Total/NA	Water	PrecSep-21	
310-264651-5	DP01-GW-0923	Total/NA	Water	PrecSep-21	
MB 160-628685/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-628685/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	

Prep Batch: 628686

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264651-1	MW13R-GW-0923	Total/NA	Water	PrecSep_0	
310-264651-2	MW27-GW-0923	Total/NA	Water	PrecSep_0	
310-264651-3	MW29R-GW-0923	Total/NA	Water	PrecSep_0	
310-264651-4	MW223S-GW-0923	Total/NA	Water	PrecSep_0	
310-264651-5	DP01-GW-0923	Total/NA	Water	PrecSep_0	
MB 160-628686/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-628686/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Client Sample ID: MW13R-GW-0923

Lab Sample ID: 310-264651-1

Date Collected: 09/12/23 13:15

Matrix: Water

Date Received: 09/13/23 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	400119	QTZ5	EET CF	09/19/23 22:08
Total/NA	Prep	3005A			399610	KCK5	EET CF	09/15/23 09:30
Total/NA	Analysis	6020B		1	400784	A6US	EET CF	09/26/23 21:07
Total/NA	Prep	7470A			400098	NFT2	EET CF	09/20/23 10:48
Total/NA	Analysis	7470A		1	400261	NFT2	EET CF	09/21/23 11:09
Total/NA	Analysis	SM 2540C		1	399601	ENB7	EET CF	09/14/23 15:18
Total/NA	Analysis	SM 4500 H+ B		1	399444	W9YR	EET CF	09/13/23 12:27
Total/NA	Prep	PrecSep-21			628685	KAC	EET SL	09/19/23 10:13
Total/NA	Analysis	9315		1	631770	FLC	EET SL	10/12/23 09:16
Total/NA	Prep	PrecSep_0			628686	KAC	EET SL	09/19/23 10:17
Total/NA	Analysis	9320		1	631026	FLC	EET SL	10/06/23 11:39
Total/NA	Analysis	Ra226_Ra228		1	631783	SCB	EET SL	10/12/23 14:53

Client Sample ID: MW27-GW-0923

Lab Sample ID: 310-264651-2

Date Collected: 09/12/23 14:35

Matrix: Water

Date Received: 09/13/23 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	400119	QTZ5	EET CF	09/19/23 22:44
Total/NA	Prep	3005A			399610	KCK5	EET CF	09/15/23 09:30
Total/NA	Analysis	6020B		1	400466	DHM5	EET CF	09/22/23 22:38
Total/NA	Prep	3005A			399610	KCK5	EET CF	09/15/23 09:30
Total/NA	Analysis	6020B		1	400784	A6US	EET CF	09/26/23 21:14
Total/NA	Prep	3005A			405697	DHM5	EET CF	11/13/23 09:45
Total/NA	Analysis	6020B		1	405898	A6US	EET CF	11/14/23 00:00
Total/NA	Prep	7470A			400098	NFT2	EET CF	09/20/23 10:48
Total/NA	Analysis	7470A		1	400261	NFT2	EET CF	09/21/23 11:15
Total/NA	Analysis	SM 2540C		1	399601	ENB7	EET CF	09/14/23 15:18
Total/NA	Analysis	SM 4500 H+ B		1	399444	W9YR	EET CF	09/13/23 12:29
Total/NA	Prep	PrecSep-21			628685	KAC	EET SL	09/19/23 10:13
Total/NA	Analysis	9315		1	631770	FLC	EET SL	10/12/23 09:16
Total/NA	Prep	PrecSep_0			628686	KAC	EET SL	09/19/23 10:17
Total/NA	Analysis	9320		1	631026	FLC	EET SL	10/06/23 11:39
Total/NA	Analysis	Ra226_Ra228		1	631783	SCB	EET SL	10/12/23 14:53

Client Sample ID: MW29R-GW-0923

Lab Sample ID: 310-264651-3

Date Collected: 09/12/23 11:00

Matrix: Water

Date Received: 09/13/23 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	400119	QTZ5	EET CF	09/19/23 22:56
Total/NA	Prep	3005A			399610	KCK5	EET CF	09/15/23 09:30
Total/NA	Analysis	6020B		1	400466	DHM5	EET CF	09/22/23 22:41

Eurofins Cedar Falls

Lab Chronicle

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Client Sample ID: MW29R-GW-0923

Lab Sample ID: 310-264651-3

Date Collected: 09/12/23 11:00

Matrix: Water

Date Received: 09/13/23 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			399610	KCK5	EET CF	09/15/23 09:30
Total/NA	Analysis	6020B		1	400784	A6US	EET CF	09/26/23 21:16
Total/NA	Prep	7470A			399842	NFT2	EET CF	09/18/23 10:53
Total/NA	Analysis	7470A		1	399998	NFT2	EET CF	09/19/23 12:58
Total/NA	Analysis	SM 2540C		1	399731	ENB7	EET CF	09/15/23 15:00
Total/NA	Analysis	SM 4500 H+ B		1	399444	W9YR	EET CF	09/13/23 12:30
Total/NA	Prep	PrecSep-21			628685	KAC	EET SL	09/19/23 10:13
Total/NA	Analysis	9315		1	631770	FLC	EET SL	10/12/23 09:16
Total/NA	Prep	PrecSep_0			628686	KAC	EET SL	09/19/23 10:17
Total/NA	Analysis	9320		1	631026	FLC	EET SL	10/06/23 11:39
Total/NA	Analysis	Ra226_Ra228		1	631783	SCB	EET SL	10/12/23 14:53

Client Sample ID: MW223S-GW-0923

Lab Sample ID: 310-264651-4

Date Collected: 09/12/23 16:20

Matrix: Water

Date Received: 09/13/23 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	399707	QTZ5	EET CF	09/13/23 12:49
Dissolved	Prep	3005A			400959	KCK5	EET CF	10/02/23 09:45
Dissolved	Analysis	6020B		1	401411	A6US	EET CF	10/03/23 22:03
Total/NA	Prep	3005A			399610	KCK5	EET CF	09/15/23 09:30
Total/NA	Analysis	6020B		1	400466	DHM5	EET CF	09/22/23 22:59
Total/NA	Prep	3005A			399610	KCK5	EET CF	09/15/23 09:30
Total/NA	Analysis	6020B		1	400784	A6US	EET CF	09/26/23 21:18
Total/NA	Prep	7470A			399842	NFT2	EET CF	09/18/23 10:53
Total/NA	Analysis	7470A		1	399998	NFT2	EET CF	09/19/23 13:00
Total/NA	Analysis	9060A		1	734239	AJP	EET CHI	09/27/23 02:13
Total/NA	Analysis	SM 2540C		1	399731	ENB7	EET CF	09/15/23 15:00
Total/NA	Analysis	SM 4500 H+ B		1	399444	W9YR	EET CF	09/13/23 12:31
Total/NA	Prep	PrecSep-21			628685	KAC	EET SL	09/19/23 10:13
Total/NA	Analysis	9315		1	631770	FLC	EET SL	10/12/23 09:16
Total/NA	Prep	PrecSep_0			628686	KAC	EET SL	09/19/23 10:17
Total/NA	Analysis	9320		1	631026	FLC	EET SL	10/06/23 11:39
Total/NA	Analysis	Ra226_Ra228		1	631783	SCB	EET SL	10/12/23 14:53

Client Sample ID: DP01-GW-0923

Lab Sample ID: 310-264651-5

Date Collected: 09/12/23 00:00

Matrix: Water

Date Received: 09/13/23 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	400119	QTZ5	EET CF	09/19/23 23:08
Total/NA	Prep	3005A			399610	KCK5	EET CF	09/15/23 09:30
Total/NA	Analysis	6020B		1	400466	DHM5	EET CF	09/22/23 23:02

Eurofins Cedar Falls

Lab Chronicle

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Client Sample ID: DP01-GW-0923

Lab Sample ID: 310-264651-5

Date Collected: 09/12/23 00:00

Matrix: Water

Date Received: 09/13/23 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			399610	KCK5	EET CF	09/15/23 09:30
Total/NA	Analysis	6020B		1	400784	A6US	EET CF	09/26/23 21:20
Total/NA	Prep	7470A			399842	NFT2	EET CF	09/18/23 10:53
Total/NA	Analysis	7470A		1	399998	NFT2	EET CF	09/19/23 13:02
Total/NA	Analysis	SM 2540C		1	399731	ENB7	EET CF	09/15/23 15:00
Total/NA	Analysis	SM 4500 H+ B		1	399444	W9YR	EET CF	09/13/23 12:32
Total/NA	Prep	PrecSep-21			628685	KAC	EET SL	09/19/23 10:13
Total/NA	Analysis	9315		1	631770	FLC	EET SL	10/12/23 09:16
Total/NA	Prep	PrecSep_0			628686	KAC	EET SL	09/19/23 10:17
Total/NA	Analysis	9320		1	631026	FLC	EET SL	10/06/23 11:40
Total/NA	Analysis	Ra226_Ra228		1	631783	SCB	EET SL	10/12/23 14:53

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	11-15-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
6020B	3005A	Water	Lithium

Laboratory: Eurofins Chicago

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2903	04-29-24
Georgia	State	N/A	04-29-24
Georgia (DW)	State	939	04-29-24
Hawaii	State	NA	04-29-24
Illinois	NELAP	IL00035	04-29-24
Indiana	State	C-IL-02	04-29-24
Iowa	State	082	05-01-24
Kansas	NELAP	E-10161	10-31-23
Kentucky (UST)	State	AI # 108083	04-29-24
Kentucky (WW)	State	KY90023	12-31-23
Louisiana (All)	NELAP	02046	06-30-24
Mississippi	State	NA	04-29-24
North Carolina (WW/SW)	State	291	12-31-23
North Dakota	State	R-194	04-29-24
South Carolina	State	77001003	04-29-24
USDA	US Federal Programs	P330-18-00018	02-11-24
Wisconsin	State	999580010	08-31-24
Wyoming	State	8TMS-Q	04-29-24

Laboratory: Eurofins St. Louis

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	373	12-01-24

Method Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
7470A	Mercury (CVAA)	SW846	EET CF
9060A	Organic Carbon, Total (TOC)	SW846	EET CHI
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET CF
SM 4500 H+ B	pH	SM	EET CF
3005A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

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

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200



Environment Testing
America



310-264651 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>GHD</u>			
City/State:	CITY	STATE	Project:
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>9/13/23</u>	<u>9:10</u>	<u>SL</u>
Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee			
☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler? ☒ Yes ☐ No If yes: Cooler ID: _____			
Multiple Coolers? ☒ Yes ☒ No If yes: Cooler # <u>1</u> of <u>2</u>			
Cooler Custody Seals Present? ☒ Yes ☐ No If yes: Cooler custody seals intact? ☐ Yes ☐ No			
Sample Custody Seals Present? ☐ Yes ☒ No If yes: Sample custody seals intact? ☐ Yes ☐ No			
Trip Blank Present? ☐ Yes ☒ No If yes: Which VOA samples are in cooler? <u>↓</u>			
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID: <u>2</u>		Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>6.9</u>		Corrected Temp (°C): <u>6.9</u>	
• Sample Container Temperature			
Container(s) used:	CONTAINER 1		CONTAINER 2
	<u>250 plastic</u>		
Uncorrected Temp (°C):	<u>3.4</u>		<u>3.5</u>
Corrected Temp (°C):	<u>3.4</u>		<u>3.5</u>
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No			
a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>GHO</u>			
City/State:	CITY	STATE	Project:
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>9/13/23</u>	<u>710</u>	<u>SL</u>
Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee			
☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?		☒ Yes ☐ No	If yes: Cooler ID: _____
Multiple Coolers?		☐ Yes ☒ No	If yes: Cooler # _____ of _____
Cooler Custody Seals Present?		☒ Yes ☐ No	If yes: Cooler custody seals intact? ☐ Yes ☐ No
Sample Custody Seals Present?		☐ Yes ☒ No	If yes: Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?		☐ Yes ☒ No	If yes: Which VOA samples are in cooler? ↓
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID:		Correction Factor (°C):	
<u>R</u>		<u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):		Corrected Temp (°C):	
<u>6.8</u>		<u>6.8</u>	
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
	<u>250 plastic</u>		
Uncorrected Temp (°C):	<u>5.8</u>	<u>6.0</u>	
Corrected Temp (°C):	<u>5.8</u>	<u>6.0</u>	
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No			
a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE. If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Chain of Custody Record

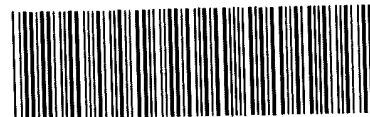
214 DSM

eurofins

Client Information		Sampler: THAD LARSON		Lab PM: Mereditin Liechth		Carrier Tracking Note(s)		COC No	
Client Contact: Kevin Armstrong		Phone: 515-491-7791		E-Mail: Mereditin.Liechth@eurofins.com		State of Origin: Iowa		Page: Page 1 of 1	
Company: GHD Services Inc		PWSID		Analysis Requested		Job #:			
Address: 11228 Aurora Avenue		Due Date Requested		TAT Requested (days): Standard		Preservation Codes			
City: Des Moines		Compliance Project: A Yes A No				A HCL		M Hexane	
State Zip: IA 50322 7903		PO #				B NaOH		N None	
Phone: 515-414-3935		340-004187				C Zn Acetate		O AsNaO2	
Email: Kevin.Armstrong@ghd.com		WOC #				D Nitric Acid		P Na2O2s	
Project Name: MEC Neal North-Bac-ground		Project #				E NaHSO4		Q Na2SO3	
Site: Neal North CCR		3-007314				F MeOH		R Na2S2O3	
		SOW#				G Amchlo		S H2SO4	
		12576482-001				H Ascorbic Acid		T-TSP Dodecahydrate	
						I Ice		U Acetone	
						J DI Water		V MCAA	
						K EDTA		W pH 4-5	
						L EDA		Y Trizma	
						Other		Z other specify)	
Sample Identification		Sample Date		Sample Time		Sample Type (C=comp, G=grab) (BT Tissue A=Air)		Matrix (In-water, Suspended, D=Residuel)	
MW13R-GW-0923		9/12/23		1315		G		Water	
MW27-GW-0923		9/12/23		1435		G		Water	
MW29R-GW-0923		9/12/23		1110		G		Water	
MW223S-GW-0923		9/12/23		1020		G		Water	
MW231SR-GW-0923		9/12/23		---		G		Water	
DP01-GW-0923		9/12/23		---		G		Water	
Possible Hazard Identification		Flammable		Toxic		Corrosive		Radiochemical	
Deliverable Requested		II III IV Other (specify)		II III IV Other (specify)		II III IV Other (specify)		II III IV Other (specify)	
Empty Kit Relinquished by		Date		Date		Date		Date	
Relinquished by: THAD LARSON		9/12/23		1735		9/12/23		1735	
Relinquished by:		Date/Time		Date/Time		Date/Time		Date/Time	
Relinquished by:		Date/Time		Date/Time		Date/Time		Date/Time	
Custody Seals Intact		Custody Seal No		Custody Seal No		Custody Seal No		Custody Seal No	
Cool Temp (Temperatures) °C and Other Remarks		Cool Temp (Temperatures) °C and Other Remarks		Cool Temp (Temperatures) °C and Other Remarks		Cool Temp (Temperatures) °C and Other Remarks		Cool Temp (Temperatures) °C and Other Remarks	



Environment Testing
America



310-264651 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: TA St. Louis			
City/State:	CITY	STATE	Project:
		MO	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	11/8/23	420	SL
Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler? ☒ Yes ☐ No If yes: Cooler ID: _____			
Multiple Coolers? ☐ Yes ☒ No If yes: Cooler # _____ of _____			
Cooler Custody Seals Present? ☐ Yes ☒ No If yes: Cooler custody seals intact? ☐ Yes ☐ No			
Sample Custody Seals Present? ☐ Yes ☒ No If yes: Sample custody seals intact? ☐ Yes ☐ No			
Trip Blank Present? ☐ Yes ☒ No If yes: Which VOA samples are in cooler? ↓			
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID: P		Correction Factor (°C): 0	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): 14.1		Corrected Temp (°C): 14.1	
• Sample Container Temperature			
Container(s) used:	CONTAINER 1		CONTAINER 2
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Sierra Worthington

From: Meredith Liehti
Sent: Tuesday, November 7, 2023 10:00 AM
To: Sabrina Early; Ops - St. Louis
Cc: Brian Graettinger; St. Louis - Radiochemistry Lead; St. Louis-Prep Leads; St. Louis - SampleReceiving
Subject: RE: Neal North CCR metals questions

INFO: INTERNAL EMAIL - Sent from your own Eurofins email domain.

Sabina,

Thank you for taking the time to look for these. Defiantly send 310-264651-D-2.

We might be able to squeak by with 310-265186-D-4 with the digest we have, but if you happen to find more volume for this set please send our way.

Thank you all again for your help on this.

Meredith Liehti

Mobile: 319-290-6238

Meredith.Liehti@ET.EurofinsUS.com

From: Sabrina Early <Sabrina.Early@et.eurofinsus.com>
Sent: Tuesday, November 7, 2023 9:54 AM
To: Meredith Liehti <meredith.liehti@et.eurofinsus.com>; Ops - St. Louis <Ops-St.Louis@et.eurofinsus.com>
Cc: Brian Graettinger <Brian.Graettinger@et.eurofinsus.com>; St. Louis - Radiochemistry Lead <St.Louis-RadiochemistryLead@et.eurofinsus.com>; St. Louis-Prep Leads <St.Louis-Prepleads@testamerica365.onmicrosoft.com>; St. Louis - SampleReceiving <St.Louis-SampleReceiving@et.eurofinsus.com>
Subject: RE: Neal North CCR metals questions

INFO: INTERNAL EMAIL - Sent from your own Eurofins email domain.

I have found 310-264651-D-2. It is logged as a 250mL bottle but it is actually 1L and the bottle is full. I will bring the bottle back to our sample receiving department.

310-265186-D-4 looks like it was most likely consumed during prep, but not consumed in TALS. I cannot find the sample in its stated storage location, nor is it in its supposed current location. The container was used for Ra-226/228 prep and the amount used is around 1L.

Sabrina Early

Phone 314-298-8566 x129

Sabrina.Early@ET.EurofinsUS.com

From: Meredith Liechti <meredith.liechti@et.eurofinsus.com>
Sent: Tuesday, November 7, 2023 9:35 AM
To: St. Louis - RAD <St.Louis-RAD@et.eurofinsus.com>; Ops - St. Louis <Ops-St.Louis@et.eurofinsus.com>
Cc: Brian Graettinger <Brian.Graettinger@et.eurofinsus.com>
Subject: FW: Neal North CCR metals questions
Importance: High

INFO: INTERNAL EMAIL - Sent from your own Eurofins email domain.

Good Morning St. Louis Lab!

Would someone mind looking into these jobs below for any bottles left over. As of yesterday these bottles were not disposed of yet:

264651-2 1-250mL Nitric bottle

265186-4 1-1L Nitric

If you still have these in house, would you mind shipping them back to Cedar Falls ASAP? The client is wanting to reanalyze the constituents below.

Please let me know.

Thank you in advance!

Meredith Liechti

Mobile: 319-290-6238

Meredith.Liechti@ET.EurofinsUS.com

From: Sarah Packer <Sarah.Packer@et.eurofinsus.com>
Sent: Tuesday, November 7, 2023 9:08 AM
To: Meredith Liechti <meredith.liechti@et.eurofinsus.com>; Lorna Bormann <Lorna.Bormann@et.eurofinsus.com>
Subject: RE: Neal North CCR metals questions

INFO: INTERNAL EMAIL - Sent from your own Eurofins email domain.

We still have the digested samples for 265186-3,4 and 264966-1. We don't have anything here for 264651-2, so if St. Louis can send us the bottle, we can test it.

It does look like these were all cases of carryover for Tl, we will rerun the ones we have digested still. If the Co, Cd results come out the same for 265186-4, then we will probably need that bottle from St. Louis as well.

Sarah Packer

Office Phone: 319-595-2021

Lab Phone: 319-277-2401

From: Sarah Packer
Sent: Monday, November 6, 2023 4:49 PM
To: Meredith Liechti <meredith.liechti@et.eurofinsus.com>; Lorna Bormann <Lorna.Bormann@et.eurofinsus.com>
Subject: RE: Neal North CCR metals questions

I will check first thing tomorrow if we have any of the digested samples still. We probably need to request the bottles from St. Louis.

Sarah Packer

Office Phone: 319-595-2021

Lab Phone: 319-277-2401

From: Meredith Liechti <meredith.liechti@et.eurofinsus.com>

Sent: Monday, November 6, 2023 4:00 PM

To: Sarah Packer <Sarah.Packer@et.eurofinsus.com>; Lorna Bormann <Lorna.Bormann@et.eurofinsus.com>

Subject: FW: Neal North CCR metals questions

Importance: High

INFO: INTERNAL EMAIL - Sent from your own Eurofins email domain.

Hi Sarah and Lorna,
See below per Kevin's request on metals.

I checked each job and it look like we have not disposed the following:

264651-MW-27-1 Rad bottle (250 Nitric)- not sure why this one is a 250?

265186-MW103- 1L Rad Nitric Bottle / 250 No treat bottle

MW104- 1L Rad Nitric Bottle / 250 No treat bottle

26496- MW225- 1L Rad Nitric bottle

Could have St. Louis do a verification/extraction analysis on the Rad bottles?

Meredith Liechti

Mobile: 319-290-6238

Meredith.Liechti@ET.EurofinsUS.com

From: Kevin Armstrong <Kevin.Armstrong@ghd.com>

Sent: Monday, November 6, 2023 3:17 PM

To: Meredith Liechti <meredith.liechti@et.eurofinsus.com>

Cc: Grant Anderson <Grant.Anderson@ghd.com>

Subject: Neal North CCR metals questions

Importance: High

CAUTION: EXTERNAL EMAIL - Sent from an email domain that is not formally trusted by Eurofins.

Do not click on links or open attachments unless you recognise the sender and are certain that the content is safe.

Meredith,
Could you have the lab look at the metals results listed below and let me know if they see any potential QC issues (dilution error, sample carryover, etc.)? The results listed below are not consistent with past results or with what we expect to see. If the lab still has sample volume, let's consider doing a verification analysis (and extraction?)

Please get back with me in the next day or two. We have reporting deadlines coming up and may need to resample if these results hold up.

Thanks,
Kevin

Lab Sample ID	GHD Sample ID	Thallium	Cobalt	Cadmium
310-264651-2	MW27-GW-0923	First thallium hit. Historically ND for thallium		
310-265186-3	MW103-GW-0923	First thallium hit. Historically ND for thallium		
310-265186-4	MW104R-GW-0923	First thallium hit. Historically ND for thallium	Unusually high cobalt result	Cadmium typically ND
310-264966-1	MW225S-GW-0923	First thallium hit. Historically ND for thallium		

Kevin Armstrong | A GHD Associate
Hydrogeologist

GHD

Proudly employee owned | ghd.com

11228 Aurora Avenue Des Moines Iowa 50322-7905 USA

D +1 515 414 3935 M +1 515 631 2178 E kevin.armstrong@ghd.com

→ The Power of Commitment

Connect



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3019 Venture Way
Cedar Falls IA 50613
Phone 319-277-2401 Fax 319-277-2425

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

1.9 → 1.4

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-264651-1

SDG Number:

Login Number: 264651

List Number: 1

Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-264651-1

SDG Number:

Login Number: 264651

List Number: 3

Creator: Scott, Sherri L

List Source: Eurofins Chicago

List Creation: 09/14/23 04:17 PM

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	1.6
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	

Tracer/Carrier Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264651-1

Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	
310-264651-1	MW13R-GW-0923	94.1	
310-264651-2	MW27-GW-0923	85.8	
310-264651-3	MW29R-GW-0923	90.2	
310-264651-4	MW223S-GW-0923	91.7	
310-264651-5	DP01-GW-0923	91.7	
LCS 160-628685/2-A	Lab Control Sample	92.4	
MB 160-628685/1-A	Method Blank	92.7	
Tracer/Carrier Legend			
Ba = Ba Carrier			

Method: 9320 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)
310-264651-1	MW13R-GW-0923	94.1	80.7
310-264651-2	MW27-GW-0923	85.8	80.4
310-264651-3	MW29R-GW-0923	90.2	78.5
310-264651-4	MW223S-GW-0923	91.7	79.3
310-264651-5	DP01-GW-0923	91.7	80.4
LCS 160-628686/2-A	Lab Control Sample	92.4	80.7
MB 160-628686/1-A	Method Blank	92.7	82.6
Tracer/Carrier Legend			
Ba = Ba Carrier			
Y = Y Carrier			

ANALYTICAL REPORT

PREPARED FOR

Attn: Kevin Armstrong

GHD Services Inc.

11228 Aurora Avenue

Des Moines, Iowa 50322-7905

Generated 10/16/2023 3:42:50 PM Revision 1

JOB DESCRIPTION

Neal North Closed CCR Monofill (IDNR)

JOB NUMBER

310-264765-1

Eurofins Cedar Falls

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization



Authorized for release by
Meredith Liechti, Service Center Manager
meredith.liechti@et.eurofinsus.com
(319)277-2401

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10/16/2023 3:42:50 PM
Revision 1

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Case Narrative

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Job ID: 310-264765-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-264765-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method. Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The samples were received on 9/14/2023 9:35 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 1.1°C and 1.9°C

HPLC/IC

Method 9056A_ORGFM_28D: The following samples were diluted due to the nature of the sample matrix: MW01R-GW-0923 (310-264765-1), MW03R-GW-0923 (310-264765-2), MW05R-GW-0923 (310-264765-3), MW19-GW-0923 (310-264765-4), MW21-GW-0923 (310-264765-5) and DP05-GW-0923 (310-264765-6). Elevated reporting limits (RLs) are provided.

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

Metals

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

General Chemistry

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

Narrative

Job Narrative 310-264765-2

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method. Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The samples were received on 9/14/2023 9:35 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 1.1°C and 1.9°C

Gas Flow Proportional Counter

Method 9315_Ra226: Radium-226 batch 628862 Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample

Case Narrative

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Job ID: 310-264765-1 (Continued)

Laboratory: Eurofins Cedar Falls (Continued)

results are reported with the count date/time applied as the Activity Reference Date. MW01R-GW-0923 (310-264765-1), MW03R-GW-0923 (310-264765-2), MW05R-GW-0923 (310-264765-3), MW19-GW-0923 (310-264765-4), MW21-GW-0923 (310-264765-5), DP05-GW-0923 (310-264765-6), (LCS 160-628862/2-A), (MB 160-628862/1-A), (380-62945-A-1-A) and (380-62945-B-1-A DU)

Method 9320_Ra228: Radium-228 batch 628864 Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW01R-GW-0923 (310-264765-1), MW03R-GW-0923 (310-264765-2), MW05R-GW-0923 (310-264765-3), MW19-GW-0923 (310-264765-4), MW21-GW-0923 (310-264765-5), DP05-GW-0923 (310-264765-6), (LCS 160-628864/2-A), (MB 160-628864/1-A), (380-62945-A-1-B) and (380-62945-B-1-B DU)

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

Sample Summary

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-264765-1	MW01R-GW-0923	Water	09/13/23 08:30	09/14/23 09:35
310-264765-2	MW03R-GW-0923	Water	09/13/23 10:55	09/14/23 09:35
310-264765-3	MW05R-GW-0923	Water	09/13/23 11:35	09/14/23 09:35
310-264765-4	MW19-GW-0923	Water	09/13/23 14:30	09/14/23 09:35
310-264765-5	MW21-GW-0923	Water	09/13/23 12:45	09/14/23 09:35
310-264765-6	DP05-GW-0923	Water	09/13/23 00:00	09/14/23 09:35

Client Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Client Sample ID: MW01R-GW-0923

Lab Sample ID: 310-264765-1

Date Collected: 09/13/23 08:30

Matrix: Water

Date Received: 09/14/23 09:35

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	61.9		5.00		mg/L			09/23/23 19:44	5
Fluoride	<1.00		1.00		mg/L			09/23/23 19:44	5
Sulfate	213		5.00		mg/L			09/23/23 19:44	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 20:32	1
Arsenic	0.0420		0.00200		mg/L		09/18/23 10:00	10/03/23 20:32	1
Barium	0.0917		0.00200		mg/L		09/18/23 10:00	10/03/23 20:32	1
Beryllium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/03/23 20:32	1
Boron	0.476		0.100		mg/L		09/18/23 10:00	10/04/23 22:04	1
Cadmium	<0.000200		0.000200		mg/L		09/18/23 10:00	10/03/23 20:32	1
Calcium	151		0.500		mg/L		09/18/23 10:00	10/04/23 22:04	1
Chromium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 20:32	1
Cobalt	<0.000500		0.000500		mg/L		09/18/23 10:00	10/03/23 20:32	1
Lithium	0.0660		0.0100		mg/L		09/18/23 10:00	10/04/23 22:04	1
Lead	<0.000500		0.000500		mg/L		09/18/23 10:00	10/03/23 20:32	1
Molybdenum	0.00489		0.00200		mg/L		09/18/23 10:00	10/03/23 20:32	1
Selenium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 20:32	1
Thallium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/04/23 22:04	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/20/23 10:48	09/21/23 11:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	872		50.0		mg/L			09/15/23 15:00	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.2	HF	1.0		SU			09/14/23 12:13	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.144		0.0974	0.0982	1.00	0.131	pCi/L	09/20/23 10:01	10/13/23 19:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.2		30 - 110					09/20/23 10:01	10/13/23 19:35	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.18		0.420	0.434	1.00	0.505	pCi/L	09/20/23 10:04	10/09/23 11:15	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.2		30 - 110					09/20/23 10:04	10/09/23 11:15	1
Y Carrier	80.4		30 - 110					09/20/23 10:04	10/09/23 11:15	1

Eurofins Cedar Falls

Client Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Client Sample ID: MW03R-GW-0923

Lab Sample ID: 310-264765-2

Date Collected: 09/13/23 10:55

Matrix: Water

Date Received: 09/14/23 09:35

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	9.02		5.00		mg/L			09/23/23 19:56	5
Fluoride	<1.00		1.00		mg/L			09/23/23 19:56	5
Sulfate	219		5.00		mg/L			09/23/23 19:56	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 20:35	1
Arsenic	0.0418		0.00200		mg/L		09/18/23 10:00	10/03/23 20:35	1
Barium	0.292		0.00200		mg/L		09/18/23 10:00	10/03/23 20:35	1
Beryllium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/03/23 20:35	1
Boron	0.352		0.100		mg/L		09/18/23 10:00	10/04/23 22:06	1
Cadmium	<0.000200		0.000200		mg/L		09/18/23 10:00	10/03/23 20:35	1
Calcium	146		0.500		mg/L		09/18/23 10:00	10/04/23 22:06	1
Chromium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 20:35	1
Cobalt	<0.000500		0.000500		mg/L		09/18/23 10:00	10/03/23 20:35	1
Lithium	0.0763		0.0100		mg/L		09/18/23 10:00	10/04/23 22:06	1
Lead	<0.000500		0.000500		mg/L		09/18/23 10:00	10/03/23 20:35	1
Molybdenum	0.00236		0.00200		mg/L		09/18/23 10:00	10/03/23 20:35	1
Selenium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 20:35	1
Thallium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/04/23 22:06	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/20/23 10:48	09/21/23 11:32	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	812		50.0		mg/L			09/15/23 15:00	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.2	HF	1.0		SU			09/14/23 12:15	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.280		0.127	0.129	1.00	0.150	pCi/L	09/20/23 10:01	10/13/23 19:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.4		30 - 110					09/20/23 10:01	10/13/23 19:36	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.18		0.435	0.448	1.00	0.542	pCi/L	09/20/23 10:04	10/09/23 11:11	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.4		30 - 110					09/20/23 10:04	10/09/23 11:11	1
Y Carrier	80.0		30 - 110					09/20/23 10:04	10/09/23 11:11	1

Eurofins Cedar Falls

Client Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Client Sample ID: MW05R-GW-0923

Lab Sample ID: 310-264765-3

Date Collected: 09/13/23 11:35

Matrix: Water

Date Received: 09/14/23 09:35

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	10.4		5.00		mg/L			09/23/23 20:09	5
Fluoride	<1.00		1.00		mg/L			09/23/23 20:09	5
Sulfate	160		5.00		mg/L			09/23/23 20:09	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 20:37	1
Arsenic	0.0283		0.00200		mg/L		09/18/23 10:00	10/03/23 20:37	1
Barium	0.100		0.00200		mg/L		09/18/23 10:00	10/03/23 20:37	1
Beryllium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/03/23 20:37	1
Boron	0.427		0.100		mg/L		09/18/23 10:00	10/04/23 22:24	1
Cadmium	<0.000200		0.000200		mg/L		09/18/23 10:00	10/03/23 20:37	1
Calcium	97.5		0.500		mg/L		09/18/23 10:00	10/04/23 22:24	1
Chromium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 20:37	1
Cobalt	<0.000500		0.000500		mg/L		09/18/23 10:00	10/03/23 20:37	1
Lithium	0.0578		0.0100		mg/L		09/18/23 10:00	10/04/23 22:24	1
Lead	<0.000500		0.000500		mg/L		09/18/23 10:00	10/03/23 20:37	1
Molybdenum	0.00393		0.00200		mg/L		09/18/23 10:00	10/03/23 20:37	1
Selenium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 20:37	1
Thallium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/04/23 22:24	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/20/23 10:48	09/21/23 11:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	626		50.0		mg/L			09/15/23 15:00	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.3	HF	1.0		SU			09/14/23 12:16	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.173		0.109	0.110	1.00	0.137	pCi/L	09/20/23 10:01	10/13/23 19:38	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	89.2		30 - 110					09/20/23 10:01	10/13/23 19:38	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.865		0.397	0.405	1.00	0.525	pCi/L	09/20/23 10:04	10/09/23 11:11	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	89.2		30 - 110					09/20/23 10:04	10/09/23 11:11	1
Y Carrier	78.1		30 - 110					09/20/23 10:04	10/09/23 11:11	1

Eurofins Cedar Falls

Client Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Client Sample ID: MW19-GW-0923

Lab Sample ID: 310-264765-4

Date Collected: 09/13/23 14:30

Matrix: Water

Date Received: 09/14/23 09:35

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	19.1		5.00		mg/L			09/23/23 20:21	5
Fluoride	<1.00		1.00		mg/L			09/23/23 20:21	5
Sulfate	736		100		mg/L			09/23/23 20:33	100

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 20:40	1
Arsenic	0.00298		0.00200		mg/L		09/18/23 10:00	10/03/23 20:40	1
Barium	0.0166		0.00200		mg/L		09/18/23 10:00	10/03/23 20:40	1
Beryllium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/03/23 20:40	1
Boron	0.606		0.100		mg/L		09/18/23 10:00	10/04/23 22:26	1
Cadmium	<0.000200		0.000200		mg/L		09/18/23 10:00	10/03/23 20:40	1
Calcium	349		0.500		mg/L		09/18/23 10:00	10/04/23 22:26	1
Chromium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 20:40	1
Cobalt	0.00670		0.000500		mg/L		09/18/23 10:00	10/03/23 20:40	1
Lithium	0.234		0.0100		mg/L		09/18/23 10:00	10/04/23 22:26	1
Lead	<0.000500		0.000500		mg/L		09/18/23 10:00	10/03/23 20:40	1
Molybdenum	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 20:40	1
Selenium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 20:40	1
Thallium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/04/23 22:26	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/20/23 10:48	09/21/23 11:37	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	2360		250		mg/L			09/15/23 15:00	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	6.7	HF	1.0		SU			09/14/23 12:17	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.101	U	0.0827	0.0832	1.00	0.118	pCi/L	09/20/23 10:01	10/13/23 19:38	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.0		30 - 110					09/20/23 10:01	10/13/23 19:38	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.882		0.389	0.397	1.00	0.507	pCi/L	09/20/23 10:04	10/09/23 11:11	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.0		30 - 110					09/20/23 10:04	10/09/23 11:11	1
Y Carrier	80.4		30 - 110					09/20/23 10:04	10/09/23 11:11	1

Eurofins Cedar Falls

Client Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Client Sample ID: MW21-GW-0923

Lab Sample ID: 310-264765-5

Date Collected: 09/13/23 12:45

Matrix: Water

Date Received: 09/14/23 09:35

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	8.18		5.00		mg/L			09/23/23 20:45	5
Fluoride	<1.00		1.00		mg/L			09/23/23 20:45	5
Sulfate	1550		100		mg/L			09/23/23 20:57	100

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 20:42	1
Arsenic	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 20:42	1
Barium	0.0139		0.00200		mg/L		09/18/23 10:00	10/03/23 20:42	1
Beryllium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/03/23 20:42	1
Boron	0.519		0.400		mg/L		09/18/23 10:00	10/04/23 22:29	4
Cadmium	0.000346		0.000200		mg/L		09/18/23 10:00	10/03/23 20:42	1
Calcium	474		2.00		mg/L		09/18/23 10:00	10/04/23 22:29	4
Chromium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 20:42	1
Cobalt	0.000983		0.000500		mg/L		09/18/23 10:00	10/03/23 20:42	1
Lithium	0.301		0.0400		mg/L		09/18/23 10:00	10/04/23 22:29	4
Lead	<0.000500		0.000500		mg/L		09/18/23 10:00	10/03/23 20:42	1
Molybdenum	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 20:42	1
Selenium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 20:42	1
Thallium	<0.00400		0.00400		mg/L		09/18/23 10:00	10/04/23 22:29	4

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/20/23 10:48	09/21/23 11:39	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	3110		250		mg/L			09/15/23 15:00	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	6.7	HF	1.0		SU			09/14/23 12:18	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0132	U	0.0669	0.0669	1.00	0.134	pCi/L	09/20/23 10:01	10/13/23 19:38	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.6		30 - 110					09/20/23 10:01	10/13/23 19:38	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.15		0.475	0.487	1.00	0.620	pCi/L	09/20/23 10:04	10/09/23 11:11	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.6		30 - 110					09/20/23 10:04	10/09/23 11:11	1
Y Carrier	76.3		30 - 110					09/20/23 10:04	10/09/23 11:11	1

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Client Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Client Sample ID: DP05-GW-0923

Lab Sample ID: 310-264765-6

Date Collected: 09/13/23 00:00

Matrix: Water

Date Received: 09/14/23 09:35

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	61.5		5.00		mg/L			09/23/23 21:09	5
Fluoride	<1.00		1.00		mg/L			09/23/23 21:09	5
Sulfate	209		5.00		mg/L			09/23/23 21:09	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 20:45	1
Arsenic	0.0436		0.00200		mg/L		09/18/23 10:00	10/03/23 20:45	1
Barium	0.0966		0.00200		mg/L		09/18/23 10:00	10/03/23 20:45	1
Beryllium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/03/23 20:45	1
Boron	0.460		0.400		mg/L		09/18/23 10:00	10/04/23 22:31	4
Cadmium	<0.000200		0.000200		mg/L		09/18/23 10:00	10/03/23 20:45	1
Calcium	128		2.00		mg/L		09/18/23 10:00	10/04/23 22:31	4
Chromium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 20:45	1
Cobalt	<0.000500		0.000500		mg/L		09/18/23 10:00	10/03/23 20:45	1
Lithium	0.0600		0.0400		mg/L		09/18/23 10:00	10/04/23 22:31	4
Lead	<0.000500		0.000500		mg/L		09/18/23 10:00	10/03/23 20:45	1
Molybdenum	0.00517		0.00200		mg/L		09/18/23 10:00	10/03/23 20:45	1
Selenium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 20:45	1
Thallium	<0.00400		0.00400		mg/L		09/18/23 10:00	10/04/23 22:31	4

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/20/23 10:48	09/21/23 11:41	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	860		50.0		mg/L			09/15/23 15:00	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.1	HF	1.0		SU			09/14/23 12:20	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.135	U	0.0975	0.0982	1.00	0.136	pCi/L	09/20/23 10:01	10/13/23 19:38	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.5		30 - 110					09/20/23 10:01	10/13/23 19:38	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.75		0.530	0.554	1.00	0.628	pCi/L	09/20/23 10:04	10/09/23 11:12	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.5		30 - 110					09/20/23 10:04	10/09/23 11:12	1
Y Carrier	77.4		30 - 110					09/20/23 10:04	10/09/23 11:12	1

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Definitions/Glossary

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Qualifiers

Metals

Qualifier	Qualifier Description
^+	Continuing Calibration Verification (CCV) is outside acceptance limits, high biased.

General Chemistry

Qualifier	Qualifier Description
HF	Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-400640/3

Matrix: Water

Analysis Batch: 400640

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			09/23/23 18:08	1
Fluoride	<0.200		0.200		mg/L			09/23/23 18:08	1
Sulfate	<1.00		1.00		mg/L			09/23/23 18:08	1

Lab Sample ID: LCS 310-400640/4

Matrix: Water

Analysis Batch: 400640

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.822		mg/L		98	90 - 110
Fluoride	2.00	2.011		mg/L		101	90 - 110
Sulfate	10.0	10.30		mg/L		103	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-399744/1-A

Matrix: Water

Analysis Batch: 401411

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 399744

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 19:25	1
Arsenic	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 19:25	1
Barium	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 19:25	1
Beryllium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/03/23 19:25	1
Boron	<0.100	^+	0.100		mg/L		09/18/23 10:00	10/03/23 19:25	1
Cadmium	<0.000200		0.000200		mg/L		09/18/23 10:00	10/03/23 19:25	1
Calcium	<0.500		0.500		mg/L		09/18/23 10:00	10/03/23 19:25	1
Chromium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 19:25	1
Cobalt	<0.000500		0.000500		mg/L		09/18/23 10:00	10/03/23 19:25	1
Lithium	<0.0100		0.0100		mg/L		09/18/23 10:00	10/03/23 19:25	1
Lead	<0.000500		0.000500		mg/L		09/18/23 10:00	10/03/23 19:25	1
Molybdenum	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 19:25	1
Selenium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 19:25	1
Thallium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/03/23 19:25	1

Lab Sample ID: LCS 310-399744/2-A

Matrix: Water

Analysis Batch: 401411

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 399744

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	2.00	2.097		mg/L		105	80 - 120
Arsenic	2.00	1.794		mg/L		90	80 - 120
Barium	1.00	0.9234		mg/L		92	80 - 120
Beryllium	1.00	0.8577		mg/L		86	80 - 120
Cadmium	1.00	0.9018		mg/L		90	80 - 120
Chromium	1.00	0.8892		mg/L		89	80 - 120
Cobalt	1.00	0.9279		mg/L		93	80 - 120
Lithium	2.00	1.667		mg/L		83	80 - 120
Lead	2.00	1.850		mg/L		93	80 - 120

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QC Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 310-399744/2-A
Matrix: Water
Analysis Batch: 401411

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 399744

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Molybdenum	2.00	1.743		mg/L		87	80 - 120
Selenium	4.00	3.544		mg/L		89	80 - 120

Lab Sample ID: LCS 310-399744/2-A ^10
Matrix: Water
Analysis Batch: 401579

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 399744

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Boron	2.00	2.195		mg/L		110	80 - 120

Lab Sample ID: LCS 310-399744/2-A ^10
Matrix: Water
Analysis Batch: 402206

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 399744

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Calcium	20.0	18.26		mg/L		91	80 - 120
Thallium	2.00	1.666		mg/L		83	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-400098/1-A
Matrix: Water
Analysis Batch: 400261

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 400098

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/20/23 10:48	09/21/23 10:43	1

Lab Sample ID: LCS 310-400098/2-A
Matrix: Water
Analysis Batch: 400261

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 400098

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001646		mg/L		99	80 - 120

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 310-399731/1
Matrix: Water
Analysis Batch: 399731

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			09/15/23 15:00	1

Lab Sample ID: LCS 310-399731/2
Matrix: Water
Analysis Batch: 399731

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	986.0		mg/L		99	90 - 110

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QC Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-399501/1
Matrix: Water
Analysis Batch: 399501

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
pH	7.00	7.0		SU		100	98 - 102

Lab Sample ID: 310-264765-1 DU
Matrix: Water
Analysis Batch: 399501

Client Sample ID: MW01R-GW-0923
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.2	HF	7.2		SU		0	20

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-628862/1-A
Matrix: Water
Analysis Batch: 631974

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 628862

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.03936	U	0.0831	0.0832	1.00	0.149	pCi/L	09/20/23 10:01	10/13/23 19:34	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.6		30 - 110					09/20/23 10:01	10/13/23 19:34	1

Lab Sample ID: LCS 160-628862/2-A
Matrix: Water
Analysis Batch: 631974

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 628862

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-226	11.3	10.61		1.14	1.00	0.155	pCi/L	94	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	95.8		30 - 110						

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-628864/1-A
Matrix: Water
Analysis Batch: 631059

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 628864

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.5143	U	0.351	0.354	1.00	0.525	pCi/L	09/20/23 10:04	10/09/23 11:15	1
Carrier	MB %Yield	MB Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.6		30 - 110					09/20/23 10:04	10/09/23 11:15	1
Y Carrier	77.0		30 - 110					09/20/23 10:04	10/09/23 11:15	1

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QC Sample Results

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Method: 9320 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCS 160-628864/2-A
Matrix: Water
Analysis Batch: 631059

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 628864

Analyte		Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-228		7.81	9.002		1.21	1.00	0.413	pCi/L	115	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits							
Ba Carrier	95.8		30 - 110							
Y Carrier	84.5		30 - 110							

QC Association Summary

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

HPLC/IC

Analysis Batch: 400640

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-1	MW01R-GW-0923	Total/NA	Water	9056A	
310-264765-2	MW03R-GW-0923	Total/NA	Water	9056A	
310-264765-3	MW05R-GW-0923	Total/NA	Water	9056A	
310-264765-4	MW19-GW-0923	Total/NA	Water	9056A	
310-264765-4	MW19-GW-0923	Total/NA	Water	9056A	
310-264765-5	MW21-GW-0923	Total/NA	Water	9056A	
310-264765-5	MW21-GW-0923	Total/NA	Water	9056A	
310-264765-6	DP05-GW-0923	Total/NA	Water	9056A	
MB 310-400640/3	Method Blank	Total/NA	Water	9056A	
LCS 310-400640/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 399744

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-1	MW01R-GW-0923	Total/NA	Water	3005A	
310-264765-2	MW03R-GW-0923	Total/NA	Water	3005A	
310-264765-3	MW05R-GW-0923	Total/NA	Water	3005A	
310-264765-4	MW19-GW-0923	Total/NA	Water	3005A	
310-264765-5	MW21-GW-0923	Total/NA	Water	3005A	
310-264765-6	DP05-GW-0923	Total/NA	Water	3005A	
MB 310-399744/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-399744/2-A	Lab Control Sample	Total/NA	Water	3005A	
LCS 310-399744/2-A ^10	Lab Control Sample	Total/NA	Water	3005A	

Prep Batch: 400098

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-1	MW01R-GW-0923	Total/NA	Water	7470A	
310-264765-2	MW03R-GW-0923	Total/NA	Water	7470A	
310-264765-3	MW05R-GW-0923	Total/NA	Water	7470A	
310-264765-4	MW19-GW-0923	Total/NA	Water	7470A	
310-264765-5	MW21-GW-0923	Total/NA	Water	7470A	
310-264765-6	DP05-GW-0923	Total/NA	Water	7470A	
MB 310-400098/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-400098/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 400261

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-1	MW01R-GW-0923	Total/NA	Water	7470A	400098
310-264765-2	MW03R-GW-0923	Total/NA	Water	7470A	400098
310-264765-3	MW05R-GW-0923	Total/NA	Water	7470A	400098
310-264765-4	MW19-GW-0923	Total/NA	Water	7470A	400098
310-264765-5	MW21-GW-0923	Total/NA	Water	7470A	400098
310-264765-6	DP05-GW-0923	Total/NA	Water	7470A	400098
MB 310-400098/1-A	Method Blank	Total/NA	Water	7470A	400098
LCS 310-400098/2-A	Lab Control Sample	Total/NA	Water	7470A	400098

Analysis Batch: 401411

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-1	MW01R-GW-0923	Total/NA	Water	6020B	399744
310-264765-2	MW03R-GW-0923	Total/NA	Water	6020B	399744

Eurofins Cedar Falls

QC Association Summary

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Metals (Continued)

Analysis Batch: 401411 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-3	MW05R-GW-0923	Total/NA	Water	6020B	399744
310-264765-4	MW19-GW-0923	Total/NA	Water	6020B	399744
310-264765-5	MW21-GW-0923	Total/NA	Water	6020B	399744
310-264765-6	DP05-GW-0923	Total/NA	Water	6020B	399744
MB 310-399744/1-A	Method Blank	Total/NA	Water	6020B	399744
LCS 310-399744/2-A	Lab Control Sample	Total/NA	Water	6020B	399744

Analysis Batch: 401579

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-1	MW01R-GW-0923	Total/NA	Water	6020B	399744
310-264765-2	MW03R-GW-0923	Total/NA	Water	6020B	399744
310-264765-3	MW05R-GW-0923	Total/NA	Water	6020B	399744
310-264765-4	MW19-GW-0923	Total/NA	Water	6020B	399744
310-264765-5	MW21-GW-0923	Total/NA	Water	6020B	399744
310-264765-6	DP05-GW-0923	Total/NA	Water	6020B	399744
LCS 310-399744/2-A ^10	Lab Control Sample	Total/NA	Water	6020B	399744

Analysis Batch: 402206

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 310-399744/2-A ^10	Lab Control Sample	Total/NA	Water	6020B	399744

General Chemistry

Analysis Batch: 399501

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-1	MW01R-GW-0923	Total/NA	Water	SM 4500 H+ B	
310-264765-2	MW03R-GW-0923	Total/NA	Water	SM 4500 H+ B	
310-264765-3	MW05R-GW-0923	Total/NA	Water	SM 4500 H+ B	
310-264765-4	MW19-GW-0923	Total/NA	Water	SM 4500 H+ B	
310-264765-5	MW21-GW-0923	Total/NA	Water	SM 4500 H+ B	
310-264765-6	DP05-GW-0923	Total/NA	Water	SM 4500 H+ B	
LCS 310-399501/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-264765-1 DU	MW01R-GW-0923	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 399731

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-1	MW01R-GW-0923	Total/NA	Water	SM 2540C	
310-264765-2	MW03R-GW-0923	Total/NA	Water	SM 2540C	
310-264765-3	MW05R-GW-0923	Total/NA	Water	SM 2540C	
310-264765-4	MW19-GW-0923	Total/NA	Water	SM 2540C	
310-264765-5	MW21-GW-0923	Total/NA	Water	SM 2540C	
310-264765-6	DP05-GW-0923	Total/NA	Water	SM 2540C	
MB 310-399731/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-399731/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Rad

Prep Batch: 628862

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-1	MW01R-GW-0923	Total/NA	Water	PrecSep-21	
310-264765-2	MW03R-GW-0923	Total/NA	Water	PrecSep-21	
310-264765-3	MW05R-GW-0923	Total/NA	Water	PrecSep-21	

Eurofins Cedar Falls

QC Association Summary

Client: GHD Services Inc.

Job ID: 310-264765-1

Project/Site: Neal North Closed CCR Monofill (IDNR)

Rad (Continued)

Prep Batch: 628862 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-4	MW19-GW-0923	Total/NA	Water	PrecSep-21	
310-264765-5	MW21-GW-0923	Total/NA	Water	PrecSep-21	
310-264765-6	DP05-GW-0923	Total/NA	Water	PrecSep-21	
MB 160-628862/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-628862/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	

Prep Batch: 628864

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-1	MW01R-GW-0923	Total/NA	Water	PrecSep_0	
310-264765-2	MW03R-GW-0923	Total/NA	Water	PrecSep_0	
310-264765-3	MW05R-GW-0923	Total/NA	Water	PrecSep_0	
310-264765-4	MW19-GW-0923	Total/NA	Water	PrecSep_0	
310-264765-5	MW21-GW-0923	Total/NA	Water	PrecSep_0	
310-264765-6	DP05-GW-0923	Total/NA	Water	PrecSep_0	
MB 160-628864/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-628864/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Client Sample ID: MW01R-GW-0923

Lab Sample ID: 310-264765-1

Date Collected: 09/13/23 08:30

Matrix: Water

Date Received: 09/14/23 09:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	400640	QTZ5	EET CF	09/23/23 19:44
Total/NA	Prep	3005A			399744	KCK5	EET CF	09/18/23 10:00
Total/NA	Analysis	6020B		1	401411	A6US	EET CF	10/03/23 20:32
Total/NA	Prep	3005A			399744	KCK5	EET CF	09/18/23 10:00
Total/NA	Analysis	6020B		1	401579	A6US	EET CF	10/04/23 22:04
Total/NA	Prep	7470A			400098	NFT2	EET CF	09/20/23 10:48
Total/NA	Analysis	7470A		1	400261	NFT2	EET CF	09/21/23 11:30
Total/NA	Analysis	SM 2540C		1	399731	ENB7	EET CF	09/15/23 15:00
Total/NA	Analysis	SM 4500 H+ B		1	399501	W9YR	EET CF	09/14/23 12:13
Total/NA	Prep	PrecSep-21			628862	KAC	EET SL	09/20/23 10:01
Total/NA	Analysis	9315		1	631808	FLC	EET SL	10/13/23 19:35
Total/NA	Prep	PrecSep_0			628864	KAC	EET SL	09/20/23 10:04
Total/NA	Analysis	9320		1	631059	FLC	EET SL	10/09/23 11:15

Client Sample ID: MW03R-GW-0923

Lab Sample ID: 310-264765-2

Date Collected: 09/13/23 10:55

Matrix: Water

Date Received: 09/14/23 09:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	400640	QTZ5	EET CF	09/23/23 19:56
Total/NA	Prep	3005A			399744	KCK5	EET CF	09/18/23 10:00
Total/NA	Analysis	6020B		1	401411	A6US	EET CF	10/03/23 20:35
Total/NA	Prep	3005A			399744	KCK5	EET CF	09/18/23 10:00
Total/NA	Analysis	6020B		1	401579	A6US	EET CF	10/04/23 22:06
Total/NA	Prep	7470A			400098	NFT2	EET CF	09/20/23 10:48
Total/NA	Analysis	7470A		1	400261	NFT2	EET CF	09/21/23 11:32
Total/NA	Analysis	SM 2540C		1	399731	ENB7	EET CF	09/15/23 15:00
Total/NA	Analysis	SM 4500 H+ B		1	399501	W9YR	EET CF	09/14/23 12:15
Total/NA	Prep	PrecSep-21			628862	KAC	EET SL	09/20/23 10:01
Total/NA	Analysis	9315		1	631808	FLC	EET SL	10/13/23 19:36
Total/NA	Prep	PrecSep_0			628864	KAC	EET SL	09/20/23 10:04
Total/NA	Analysis	9320		1	631051	FLC	EET SL	10/09/23 11:11

Client Sample ID: MW05R-GW-0923

Lab Sample ID: 310-264765-3

Date Collected: 09/13/23 11:35

Matrix: Water

Date Received: 09/14/23 09:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	400640	QTZ5	EET CF	09/23/23 20:09
Total/NA	Prep	3005A			399744	KCK5	EET CF	09/18/23 10:00
Total/NA	Analysis	6020B		1	401411	A6US	EET CF	10/03/23 20:37
Total/NA	Prep	3005A			399744	KCK5	EET CF	09/18/23 10:00
Total/NA	Analysis	6020B		1	401579	A6US	EET CF	10/04/23 22:24

Eurofins Cedar Falls

Lab Chronicle

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Client Sample ID: MW05R-GW-0923

Lab Sample ID: 310-264765-3

Date Collected: 09/13/23 11:35

Matrix: Water

Date Received: 09/14/23 09:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			400098	NFT2	EET CF	09/20/23 10:48
Total/NA	Analysis	7470A		1	400261	NFT2	EET CF	09/21/23 11:34
Total/NA	Analysis	SM 2540C		1	399731	ENB7	EET CF	09/15/23 15:00
Total/NA	Analysis	SM 4500 H+ B		1	399501	W9YR	EET CF	09/14/23 12:16
Total/NA	Prep	PrecSep-21			628862	KAC	EET SL	09/20/23 10:01
Total/NA	Analysis	9315		1	631808	FLC	EET SL	10/13/23 19:38
Total/NA	Prep	PrecSep_0			628864	KAC	EET SL	09/20/23 10:04
Total/NA	Analysis	9320		1	631051	FLC	EET SL	10/09/23 11:11

Client Sample ID: MW19-GW-0923

Lab Sample ID: 310-264765-4

Date Collected: 09/13/23 14:30

Matrix: Water

Date Received: 09/14/23 09:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	400640	QTZ5	EET CF	09/23/23 20:21
Total/NA	Analysis	9056A		100	400640	QTZ5	EET CF	09/23/23 20:33
Total/NA	Prep	3005A			399744	KCK5	EET CF	09/18/23 10:00
Total/NA	Analysis	6020B		1	401411	A6US	EET CF	10/03/23 20:40
Total/NA	Prep	3005A			399744	KCK5	EET CF	09/18/23 10:00
Total/NA	Analysis	6020B		1	401579	A6US	EET CF	10/04/23 22:26
Total/NA	Prep	7470A			400098	NFT2	EET CF	09/20/23 10:48
Total/NA	Analysis	7470A		1	400261	NFT2	EET CF	09/21/23 11:37
Total/NA	Analysis	SM 2540C		1	399731	ENB7	EET CF	09/15/23 15:00
Total/NA	Analysis	SM 4500 H+ B		1	399501	W9YR	EET CF	09/14/23 12:17
Total/NA	Prep	PrecSep-21			628862	KAC	EET SL	09/20/23 10:01
Total/NA	Analysis	9315		1	631808	FLC	EET SL	10/13/23 19:38
Total/NA	Prep	PrecSep_0			628864	KAC	EET SL	09/20/23 10:04
Total/NA	Analysis	9320		1	631051	FLC	EET SL	10/09/23 11:11

Client Sample ID: MW21-GW-0923

Lab Sample ID: 310-264765-5

Date Collected: 09/13/23 12:45

Matrix: Water

Date Received: 09/14/23 09:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	400640	QTZ5	EET CF	09/23/23 20:45
Total/NA	Analysis	9056A		100	400640	QTZ5	EET CF	09/23/23 20:57
Total/NA	Prep	3005A			399744	KCK5	EET CF	09/18/23 10:00
Total/NA	Analysis	6020B		1	401411	A6US	EET CF	10/03/23 20:42
Total/NA	Prep	3005A			399744	KCK5	EET CF	09/18/23 10:00
Total/NA	Analysis	6020B		4	401579	A6US	EET CF	10/04/23 22:29
Total/NA	Prep	7470A			400098	NFT2	EET CF	09/20/23 10:48
Total/NA	Analysis	7470A		1	400261	NFT2	EET CF	09/21/23 11:39
Total/NA	Analysis	SM 2540C		1	399731	ENB7	EET CF	09/15/23 15:00
Total/NA	Analysis	SM 4500 H+ B		1	399501	W9YR	EET CF	09/14/23 12:18

Eurofins Cedar Falls

Lab Chronicle

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Client Sample ID: MW21-GW-0923

Lab Sample ID: 310-264765-5

Date Collected: 09/13/23 12:45

Matrix: Water

Date Received: 09/14/23 09:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			628862	KAC	EET SL	09/20/23 10:01
Total/NA	Analysis	9315		1	631808	FLC	EET SL	10/13/23 19:38
Total/NA	Prep	PrecSep_0			628864	KAC	EET SL	09/20/23 10:04
Total/NA	Analysis	9320		1	631051	FLC	EET SL	10/09/23 11:11

Client Sample ID: DP05-GW-0923

Lab Sample ID: 310-264765-6

Date Collected: 09/13/23 00:00

Matrix: Water

Date Received: 09/14/23 09:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	400640	QTZ5	EET CF	09/23/23 21:09
Total/NA	Prep	3005A			399744	KCK5	EET CF	09/18/23 10:00
Total/NA	Analysis	6020B		1	401411	A6US	EET CF	10/03/23 20:45
Total/NA	Prep	3005A			399744	KCK5	EET CF	09/18/23 10:00
Total/NA	Analysis	6020B		4	401579	A6US	EET CF	10/04/23 22:31
Total/NA	Prep	7470A			400098	NFT2	EET CF	09/20/23 10:48
Total/NA	Analysis	7470A		1	400261	NFT2	EET CF	09/21/23 11:41
Total/NA	Analysis	SM 2540C		1	399731	ENB7	EET CF	09/15/23 15:00
Total/NA	Analysis	SM 4500 H+ B		1	399501	W9YR	EET CF	09/14/23 12:20
Total/NA	Prep	PrecSep-21			628862	KAC	EET SL	09/20/23 10:01
Total/NA	Analysis	9315		1	631808	FLC	EET SL	10/13/23 19:38
Total/NA	Prep	PrecSep_0			628864	KAC	EET SL	09/20/23 10:04
Total/NA	Analysis	9320		1	631051	FLC	EET SL	10/09/23 11:12

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
6020B	3005A	Water	Lithium

Laboratory: Eurofins St. Louis

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	373	12-01-24

Method Summary

Client: GHD Services Inc.

Job ID: 310-264765-1

Project/Site: Neal North Closed CCR Monofill (IDNR)

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
7470A	Mercury (CVAA)	SW846	EET CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET CF
SM 4500 H+ B	pH	SM	EET CF
3005A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

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

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401



Environment Testing
America



310-264765 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>6HD Services</u>			
City/State:	CITY	STATE	Project:
Receipt Information			
Date/Time Received:	DATE <u>9-14-23</u>	TIME <u>0935</u>	Received By: <u>MY</u>
Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?		☒ Yes ☐ No	If yes: Cooler ID: _____
Multiple Coolers?		☒ Yes ☐ No	If yes: Cooler # <u>2</u> of <u>2</u>
Cooler Custody Seals Present?		☒ Yes ☐ No	If yes: Cooler custody seals intact? ☒ Yes ☐ No
Sample Custody Seals Present?		☐ Yes ☒ No	If yes: Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?		☐ Yes ☒ No	If yes: Which VOA samples are in cooler? ↓
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID: <u>R</u>		Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>11</u>		Corrected Temp (°C): <u>11</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>		<u>CONTAINER 2</u>
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Eurofins Cedar Falls

3019 Venture Way
Cedar Falls IA 50613
Phone (319) 277-2401 Phone (319) 277-2425

Chain of Custody Record

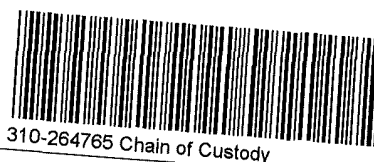
DSM214

eurofins

Client Information Client Contact: Kevin Armstrong Company: GHD Services Inc. Address: 11228 Aurora Avenue City: Des Moines State Zip: IA, 50322 7905 Phone: 515-414-3935 Email: Kevin.Armstrong@ghd.com Project Name: Neal North C osee CCR Monofil (IDNR) Site: Neal North C osee CCR Monofil		Sampler: TIAO LARSON Phone: 515-491-7791 Lab PM: Meredith Liechti E-Mail: meredith_liechti@eurofins.com State of Origin: Iowa		Carmer Tracking Note Page 1 of 1 Job #		COC No	
Due Date Requested TAT Requested (days): Standard Compliance Project: Yes No PO #: 340-004-18 WO #: 12576482-001 Project #: 31007314 SSOW#: 12576482 001		Analysis Requested Perform MS/MSD (Yes or No) Field Filtered Sample (Yes or No) 9315 Ra226 Standard Target List 9320 Ra228 Standard Target List 9556A ORGEM 280 Chloride Fluoride & Sulfate 6020B 7470A Appendix III and IV Metals 2540C Calcd, SM4500.H+		Preservation Codes A HCL B NaOH C Zn Acetate D Nitric Acid E NaHSO4 F MeOH G Amchlor H Ascorbic Acid I Ice J Di Water K EDTA L EDA Other		Preservation Codes M Hexane N None O AsNaO2 P Na2SO3 Q Na2SO4 R Na2S2O3 S H2SO4 T TSP Dodecahydrate U Acetone V MCAA W pH 4-5 Y Triaza Z other specify	
Sample Identification Sample Date Sample Time Sample Type (C=comp, G=grab) Matrix (W=water, S=solid, O=other, T=tissue, A=air)		Total Number of containers Special Instructions/Note					
MW01R-GW-0923 MW03R-GW-0923 MW05R-GW-0923 MW19-GW-0923 MW21-GW-0923 DP05-GW-0923 MW23SR-6W-0923		9/13/23 0820 9/13/23 1055 9/13/23 1135 9/13/23 1430 9/13/23 1245 9/13/23 9/13/23 0930		G G G G G G G		N N N N N N N	
Possible Hazard Identification ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological Deliverable Requested II III IV Other (specify)		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) ☐ Return To Client ☐ Disposal By Lab ☐ Archive For Months		Special Instructions/QC Requirements, Database Facility Code 1114642-GD-MidAmer			
Empty Kit Returned by Relinquished by Relinquished by Relinquished by		Date Date/Time Date/Time Date/Time		Method of Shipment Date/Time Date/Time Date/Time		Company Company Company Company	
Relinquished by Relinquished by Relinquished by		Date Date/Time Date/Time		Method of Shipment Date/Time Date/Time		Company Company Company	
Custody Seal No 1 Yes No		Date Date/Time Date/Time		Method of Shipment Date/Time Date/Time		Company Company Company	



Environment Testing
America



Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>GHD Services</u>			
City/State:	CITY	STATE	Project:
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>9-14-23</u>	<u>0935</u>	<u>MY</u>
Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler? ☒ Yes ☐ No If yes: Cooler ID: _____			
Multiple Coolers? ☒ Yes ☒ No <u>MY</u> If yes: Cooler # <u>1</u> of <u>2</u>			
Cooler Custody Seals Present? ☒ Yes ☐ No If yes: Cooler custody seals intact? ☒ Yes ☐ No			
Sample Custody Seals Present? ☐ Yes ☒ No If yes: Sample custody seals intact? ☐ Yes ☐ No			
Trip Blank Present? ☐ Yes ☒ No If yes: Which VOA samples are in cooler? ↓			
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID: <u>R</u>		Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>1.9</u>		Corrected Temp (°C): <u>1.9</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>		<u>CONTAINER 2</u>
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Environment Testing
America

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>GHD Services</u>			
City/State:	CITY	STATE	Project:
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>9-14-23</u>	<u>0935</u>	<u>My</u>
Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?		☒ Yes ☐ No	If yes: Cooler ID:
Multiple Coolers?		☒ Yes ☐ No	If yes: Cooler # <u>2</u> of <u>2</u>
Cooler Custody Seals Present?		☒ Yes ☐ No	If yes: Cooler custody seals intact? ☒ Yes ☐ No
Sample Custody Seals Present?		☐ Yes ☒ No	If yes: Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?		☐ Yes ☒ No	If yes: Which VOA samples are in cooler? ↓
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID: <u>R</u>		Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>1</u>		Corrected Temp (°C): <u>1</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>		<u>CONTAINER 2</u>
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE. If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Chain of Custody Record

DSM214

eurofins

84966

Client Information		Sampler: THAO LARSON		Lab P/N: Meredith Liech		Camer Tracking No:		COC No	
Client Contact:		Phone: 515-491-7791		E-Mail: meredith.liech@eurofins.com		State of Origin: Iowa		Page: Page 1 of 1	
Company: GHD Services Inc		PWSID: PWSID		Analysis Requested		Total Number of Containers		Preservation Codes	
Address: 11228 Aurora Avenue		Due Date Requested		Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)		9056A ORGFM 280 Chloride, Fluoride & Sulfate	
City: Des Moines		TAT Requested (days): Standard		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)	
State Zip: IA 50322 7905		Compliance Project: Yes		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)	
Phone: 515-414-3935		PO #: 340-00418		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)	
Email: Kevin.Armstrong@ghd.com		WG #: 12576482-001		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)	
Project Name: Neal North Cosec CCR Monofil (IDAR)		Project #: 3-007314		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)	
Site: Neal North Cosec CCR Monofil		SSOW#: 2576482-00		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)	
Sample Identification		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)		Matrix (for water, solids, or metals)	
MW01R-GW-0923		9/13/23		0830		G		Water	
MW03R-GW-0923		9/13/23		1055		G		Water	
MW05R-GW-0923		9/13/23		1135		G		Water	
MW19-GW-0923		9/13/23		1430		G		Water	
MW21-GW-0923		9/13/23		1245		G		Water	
DP05-GW-0923		9/13/23		---		G		Water	
MW23SR-GW-0923		9/13/23		0930		G		Water	
Possible Hazard Identification		Flammable		Skin Irritant		Radioactive		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	
Deliverable Requested		II III IV Other (specify)		Position B		Unknown		Return To Client	
Empty Kit Relinquished by		Date		Time		Method or Shipment		Archive For	
Relinquished by: THAO LARSON		Date/Time: 9/13/23 1540		Company: GHD		Received by: Mary Jane		Date/Time: 9-14-23 0935	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:	
Custody Seal Intact		Custody Seal No		Cooler Temperature (°C and Other Remarks)		Special Instructions/QC Requirements: Database Facility Code 1114642-GD-MidAmer		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	
Yes No		Yes No		Cooler Temperature (°C and Other Remarks)		Special Instructions/QC Requirements: Database Facility Code 1114642-GD-MidAmer		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-264765-1

Login Number: 264765

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Yang, Mary E

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Tracer/Carrier Summary

Client: GHD Services Inc.
Project/Site: Neal North Closed CCR Monofill (IDNR)

Job ID: 310-264765-1

Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	
310-264765-1	MW01R-GW-0923	90.2	
310-264765-2	MW03R-GW-0923	91.4	
310-264765-3	MW05R-GW-0923	89.2	
310-264765-4	MW19-GW-0923	90.0	
310-264765-5	MW21-GW-0923	85.6	
310-264765-6	DP05-GW-0923	90.5	
LCS 160-628862/2-A	Lab Control Sample	95.8	
MB 160-628862/1-A	Method Blank	95.6	
Tracer/Carrier Legend			
Ba = Ba Carrier			

Method: 9320 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)
310-264765-1	MW01R-GW-0923	90.2	80.4
310-264765-2	MW03R-GW-0923	91.4	80.0
310-264765-3	MW05R-GW-0923	89.2	78.1
310-264765-4	MW19-GW-0923	90.0	80.4
310-264765-5	MW21-GW-0923	85.6	76.3
310-264765-6	DP05-GW-0923	90.5	77.4
LCS 160-628864/2-A	Lab Control Sample	95.8	84.5
MB 160-628864/1-A	Method Blank	95.6	77.0
Tracer/Carrier Legend			
Ba = Ba Carrier			
Y = Y Carrier			

ANALYTICAL REPORT

PREPARED FOR

Attn: Kevin Armstrong
GHD Services Inc.

11228 Aurora Avenue
Des Moines, Iowa 50322-7905

Generated 10/16/2023 3:55:07 PM Revision 1

JOB DESCRIPTION

MEC Neal North - Background

JOB NUMBER

310-264765-3

Eurofins Cedar Falls

Job Notes

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The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization



Authorized for release by
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Revision 1

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Case Narrative

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Job ID: 310-264765-3

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-264765-3

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method. Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The samples were received on 9/14/2023 9:35 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 1.1°C and 1.9°C

HPLC/IC

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

Metals

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

General Chemistry

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

Narrative

Job Narrative 310-264765-4

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method. Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The samples were received on 9/14/2023 9:35 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 1.1°C and 1.9°C

Gas Flow Proportional Counter

Method 9315_Ra226: Radium-226 batch 628862 Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW231SR-GW-0923 (310-264765-7), (LCS 160-628862/2-A), (MB 160-628862/1-A), (380-62945-A-1-A) and (380-62945-B-1-A DU)

Method 9320_Ra228: Radium-228 batch 628864 Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking

Case Narrative

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Job ID: 310-264765-3 (Continued)

Laboratory: Eurofins Cedar Falls (Continued)

Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW231SR-GW-0923 (310-264765-7), (LCS 160-628864/2-A), (MB 160-628864/1-A), (380-62945-A-1-B) and (380-62945-B-1-B DU)

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

Narrative

Job Narrative 310-264765-5

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method. Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The samples were received on 9/14/2023 9:35 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 1.1°C and 1.9°C

HPLC/IC

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

Sample Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-264765-7	MW231SR-GW-0923	Water	09/13/23 09:30	09/14/23 09:35

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Client Sample ID: MW231SR-GW-0923

Lab Sample ID: 310-264765-7

Date Collected: 09/13/23 09:30

Matrix: Water

Date Received: 09/14/23 09:35

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			09/14/23 13:01	1
Nitrate as N	0.445		0.200		mg/L			09/14/23 13:01	1
Fluoride	<0.200		0.200		mg/L			09/14/23 13:01	1
Sulfate	158		20.0		mg/L			09/15/23 19:44	20

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 20:47	1
Arsenic	0.00967		0.00200		mg/L		09/18/23 10:00	10/03/23 20:47	1
Barium	0.120		0.00200		mg/L		09/18/23 10:00	10/03/23 20:47	1
Beryllium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/03/23 20:47	1
Boron	0.253		0.100		mg/L		09/18/23 10:00	10/04/23 22:33	1
Cadmium	<0.000200		0.000200		mg/L		09/18/23 10:00	10/03/23 20:47	1
Calcium	175		0.500		mg/L		09/18/23 10:00	10/04/23 22:33	1
Chromium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 20:47	1
Cobalt	0.00257		0.000500		mg/L		09/18/23 10:00	10/03/23 20:47	1
Lithium	0.0851		0.0100		mg/L		09/18/23 10:00	10/04/23 22:33	1
Lead	<0.000500		0.000500		mg/L		09/18/23 10:00	10/03/23 20:47	1
Molybdenum	0.00219		0.00200		mg/L		09/18/23 10:00	10/03/23 20:47	1
Selenium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 20:47	1
Thallium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/04/23 22:33	1
Iron	8.58		0.100		mg/L		09/18/23 10:00	10/03/23 20:47	1
Manganese	1.28		0.0100		mg/L		09/18/23 10:00	10/03/23 20:47	1

Method: SW846 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	2.26		0.100		mg/L		09/18/23 10:00	09/29/23 17:33	1
Manganese	0.717		0.0100		mg/L		09/18/23 10:00	09/29/23 17:33	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/20/23 10:52	09/21/23 11:47	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Quad (SW846 9060A)	3.03		1.00		mg/L			09/27/23 17:25	1
Total Dissolved Solids (SM 2540C)	716		50.0		mg/L			09/15/23 15:00	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.1	HF	1.0		SU			09/14/23 12:19	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.138		0.0866	0.0875	1.00	0.104	pCi/L	09/20/23 10:01	10/13/23 19:39	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.3		30 - 110					09/20/23 10:01	10/13/23 19:39	1

Eurofins Cedar Falls

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Client Sample ID: MW231SR-GW-0923

Lab Sample ID: 310-264765-7

Date Collected: 09/13/23 09:30

Matrix: Water

Date Received: 09/14/23 09:35

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.34		0.446	0.463	1.00	0.503	pCi/L	09/20/23 10:04	10/09/23 11:12	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.3		30 - 110					09/20/23 10:04	10/09/23 11:12	1
Y Carrier	77.4		30 - 110					09/20/23 10:04	10/09/23 11:12	1

Definitions/Glossary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Qualifiers

Metals

Qualifier	Qualifier Description
^+	Continuing Calibration Verification (CCV) is outside acceptance limits, high biased.

General Chemistry

Qualifier	Qualifier Description
HF	Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.

Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-399832/3

Matrix: Water

Analysis Batch: 399832

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			09/14/23 09:43	1
Fluoride	<0.200		0.200		mg/L			09/14/23 09:43	1
Sulfate	<1.00		1.00		mg/L			09/14/23 09:43	1

Lab Sample ID: LCS 310-399832/4

Matrix: Water

Analysis Batch: 399832

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.267		mg/L		93	90 - 110
Fluoride	2.00	2.032		mg/L		102	90 - 110
Sulfate	10.0	9.226		mg/L		92	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-399744/1-A

Matrix: Water

Analysis Batch: 401411

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 399744

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 19:25	1
Arsenic	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 19:25	1
Barium	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 19:25	1
Beryllium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/03/23 19:25	1
Boron	<0.100	^+	0.100		mg/L		09/18/23 10:00	10/03/23 19:25	1
Cadmium	<0.000200		0.000200		mg/L		09/18/23 10:00	10/03/23 19:25	1
Calcium	<0.500		0.500		mg/L		09/18/23 10:00	10/03/23 19:25	1
Chromium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 19:25	1
Cobalt	<0.000500		0.000500		mg/L		09/18/23 10:00	10/03/23 19:25	1
Lithium	<0.0100		0.0100		mg/L		09/18/23 10:00	10/03/23 19:25	1
Lead	<0.000500		0.000500		mg/L		09/18/23 10:00	10/03/23 19:25	1
Molybdenum	<0.00200		0.00200		mg/L		09/18/23 10:00	10/03/23 19:25	1
Selenium	<0.00500		0.00500		mg/L		09/18/23 10:00	10/03/23 19:25	1
Thallium	<0.00100		0.00100		mg/L		09/18/23 10:00	10/03/23 19:25	1
Iron	<0.100		0.100		mg/L		09/18/23 10:00	10/03/23 19:25	1
Manganese	<0.0100		0.0100		mg/L		09/18/23 10:00	10/03/23 19:25	1

Lab Sample ID: LCS 310-399744/2-A

Matrix: Water

Analysis Batch: 401411

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 399744

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	2.00	2.097		mg/L		105	80 - 120
Arsenic	2.00	1.794		mg/L		90	80 - 120
Barium	1.00	0.9234		mg/L		92	80 - 120
Beryllium	1.00	0.8577		mg/L		86	80 - 120
Cadmium	1.00	0.9018		mg/L		90	80 - 120
Chromium	1.00	0.8892		mg/L		89	80 - 120
Cobalt	1.00	0.9279		mg/L		93	80 - 120

Eurofins Cedar Falls

QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 310-399744/2-A
Matrix: Water
Analysis Batch: 401411

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 399744

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lithium	2.00	1.667		mg/L		83	80 - 120
Lead	2.00	1.850		mg/L		93	80 - 120
Molybdenum	2.00	1.743		mg/L		87	80 - 120
Selenium	4.00	3.544		mg/L		89	80 - 120
Iron	2.00	1.728		mg/L		86	80 - 120
Manganese	1.00	0.8237		mg/L		82	80 - 120

Lab Sample ID: LCS 310-399744/2-A ^10
Matrix: Water
Analysis Batch: 401579

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 399744

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Boron	2.00	2.195		mg/L		110	80 - 120

Lab Sample ID: LCS 310-399744/2-A ^10
Matrix: Water
Analysis Batch: 402206

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 399744

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Calcium	20.0	18.26		mg/L		91	80 - 120
Thallium	2.00	1.666		mg/L		83	80 - 120

Lab Sample ID: 310-264765-7 DU
Matrix: Water
Analysis Batch: 401411

Client Sample ID: MW231SR-GW-0923
Prep Type: Total/NA
Prep Batch: 399744

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	<0.00200		<0.00200		mg/L		NC	20
Antimony	<0.00200		<0.00200		mg/L		NC	20
Arsenic	0.00967		0.009552		mg/L		1	20
Arsenic	0.00967		0.009552		mg/L		1	20
Barium	0.120		0.1208		mg/L		0.7	20
Barium	0.120		0.1208		mg/L		0.7	20
Beryllium	<0.00100		<0.00100		mg/L		NC	20
Beryllium	<0.00100		<0.00100		mg/L		NC	20
Cadmium	<0.000200		<0.000200		mg/L		NC	20
Cadmium	<0.000200		<0.000200		mg/L		NC	20
Chromium	<0.00500		<0.00500		mg/L		NC	20
Chromium	<0.00500		<0.00500		mg/L		NC	20
Cobalt	0.00257		0.002620		mg/L		2	20
Cobalt	0.00257		0.002620		mg/L		2	20
Lead	<0.000500		<0.000500		mg/L		NC	20
Lead	<0.000500		<0.000500		mg/L		NC	20
Molybdenum	0.00219		0.002169		mg/L		1	20
Molybdenum	0.00219		0.002169		mg/L		1	20
Selenium	<0.00500		<0.00500		mg/L		NC	20
Selenium	<0.00500		<0.00500		mg/L		NC	20
Iron	8.58		8.526		mg/L		0.7	20
Iron	8.58		8.526		mg/L		0.7	20

Eurofins Cedar Falls

QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 310-264765-7 DU

Matrix: Water

Analysis Batch: 401411

Client Sample ID: MW231SR-GW-0923

Prep Type: Total/NA

Prep Batch: 399744

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Manganese	1.28		1.264		mg/L		1	20
Manganese	1.28		1.264		mg/L		1	20

Lab Sample ID: 310-264765-7 DU

Matrix: Water

Analysis Batch: 401579

Client Sample ID: MW231SR-GW-0923

Prep Type: Total/NA

Prep Batch: 399744

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Beryllium	<0.00100		<0.00100		mg/L		NC	20
Beryllium	<0.00100		<0.00100		mg/L		NC	20
Calcium	175		170.1		mg/L		3	20
Calcium	175		170.1		mg/L		3	20
Lithium	0.0851		0.08398		mg/L		1	20
Lithium	0.0851		0.08398		mg/L		1	20
Thallium	<0.00100		<0.00100		mg/L		NC	20
Thallium	<0.00100		<0.00100		mg/L		NC	20
Iron	8.68		8.561		mg/L		1	20
Manganese	1.33		1.291		mg/L		3	20

Lab Sample ID: MB 310-399745/1-A

Matrix: Water

Analysis Batch: 401097

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 399745

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<0.100		0.100		mg/L		09/18/23 10:00	09/29/23 15:26	1
Manganese	<0.0100		0.0100		mg/L		09/18/23 10:00	09/29/23 15:26	1

Lab Sample ID: LCS 310-399745/2-A

Matrix: Water

Analysis Batch: 401097

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 399745

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	0.200	0.1809		mg/L		90	80 - 120
Manganese	0.100	0.09987		mg/L		100	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-400100/1-A

Matrix: Water

Analysis Batch: 400261

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 400100

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/20/23 10:52	09/21/23 11:43	1

Lab Sample ID: LCS 310-400100/2-A

Matrix: Water

Analysis Batch: 400261

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 400100

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001623		mg/L		97	80 - 120

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QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Method: 9060A - Organic Carbon, Total (TOC)

Lab Sample ID: MB 500-734482/6
Matrix: Water
Analysis Batch: 734482

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Quad	<1.00		1.00		mg/L			09/27/23 16:34	1

Lab Sample ID: LCS 500-734482/7
Matrix: Water
Analysis Batch: 734482

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Organic Carbon - Quad	50.0	50.32		mg/L		101	86 - 116

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 310-399731/1
Matrix: Water
Analysis Batch: 399731

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			09/15/23 15:00	1

Lab Sample ID: LCS 310-399731/2
Matrix: Water
Analysis Batch: 399731

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	986.0		mg/L		99	90 - 110

Lab Sample ID: 310-264765-7 DU
Matrix: Water
Analysis Batch: 399731

Client Sample ID: MW231SR-GW-0923
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	716		688.0		mg/L		4	20

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-399501/1
Matrix: Water
Analysis Batch: 399501

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
pH	7.00	7.0		SU		100	98 - 102

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-628862/1-A
Matrix: Water
Analysis Batch: 631974

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 628862

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.03936	U	0.0831	0.0832	1.00	0.149	pCi/L	09/20/23 10:01	10/13/23 19:34	1

Eurofins Cedar Falls

QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Method: 9315 - Radium-226 (GFPC) (Continued)

Lab Sample ID: MB 160-628862/1-A
Matrix: Water
Analysis Batch: 631974

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 628862

Carrier	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	95.6		30 - 110	09/20/23 10:01	10/13/23 19:34	1

Lab Sample ID: LCS 160-628862/2-A
Matrix: Water
Analysis Batch: 631974

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 628862

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-226	11.3	10.61		1.14	1.00	0.155	pCi/L	94	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	95.8		30 - 110						

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-628864/1-A
Matrix: Water
Analysis Batch: 631059

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 628864

			Count	Total						
	MB	MB	Uncert.	Uncert.						
Analyte	Result	Qualifier	(2σ+/-)	(2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.5143	U	0.351	0.354	1.00	0.525	pCi/L	09/20/23 10:04	10/09/23 11:15	1
Carrier	MB	MB								
	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.6		30 - 110					09/20/23 10:04	10/09/23 11:15	1
Y Carrier	77.0		30 - 110					09/20/23 10:04	10/09/23 11:15	1

Lab Sample ID: LCS 160-628864/2-A
Matrix: Water
Analysis Batch: 631059

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 628864

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-228	7.81	9.002		1.21	1.00	0.413	pCi/L	115	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	95.8		30 - 110						
Y Carrier	84.5		30 - 110						

Eurofins Cedar Falls

QC Association Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

HPLC/IC

Analysis Batch: 399832

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-7	MW231SR-GW-0923	Total/NA	Water	9056A	
310-264765-7	MW231SR-GW-0923	Total/NA	Water	9056A	
MB 310-399832/3	Method Blank	Total/NA	Water	9056A	
LCS 310-399832/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 399744

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-7	MW231SR-GW-0923	Total/NA	Water	3005A	
MB 310-399744/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-399744/2-A	Lab Control Sample	Total/NA	Water	3005A	
LCS 310-399744/2-A ^10	Lab Control Sample	Total/NA	Water	3005A	
310-264765-7 DU	MW231SR-GW-0923	Total/NA	Water	3005A	

Prep Batch: 399745

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-7	MW231SR-GW-0923	Dissolved	Water	3005A	
MB 310-399745/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-399745/2-A	Lab Control Sample	Total/NA	Water	3005A	

Prep Batch: 400100

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-7	MW231SR-GW-0923	Total/NA	Water	7470A	
MB 310-400100/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-400100/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 400261

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-7	MW231SR-GW-0923	Total/NA	Water	7470A	400100
MB 310-400100/1-A	Method Blank	Total/NA	Water	7470A	400100
LCS 310-400100/2-A	Lab Control Sample	Total/NA	Water	7470A	400100

Analysis Batch: 401097

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-7	MW231SR-GW-0923	Dissolved	Water	6020B	399745
MB 310-399745/1-A	Method Blank	Total/NA	Water	6020B	399745
LCS 310-399745/2-A	Lab Control Sample	Total/NA	Water	6020B	399745

Analysis Batch: 401411

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-7	MW231SR-GW-0923	Total/NA	Water	6020B	399744
MB 310-399744/1-A	Method Blank	Total/NA	Water	6020B	399744
LCS 310-399744/2-A	Lab Control Sample	Total/NA	Water	6020B	399744
310-264765-7 DU	MW231SR-GW-0923	Total/NA	Water	6020B	399744

Analysis Batch: 401579

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-7	MW231SR-GW-0923	Total/NA	Water	6020B	399744
LCS 310-399744/2-A ^10	Lab Control Sample	Total/NA	Water	6020B	399744
310-264765-7 DU	MW231SR-GW-0923	Total/NA	Water	6020B	399744

Eurofins Cedar Falls

QC Association Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Metals

Analysis Batch: 402206

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 310-399744/2-A ^10	Lab Control Sample	Total/NA	Water	6020B	399744

General Chemistry

Analysis Batch: 399501

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-7	MW231SR-GW-0923	Total/NA	Water	SM 4500 H+ B	
LCS 310-399501/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 399731

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-7	MW231SR-GW-0923	Total/NA	Water	SM 2540C	
MB 310-399731/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-399731/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-264765-7 DU	MW231SR-GW-0923	Total/NA	Water	SM 2540C	

Analysis Batch: 734482

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-7	MW231SR-GW-0923	Total/NA	Water	9060A	
MB 500-734482/6	Method Blank	Total/NA	Water	9060A	
LCS 500-734482/7	Lab Control Sample	Total/NA	Water	9060A	

Rad

Prep Batch: 628862

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-7	MW231SR-GW-0923	Total/NA	Water	PrecSep-21	
MB 160-628862/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-628862/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	

Prep Batch: 628864

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-264765-7	MW231SR-GW-0923	Total/NA	Water	PrecSep_0	
MB 160-628864/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-628864/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Client Sample ID: MW231SR-GW-0923

Lab Sample ID: 310-264765-7

Date Collected: 09/13/23 09:30

Matrix: Water

Date Received: 09/14/23 09:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	399832	QTZ5	EET CF	09/14/23 13:01
Total/NA	Analysis	9056A		20	399832	QTZ5	EET CF	09/15/23 19:44
Dissolved	Prep	3005A			399745	KCK5	EET CF	09/18/23 10:00
Dissolved	Analysis	6020B		1	401097	ZRI4	EET CF	09/29/23 17:33
Total/NA	Prep	3005A			399744	KCK5	EET CF	09/18/23 10:00
Total/NA	Analysis	6020B		1	401411	A6US	EET CF	10/03/23 20:47
Total/NA	Prep	3005A			399744	KCK5	EET CF	09/18/23 10:00
Total/NA	Analysis	6020B		1	401579	A6US	EET CF	10/04/23 22:33
Total/NA	Prep	7470A			400100	NFT2	EET CF	09/20/23 10:52
Total/NA	Analysis	7470A		1	400261	NFT2	EET CF	09/21/23 11:47
Total/NA	Analysis	9060A		1	734482	AJP	EET CHI	09/27/23 17:25
Total/NA	Analysis	SM 2540C		1	399731	ENB7	EET CF	09/15/23 15:00
Total/NA	Analysis	SM 4500 H+ B		1	399501	W9YR	EET CF	09/14/23 12:19
Total/NA	Prep	PrecSep-21			628862	KAC	EET SL	09/20/23 10:01
Total/NA	Analysis	9315		1	631808	FLC	EET SL	10/13/23 19:39
Total/NA	Prep	PrecSep_0			628864	KAC	EET SL	09/20/23 10:04
Total/NA	Analysis	9320		1	631051	FLC	EET SL	10/09/23 11:12

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-23
The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.			
Analysis Method	Prep Method	Matrix	Analyte
6020B	3005A	Water	Lithium

Laboratory: Eurofins Chicago

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2903	04-29-24
Georgia	State	N/A	04-29-24
Georgia (DW)	State	939	04-29-24
Hawaii	State	NA	04-29-24
Illinois	NELAP	IL00035	04-29-24
Indiana	State	C-IL-02	04-29-24
Iowa	State	082	05-01-24
Kansas	NELAP	E-10161	10-31-23
Kentucky (UST)	State	AI # 108083	04-29-24
Kentucky (WW)	State	KY90023	12-31-23
Louisiana (All)	NELAP	02046	06-30-23 *
Mississippi	State	NA	04-29-24
North Carolina (WW/SW)	State	291	12-31-23
North Dakota	State	R-194	04-29-24
South Carolina	State	77001003	04-29-24
USDA	US Federal Programs	P330-18-00018	02-11-24
Wisconsin	State	999580010	08-31-24
Wyoming	State	8TMS-Q	04-29-24

Laboratory: Eurofins St. Louis

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	373	12-01-24

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins Cedar Falls

Method Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
7470A	Mercury (CVAA)	SW846	EET CF
9060A	Organic Carbon, Total (TOC)	SW846	EET CHI
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET CF
SM 4500 H+ B	pH	SM	EET CF
3005A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

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

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200



Environment Testing
America



310-264765 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>6 HD Services</u>			
City/State:	CITY	STATE	Project:
Receipt Information			
Date/Time Received:	DATE <u>9-14-23</u>	TIME <u>0935</u>	Received By: <u>MY</u>
Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?		☒ Yes ☐ No	If yes: Cooler ID: _____
Multiple Coolers?		☒ Yes ☐ No	If yes: Cooler # <u>2</u> of <u>2</u>
Cooler Custody Seals Present?		☒ Yes ☐ No	If yes: Cooler custody seals intact? ☒ Yes ☐ No
Sample Custody Seals Present?		☐ Yes ☒ No	If yes: Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?		☐ Yes ☒ No	If yes: Which VOA samples are in cooler? ↓
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID: <u>R</u>		Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>1</u>		Corrected Temp (°C): <u>1</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>		<u>CONTAINER 2</u>
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Eurofins Cedar Falls

3019 Venture Way
Cedar Falls IA 50613
Phone (319) 277-2401 Phone (319) 277-2425

Chain of Custody Record

DSM214

eurofins

Client Information Client Contact: Kevin Armstrong Company: GHD Services Inc. Address: 11228 Aurora Avenue City: Des Moines State Zip: IA, 50322 7905 Phone: 515-414-3935 Email: Kevin.Armstrong@ghd.com Project Name: Neal North C osee CCR Monofil (IDNR) Site: Neal North C osee CCR Monofil		Sampler: <u>TIAO LARSON</u> Phone: <u>515-491-7791</u> Lab PM: Meredith Liechti E-Mail: meredith_liechti@eurofins.com State of Origin: Iowa		Carmer Tracking Note Page 1 of 1 Job #		COC No	
Due Date Requested TAT Requested (days): Standard Compliance Project: ☐ Yes ☐ No PC #: 340-004-18 WO #: 12576482-001 Project #: 31007314 SSOW#: 12576482 001		Analysis Requested Perform MS/MSD (Yes or No) Field Filtered Sample (Yes or No) 9315 Ra226 Standard Target List 9320 Ra228 Standard Target List 9505A ORGFM 280 Chloride Fluoride & Sulfate 6020B 7470A Appendix III and IV Metals 2540C Calcd, SM4500.H+		Preservation Codes A HCL B NaOH C Zn Acetate D Nitric Acid E NaHSO4 F MeOH G Amchlor H Ascorbic Acid I Ice J Di Water K EDTA L EDA Other		Preservation Codes M Hexane N None O AsNaO2 P Na2SO3 Q Na2SO4 R Na2SO3 S H2SO4 T TSP Dodecylhydrate U Acetone V MCAA W pH 4-5 Y Triaza Z other spscly)	
Sample Identification Sample Date Sample Time Sample Type (C=comp, G=grab) Matrix (W=water, S=solid, O=other) Preservation Code		Total Number of containers		Special Instructions/Note			
MW01R-GW-0923 9/13/23 0820 G Water N		X		S			
MW03R-GW-0923 9/13/23 1055 G Water N		X		S			
MW05R-GW-0923 9/13/23 1135 G Water N		X		S			
MW19-GW-0923 9/13/23 1430 G Water N		X		S			
MW21-GW-0923 9/13/23 1245 G Water N		X		S			
DP05-GW-0923 9/13/23 G Water N		X		S			
MW23SR-6W-0923 9/13/23 0930 G WATER N		X		S		9 SHOW HOLD	
TL		TL		TL			

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
 Special Instructions/QC Requirements: Database Facility Code 1114642-GD-MidAmer

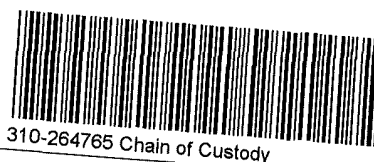
Empty Kit Relinquished by Relinquished by: <u>TIAO LARSON</u> Date/Time: 9/13/23 1540 Company: GHD		Relinquished by Date/Time: 9/14/23 0935 Company:	
Relinquished by Date/Time: Company:		Relinquished by Date/Time: Company:	
Relinquished by Date/Time: Company:		Relinquished by Date/Time: Company:	
Custody Seal No 1 Yes ☐ No ☐		Cool Temperature s) °C and Other Remarks.	

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Environment Testing
America



Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>GHD Services</u>			
City/State:	CITY	STATE	Project:
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>9-14-23</u>	<u>0935</u>	<u>MY</u>
Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler? ☒ Yes ☐ No If yes: Cooler ID: _____			
Multiple Coolers? ☒ Yes ☒ No <u>MY</u> If yes: Cooler # <u>1</u> of <u>2</u>			
Cooler Custody Seals Present? ☒ Yes ☐ No If yes: Cooler custody seals intact? ☒ Yes ☐ No			
Sample Custody Seals Present? ☐ Yes ☒ No If yes: Sample custody seals intact? ☐ Yes ☐ No			
Trip Blank Present? ☐ Yes ☒ No If yes: Which VOA samples are in cooler? ↓			
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID: <u>R</u>		Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>1.9</u>		Corrected Temp (°C): <u>1.9</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>		<u>CONTAINER 2</u>
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Environment Testing
America

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>GHD Services</u>			
City/State:	CITY	STATE	Project:
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>9-14-23</u>	<u>0935</u>	<u>My</u>
Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?		☒ Yes ☐ No	If yes: Cooler ID:
Multiple Coolers?		☒ Yes ☐ No	If yes: Cooler # <u>2</u> of <u>2</u>
Cooler Custody Seals Present?		☒ Yes ☐ No	If yes: Cooler custody seals intact? ☒ Yes ☐ No
Sample Custody Seals Present?		☐ Yes ☒ No	If yes: Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?		☐ Yes ☒ No	If yes: Which VOA samples are in cooler? ↓
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID: <u>R</u>		Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>1</u>		Corrected Temp (°C): <u>1</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>		<u>CONTAINER 2</u>
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE. If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Chain of Custody Record

DSM214

eurofins

Client Information		Sampler: TARA LARSON		Lab P/N: Meredith Lecht		Camer Tracking No:		COC No:	
Client Contact: Kevin Armstrong		Phone: 515-491-7791		E-Mail: meredith.lecht@eurofins.com		State of Origin: Iowa		Page: Page 1 of 1	
Company: GHD Services Inc		Address: 11228 Aurora Avenue		City: Des Moines		State: IA		Zip: 50322 7905	
Phone: 515-414-3935		Fax: 515-414-3935		Email: Kevin.Armstrong@ghd.com		Project Name: Neal North Cosec CCR Monofil (IDAR)		Site: Neal North Cosec CCR Monofil	
Due Date Requested: TAT Requested (days):		Compliance Project: Yes		Sample Date: 9/13/23		Sample Time: 0830		Sample Type: G	
PO #: 340-00418		WG #: 12576482-001		Project #: 3-007314		SSOW #: 2576482-00		Matrix: Water	
Sample Identification		Sample Date		Sample Time		Sample Type (G=Grab)		Preservation Code	
MW01R-GW-0923	9/13/23	0830	G	Water	N	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9315 Ra226 Standard Target List	9320 Ra228 Standard Target List
MW03R-GW-0923	9/13/23	1055	G	Water	N			9056A ORGFM 280 Chloride, Fluoride & Sulfate	6020B 7470A Appendix III and IV Metals
MW05R-GW-0923	9/13/23	1135	G	Water	N				2540C Calcd 8M4500.H+
MW19-GW-0923	9/13/23	1430	G	Water	N				
MW21-GW-0923	9/13/23	1245	G	Water	N				
DP05-GW-0923	9/13/23		G	Water	N				
MW23SR-GW-0923	9/13/23	0930	G	Water	N				
Possible Hazard Identification		Non-Hazard		Flammable		Skin Irritant		Radioactive	
Deliverable Requested		II		III		IV		Other (specify)	
Empty Kit Relinquished by		Date		Time		Method or Shipment		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	
Relinquished by: TARA LARSON		Date/Time: 9/13/23 1540		Company: GHD		Received by: Meredith Lecht		Date/Time: 9-14-23 0935	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:	
Custody Seal Intact		Yes		No		Custody Seal No		Cooler Temperature (°C) and Other Remarks:	

3019 Venture Way
Cedar Falls IA 50613
Phone 319 277-2401 Fax 319-277-2425

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10/16/2023 (Rev. 1)

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-264765-3

Login Number: 264765

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Yang, Mary E

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-264765-3

Login Number: 264765

List Number: 2

Creator: Scott, Sherri L

List Source: Eurofins Chicago

List Creation: 09/16/23 01:04 PM

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	4.0
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	True	

Tracer/Carrier Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North - Background

Job ID: 310-264765-3

Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)					
		Ba					
Lab Sample ID	Client Sample ID	(30-110)					
310-264765-7	MW231SR-GW-0923	88.3					
LCS 160-628862/2-A	Lab Control Sample	95.8					
MB 160-628862/1-A	Method Blank	95.6					
Tracer/Carrier Legend							
Ba = Ba Carrier							

Method: 9320 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)					
		Ba	Y				
Lab Sample ID	Client Sample ID	(30-110)	(30-110)				
310-264765-7	MW231SR-GW-0923	88.3	77.4				
LCS 160-628864/2-A	Lab Control Sample	95.8	84.5				
MB 160-628864/1-A	Method Blank	95.6	77.0				
Tracer/Carrier Legend							
Ba = Ba Carrier							
Y = Y Carrier							

ANALYTICAL REPORT

PREPARED FOR

Attn: Kevin Armstrong
GHD Services Inc.
11228 Aurora Avenue
Des Moines, Iowa 50322-7905

Generated 12/12/2023 9:58:24 AM

JOB DESCRIPTION

MEC Neal North Impoundment 1,2, and 3A

JOB NUMBER

310-270951-1

Eurofins Cedar Falls

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization



Generated
12/12/2023 9:58:24 AM

Authorized for release by
Meredith Liechti, Service Center Manager
meredith.liechti@et.eurofinsus.com
(319)277-2401

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Case Narrative

Client: GHD Services Inc.
Project/Site: MEC Neal North Impoundment 1,2, and 3A

Job ID: 310-270951-1

Job ID: 310-270951-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-270951-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method. Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The samples were received on 12/6/2023 4:25 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was -0.3°C

Metals

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

Sample Summary

Client: GHD Services Inc.

Job ID: 310-270951-1

Project/Site: MEC Neal North Impoundment 1,2, and 3A

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-270951-1	MW104R-GW-1223	Water	12/05/23 12:55	12/06/23 16:25
310-270951-2	MW21-GW-1223	Water	12/05/23 11:25	12/06/23 16:25

Client Sample Results

Client: GHD Services Inc.

Job ID: 310-270951-1

Project/Site: MEC Neal North Impoundment 1,2, and 3A

Client Sample ID: MW104R-GW-1223

Lab Sample ID: 310-270951-1

Date Collected: 12/05/23 12:55

Matrix: Water

Date Received: 12/06/23 16:25

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.000718		0.000200		mg/L		12/08/23 08:45	12/08/23 16:33	1
Cobalt	0.0153		0.000500		mg/L		12/08/23 08:45	12/08/23 16:33	1

Client Sample Results

Client: GHD Services Inc.

Job ID: 310-270951-1

Project/Site: MEC Neal North Impoundment 1,2, and 3A

Client Sample ID: MW21-GW-1223

Lab Sample ID: 310-270951-2

Date Collected: 12/05/23 11:25

Matrix: Water

Date Received: 12/06/23 16:25

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.337		0.100		mg/L		12/08/23 08:45	12/08/23 16:36	1

Definitions/Glossary

Client: GHD Services Inc.

Job ID: 310-270951-1

Project/Site: MEC Neal North Impoundment 1,2, and 3A

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

QC Sample Results

Client: GHD Services Inc.
Project/Site: MEC Neal North Impoundment 1,2, and 3A

Job ID: 310-270951-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-408171/1-A

Matrix: Water

Analysis Batch: 408410

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 408171

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	<0.100		0.100		mg/L		12/08/23 08:45	12/08/23 16:29	1
Cadmium	<0.000200		0.000200		mg/L		12/08/23 08:45	12/08/23 16:29	1
Cobalt	<0.000500		0.000500		mg/L		12/08/23 08:45	12/08/23 16:29	1

Lab Sample ID: LCS 310-408171/2-A

Matrix: Water

Analysis Batch: 408410

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 408171

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Boron	0.200	0.2253		mg/L		113	80 - 120
Cadmium	0.100	0.09249		mg/L		92	80 - 120
Cobalt	0.100	0.09621		mg/L		96	80 - 120

Lab Sample ID: 310-270951-1 MS

Matrix: Water

Analysis Batch: 408410

Client Sample ID: MW104R-GW-1223

Prep Type: Total/NA

Prep Batch: 408171

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Cadmium	0.000718		0.100	0.09370		mg/L		93	75 - 125
Cobalt	0.0153		0.100	0.1070		mg/L		92	75 - 125

Lab Sample ID: 310-270951-1 MSD

Matrix: Water

Analysis Batch: 408410

Client Sample ID: MW104R-GW-1223

Prep Type: Total/NA

Prep Batch: 408171

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cadmium	0.000718		0.100	0.09077		mg/L		90	75 - 125	3	20
Cobalt	0.0153		0.100	0.1039		mg/L		89	75 - 125	3	20

Lab Sample ID: 310-270951-2 MS

Matrix: Water

Analysis Batch: 408410

Client Sample ID: MW21-GW-1223

Prep Type: Total/NA

Prep Batch: 408171

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Boron	0.337		0.200	0.5237		mg/L		93	75 - 125

Lab Sample ID: 310-270951-2 MSD

Matrix: Water

Analysis Batch: 408410

Client Sample ID: MW21-GW-1223

Prep Type: Total/NA

Prep Batch: 408171

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Boron	0.337		0.200	0.4914		mg/L		77	75 - 125	6	20

Eurofins Cedar Falls

QC Association Summary

Client: GHD Services Inc.

Job ID: 310-270951-1

Project/Site: MEC Neal North Impoundment 1,2, and 3A

Metals

Prep Batch: 408171

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-270951-1	MW104R-GW-1223	Total/NA	Water	3005A	
310-270951-2	MW21-GW-1223	Total/NA	Water	3005A	
MB 310-408171/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-408171/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-270951-1 MS	MW104R-GW-1223	Total/NA	Water	3005A	
310-270951-1 MSD	MW104R-GW-1223	Total/NA	Water	3005A	
310-270951-2 MS	MW21-GW-1223	Total/NA	Water	3005A	
310-270951-2 MSD	MW21-GW-1223	Total/NA	Water	3005A	

Analysis Batch: 408410

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-270951-1	MW104R-GW-1223	Total/NA	Water	6020B	408171
310-270951-2	MW21-GW-1223	Total/NA	Water	6020B	408171
MB 310-408171/1-A	Method Blank	Total/NA	Water	6020B	408171
LCS 310-408171/2-A	Lab Control Sample	Total/NA	Water	6020B	408171
310-270951-1 MS	MW104R-GW-1223	Total/NA	Water	6020B	408171
310-270951-1 MSD	MW104R-GW-1223	Total/NA	Water	6020B	408171
310-270951-2 MS	MW21-GW-1223	Total/NA	Water	6020B	408171
310-270951-2 MSD	MW21-GW-1223	Total/NA	Water	6020B	408171

Lab Chronicle

Client: GHD Services Inc.
Project/Site: MEC Neal North Impoundment 1,2, and 3A

Job ID: 310-270951-1

Client Sample ID: MW104R-GW-1223
Date Collected: 12/05/23 12:55
Date Received: 12/06/23 16:25

Lab Sample ID: 310-270951-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			408171	QTZ5	EET CF	12/08/23 08:45
Total/NA	Analysis	6020B		1	408410	A6US	EET CF	12/08/23 16:33

Client Sample ID: MW21-GW-1223
Date Collected: 12/05/23 11:25
Date Received: 12/06/23 16:25

Lab Sample ID: 310-270951-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			408171	QTZ5	EET CF	12/08/23 08:45
Total/NA	Analysis	6020B		1	408410	A6US	EET CF	12/08/23 16:36

Laboratory References:
EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Accreditation/Certification Summary

Client: GHD Services Inc.
Project/Site: MEC Neal North Impoundment 1,2, and 3A

Job ID: 310-270951-1

Laboratory: Eurofins Cedar Falls

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-23 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: GHD Services Inc.

Job ID: 310-270951-1

Project/Site: MEC Neal North Impoundment 1,2, and 3A

Method	Method Description	Protocol	Laboratory
6020B	Metals (ICP/MS)	SW846	EET CF
3005A	Preparation, Total Metals	SW846	EET CF

Protocol References:

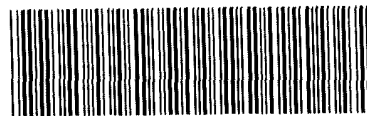
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401



Environment Testing
America



310-270951 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>GHD</u>			
City/State:	<u>Des Moines</u>	STATE <u>IA</u>	Project:
Receipt Information			
Date/Time Received:	DATE <u>12/06/23</u>	TIME <u>16:25</u>	Received By: <u>ZB</u>
Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☒ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?		☒ Yes ☐ No	If yes: Cooler ID: _____
Multiple Coolers?		☐ Yes ☒ No	If yes: Cooler # _____ of _____
Cooler Custody Seals Present?		☒ Yes ☐ No	If yes: Cooler custody seals intact? ☒ Yes ☐ No
Sample Custody Seals Present?		☐ Yes ☒ No	If yes: Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?		☐ Yes ☒ No	If yes: Which VOA samples are in cooler? ↓
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other: _____ ☐ NONE			
Thermometer ID: <u>Y</u>		Correction Factor (°C): <u>0.0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>-0.3</u>		Corrected Temp (°C): <u>-0.3</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>		<u>CONTAINER 2</u>
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) If yes: Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Phone (319) 277-2401 Phone (319) 277-2425

Ver. 01/16/2019

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-270951-1

SDG Number:

Login Number: 270951

List Number: 1

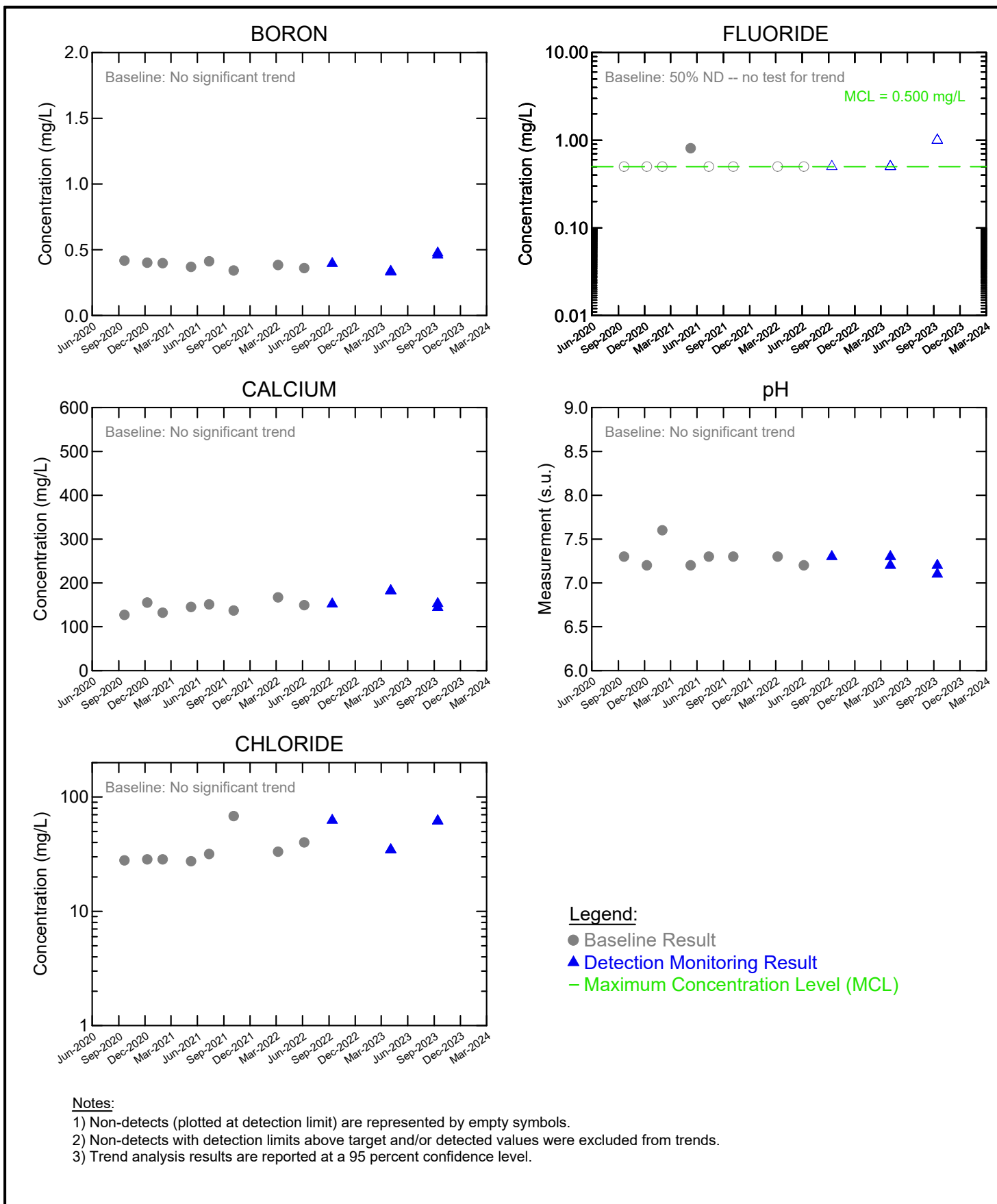
Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix C

Time Series Graphs

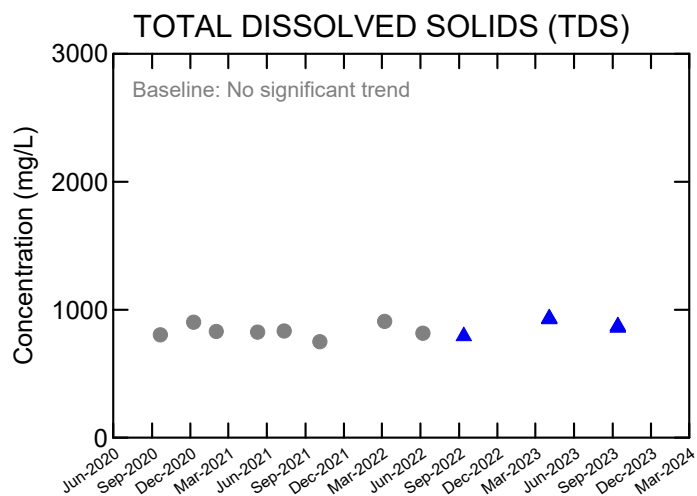
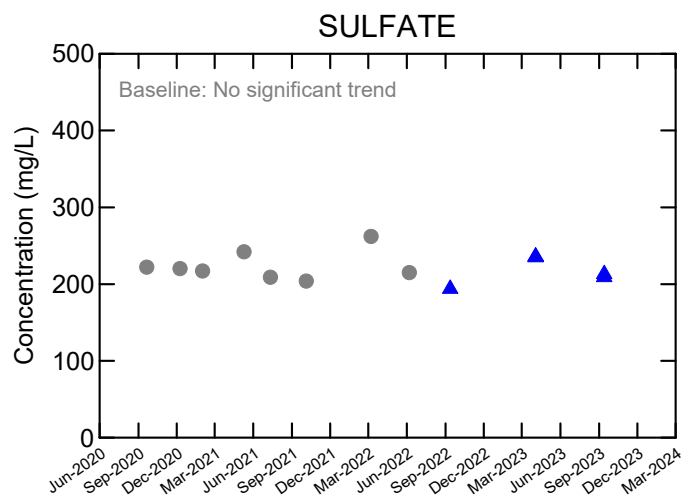


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-1R -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 1.a



Legend:

- Baseline Result
- ▲ Detection Monitoring Result

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

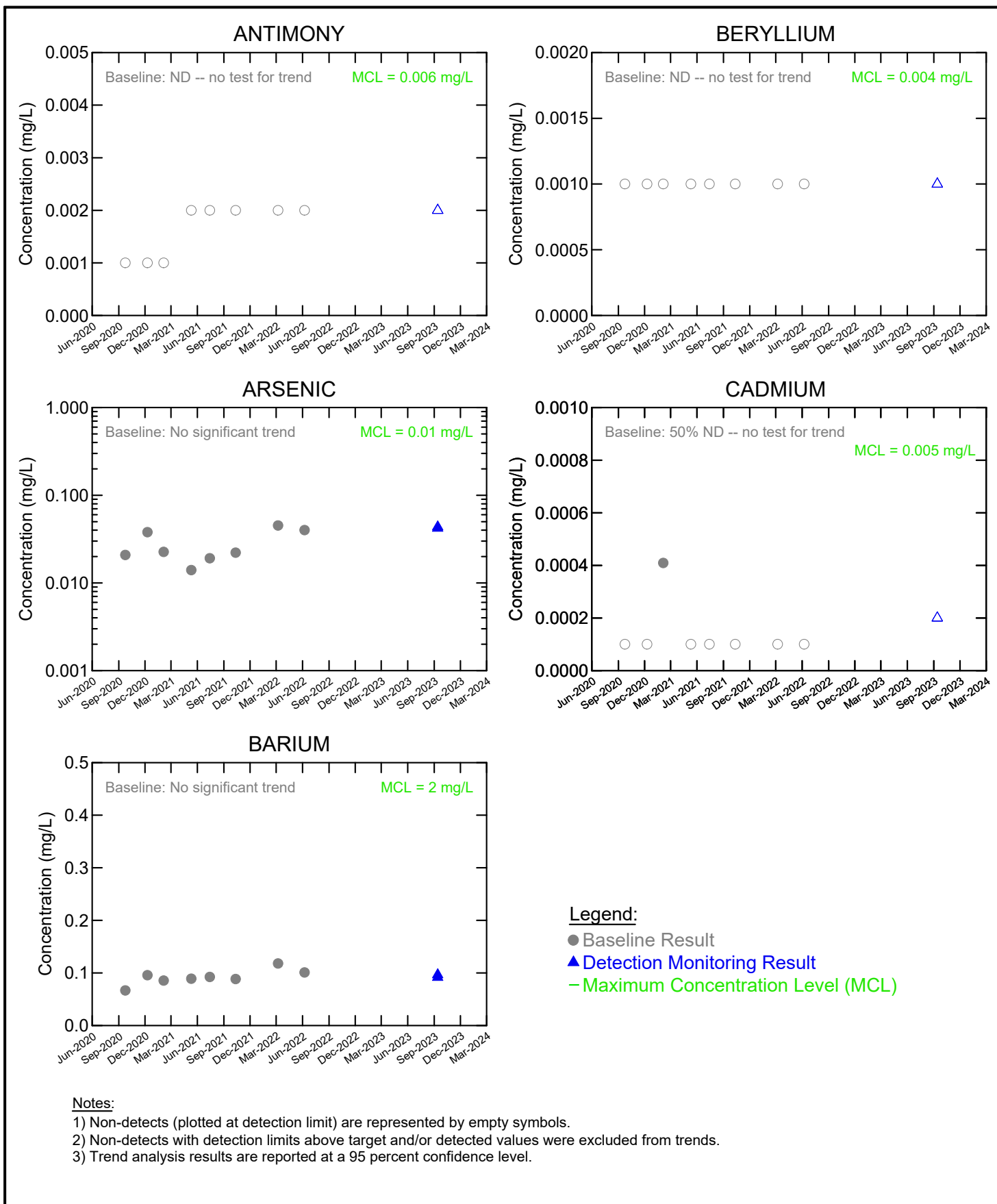


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-1R -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 1.b

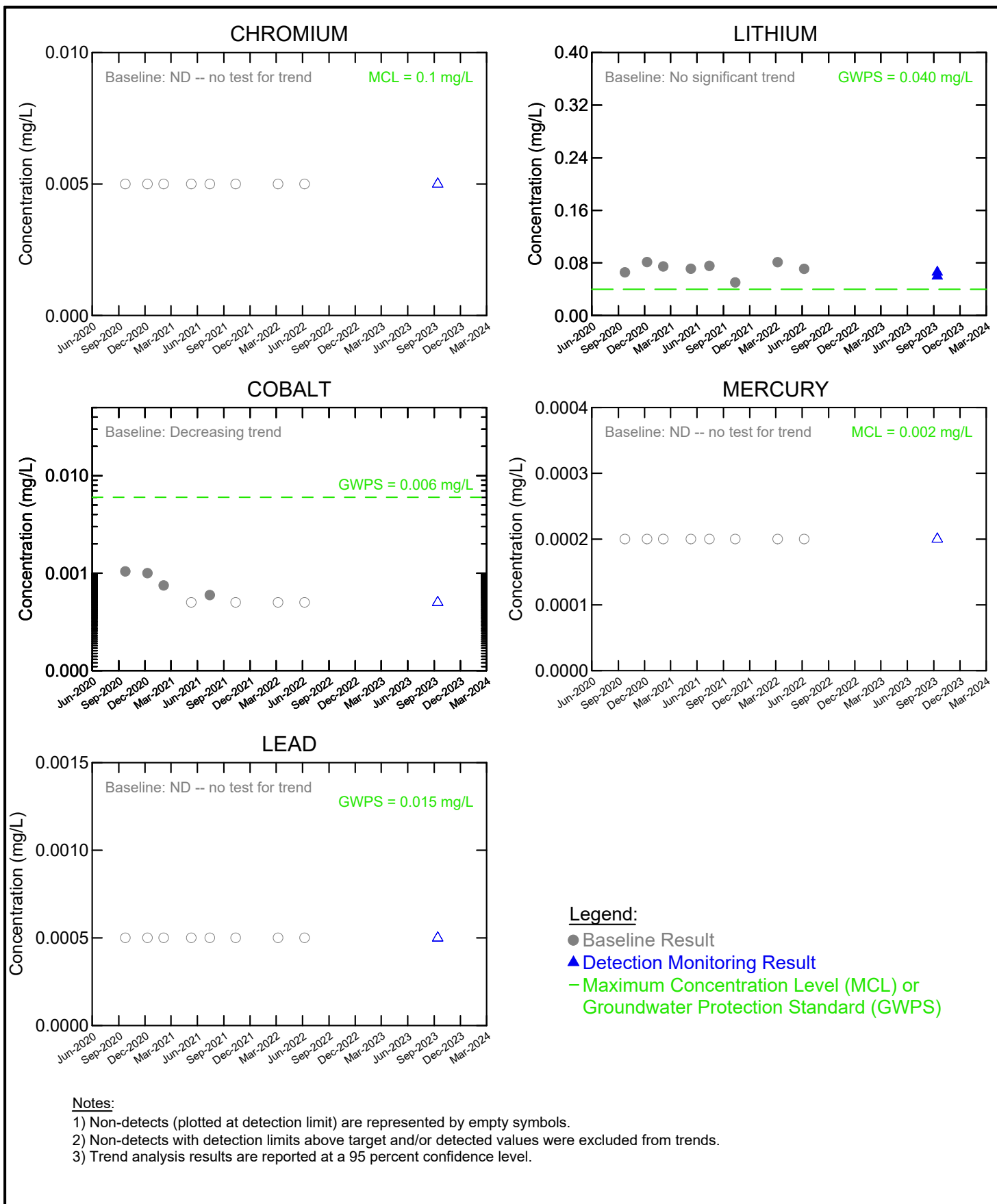


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-1R -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 1.c

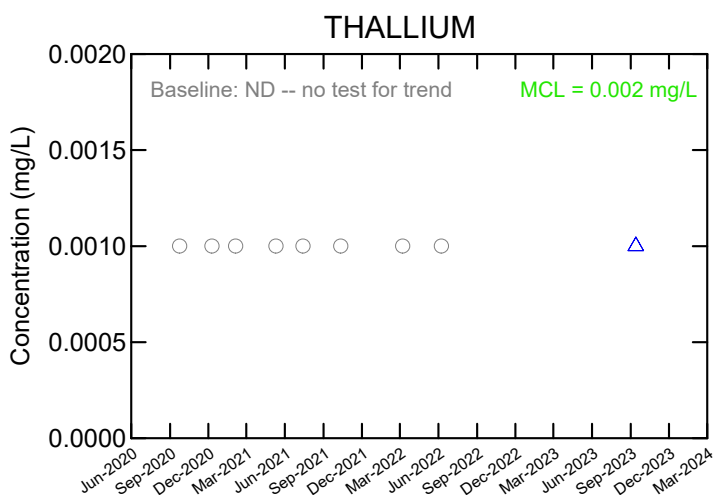
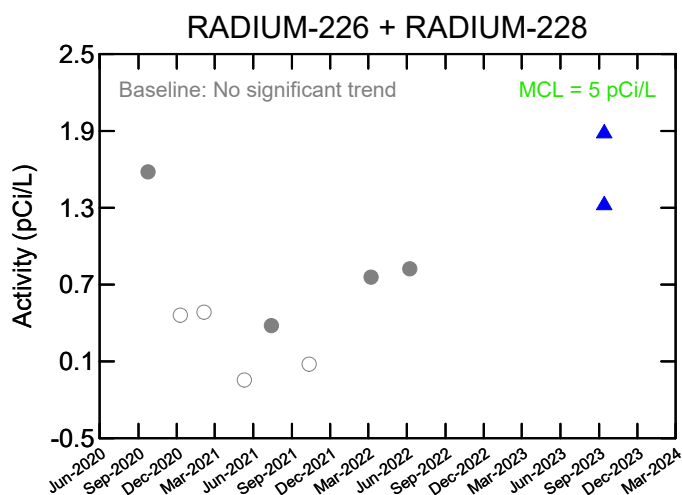
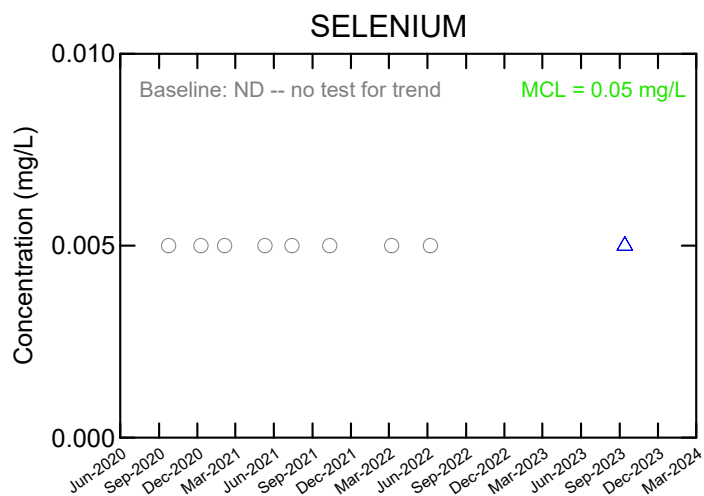
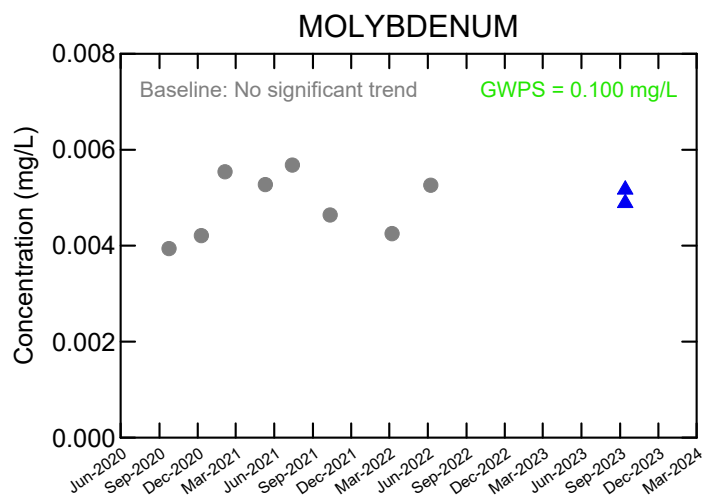


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-1R -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 1.d



Legend:

- Baseline Result
- ▲ Detection Monitoring Result
- Maximum Concentration Level (MCL) or Groundwater Protection Standard (GWPS)

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

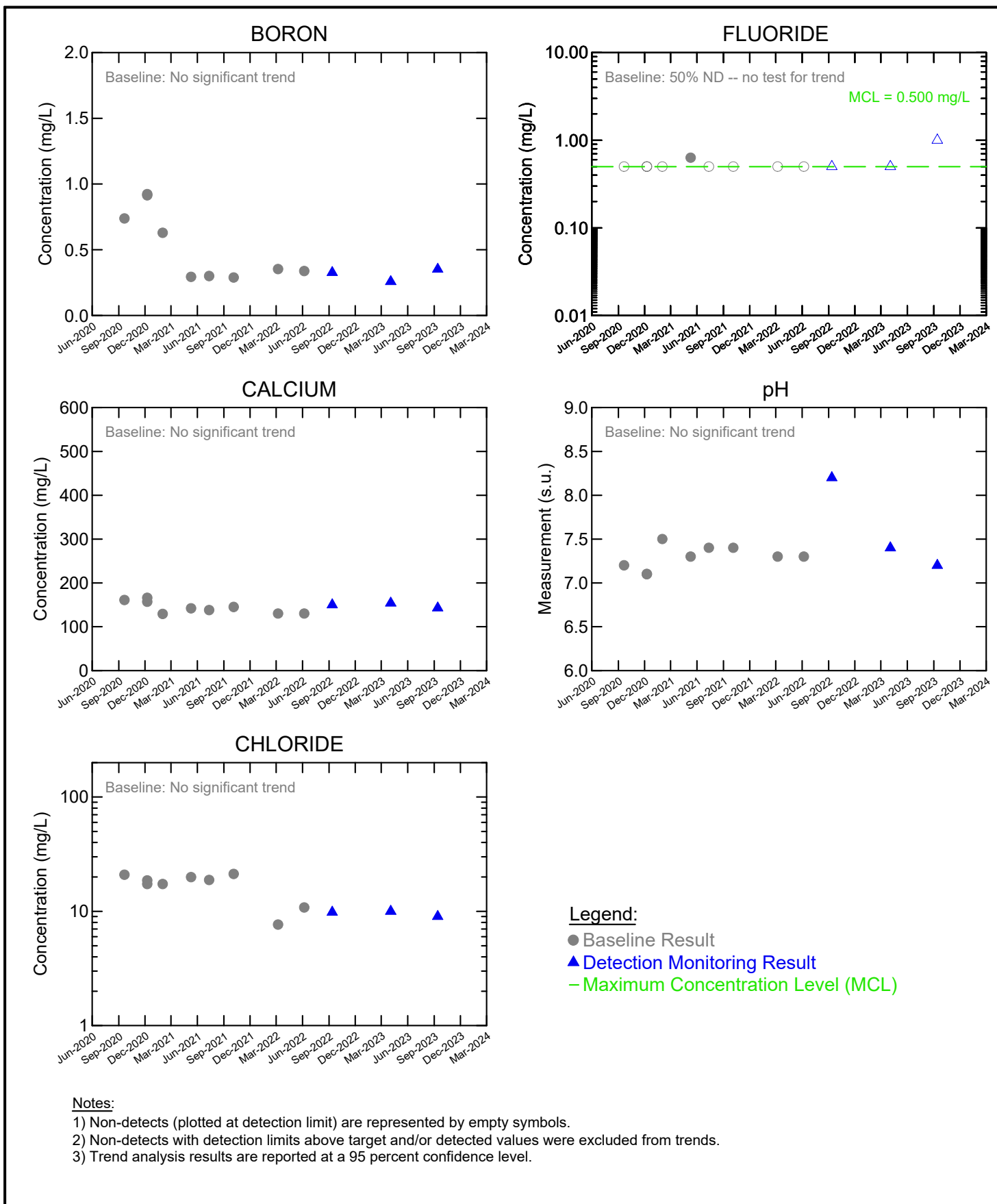


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

MW-1R -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 1.e

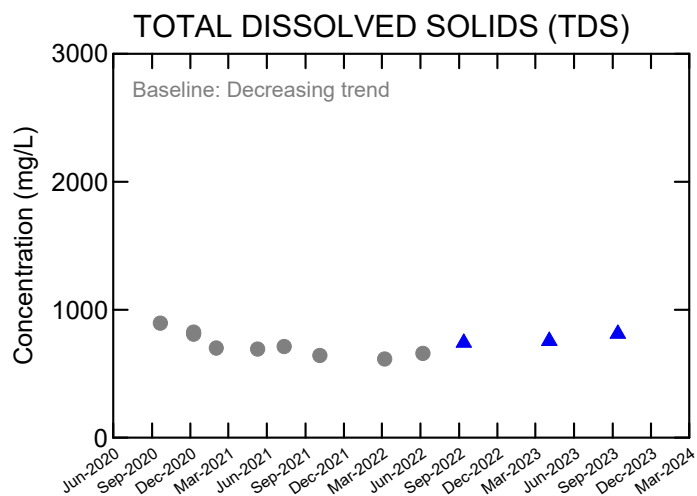
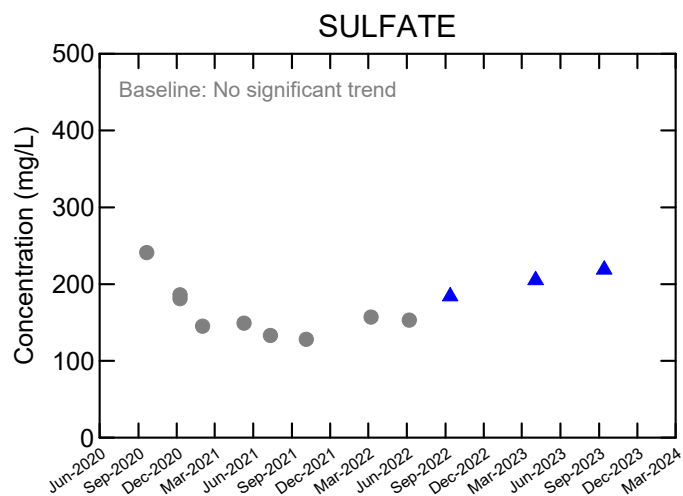


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-3R -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 2.a



Legend:

- Baseline Result
- ▲ Detection Monitoring Result

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

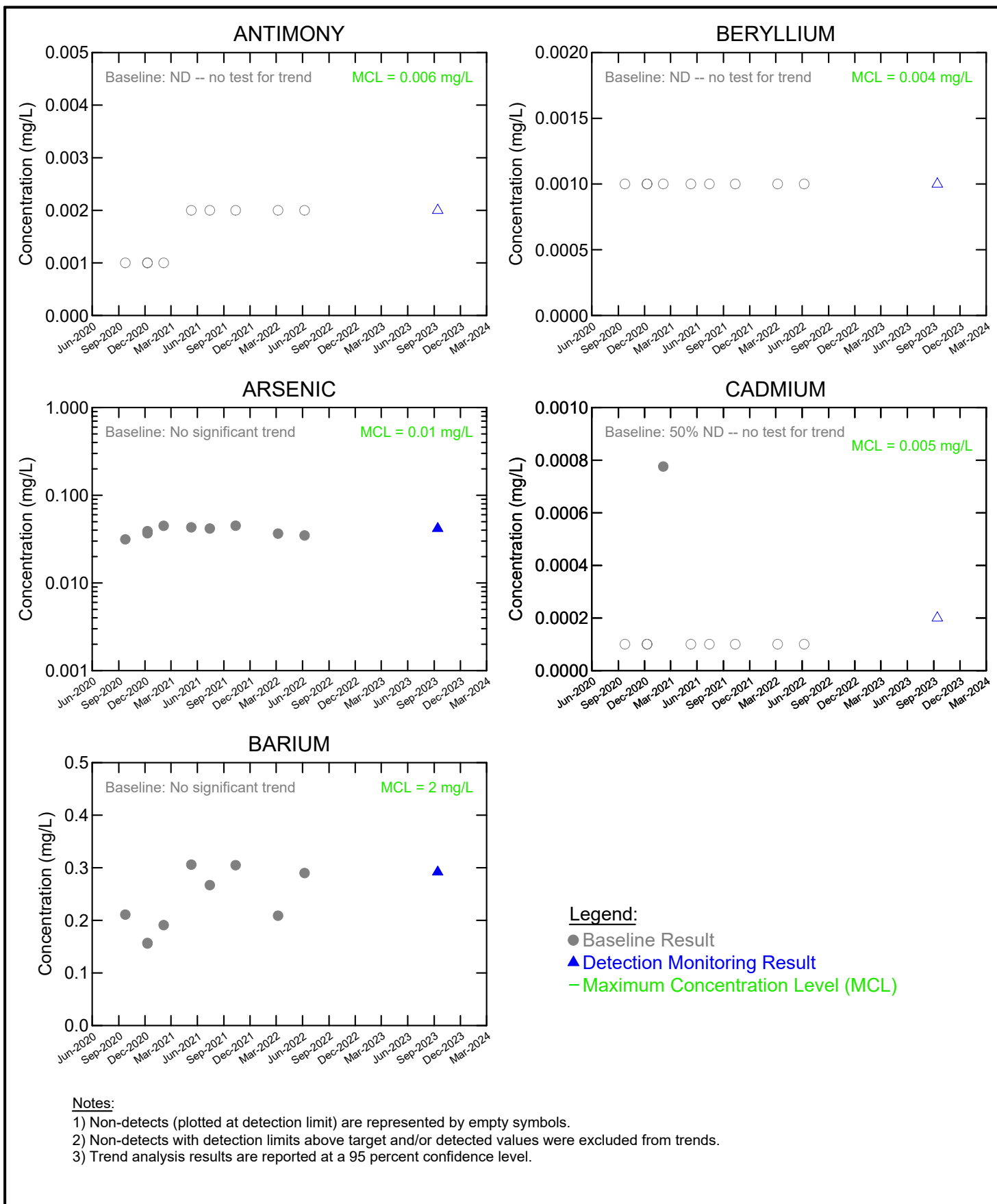


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-3R -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 2.b

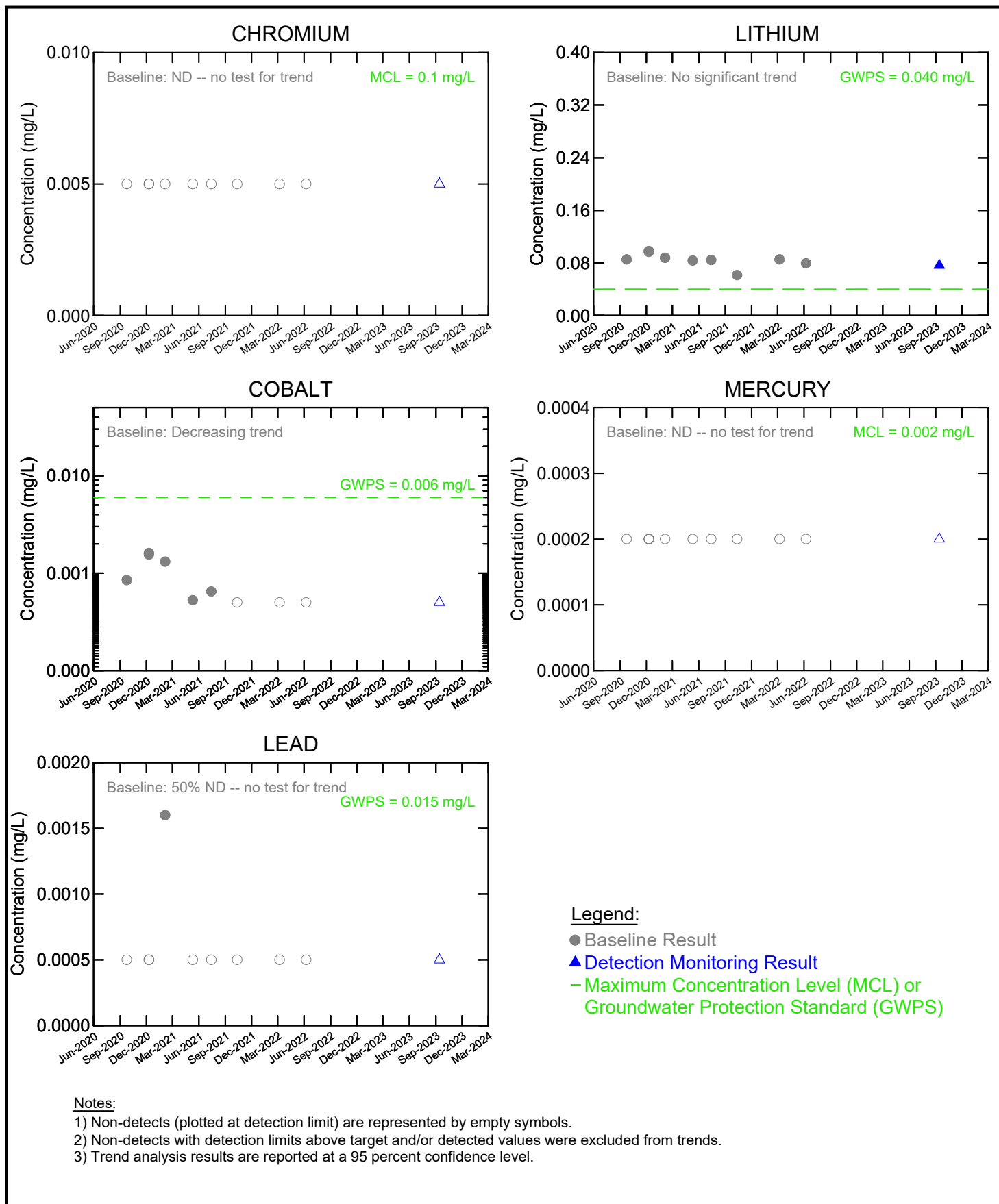


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-3R -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 2.c

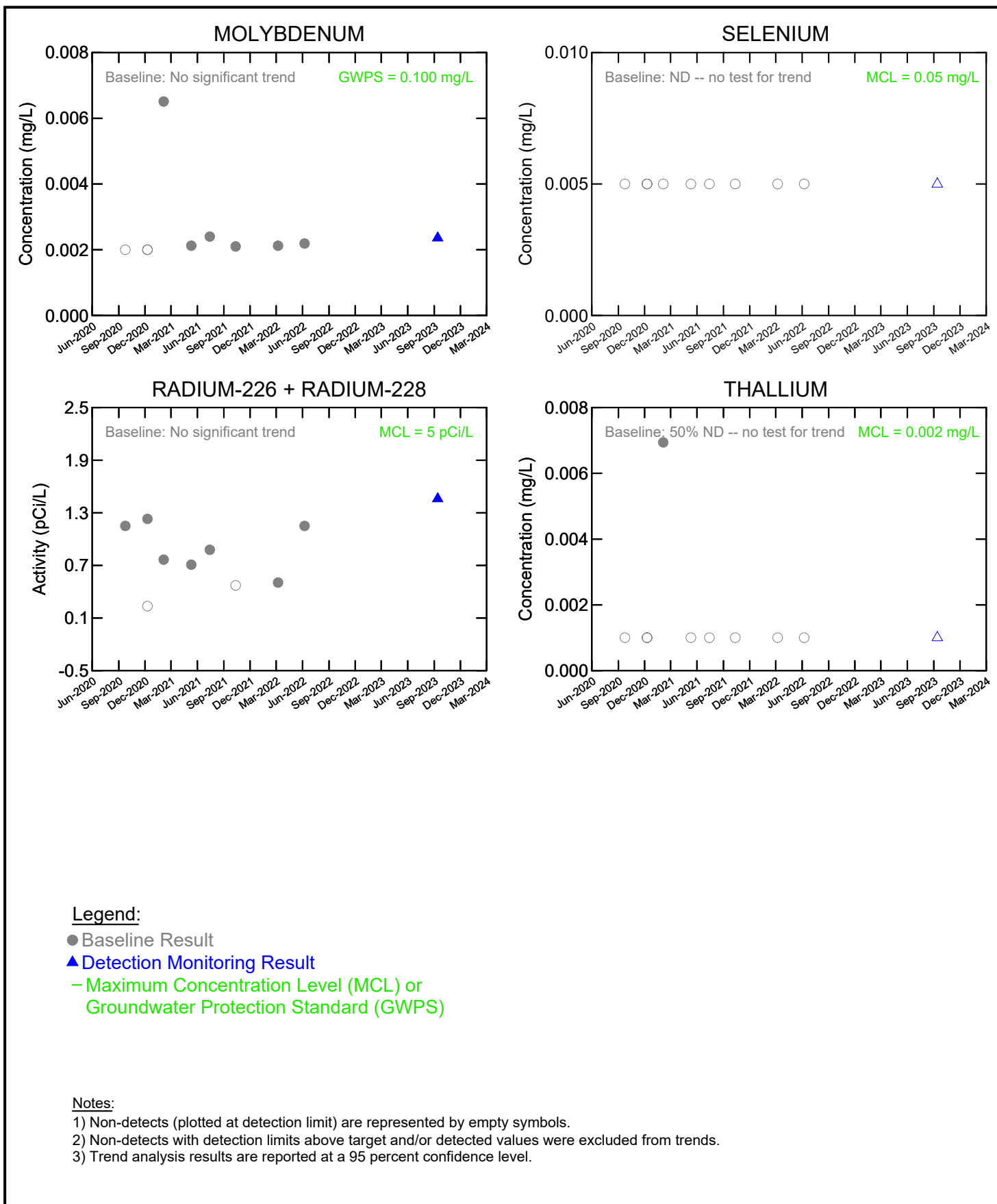


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Sergeant Bluff, Iowa

**MW-3R -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 2.d

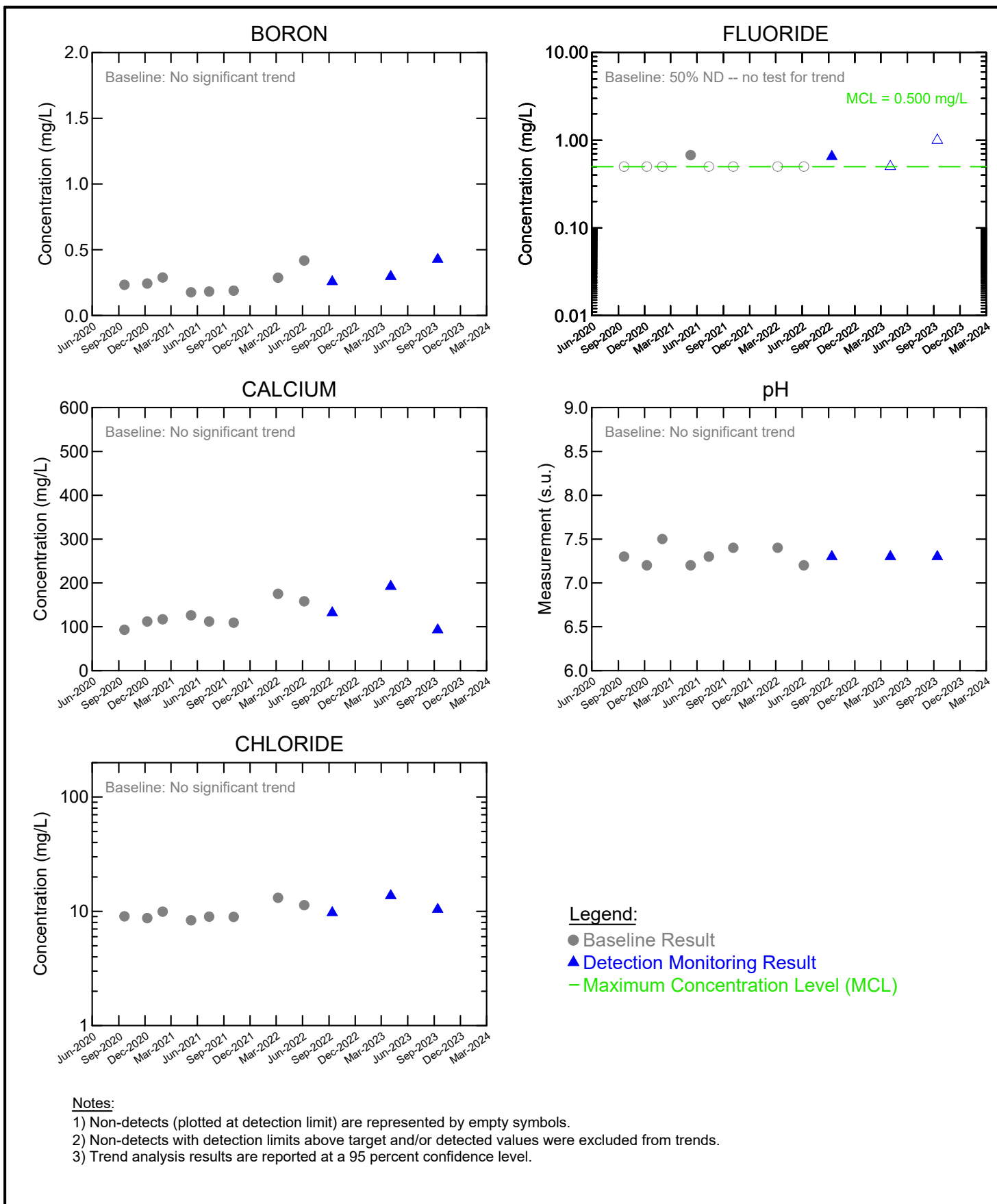


MidAmerican Energy Company
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Sergeant Bluff, Iowa

**MW-3R -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 2.e

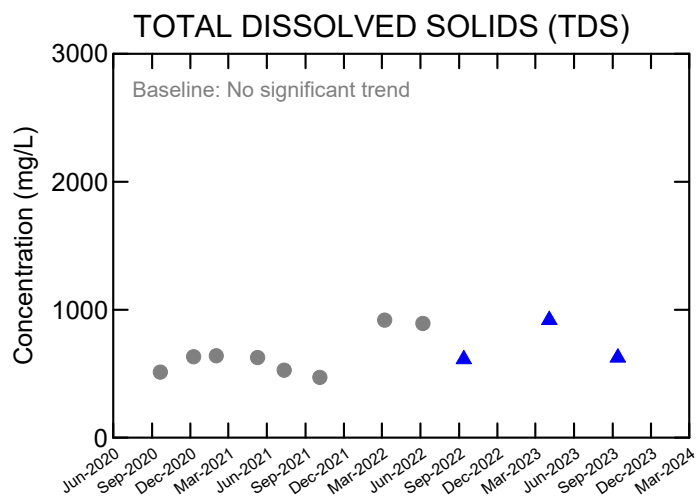
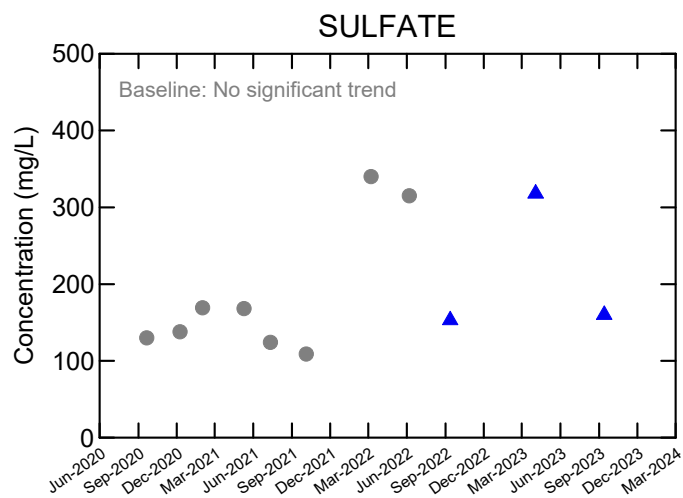


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-5R -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 3.a



Legend:

- Baseline Result
- ▲ Detection Monitoring Result

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

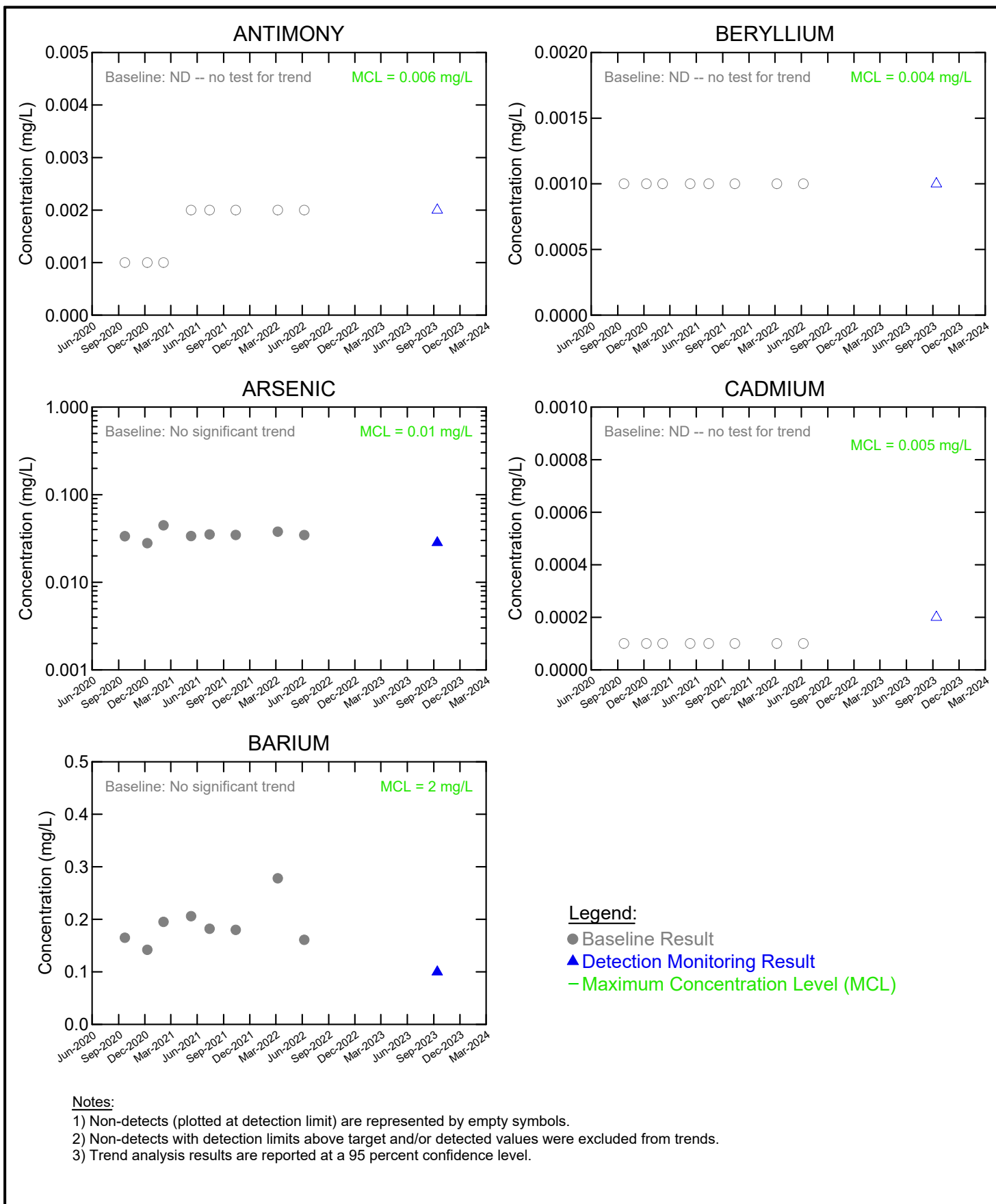


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-5R -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 3.b

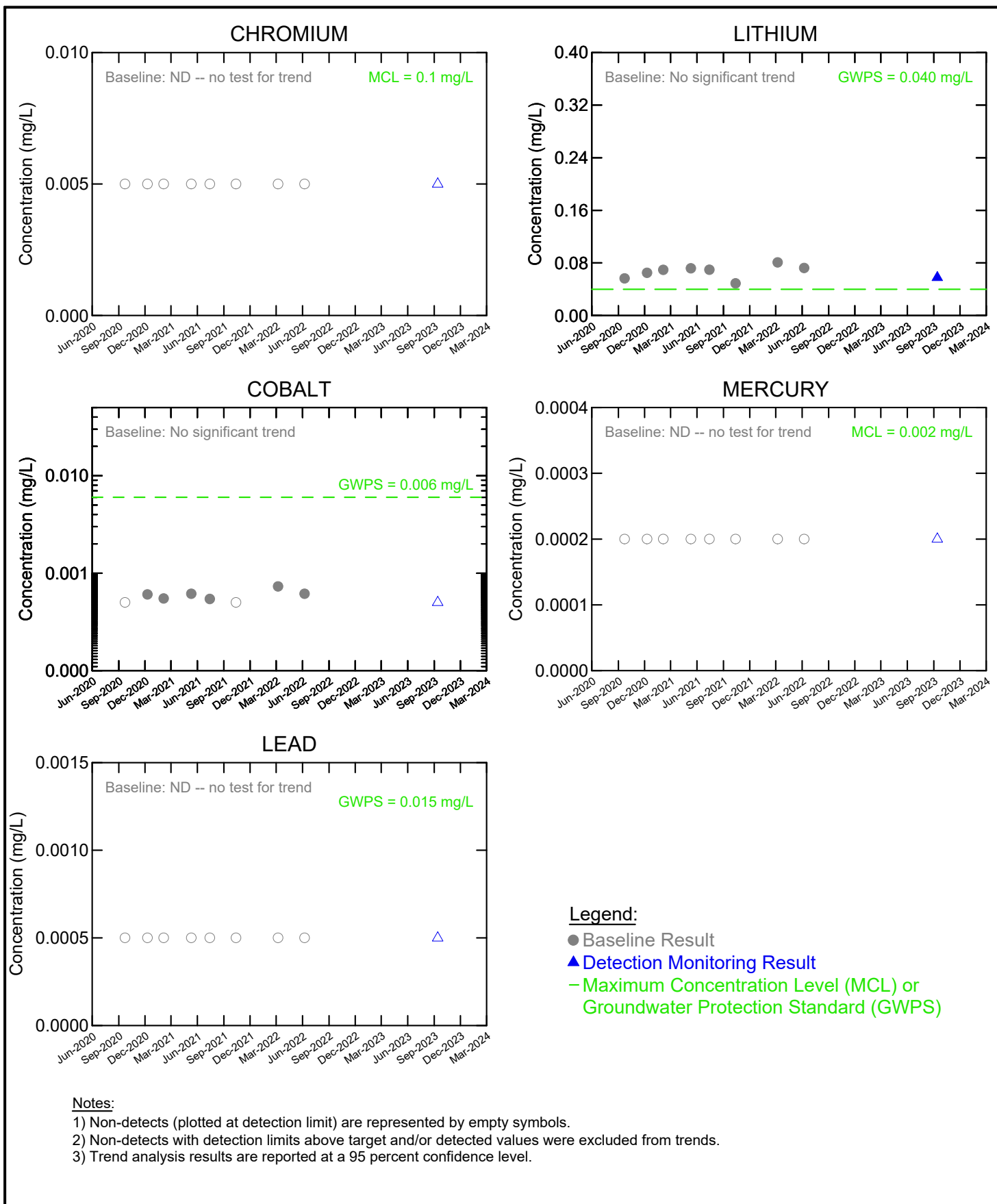


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-5R -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 3.c

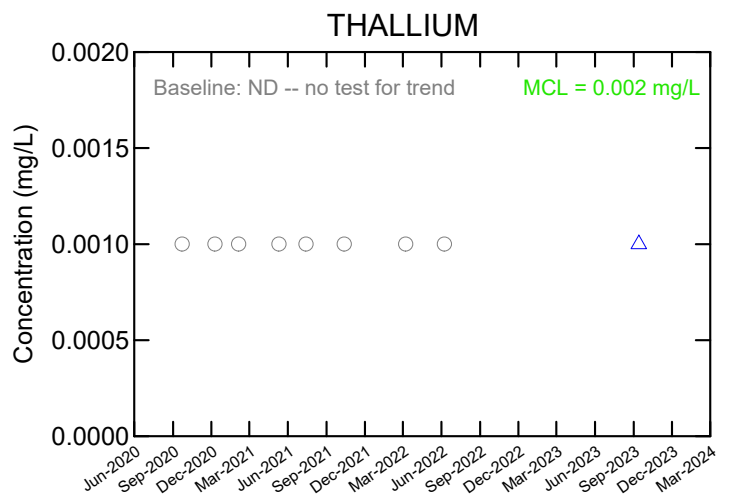
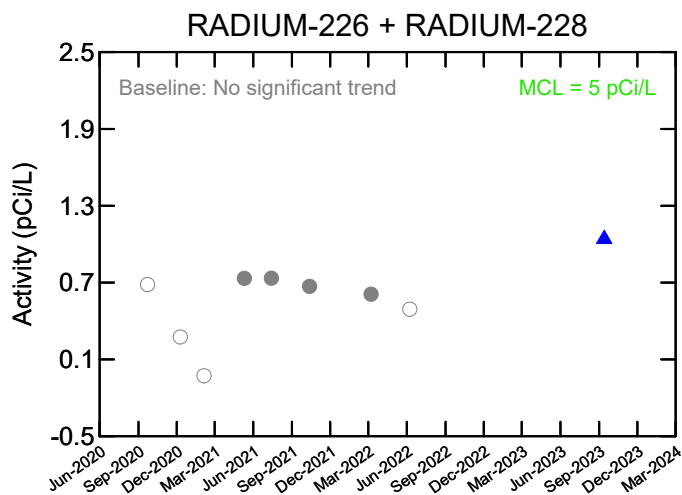
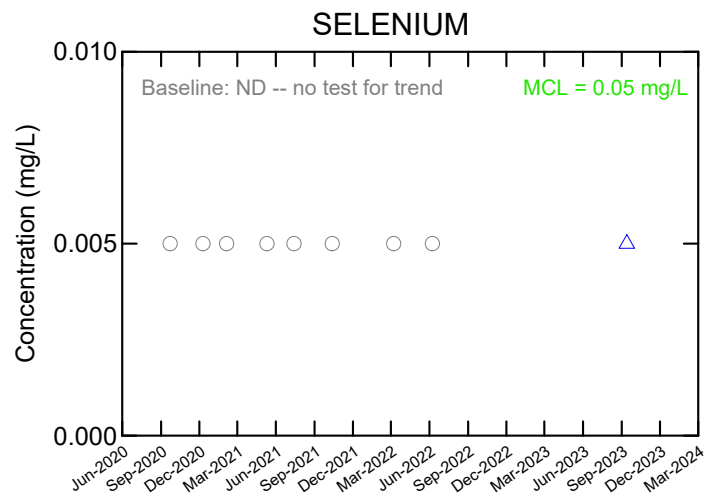
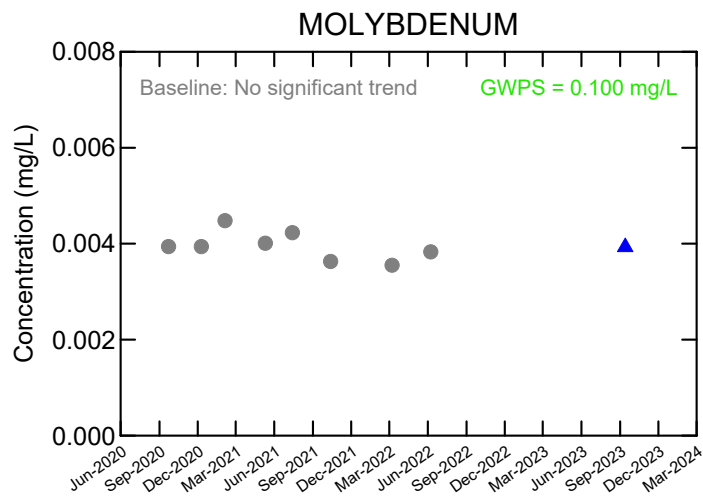


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-5R -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 3.d



Legend:

- Baseline Result
- ▲ Detection Monitoring Result
- Maximum Concentration Level (MCL) or Groundwater Protection Standard (GWPS)

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

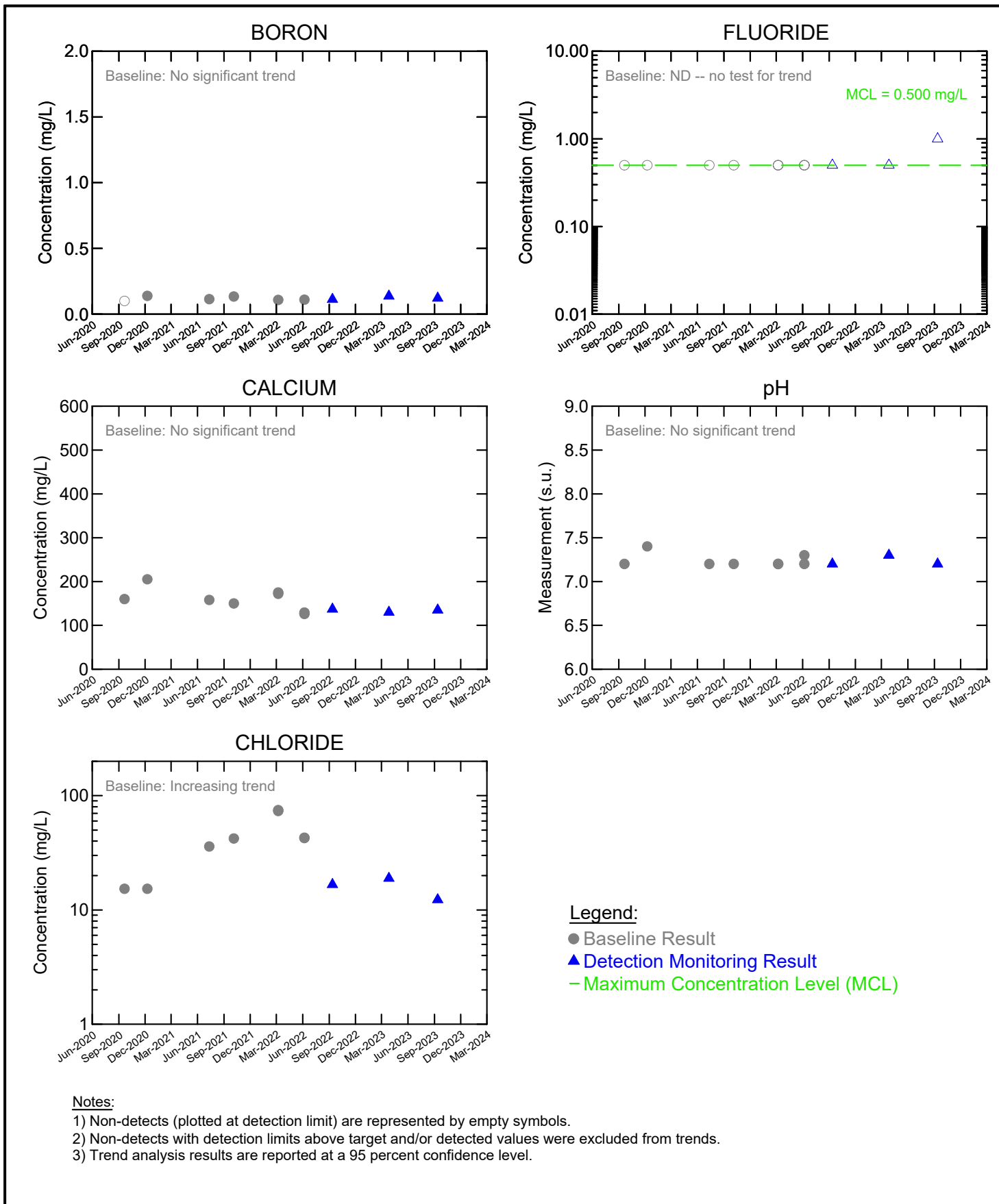


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

MW-5R -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 3.e

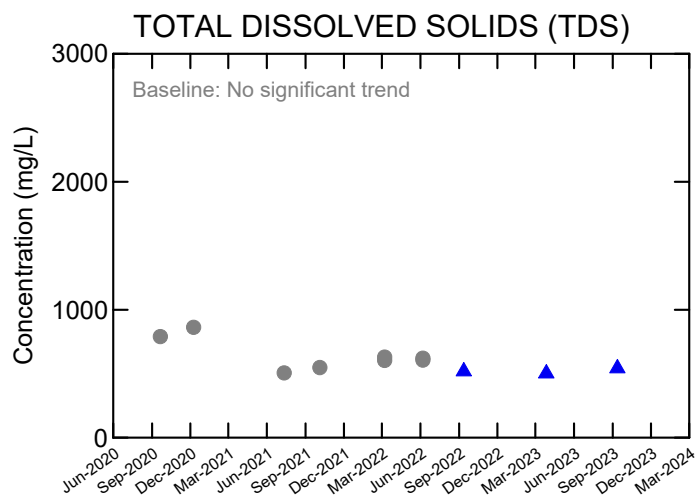
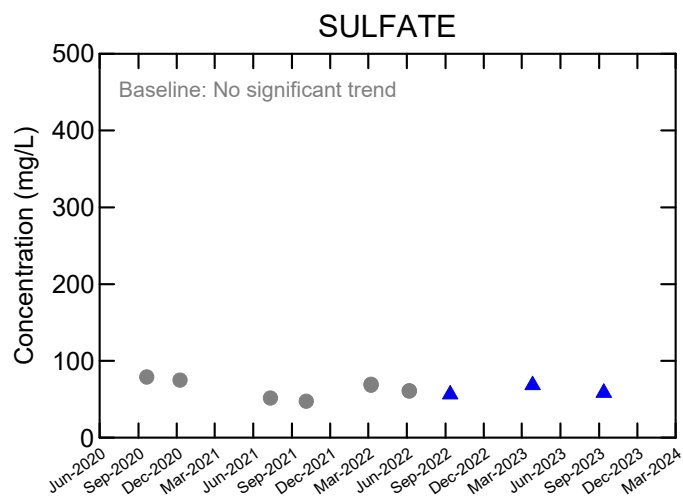


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-13 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 4.a



Legend:

- Baseline Result
- ▲ Detection Monitoring Result

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

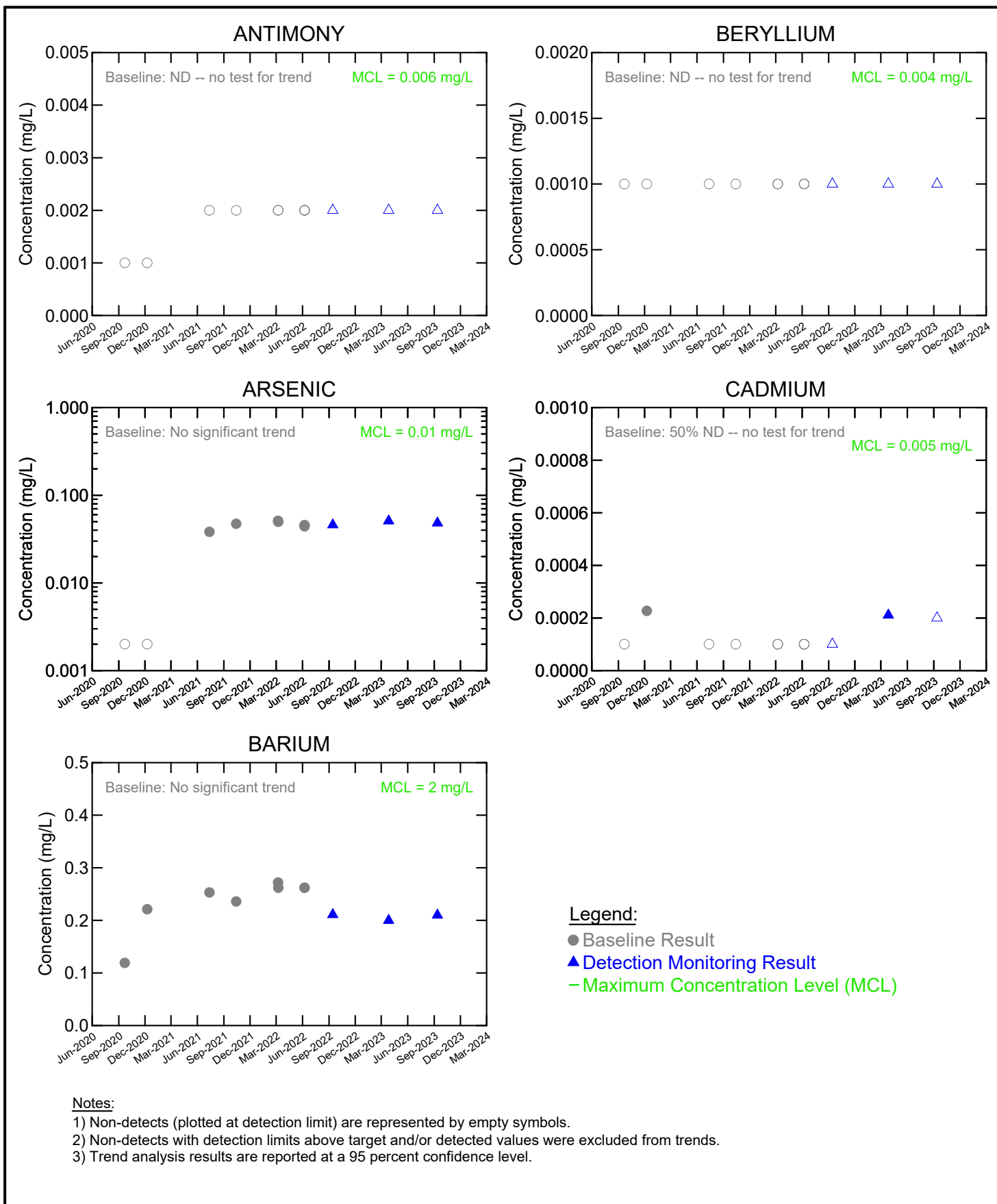


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-13 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 4.b

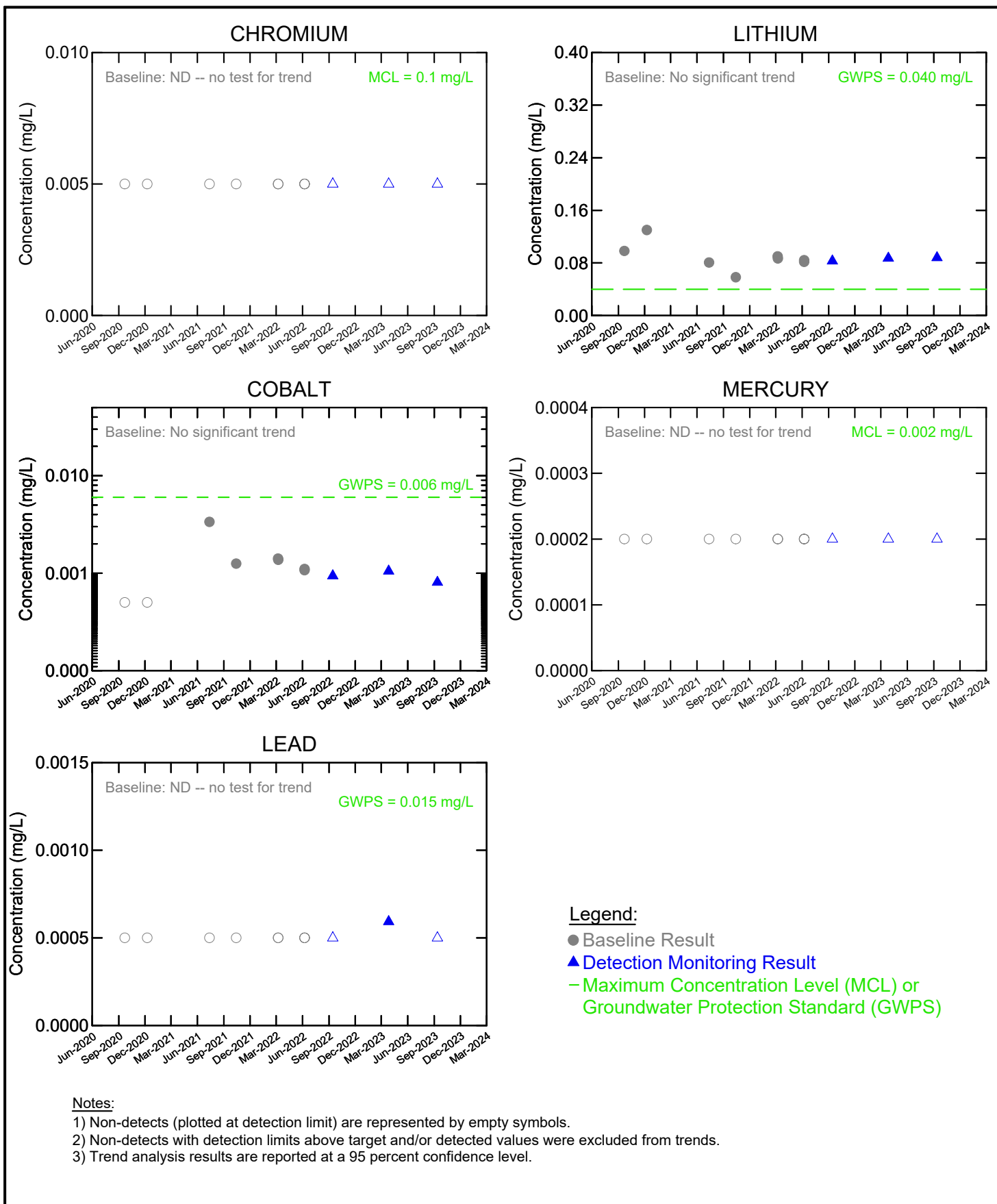


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-13 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 4.c

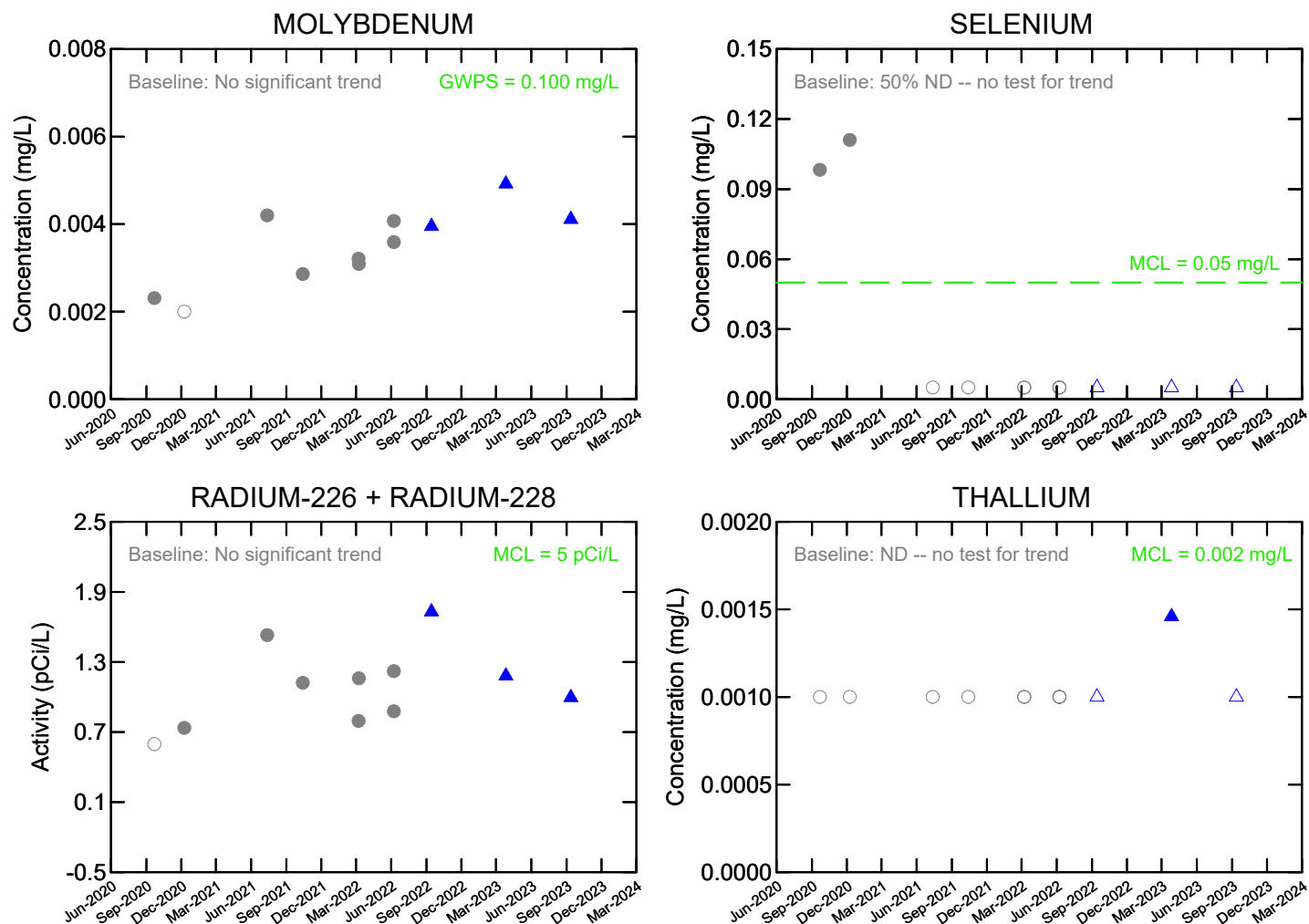


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-13 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 4.d



Legend:

- Baseline Result
- ▲ Detection Monitoring Result
- Maximum Concentration Level (MCL) or Groundwater Protection Standard (GWPS)

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

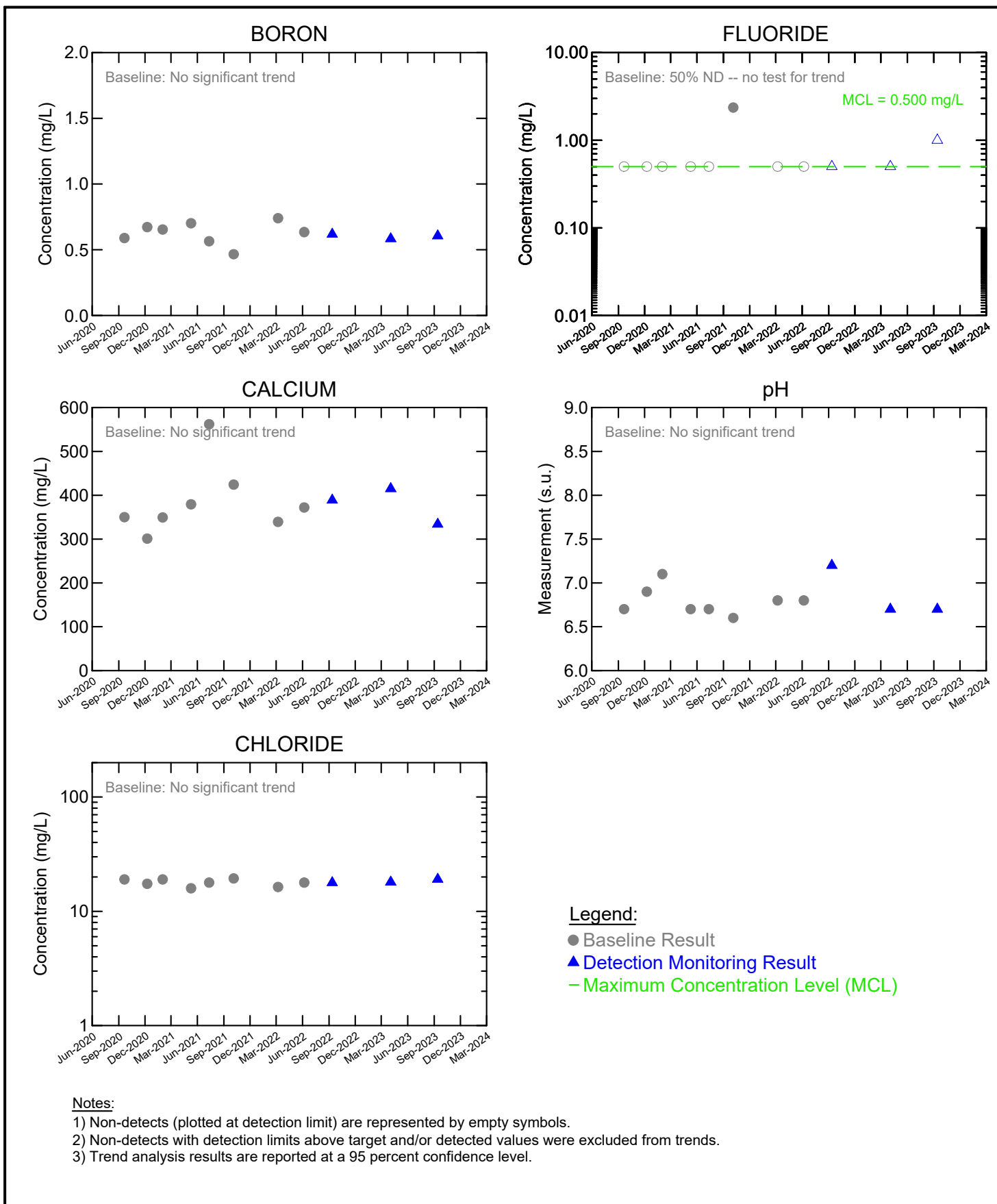


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

MW-13 -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

Project No. 12576482
Date: Jan 8, 2024

FIGURE 4.e

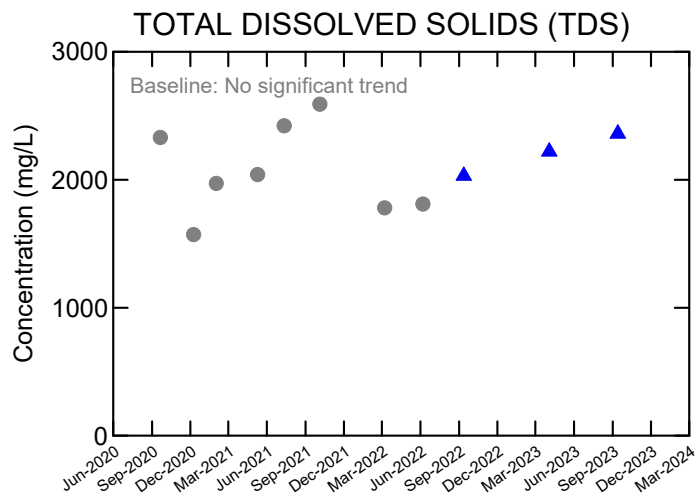
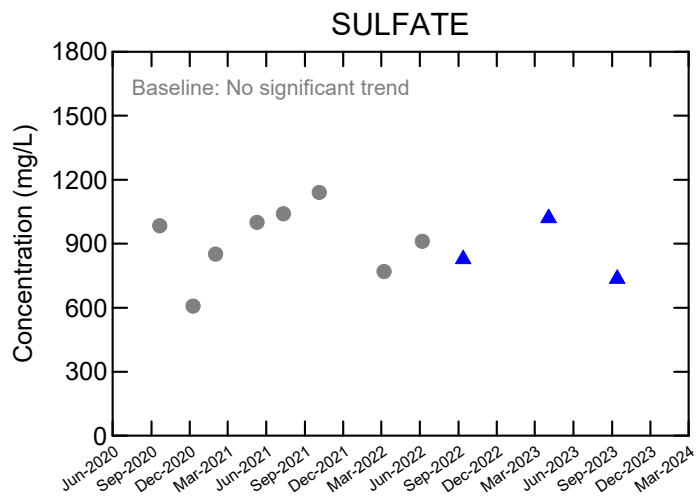


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-19 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 5.a



Legend:

- Baseline Result
- ▲ Detection Monitoring Result

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

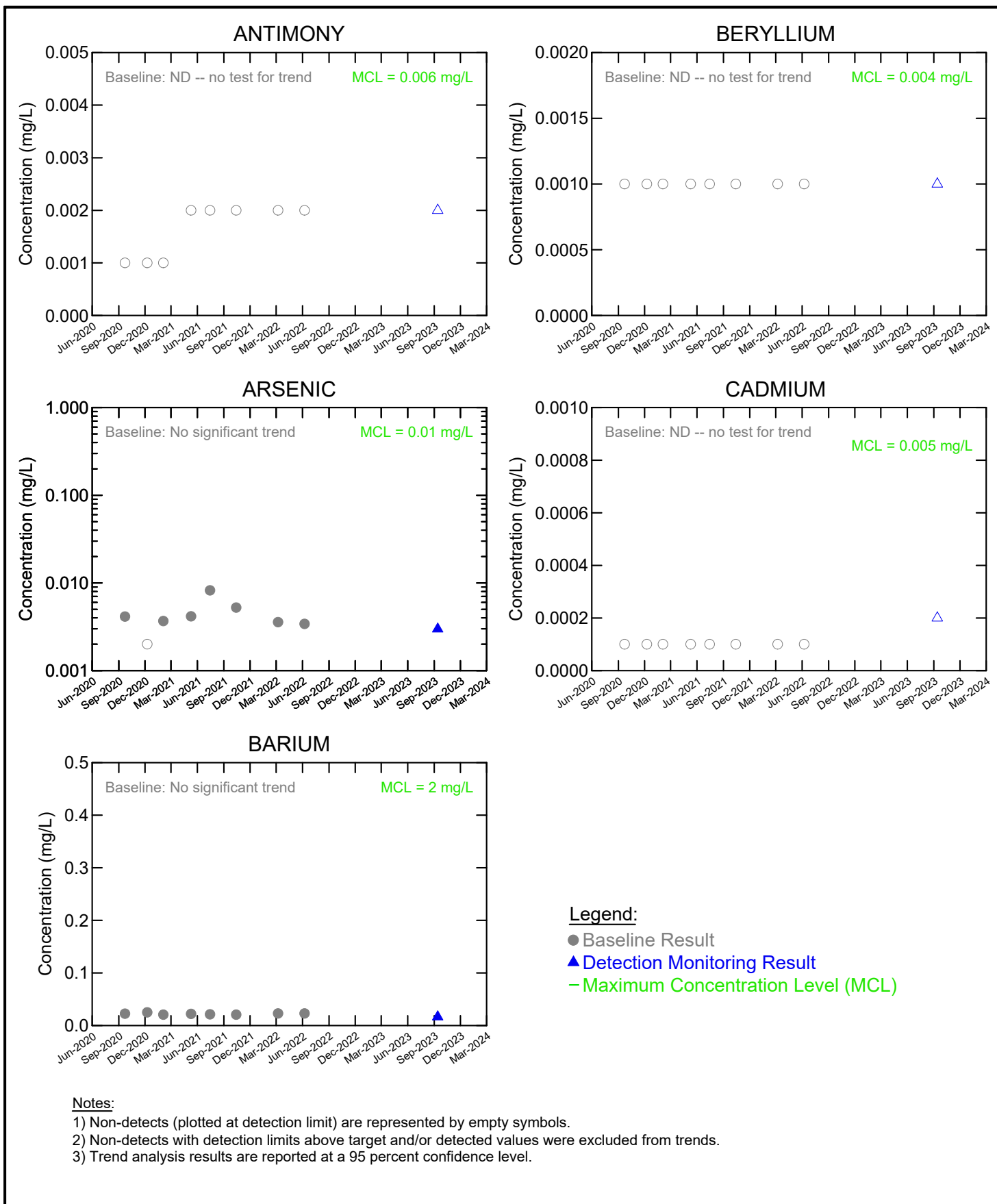


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-19 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 5.b

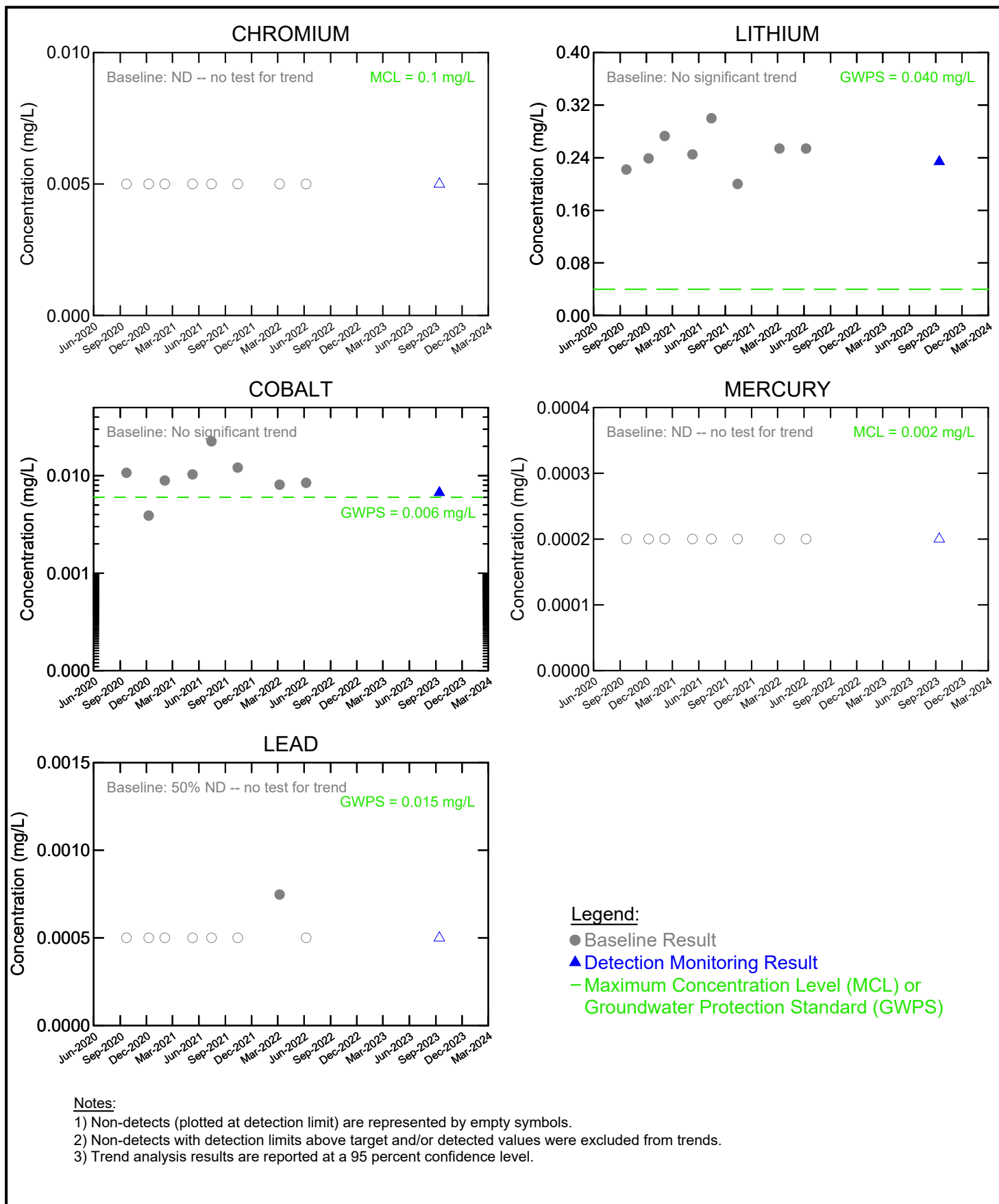


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-19 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 5.c

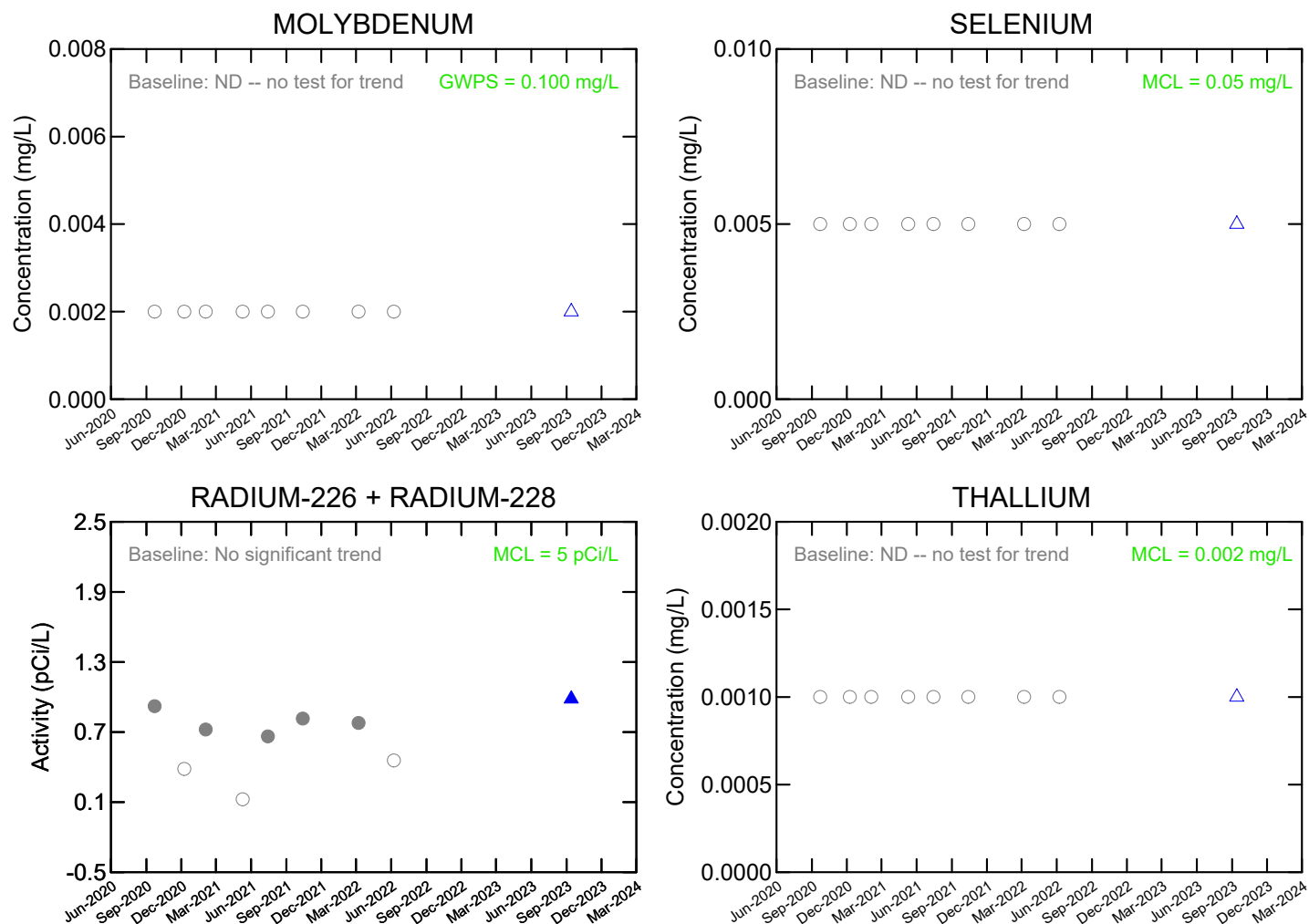


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-19 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 5.d



Legend:

- Baseline Result
- ▲ Detection Monitoring Result
- Maximum Concentration Level (MCL) or Groundwater Protection Standard (GWPS)

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

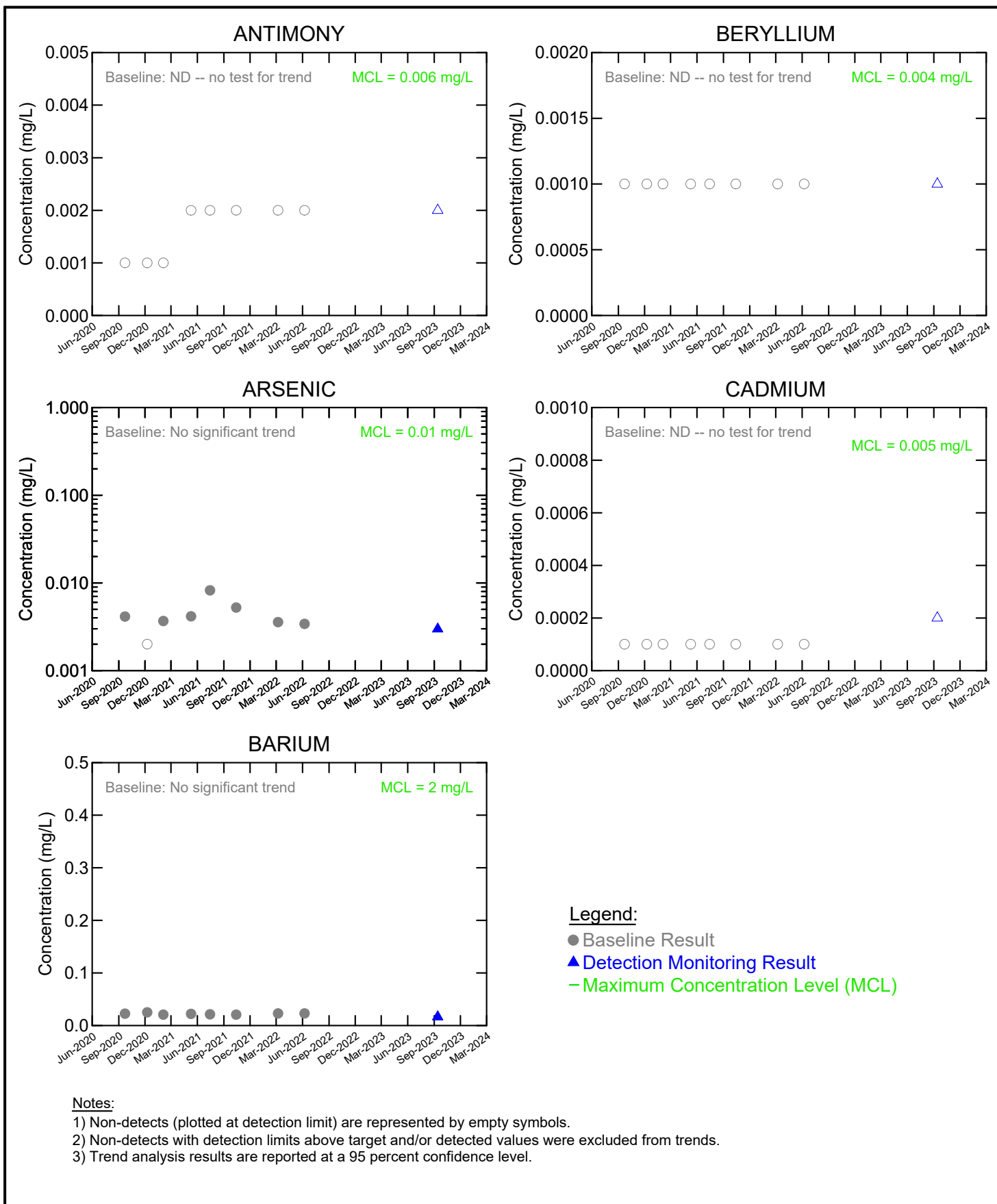


MidAmerican Energy Company
 Neal North CCR Closed Monofill
 Sergeant Bluff, Iowa

**MW-19 -- APPENDIX IV PARAMETERS
 ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
 Date: **Jan 8, 2024**

FIGURE 5.e

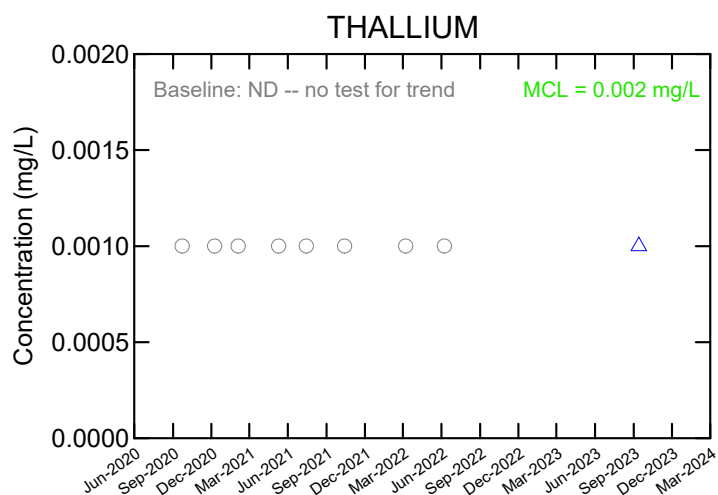
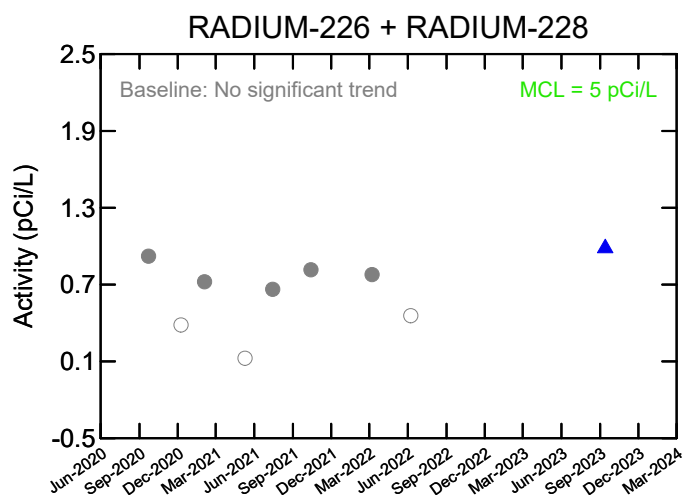
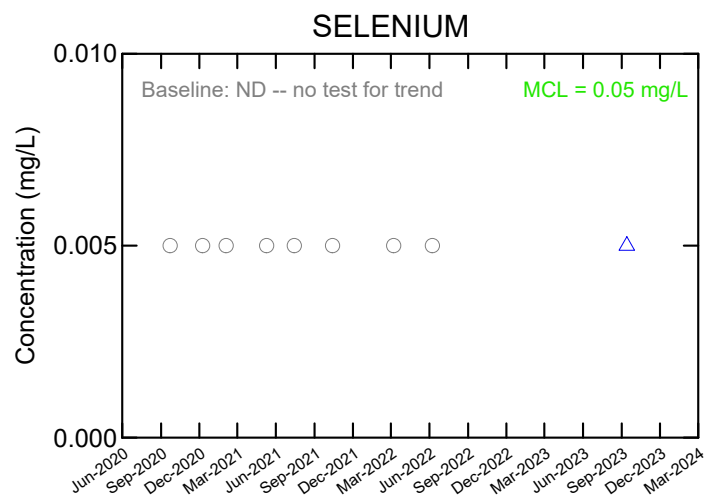
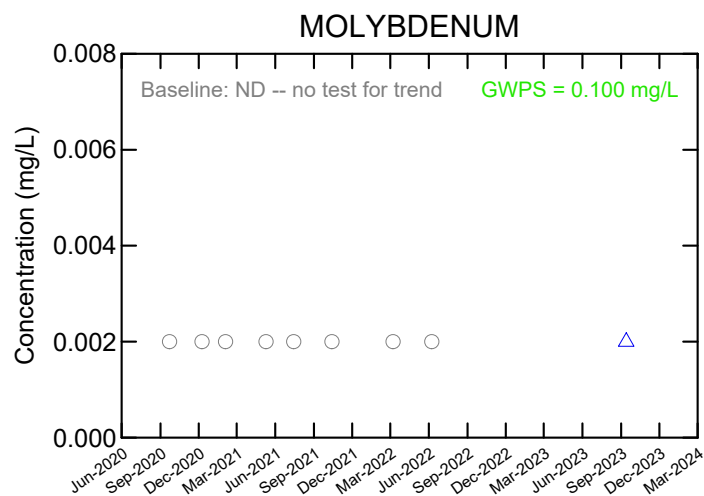


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-19 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 5.c



Legend:

- Baseline Result
- ▲ Detection Monitoring Result
- Maximum Concentration Level (MCL) or Groundwater Protection Standard (GWPS)

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

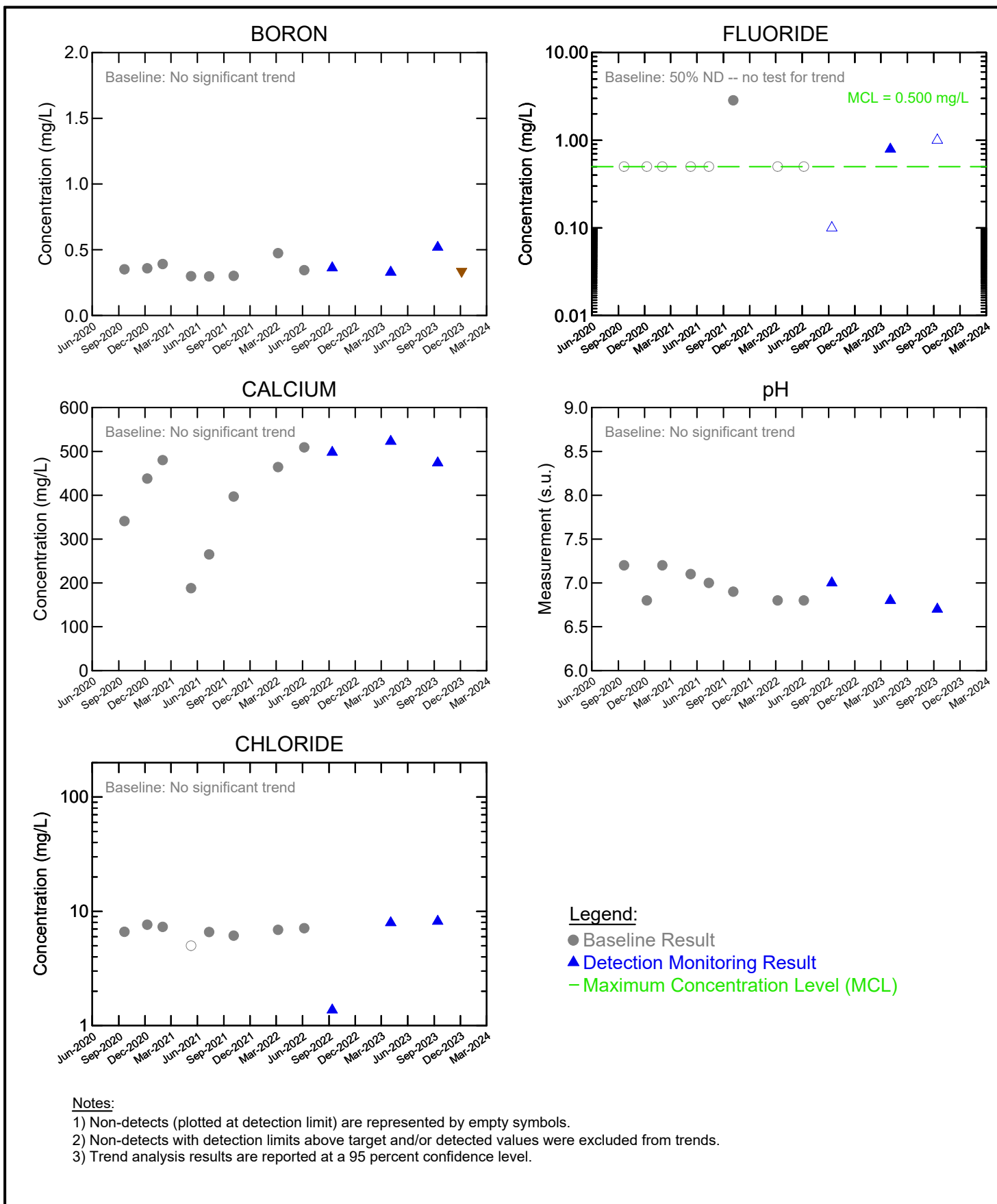


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

MW-19 -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 5.e

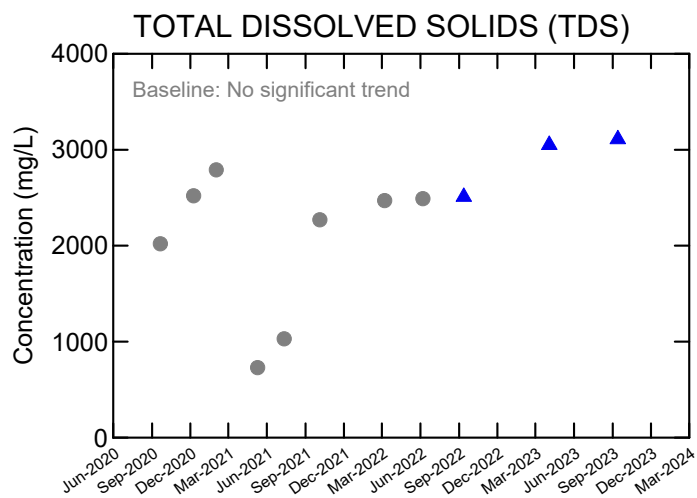
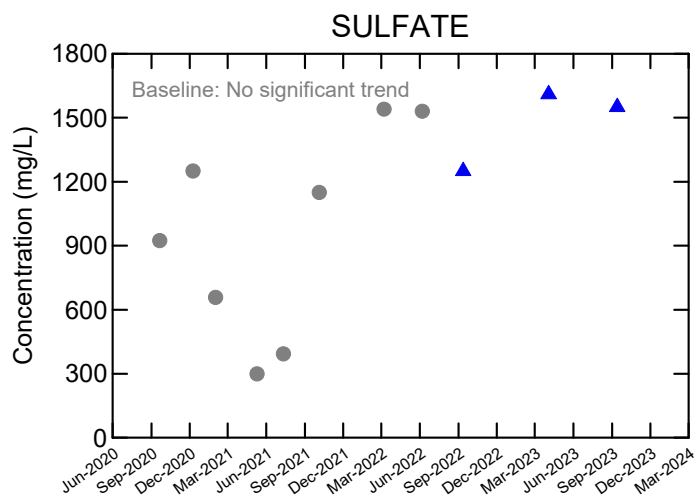


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-21 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 6.a



Legend:

- Baseline Result
- ▲ Detection Monitoring Result

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

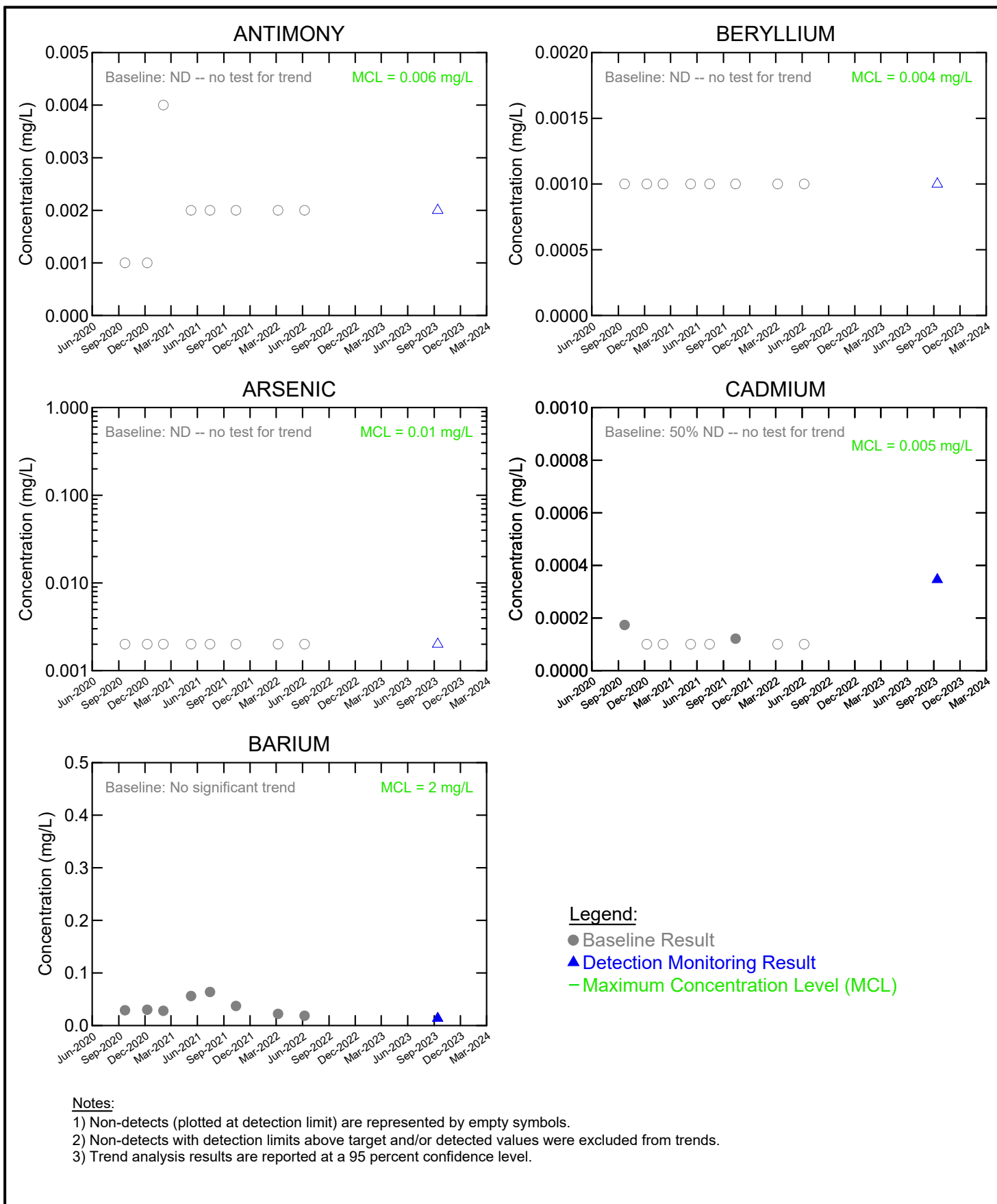


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-21 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 6.b

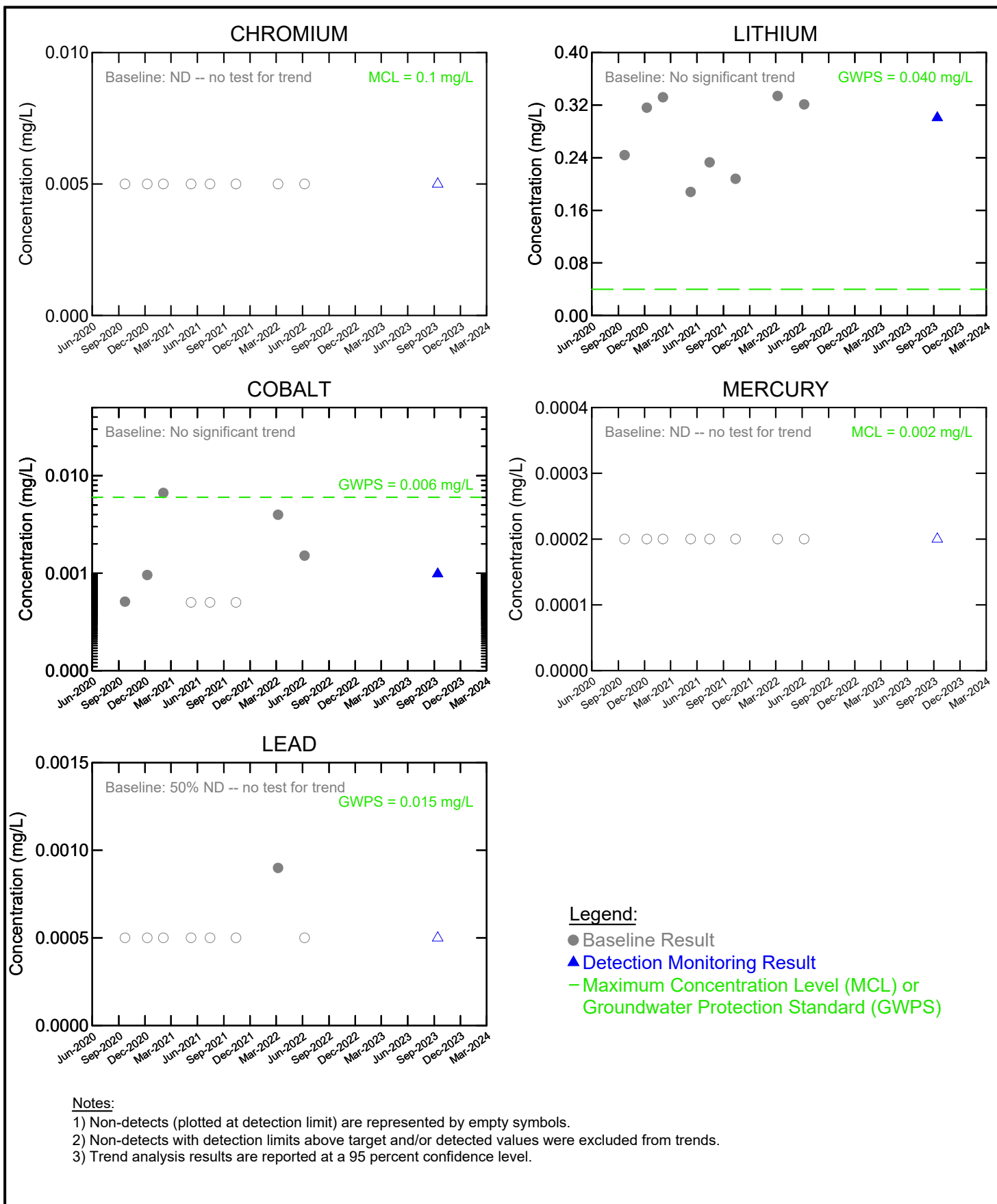


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-21 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 6.c

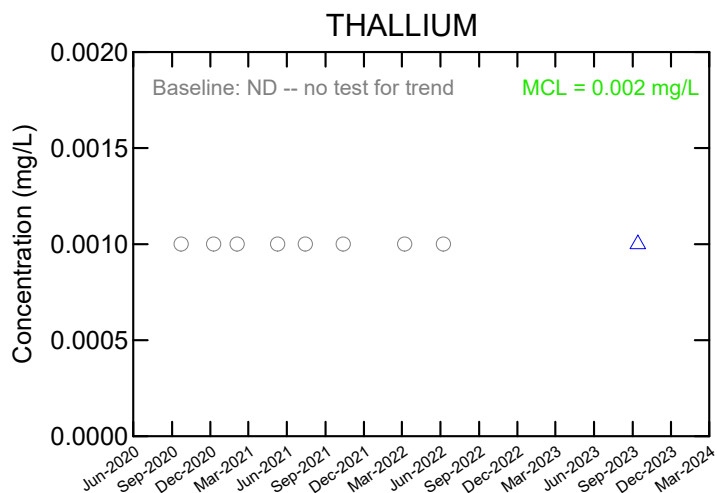
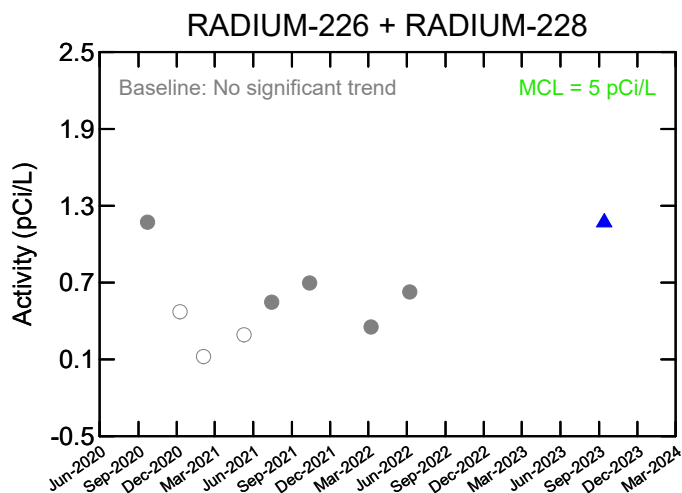
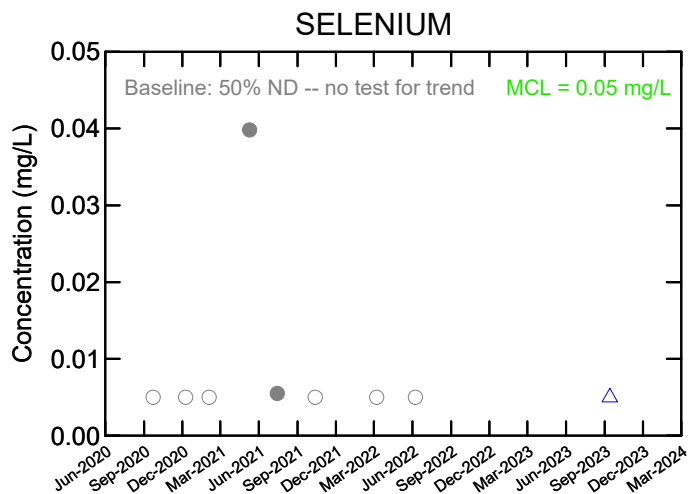
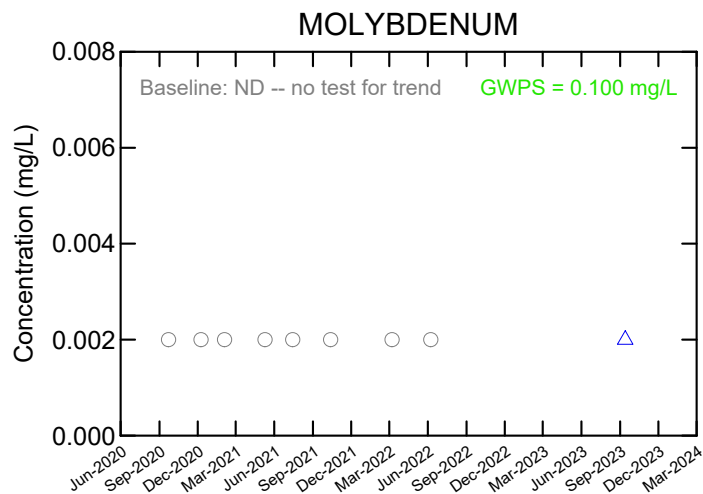


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-21 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 6.d



Legend:

- Baseline Result
- ▲ Detection Monitoring Result
- Maximum Concentration Level (MCL) or Groundwater Protection Standard (GWPS)

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

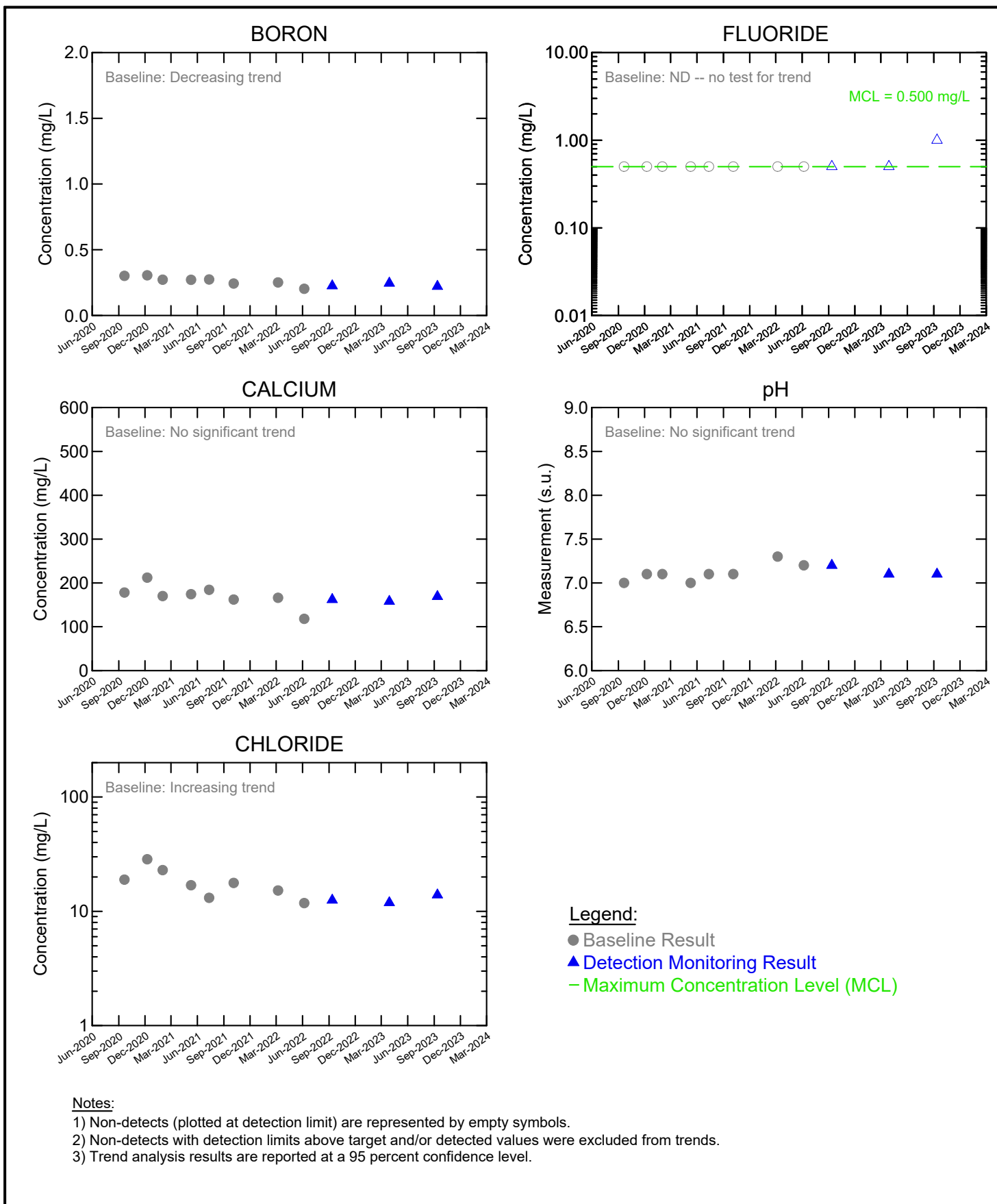


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

MW-21 -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

Project No. 12576482
Date: Jan 8, 2024

FIGURE 6.e

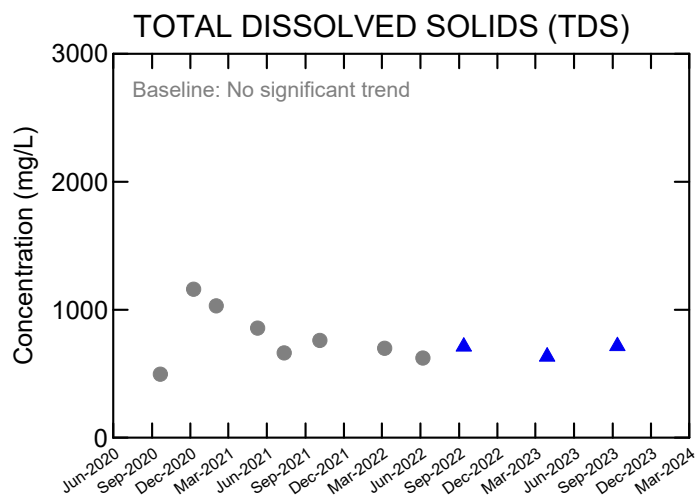
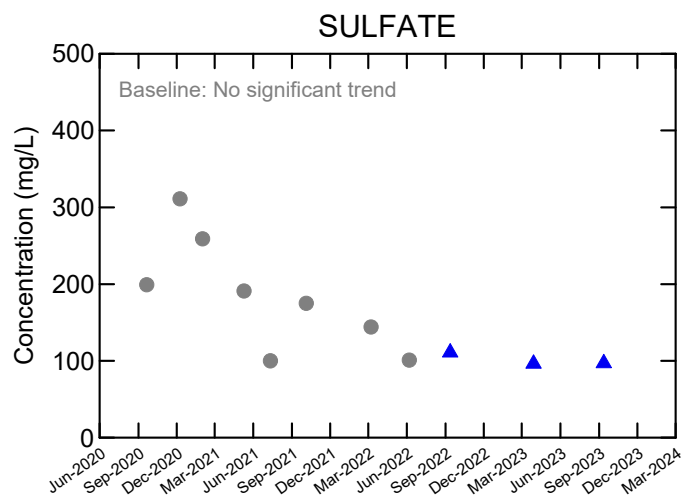


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-27 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 7.a



Legend:

- Baseline Result
- ▲ Detection Monitoring Result

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

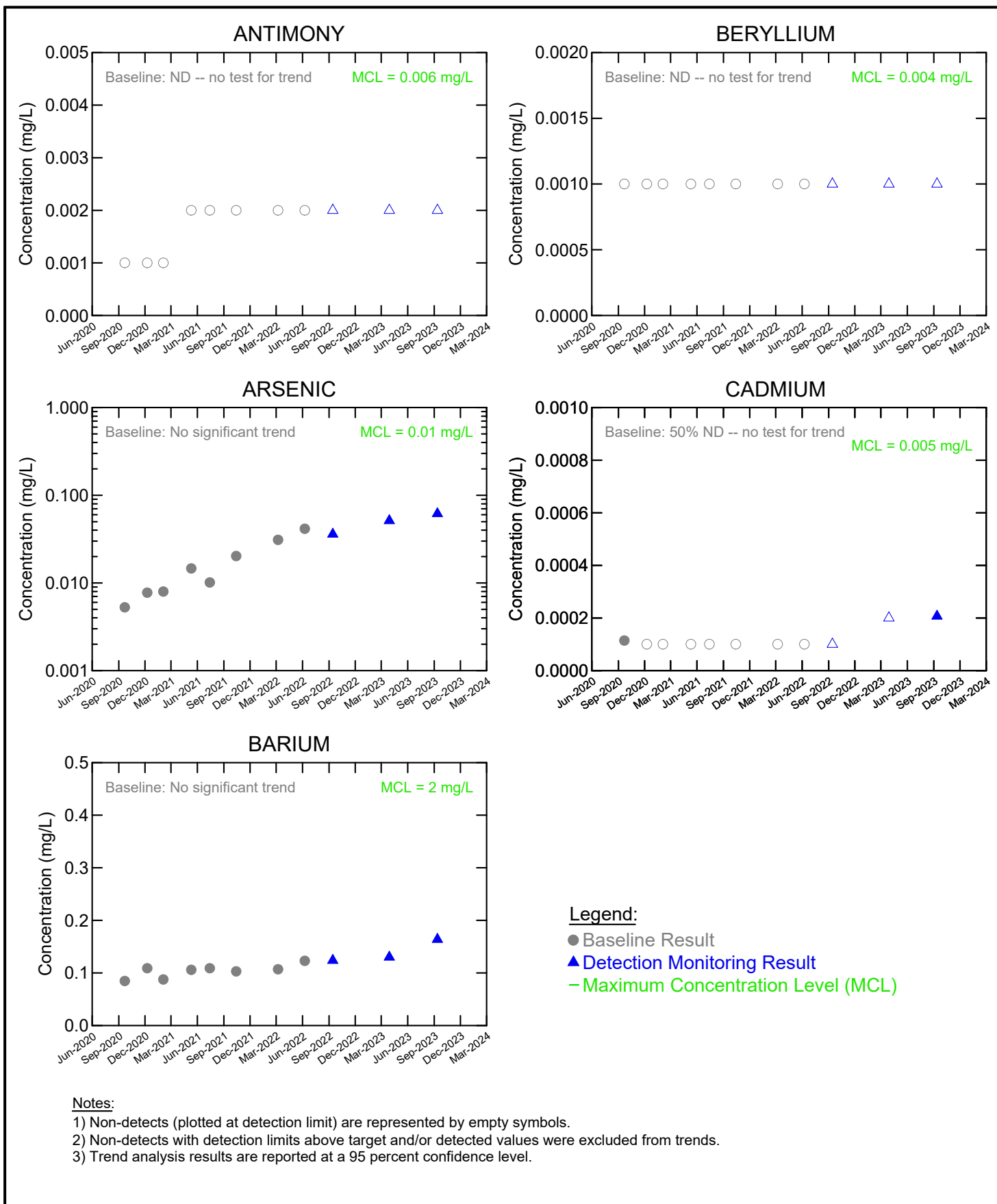


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-27 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 7.b

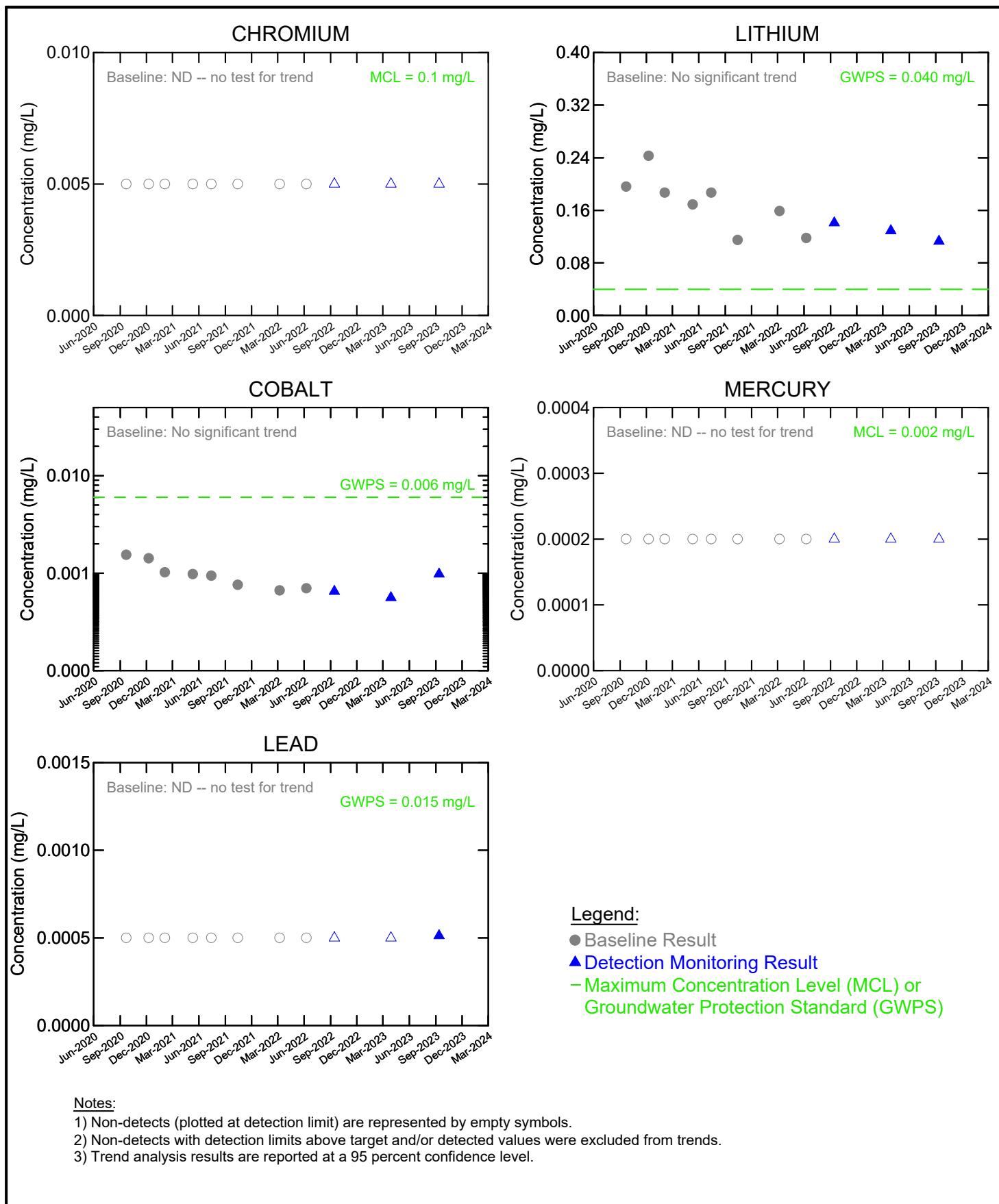


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-27 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 7.c

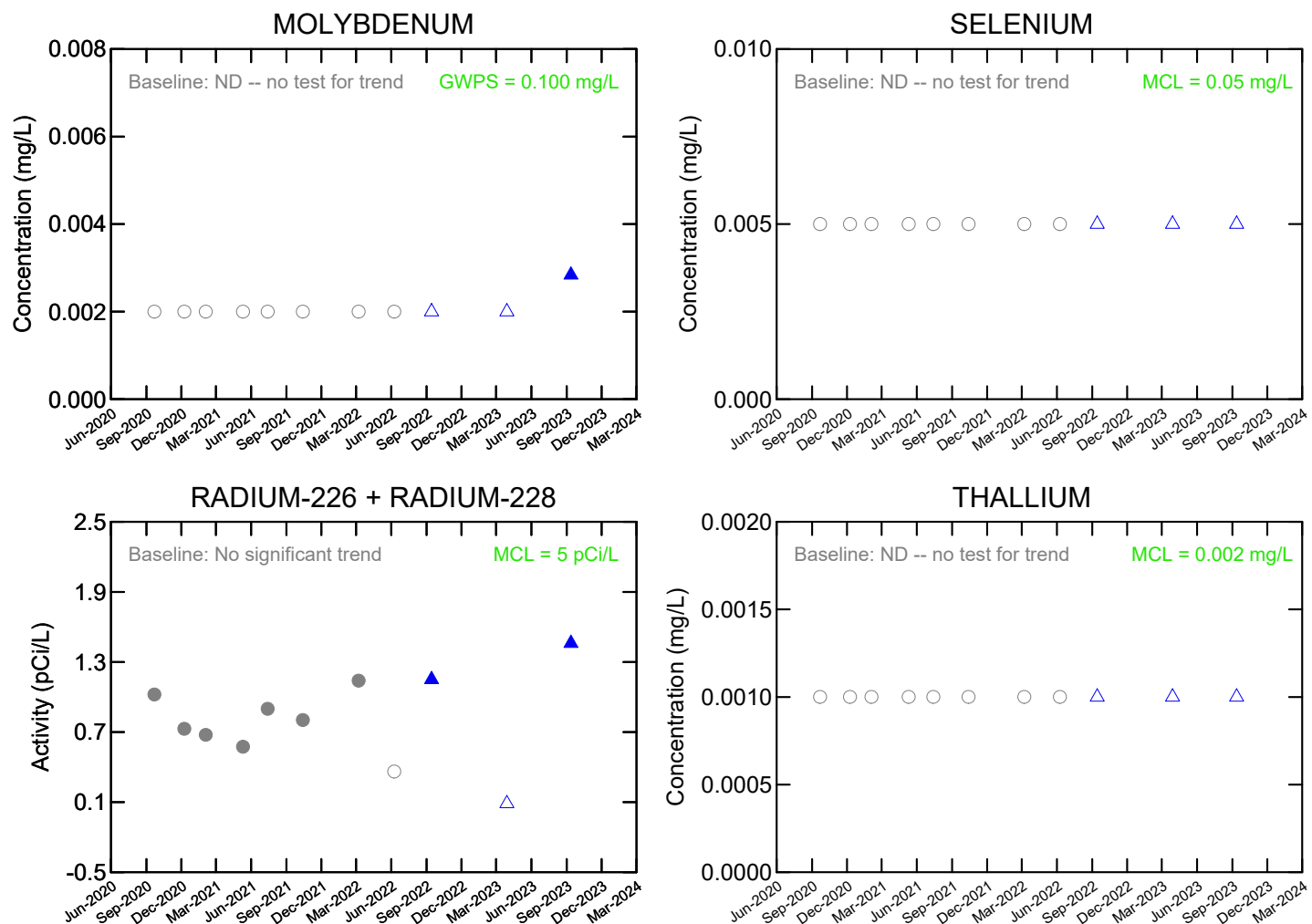


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-27 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 7.d



Legend:

- Baseline Result
- ▲ Detection Monitoring Result
- Maximum Concentration Level (MCL) or Groundwater Protection Standard (GWPS)

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

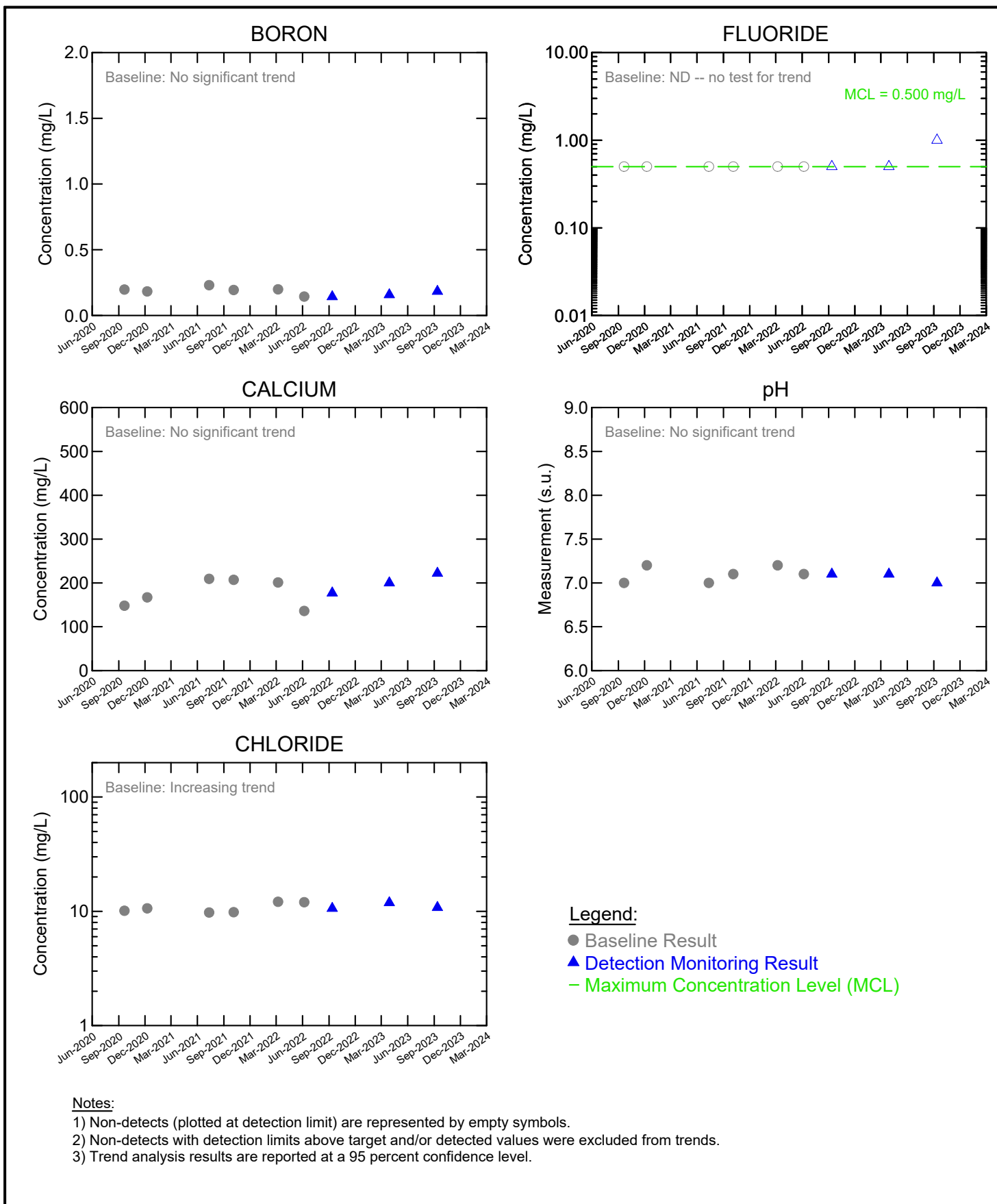


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-27 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 7.e

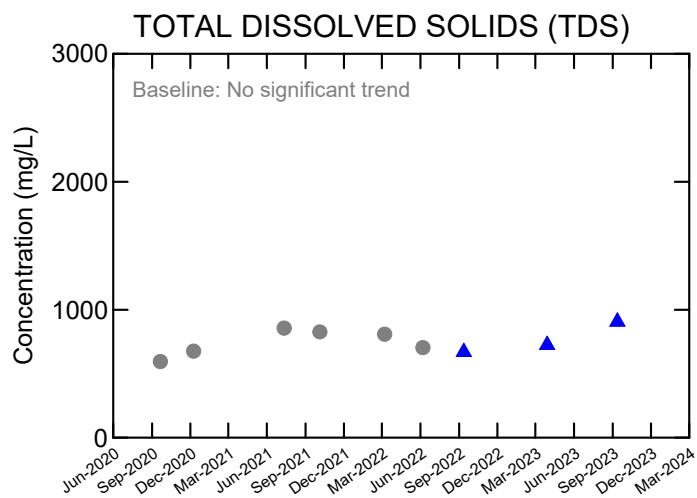
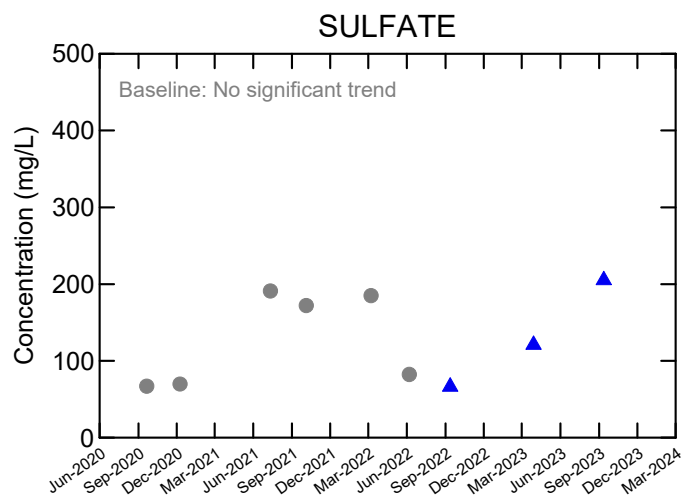


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-29 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 8.a



Legend:

- Baseline Result
- ▲ Detection Monitoring Result

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

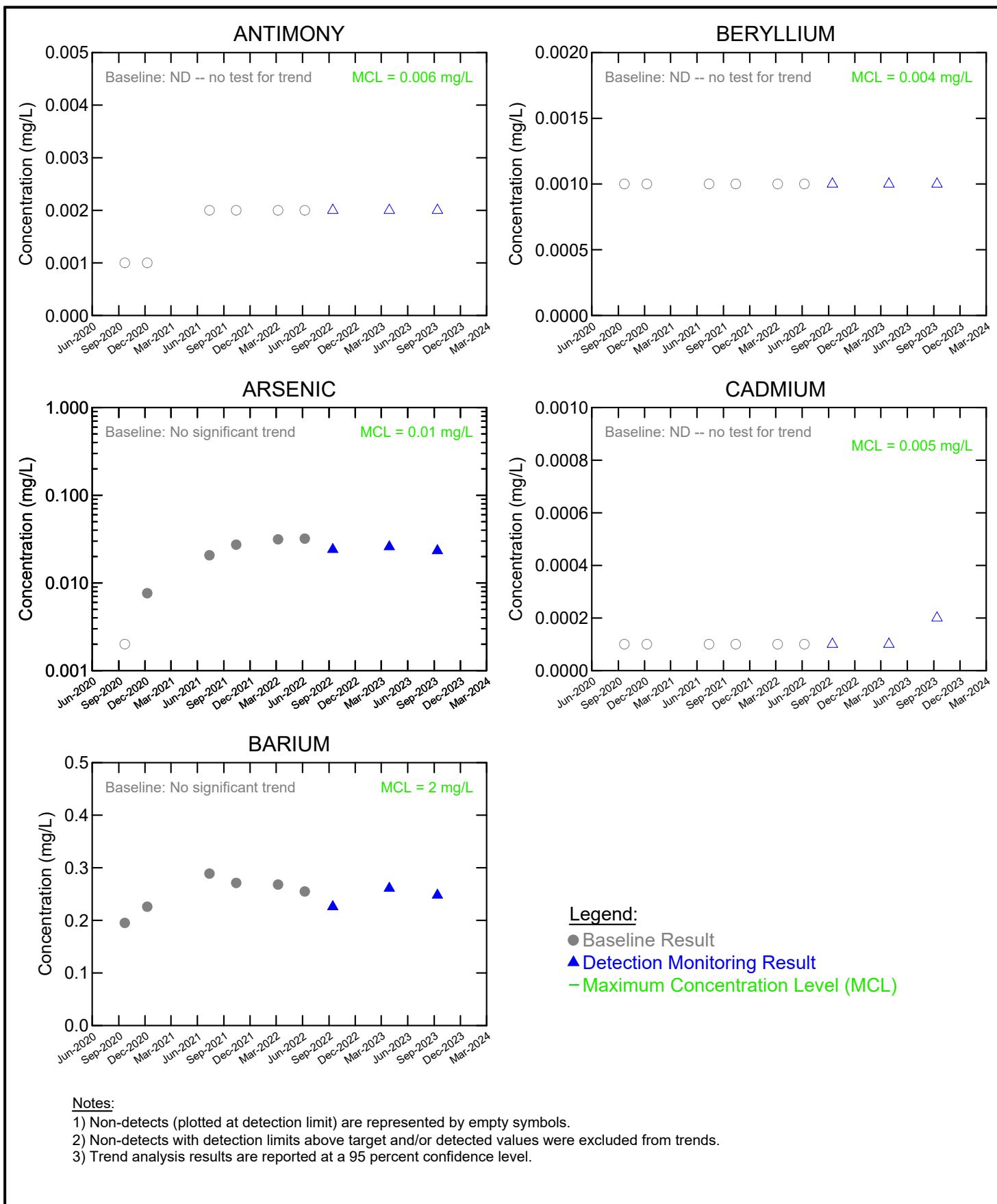


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-29 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 8.b

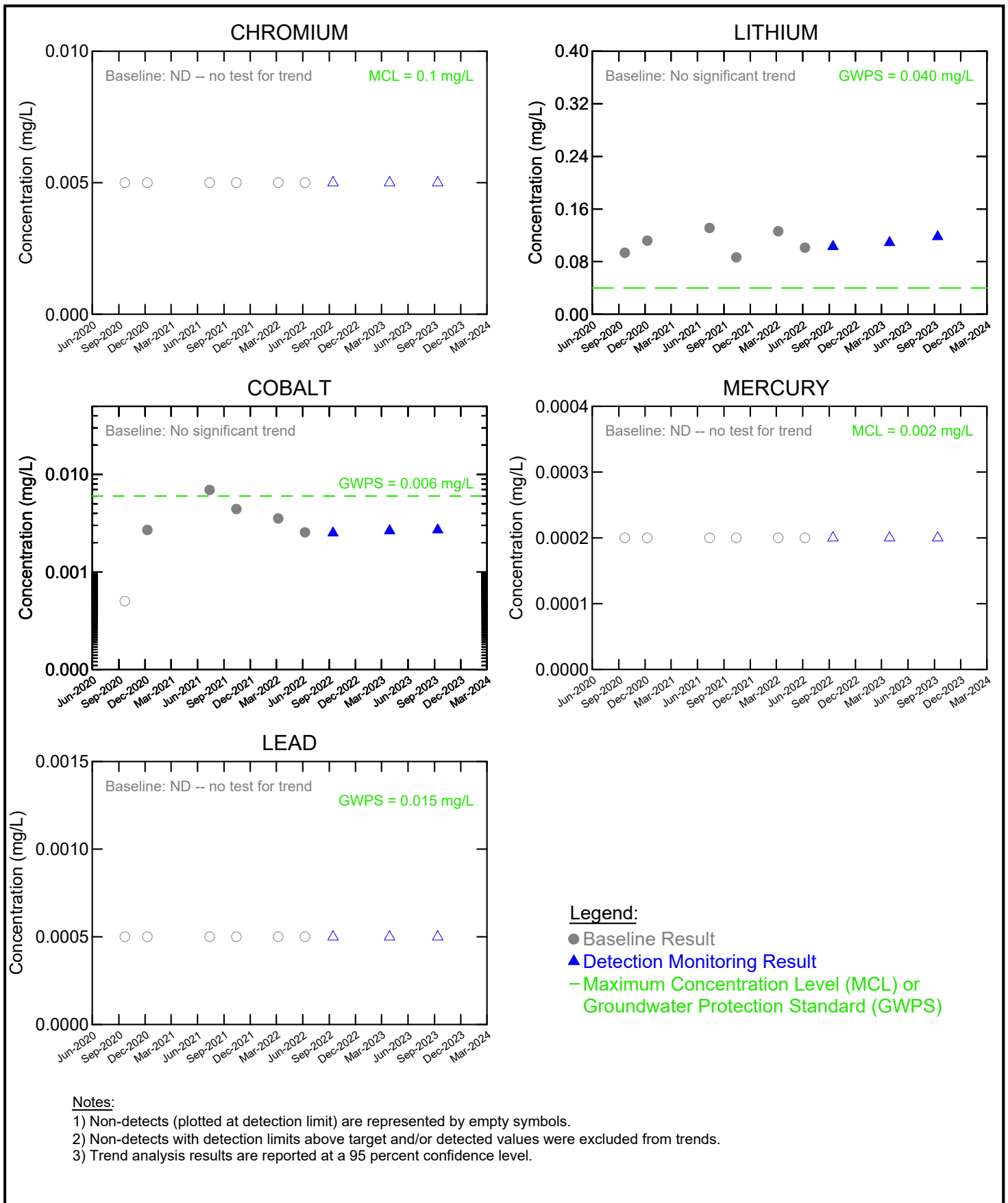


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-29 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 8.c

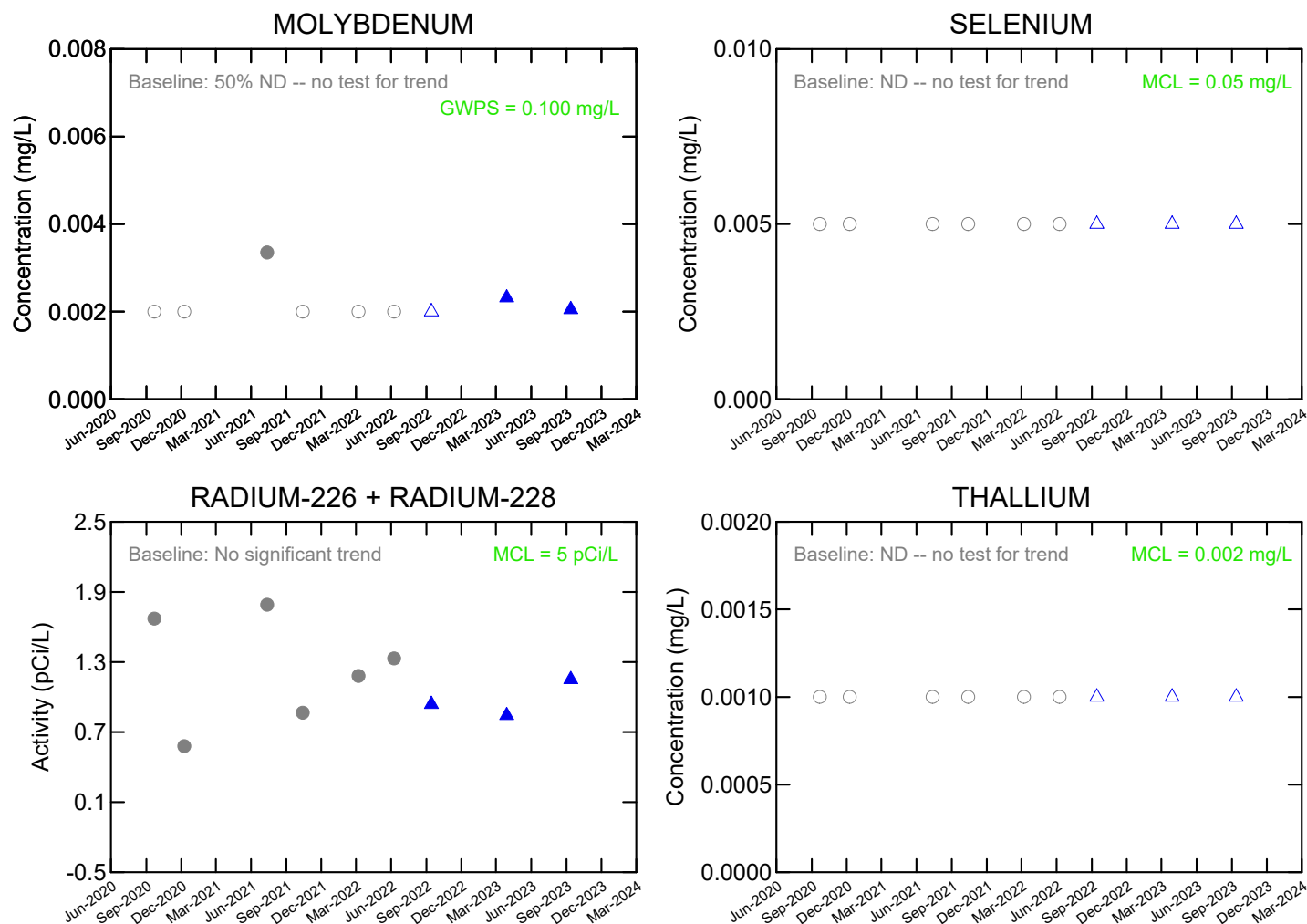


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-29 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 8.d



Legend:

- Baseline Result
- ▲ Detection Monitoring Result
- Maximum Concentration Level (MCL) or Groundwater Protection Standard (GWPS)

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

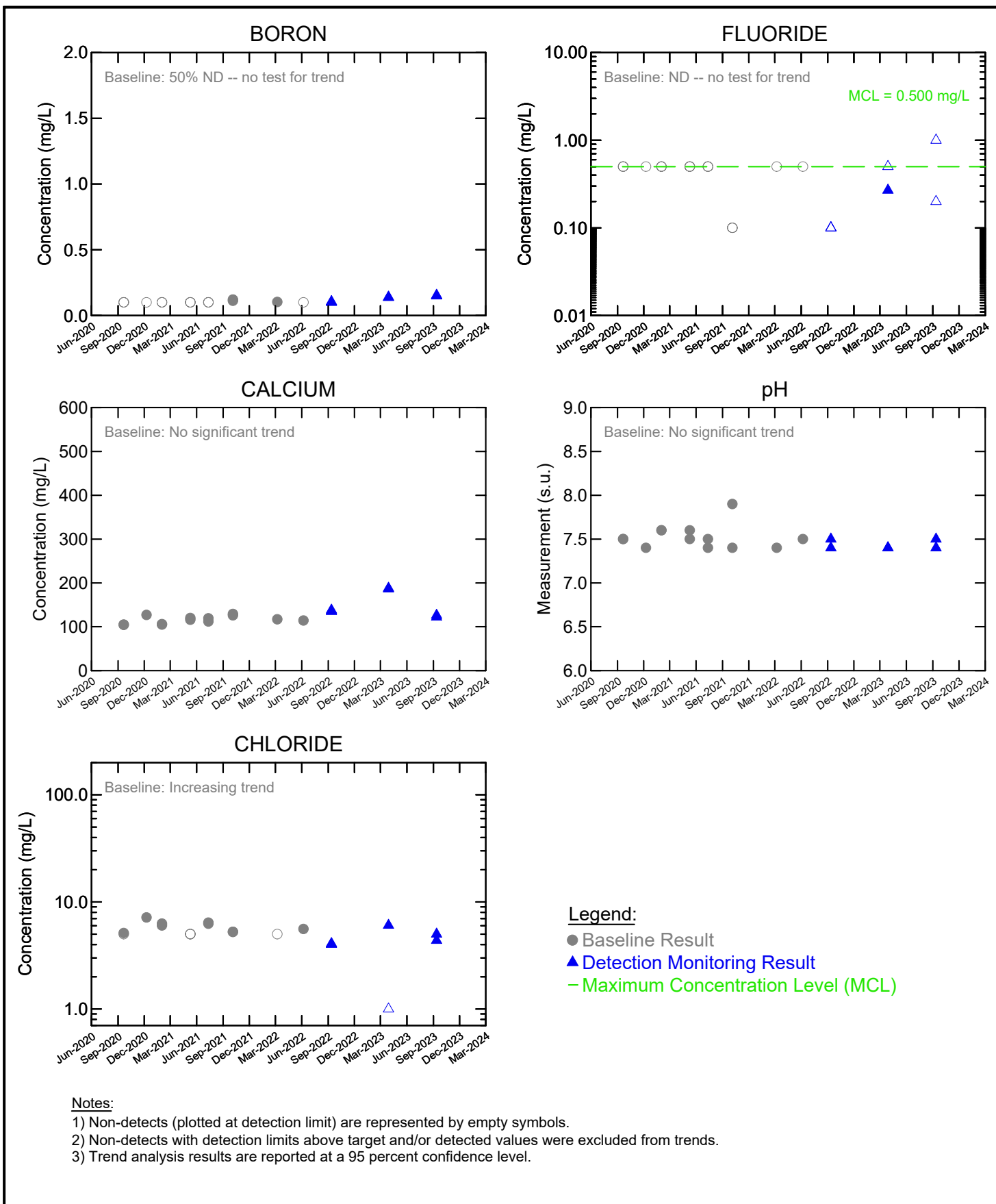


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

MW-29 -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 8.e

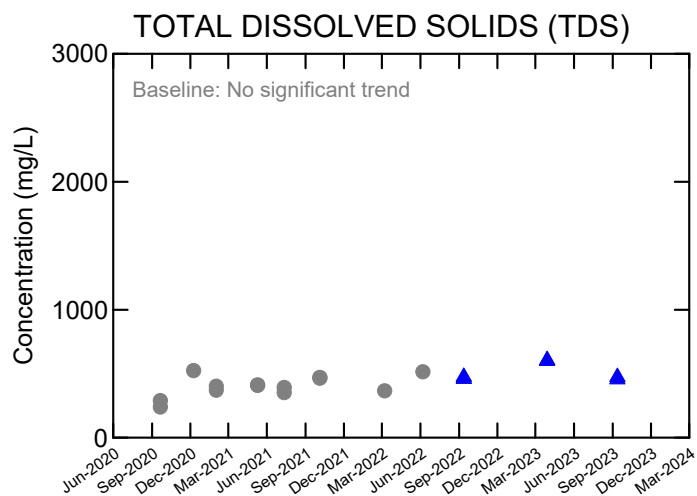
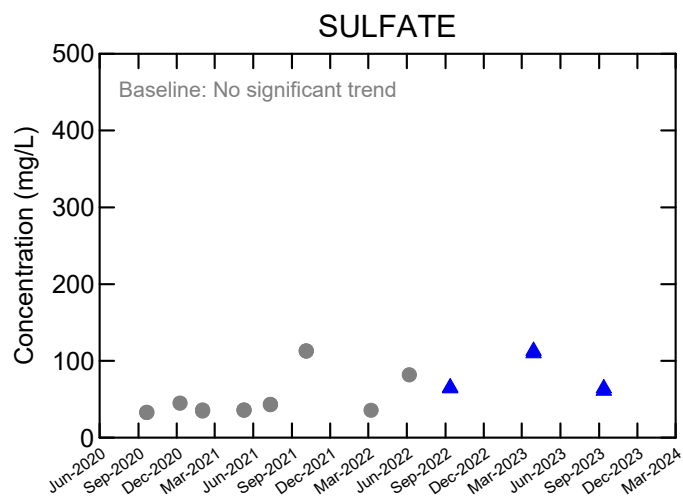


MidAmerican Energy Company
 Neal North CCR Closed Monofill
 Sergeant Bluff, Iowa

**MW-223S -- APPENDIX III PARAMETERS
 ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
 Date: **Jan 3, 2024**

FIGURE 9.a



Legend:

- Baseline Result
- ▲ Detection Monitoring Result

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

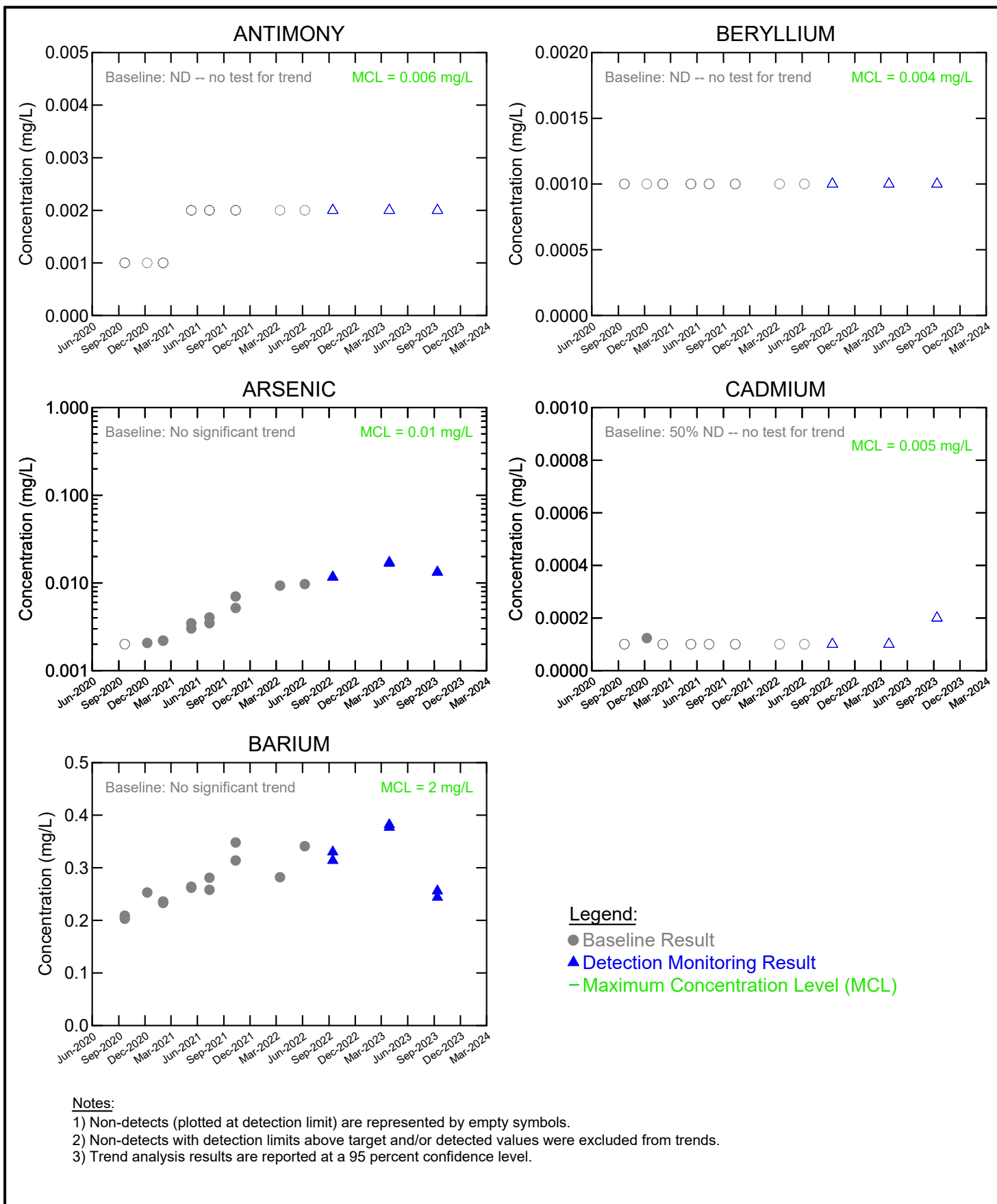


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-223S -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 9.b

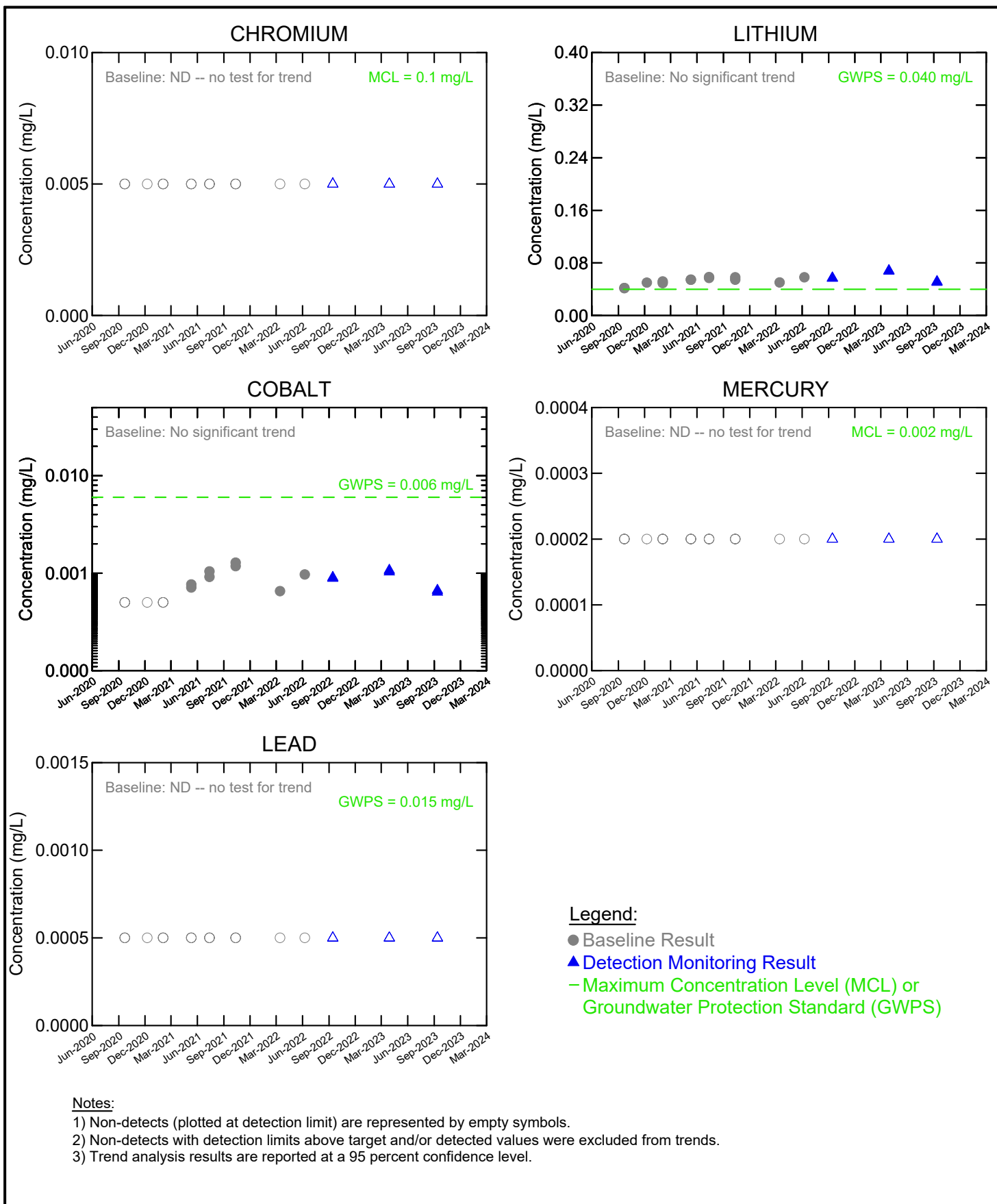


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-223S -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 9.c

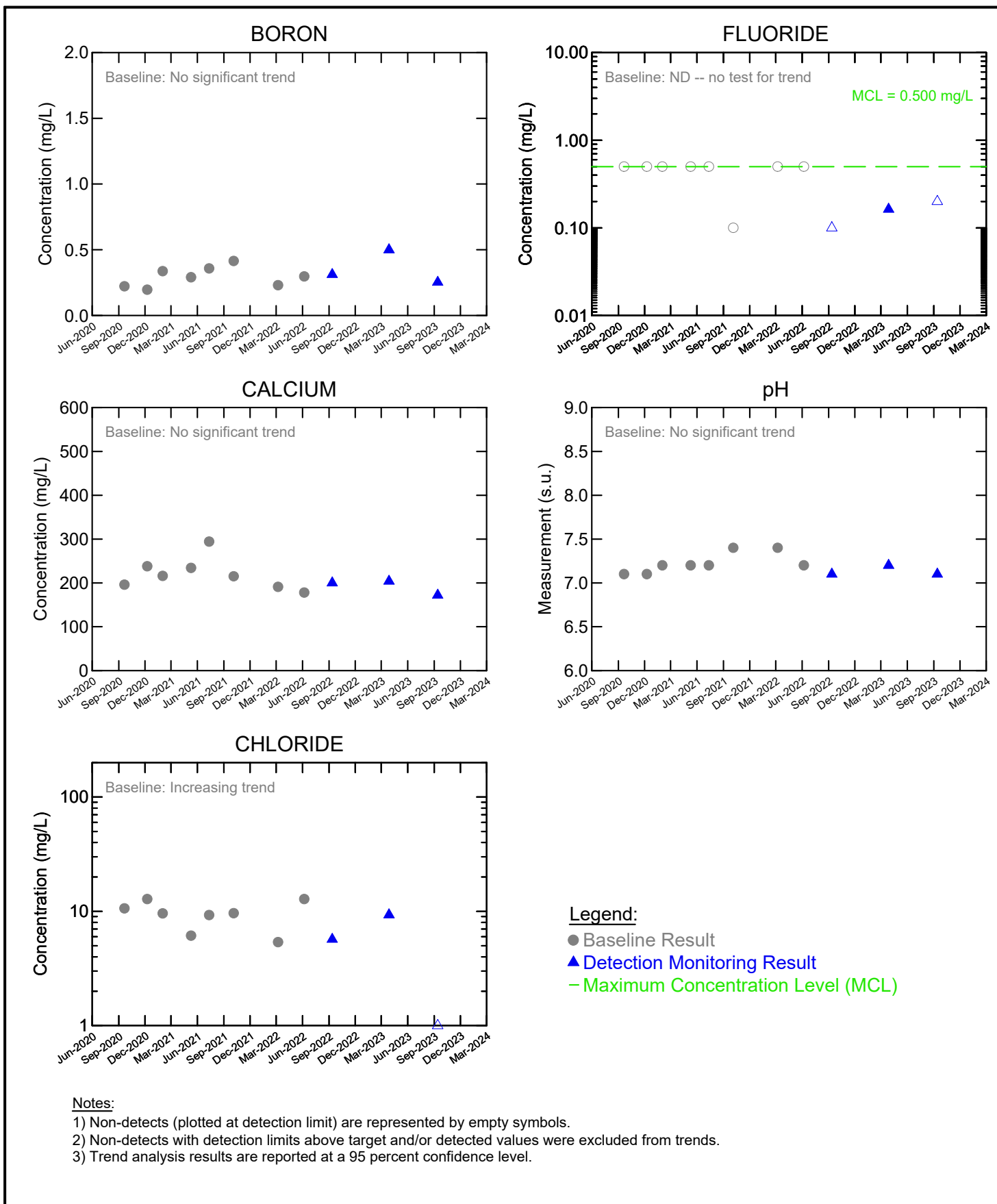


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-223S -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 9.d

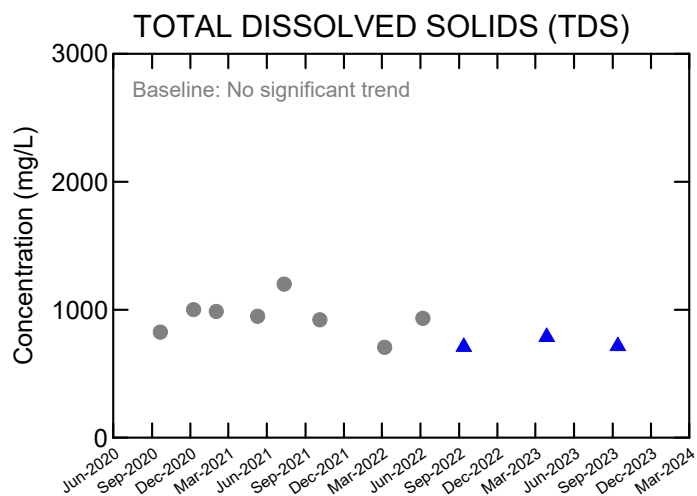
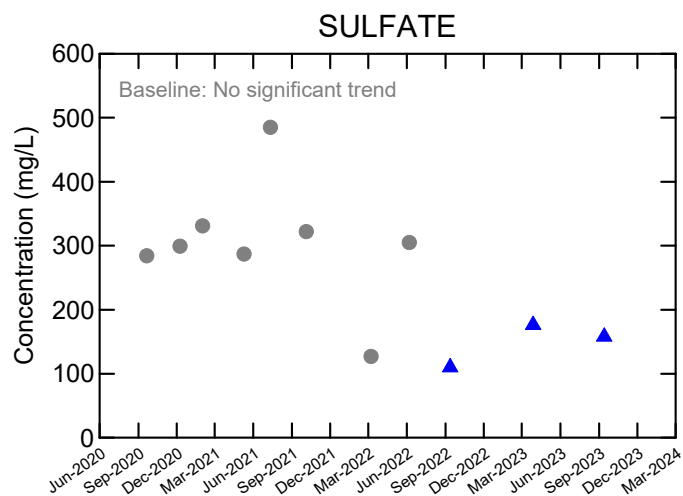


MidAmerican Energy Company
 Neal North CCR Closed Monofill
 Sergeant Bluff, Iowa

**MW-231S -- APPENDIX III PARAMETERS
 ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
 Date: **Jan 3, 2024**

FIGURE 10.a



Legend:

- Baseline Result
- ▲ Detection Monitoring Result

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.

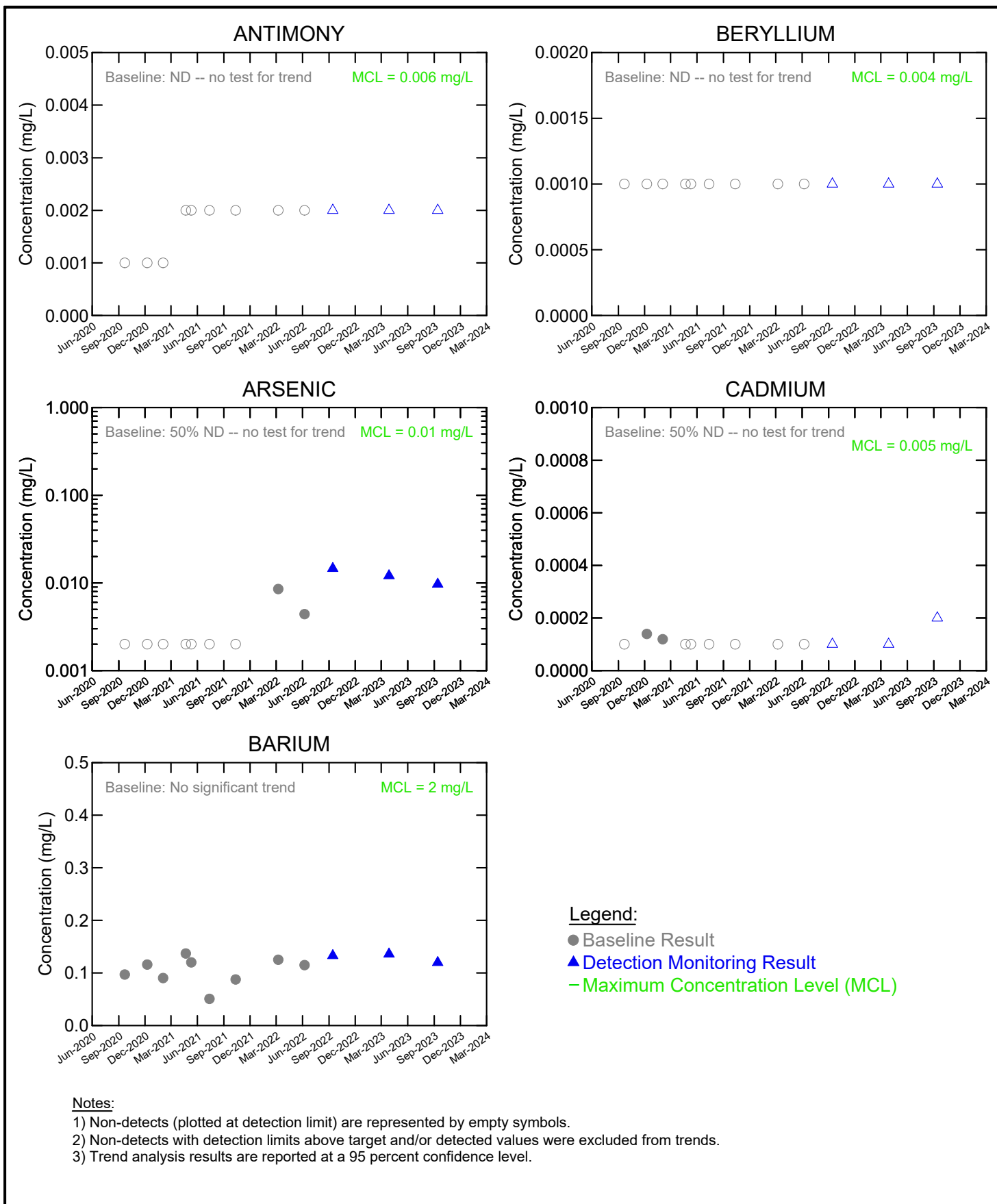


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-231S -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 3, 2024**

FIGURE 10.b

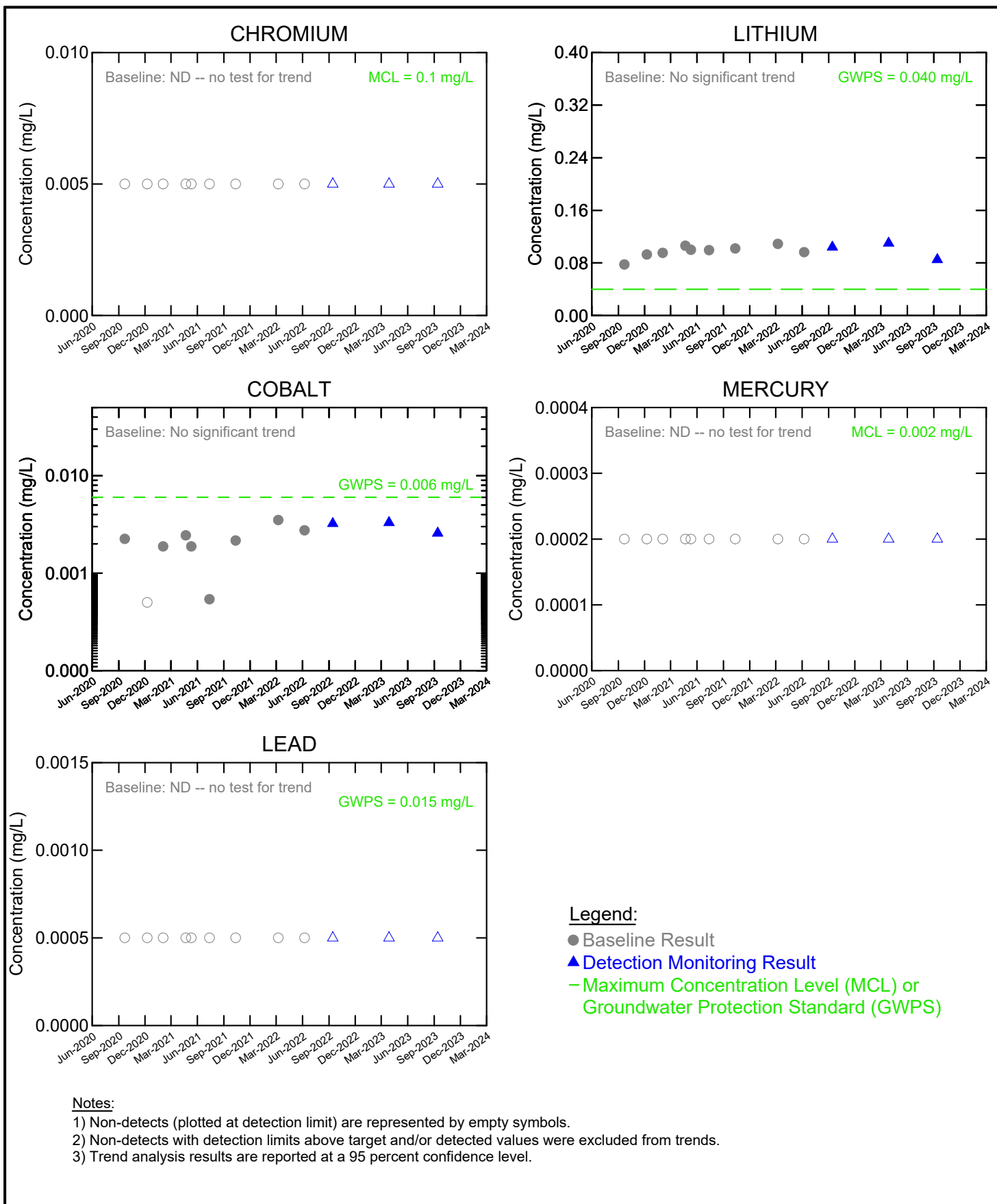


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-231S -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 10.c

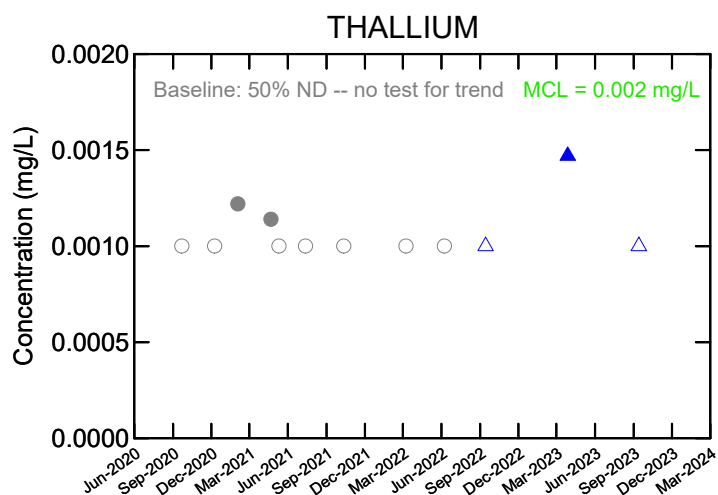
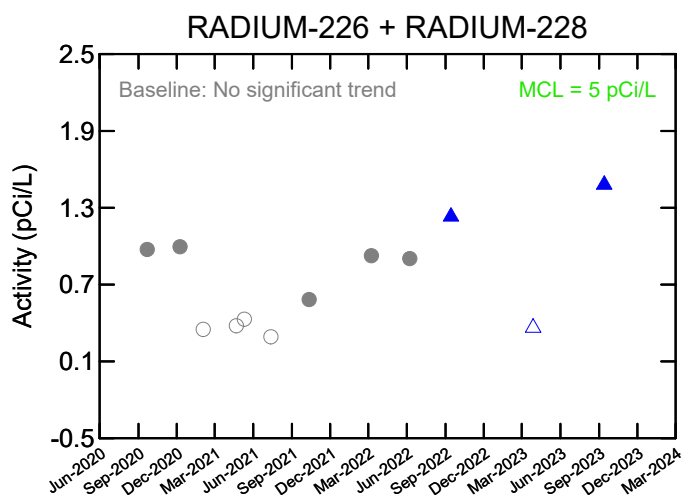
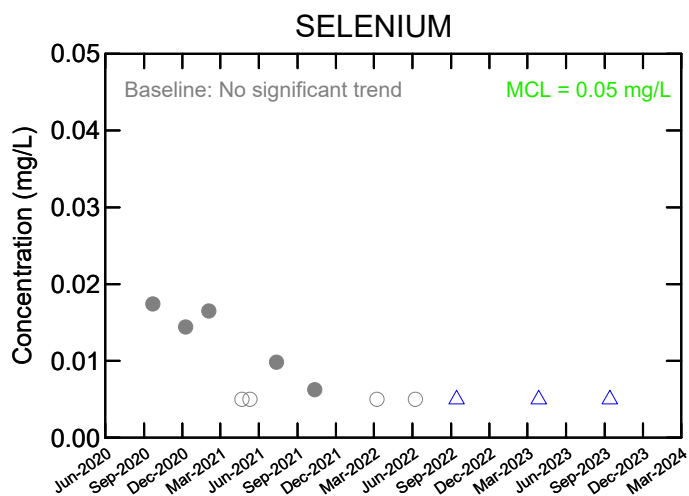
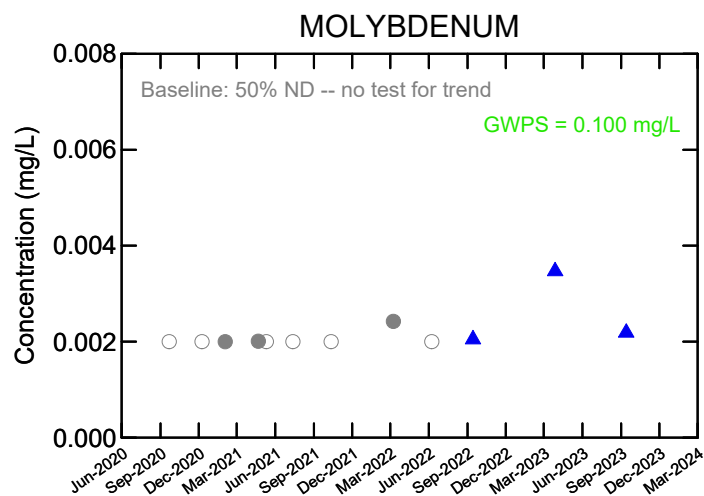


MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

**MW-231S -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME**

Project No. **12576482**
Date: **Jan 8, 2024**

FIGURE 10.d



Legend:

- Baseline Result
- ▲ Detection Monitoring Result
- Maximum Concentration Level (MCL) or Groundwater Protection Standard (GWPS)

Notes:

- 1) Non-detects (plotted at detection limit) are represented by empty symbols.
- 2) Non-detects with detection limits above target and/or detected values were excluded from trends.
- 3) Trend analysis results are reported at a 95 percent confidence level.



MidAmerican Energy Company
Neal North CCR Closed Monofill
Sergeant Bluff, Iowa

MW-231S -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

Project No. 12576482
Date: Jan 8, 2024

FIGURE 10.e

Appendix D

Statistical Summary Tables

Baseline Period Groundwater Monitoring Data
MidAmerican Energy Company
Neal North Closed CCR Monofill
Sergeant Bluff, Iowa

Well	Date	Appendix III Parameters						
		Boron mg/L	Calcium mg/L	Chloride mg/L	Fluoride mg/L	pH, lab s.u.	Sulfate mg/L	TDS mg/L
i) Upgradient Wells								
MW-13	09/21/2020	< 0.100	160	15.3	< 0.500	7.2 J	79.0	790
	12/09/2020	0.139	205	15.3	< 0.500	7.4 J	74.9	862
	02/01/2021	--	--	--	--	--	--	--
	05/10/2021	--	--	--	--	--	--	--
	07/12/2021	0.114	158	35.9 J-	< 0.500 J	7.2 J	51.6	506
	10/05/2021	0.134	150	42.1	< 0.500	7.2 J	47.5	548
	03/08/2022	0.108 / 0.112	175 / 172	74.6 / 73.3	< 0.500 / < 0.500	7.2 J / 7.2 J	69.5 / 68.4	630 / 604
	06/07/2022	0.110 / 0.105	126 / 129	42.8 / 42.5	< 0.500 / < 0.500	7.3 J / 7.2 J	60.8 / 61.1	606 / 620
MW-27	09/21/2020	0.302	178	18.9	< 0.500	7.0 J	199	496
	12/09/2020	0.305	212	28.5	< 0.500	7.1 J	311	1160
	02/01/2021	0.272	170	22.9	< 0.500	7.1 J	259	1030
	05/10/2021	0.271	174	16.9	< 0.500	7.0 J	191	856
	07/12/2021	0.274	184	13.1 J-	< 0.500 J	7.1 J	100	662
	10/05/2021	0.243	162	17.7	< 0.500	7.1 J	175	760
	03/08/2022	0.251	166	15.2	< 0.500	7.3 J	144	698
	06/07/2022	0.203	118	11.8	< 0.500	7.2 J	101	622
MW-29	09/21/2020	0.197	148	10.1	< 0.500	7.0 J	67.0	594
	12/09/2020	0.183	167	10.6	< 0.500	7.2 J	69.8	676
	02/01/2021	--	--	--	--	--	--	--
	05/10/2021	--	--	--	--	--	--	--
	07/12/2021	0.230	209	9.75 J-	< 0.500 J	7.0 J	191	856
	10/05/2021	0.194	207	9.81	< 0.500	7.1 J	172	826
	03/08/2022	0.199	201	12.1	< 0.500	7.2 J	185	808
	06/07/2022	0.144	136	12.0	< 0.500	7.1 J	82.3	704
MW-223S	09/21/2020	< 0.100 / < 0.100	105 / 104	5.12 / < 5.00	< 0.500 / < 0.500	7.5 J / 7.5 J	32.9 / 32.9	240 / 290
	12/09/2020	< 0.100	127	7.15	< 0.500	7.4 J	44.9	524
	02/01/2021	< 0.100 / < 0.100	106 / 105	6.03 / 6.27	< 0.500 / < 0.500	7.6 J / 7.6 J	34.8 / 36.1	402 / 370
	05/10/2021	< 0.100 / < 0.100	120 / 116	< 5.00 / < 5.00	< 0.500 / < 0.500	7.6 J / 7.5 J	36.1 / 35.7	408 / 412
	07/12/2021	< 0.100 / < 0.100	112 / 119	6.40 J- / 6.26 J-	< 0.500 J / < 0.500 J	7.4 J / 7.5 J	43.3 / 43.1	352 / 392
	10/05/2021	0.112 / 0.121	129 / 126	5.25 / 5.24	< 0.100 / < 0.100	7.4 J / 7.9 J	113 / 113	470 / 464
	03/08/2022	0.103	117	< 5.00	< 0.500	7.4 J	35.6	366
	06/07/2022	< 0.100	114	5.58	< 0.500	7.5 J	81.8	514
MW-231S	09/21/2020	0.222	196	10.6	< 0.500	7.1 J	284	824
	12/09/2020	0.196	238	12.8	< 0.500	7.1 J	299	1000
	02/01/2021	0.337	216	9.58	< 0.500	7.2 J	331	986
	05/10/2021	0.291	234	6.12	< 0.500	7.2 J	287	948
	07/12/2021	0.358	294	9.27 J-	< 0.500 J	7.2 J	485	1200
	10/05/2021	0.415	215	9.62	< 0.100	7.4 J	322	920
	03/08/2022	0.231	191	5.37	< 0.500	7.4 J	127	706
	06/07/2022	0.297	178	12.8	< 0.500	7.2 J	305	932

Baseline Period Groundwater Monitoring Data
MidAmerican Energy Company
Neal North Closed CCR Monofill
Sergeant Bluff, Iowa

Well	Date	Appendix III Parameters						
		Boron mg/L	Calcium mg/L	Chloride mg/L	Fluoride mg/L	pH, lab s.u.	Sulfate mg/L	TDS mg/L
ii) Downgradient Wells								
MW-1R	09/21/2020	0.417	127	27.9	< 0.500	7.3 J	222	804
	12/09/2020	0.402	155	28.4	< 0.500	7.2 J	220	902
	02/01/2021	0.398	132	28.4	< 0.500	7.6 J	217	830
	05/10/2021	0.370	145	27.4	0.808	7.2 J	242	824
	07/12/2021	0.412 J	151	31.7	< 0.500	7.3 J	209	834
	10/05/2021	0.342	137	68.0	< 0.500	7.3 J	204	750
	03/08/2022	0.384	167	33.2	< 0.500	7.3 J	262	908
	06/07/2022	0.361	149	40.1	< 0.500	7.2 J	215	816
MW-3R	09/21/2020	0.738	161	20.9	< 0.500	7.2 J	241	894
	12/09/2020	0.923 / 0.914	166 / 157	18.6 / 17.3	< 0.500 / < 0.500	7.1 J / 7.1 J	186 / 181	808 / 824
	02/01/2021	0.629	129	17.3	< 0.500	7.5 J	145	700
	05/10/2021	0.294	142	19.9	0.631	7.3 J	149	692
	07/12/2021	0.300 J	138	18.8	< 0.500	7.4 J	133	712
	10/05/2021	0.289	145	21.2	< 0.500	7.4 J	128	642
	03/08/2022	0.353	130	7.64	< 0.500	7.3 J	157	614
	06/07/2022	0.338	130	10.8	< 0.500	7.3 J	153	658
MW-5R	09/21/2020	0.233	92.8	9.02	< 0.500	7.3 J	130	512
	12/09/2020	0.243	112	8.71	< 0.500	7.2 J	138	632
	02/01/2021	0.289	117	9.92	< 0.500	7.5 J	169	640
	05/10/2021	0.177	126	8.33	0.675	7.2 J	168	626
	07/12/2021	0.182 J	112	8.97	< 0.500	7.3 J	124	528
	10/05/2021	0.189	109	8.94	< 0.500	7.4 J	109	470
	03/08/2022	0.287	175	13.1	< 0.500	7.4 J	340	918
	06/07/2022	0.418	158	11.3	< 0.500	7.2 J	315	892
MW-19	09/21/2020	0.589	350	19.0	< 0.500	6.7 J	984	2330
	12/09/2020	0.672	301	17.4	< 0.500	6.9 J	607	1570
	02/01/2021	0.654	349	19.0	< 0.500	7.1 J	851	1970
	05/10/2021	0.701	379	15.9	< 0.500	6.7 J	1000	2040
	07/12/2021	0.565 J	562	17.8	< 0.500	6.7 J	1040	2420
	10/05/2021	0.466	424	19.4	2.36	6.6 J	1140	2590
	03/08/2022	0.740	339	16.3	< 0.500	6.8 J	769	1780
	06/07/2022	0.634	372	17.8	< 0.500	6.8 J	911	1810
MW-21	09/21/2020	0.352	341	6.61	< 0.500	7.2 J	924	2020
	12/09/2020	0.359	438	7.63	< 0.500	6.8 J	1250	2520
	02/01/2021	0.391	480	7.30	< 0.500	7.2 J	658	2790
	05/10/2021	0.299	188	< 5.00	< 0.500	7.1 J	299	730
	07/12/2021	0.297 J	265	6.58	< 0.500	7.0 J	393	1030
	10/05/2021	0.301	397	6.12	2.85	6.9 J	1150	2270
	03/08/2022	0.474	464	6.88	< 0.500	6.8 J	1540	2470
	06/07/2022	0.345	509	7.11	< 0.500	6.8 J	1530	2490

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Appendix IV Parameters

Well	Date	Antimony mg/L	Arsenic mg/L	Barium mg/L	Beryllium mg/L	Cadmium mg/L
<i>i) Upgradient Wells</i>						
MW-13	09/21/2020	< 0.00100	< 0.00200	0.119	< 0.00100	< 0.000100
	12/09/2020	< 0.00100	< 0.00200	0.221	< 0.00100	0.000227
	02/01/2021	--	--	--	--	--
	05/10/2021	--	--	--	--	--
	07/12/2021	< 0.00200	0.0382	0.253	< 0.00100	< 0.000100
	10/05/2021	< 0.00200	0.0472	0.236	< 0.00100	< 0.000100
	03/08/2022	< 0.00200 / < 0.00200	0.0512 / 0.0498	0.272 / 0.262	< 0.00100 / < 0.00100	< 0.000100 / < 0.000100
	06/07/2022	< 0.00200 / < 0.00200	0.0441 / 0.0457	0.262 / 0.262	< 0.00100 / < 0.00100	< 0.000100 / < 0.000100
MW-27	09/21/2020	< 0.00100	0.00527	0.0847	< 0.00100	0.000114
	12/09/2020	< 0.00100	0.00773	0.109	< 0.00100	< 0.000100
	02/01/2021	< 0.00100	0.00796	0.0876	< 0.00100	< 0.000100
	05/10/2021	< 0.00200	0.0146	0.106	< 0.00100	< 0.000100
	07/12/2021	< 0.00200	0.0101	0.109	< 0.00100	< 0.000100
	10/05/2021	< 0.00200	0.0202	0.103	< 0.00100	< 0.000100
	03/08/2022	< 0.00200	0.0310	0.107	< 0.00100	< 0.000100
	06/07/2022	< 0.00200	0.0414	0.123	< 0.00100	< 0.000100
MW-29	09/21/2020	< 0.00100	< 0.00200	0.195	< 0.00100	< 0.000100
	12/09/2020	< 0.00100	0.00762	0.226	< 0.00100	< 0.000100
	02/01/2021	--	--	--	--	--
	05/10/2021	--	--	--	--	--
	07/12/2021	< 0.00200	0.0206	0.289	< 0.00100	< 0.000100
	10/05/2021	< 0.00200	0.0273	0.271	< 0.00100	< 0.000100
	03/08/2022	< 0.00200	0.0314	0.268	< 0.00100	< 0.000100
	06/07/2022	< 0.00200	0.0320	0.255	< 0.00100	< 0.000100
MW-223S	09/21/2020	< 0.00100 / < 0.00100	< 0.00200 / < 0.00200	0.203 / 0.209	< 0.00100 / < 0.00100	< 0.000100 / < 0.000100
	12/09/2020	< 0.00100	0.00206	0.253	< 0.00100	0.000123
	02/01/2021	< 0.00100 / < 0.00100	0.00219 / 0.00220	0.233 / 0.236	< 0.00100 / < 0.00100	< 0.000100 / < 0.000100
	05/10/2021	< 0.00200 / < 0.00200	0.00302 / 0.00347	0.264 / 0.262	< 0.00100 / < 0.00100	< 0.000100 / < 0.000100
	07/12/2021	< 0.00200 / < 0.00200	0.00346 / 0.00403	0.258 / 0.281	< 0.00100 / < 0.00100	< 0.000100 / < 0.000100
	10/05/2021	< 0.00200 / < 0.00200	0.00698 / 0.00516	0.348 / 0.314	< 0.00100 / < 0.00100	< 0.000100 / < 0.000100
	03/08/2022	< 0.00200	0.00929	0.282	< 0.00100	< 0.000100
	06/07/2022	< 0.00200	0.00969	0.341	< 0.00100	< 0.000100
MW-231S	09/21/2020	< 0.00100	< 0.00200	0.0969	< 0.00100	< 0.000100
	12/09/2020	< 0.00100	< 0.00200	0.116	< 0.00100	0.000139
	02/01/2021	< 0.00100	< 0.00200	0.0903	< 0.00100	0.000119
	05/10/2021	< 0.00200	< 0.00200	0.120	< 0.00100	< 0.000100
	07/12/2021	< 0.00200	< 0.00200	0.0508	< 0.00100	< 0.000100
	10/05/2021	< 0.00200	< 0.00200	0.0875	< 0.00100	< 0.000100
	03/08/2022	< 0.00200	0.00850	0.125	< 0.00100	< 0.000100
	06/07/2022	< 0.00200	0.00440	0.115	< 0.00100	< 0.000100

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Appendix IV Parameters

Well	Date	Antimony mg/L	Arsenic mg/L	Barium mg/L	Beryllium mg/L	Cadmium mg/L
<i>ii) Downgradient Wells</i>						
MW-1R	09/21/2020	< 0.00100	0.0208	0.0668	< 0.00100	< 0.000100
	12/09/2020	< 0.00100	0.0379	0.0958	< 0.00100	< 0.000100
	02/01/2021	< 0.00100	0.0226	0.0855	< 0.00100	0.000409
	05/10/2021	< 0.00200	0.0140	0.0891	< 0.00100	< 0.000100
	07/12/2021	< 0.00200	0.0191	0.0925	< 0.00100	< 0.000100
	10/05/2021	< 0.00200	0.0221	0.0884	< 0.00100	< 0.000100
	03/08/2022	< 0.00200	0.0452	0.118	< 0.00100	< 0.000100
	06/07/2022	< 0.00200	0.0400	0.101	< 0.00100	< 0.000100
MW-3R	09/21/2020	< 0.00100	0.0314	0.211	< 0.00100	< 0.000100
	12/09/2020	< 0.00100 / < 0.00100	0.0368 / 0.0388	0.156 / 0.157	< 0.00100 / < 0.00100	< 0.000100 / < 0.000100
	02/01/2021	< 0.00100	0.0447	0.191	< 0.00100	0.000776
	05/10/2021	< 0.00200	0.0429	0.306	< 0.00100	< 0.000100
	07/12/2021	< 0.00200	0.0416	0.267	< 0.00100	< 0.000100
	10/05/2021	< 0.00200	0.0448	0.305	< 0.00100	< 0.000100
	03/08/2022	< 0.00200	0.0365	0.209	< 0.00100	< 0.000100
	06/07/2022	< 0.00200	0.0348	0.290	< 0.00100	< 0.000100
MW-5R	09/21/2020	< 0.00100	0.0335	0.165	< 0.00100	< 0.000100
	12/09/2020	< 0.00100	0.0279	0.142	< 0.00100	< 0.000100
	02/01/2021	< 0.00100	0.0446	0.195	< 0.00100	< 0.000100
	05/10/2021	< 0.00200	0.0337	0.206	< 0.00100	< 0.000100
	07/12/2021	< 0.00200	0.0351	0.182	< 0.00100	< 0.000100
	10/05/2021	< 0.00200	0.0347	0.180	< 0.00100	< 0.000100
	03/08/2022	< 0.00200	0.0378	0.278	< 0.00100	< 0.000100
	06/07/2022	< 0.00200	0.0345	0.161	< 0.00100	< 0.000100
MW-19	09/21/2020	< 0.00100	0.00413	0.0227	< 0.00100	< 0.000100
	12/09/2020	< 0.00100	< 0.00200	0.0251	< 0.00100	< 0.000100
	02/01/2021	< 0.00100	0.00367	0.0208	< 0.00100	< 0.000100
	05/10/2021	< 0.00200	0.00415	0.0221	< 0.00100	< 0.000100
	07/12/2021	< 0.00200	0.00821	0.0214	< 0.00100	< 0.000100
	10/05/2021	< 0.00200	0.00523	0.0207	< 0.00100	< 0.000100
	03/08/2022	< 0.00200	0.00357	0.0230	< 0.00100	< 0.000100
	06/07/2022	< 0.00200	0.00340	0.0229	< 0.00100	< 0.000100
MW-21	09/21/2020	< 0.00100	< 0.00200	0.0290	< 0.00100	0.000173
	12/09/2020	< 0.00100	< 0.00200	0.0301	< 0.00100	< 0.000100
	02/01/2021	< 0.00400	< 0.00200	0.0280	< 0.00100	< 0.000100
	05/10/2021	< 0.00200	< 0.00200	0.0561	< 0.00100	< 0.000100
	07/12/2021	< 0.00200	< 0.00200	0.0639	< 0.00100	< 0.000100
	10/05/2021	< 0.00200	< 0.00200	0.0372	< 0.00100	0.000121
	03/08/2022	< 0.00200	< 0.00200	0.0222	< 0.00100	< 0.000100
	06/07/2022	< 0.00200	< 0.00200	0.0187	< 0.00100	< 0.000100

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Well	Date	Appendix IV Parameters			
		Chromium mg/L	Cobalt mg/L	Lead mg/L	Lithium mg/L
i) Upgradient Wells					
MW-13	09/21/2020	< 0.00500	< 0.000500	< 0.000500	0.0982
	12/09/2020	< 0.00500	< 0.000500	< 0.000500	0.130
	02/01/2021	--	--	--	--
	05/10/2021	--	--	--	--
	07/12/2021	< 0.00500	0.00335	< 0.000500	0.0806
	10/05/2021	< 0.00500	0.00125	< 0.000500	0.0582
	03/08/2022	< 0.00500 / < 0.00500	0.00137 / 0.00141	< 0.000500 / < 0.000500	0.0900 / 0.0868
	06/07/2022	< 0.00500 / < 0.00500	0.00110 / 0.00107	< 0.000500 / < 0.000500	0.0841 / 0.0816
MW-27	09/21/2020	< 0.00500	0.00154	< 0.000500	0.196
	12/09/2020	< 0.00500	0.00142	< 0.000500	0.243
	02/01/2021	< 0.00500	0.00102	< 0.000500	0.187
	05/10/2021	< 0.00500	0.000977	< 0.000500	0.169
	07/12/2021	< 0.00500	0.000940	< 0.000500	0.187
	10/05/2021	< 0.00500	0.000759	< 0.000500	0.115
	03/08/2022	< 0.00500	0.000666	< 0.000500	0.159
	06/07/2022	< 0.00500	0.000699	< 0.000500	0.118
MW-29	09/21/2020	< 0.00500	< 0.000500	< 0.000500	0.0934
	12/09/2020	< 0.00500	0.00269	< 0.000500	0.112
	02/01/2021	--	--	--	--
	05/10/2021	--	--	--	--
	07/12/2021	< 0.00500	0.00694	< 0.000500	0.131
	10/05/2021	< 0.00500	0.00442	< 0.000500	0.0865
	03/08/2022	< 0.00500	0.00354	< 0.000500	0.126
	06/07/2022	< 0.00500	0.00254	< 0.000500	0.101
MW-223S	09/21/2020	< 0.00500 / < 0.00500	< 0.000500 / < 0.000500	< 0.000500 / < 0.000500	0.0416 / 0.0418
	12/09/2020	< 0.00500	< 0.000500	< 0.000500	0.0500
	02/01/2021	< 0.00500 / < 0.00500	< 0.000500 / < 0.000500	< 0.000500 / < 0.000500	0.0492 / 0.0517
	05/10/2021	< 0.00500 / < 0.00500	0.000712 / 0.000764	< 0.000500 / < 0.000500	0.0544 / 0.0545
	07/12/2021	< 0.00500 / < 0.00500	0.00104 / 0.000914	< 0.000500 / < 0.000500	0.0584 / 0.0572
	10/05/2021	< 0.00500 / < 0.00500	0.00128 / 0.00118	< 0.000500 / < 0.000500	0.0544 / 0.0581
	03/08/2022	< 0.00500	0.000653	< 0.000500	0.0504
	06/07/2022	< 0.00500	0.000969	< 0.000500	0.0581
MW-231S	09/21/2020	< 0.00500	0.00225	< 0.000500	0.0776
	12/09/2020	< 0.00500	< 0.000500	< 0.000500	0.0929
	02/01/2021	< 0.00500	0.00188	< 0.000500	0.0952
	05/10/2021	< 0.00500	0.00188	< 0.000500	0.100
	07/12/2021	< 0.00500	0.000539	< 0.000500	0.0994
	10/05/2021	< 0.00500	0.00216	< 0.000500	0.102
	03/08/2022	< 0.00500	0.00351	< 0.000500	0.109
	06/07/2022	< 0.00500	0.00275	< 0.000500	0.0964

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Well	Date	Appendix IV Parameters			
		Chromium mg/L	Cobalt mg/L	Lead mg/L	Lithium mg/L
ii) Downgradient Wells					
MW-1R	09/21/2020	< 0.00500	0.00104	< 0.000500	0.0656
	12/09/2020	< 0.00500	0.000998	< 0.000500	0.0813
	02/01/2021	< 0.00500	0.000747	< 0.000500	0.0747
	05/10/2021	< 0.00500	< 0.000500	< 0.000500	0.0711
	07/12/2021	< 0.00500	0.000595	< 0.000500	0.0755
	10/05/2021	< 0.00500	< 0.000500	< 0.000500	0.0503
	03/08/2022	< 0.00500	< 0.000500	< 0.000500	0.0812
	06/07/2022	< 0.00500	< 0.000500	< 0.000500	0.0709
MW-3R	09/21/2020	< 0.00500	0.000848	< 0.000500	0.0854
	12/09/2020	< 0.00500 / < 0.00500	0.00161 / 0.00155	< 0.000500 / < 0.000500	0.0982 / 0.0969
	02/01/2021	< 0.00500	0.00131	0.00160	0.0877
	05/10/2021	< 0.00500	0.000526	< 0.000500	0.0837
	07/12/2021	< 0.00500	0.000647	< 0.000500	0.0844
	10/05/2021	< 0.00500	< 0.000500	< 0.000500	0.0615
	03/08/2022	< 0.00500	< 0.000500	< 0.000500	0.0854
	06/07/2022	< 0.00500	< 0.000500	< 0.000500	0.0793
MW-5R	09/21/2020	< 0.00500	< 0.000500	< 0.000500	0.0565
	12/09/2020	< 0.00500	0.000604	< 0.000500	0.0649
	02/01/2021	< 0.00500	0.000550	< 0.000500	0.0695
	05/10/2021	< 0.00500	0.000613	< 0.000500	0.0717
	07/12/2021	< 0.00500	0.000543	< 0.000500	0.0697
	10/05/2021	< 0.00500	< 0.000500	< 0.000500	0.0489
	03/08/2022	< 0.00500	0.000730	< 0.000500	0.0808
	06/07/2022	< 0.00500	0.000613	< 0.000500	0.0723
MW-19	09/21/2020	< 0.00500	0.0107	< 0.000500	0.222
	12/09/2020	< 0.00500	0.00389	< 0.000500	0.239
	02/01/2021	< 0.00500	0.00890	< 0.000500	0.273
	05/10/2021	< 0.00500	0.0103	< 0.000500	0.245
	07/12/2021	< 0.00500	0.0225	< 0.000500	0.300
	10/05/2021	< 0.00500	0.0121	< 0.000500	0.200
	03/08/2022	< 0.00500	0.00806	0.000747	0.254
	06/07/2022	< 0.00500	0.00845	< 0.000500	0.254
MW-21	09/21/2020	< 0.00500	0.000510	< 0.000500	0.244
	12/09/2020	< 0.00500	0.000956	< 0.000500	0.316
	02/01/2021	< 0.00500	0.00664	< 0.000500	0.332
	05/10/2021	< 0.00500	< 0.000500	< 0.000500	0.188
	07/12/2021	< 0.00500	< 0.000500	< 0.000500	0.233
	10/05/2021	< 0.00500	< 0.000500	< 0.000500	0.208
	03/08/2022	< 0.00500	0.00397	0.000899	0.334
	06/07/2022	< 0.00500	0.00151	< 0.000500	0.321

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Well	Date	Appendix IV Parameters				
		Mercury mg/L	Molybdenum mg/L	Radium-226 & 228 pCi/L	Selenium mg/L	Thallium mg/L
i) Upgradient Wells						
MW-13	09/21/2020	< 0.000200	0.00231	< 0.595	0.0982	< 0.00100
	12/09/2020	< 0.000200	< 0.00200	0.735	0.111	< 0.00100
	02/01/2021	--	--	--	--	--
	05/10/2021	--	--	--	--	--
	07/12/2021	< 0.000200	0.00420	1.53	< 0.00500	< 0.00100
	10/05/2021	< 0.000200	0.00286	1.12	< 0.00500	< 0.00100
	03/08/2022	< 0.000200 / < 0.000200	0.00321 / 0.00309	0.794 / 1.16	< 0.00500 / < 0.00500	< 0.00100 / < 0.00100
	06/07/2022	< 0.000200 / < 0.000200	0.00359 / 0.00407	1.22 / 0.878	< 0.00500 / < 0.00500	< 0.00100 / < 0.00100
MW-27	09/21/2020	< 0.000200	< 0.00200	1.02	< 0.00500	< 0.00100
	12/09/2020	< 0.000200	< 0.00200	0.728	< 0.00500	< 0.00100
	02/01/2021	< 0.000200	< 0.00200	0.675	< 0.00500	< 0.00100
	05/10/2021	< 0.000200	< 0.00200	0.573	< 0.00500	< 0.00100
	07/12/2021	< 0.000200	< 0.00200	0.898	< 0.00500	< 0.00100
	10/05/2021	< 0.000200	< 0.00200	0.803	< 0.00500	< 0.00100
	03/08/2022	< 0.000200	< 0.00200	1.14	< 0.00500	< 0.00100
	06/07/2022	< 0.000200	< 0.00200	< 0.361	< 0.00500	< 0.00100
MW-29	09/21/2020	< 0.000200	< 0.00200	1.67	< 0.00500	< 0.00100
	12/09/2020	< 0.000200	< 0.00200	0.579	< 0.00500	< 0.00100
	02/01/2021	--	--	--	--	--
	05/10/2021	--	--	--	--	--
	07/12/2021	< 0.000200	0.00335	1.79	< 0.00500	< 0.00100
	10/05/2021	< 0.000200	< 0.00200	0.865	< 0.00500	< 0.00100
	03/08/2022	< 0.000200	< 0.00200	1.18	< 0.00500	< 0.00100
	06/07/2022	< 0.000200	< 0.00200	1.33	< 0.00500	< 0.00100
MW-223S	09/21/2020	< 0.000200 / < 0.000200	< 0.00200 / < 0.00200	1.37 / < 0.449	< 0.00500 / < 0.00500	< 0.00100 / < 0.00100
	12/09/2020	< 0.000200	0.00316	0.497	< 0.00500	< 0.00100
	02/01/2021	< 0.000200 / < 0.000200	0.00238 / 0.00221	< 0.0912 / < -0.0527	< 0.00500 / < 0.00500	< 0.00100 / < 0.00100
	05/10/2021	< 0.000200 / < 0.000200	0.00218 / 0.00272	0.618 / 0.808	< 0.00500 / < 0.00500	< 0.00100 / < 0.00100
	07/12/2021	< 0.000200 / < 0.000200	0.00226 / 0.00258	0.658 / < 0.270	< 0.00500 / < 0.00500	< 0.00100 / < 0.00100
	10/05/2021	< 0.000200 / < 0.000200	0.00239 / 0.00240	0.698 / 0.785	< 0.00500 / < 0.00500	< 0.00100 / < 0.00100
	03/08/2022	< 0.000200	0.00246	0.438	< 0.00500	< 0.00100
	06/07/2022	< 0.000200	0.00241	0.832	< 0.00500	< 0.00100
MW-231S	09/21/2020	< 0.000200	< 0.00200	0.973	0.0174	< 0.00100
	12/09/2020	< 0.000200	< 0.00200	0.994	0.0144	< 0.00100
	02/01/2021	< 0.000200	0.00200	< 0.349	0.0165	0.00122
	05/10/2021	< 0.000200	< 0.00200	< 0.429	< 0.00500	< 0.00100
	07/12/2021	< 0.000200	< 0.00200	< 0.291	0.00984	< 0.00100
	10/05/2021	< 0.000200	< 0.00200	0.582	0.00624	< 0.00100
	03/08/2022	< 0.000200	0.00242	0.925	< 0.00500	< 0.00100
	06/07/2022	< 0.000200	< 0.00200	0.902	< 0.00500	< 0.00100

Baseline Period Groundwater Monitoring Data
MidAmerican Energy Company
Neal North Closed CCR Monofill
Sergeant Bluff, Iowa

Well	Date	Appendix IV Parameters				
		Mercury mg/L	Molybdenum mg/L	Radium-226 & 228 pCi/L	Selenium mg/L	Thallium mg/L
ii) Downgradient Wells						
MW-1R	09/21/2020	< 0.000200	0.00394	1.58	< 0.00500	< 0.00100
	12/09/2020	< 0.000200	0.00421	< 0.460	< 0.00500	< 0.00100
	02/01/2021	< 0.000200	0.00554	< 0.484	< 0.00500	< 0.00100
	05/10/2021	< 0.000200	0.00527	< -0.0461	< 0.00500	< 0.00100
	07/12/2021	< 0.000200	0.00568	0.379	< 0.00500	< 0.00100
	10/05/2021	< 0.000200	0.00464	< 0.0779	< 0.00500	< 0.00100
	03/08/2022	< 0.000200	0.00425	0.757	< 0.00500	< 0.00100
	06/07/2022	< 0.000200	0.00526	0.822	< 0.00500	< 0.00100
MW-3R	09/21/2020	< 0.000200	< 0.00200	1.15	< 0.00500	< 0.00100
	12/09/2020	< 0.000200 / < 0.000200	< 0.00200 / < 0.00200	< 0.235 / 1.23	< 0.00500 / < 0.00500	< 0.00100 / < 0.00100
	02/01/2021	< 0.000200	0.00651	0.764	< 0.00500	0.00694
	05/10/2021	< 0.000200	0.00212	0.707	< 0.00500	< 0.00100
	07/12/2021	< 0.000200	0.00240	0.878	< 0.00500	< 0.00100
	10/05/2021	< 0.000200	0.00210	< 0.470	< 0.00500	< 0.00100
	03/08/2022	< 0.000200	0.00212	0.504	< 0.00500	< 0.00100
	06/07/2022	< 0.000200	0.00219	1.15	< 0.00500	< 0.00100
MW-5R	09/21/2020	< 0.000200	0.00394	< 0.683	< 0.00500	< 0.00100
	12/09/2020	< 0.000200	0.00394	< 0.274	< 0.00500	< 0.00100
	02/01/2021	< 0.000200	0.00448	< -0.0292	< 0.00500	< 0.00100
	05/10/2021	< 0.000200	0.00401	0.732	< 0.00500	< 0.00100
	07/12/2021	< 0.000200	0.00423	0.734	< 0.00500	< 0.00100
	10/05/2021	< 0.000200	0.00363	0.669	< 0.00500	< 0.00100
	03/08/2022	< 0.000200	0.00355	0.608	< 0.00500	< 0.00100
	06/07/2022	< 0.000200	0.00383	< 0.491	< 0.00500	< 0.00100
MW-19	09/21/2020	< 0.000200	< 0.00200	0.920	< 0.00500	< 0.00100
	12/09/2020	< 0.000200	< 0.00200	< 0.383	< 0.00500	< 0.00100
	02/01/2021	< 0.000200	< 0.00200	0.720	< 0.00500	< 0.00100
	05/10/2021	< 0.000200	< 0.00200	< 0.123	< 0.00500	< 0.00100
	07/12/2021	< 0.000200	< 0.00200	0.662	< 0.00500	< 0.00100
	10/05/2021	< 0.000200	< 0.00200	0.815	< 0.00500	< 0.00100
	03/08/2022	< 0.000200	< 0.00200	0.777	< 0.00500	< 0.00100
	06/07/2022	< 0.000200	< 0.00200	< 0.456	< 0.00500	< 0.00100
MW-21	09/21/2020	< 0.000200	< 0.00200	1.17	< 0.00500	< 0.00100
	12/09/2020	< 0.000200	< 0.00200	< 0.471	< 0.00500	< 0.00100
	02/01/2021	< 0.000200	< 0.00200	< 0.120	< 0.00500	< 0.00100
	05/10/2021	< 0.000200	< 0.00200	< 0.291	0.0398	< 0.00100
	07/12/2021	< 0.000200	< 0.00200	0.546	0.00549	< 0.00100
	10/05/2021	< 0.000200	< 0.00200	0.696	< 0.00500	< 0.00100
	03/08/2022	< 0.000200	< 0.00200	0.353	< 0.00500	< 0.00100
	06/07/2022	< 0.000200	< 0.00200	0.626	< 0.00500	< 0.00100

Table D.2

2023 Monitoring Analytical Results Summary
MidAmerican Energy Company
Neal North Closed CCR Monofill
Sergeant Bluff, Iowa

Location ID: Sample Name: Sample Date:		MW-13 MW13R-GW-0323 03/27/2023	MW-13 MW13R-GW-0923 09/12/2023	MW-27 MW27-GW-0323 03/29/2023	MW-27 MW27-GW-0923 09/12/2023	MW-29 MW29R-GW-0323 03/29/2023	MW-29 MW29R-GW-0923 09/12/2023	MW-223S MW223S-GW-0323 03/29/2023	MW-223S DP01-GW-0323 03/29/2023 (Duplicate)	MW-223S MW223S-GW-0923 09/12/2023	MW-223S DP01-GW-0923 09/12/2023 (Duplicate)
Parameters	Unit										
Appendix III											
Boron	mg/L	0.138	0.122 J+	0.246	0.222 J+	0.158	0.184 J+	0.140	0.137	0.149 J+	0.154 J+
Calcium	mg/L	130	135	158	169	200	222	186	188	126	122
Chloride	mg/L	18.9	12.3	11.9	13.9	11.9	10.8	<1.00 J	6.06 J	4.37	5.00
Fluoride	mg/L	<0.500	<1.00	<0.500	<1.00	<0.500	<1.00	0.269	<0.500	<0.200	<1.00
pH, lab	s.u.	7.3 J	7.2 J	7.1 J	7.1 J	7.1 J	7.0 J	7.4 J	7.4 J	7.5 J	7.4 J
Sulfate	mg/L	68.4	58.6	96.4	97.1	121	205	113	110	64.3	61.1
Total dissolved solids (TDS)	mg/L	502	542	634	716	724	906	600	606	474	456
Appendix IV											
Antimony	mg/L	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200
Arsenic	mg/L	0.0510	0.0483 J+	0.0513	0.0616 J+	0.0258	0.0233 J+	0.0172	0.0167	0.0133 J+	0.0132 J+
Barium	mg/L	0.200	0.210 J+	0.130	0.164 J+	0.261	0.248 J+	0.377	0.382	0.256 J+	0.244 J+
Beryllium	mg/L	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Cadmium	mg/L	0.000211	<0.000200	<0.000200	0.000207 J+	<0.000100	<0.000200	<0.000100	<0.000100	<0.000200	<0.000200
Chromium	mg/L	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Cobalt	mg/L	0.00105	0.000806 J+	0.000561	0.000978 J+	0.00265	0.00270 J+	0.00107	0.00103	0.000667 J+	0.000638 J+
Lead	mg/L	0.000593	<0.000500	<0.000500	0.000513 J+	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Lithium	mg/L	0.0873	0.0880 J+	0.129	0.113 J+	0.109	0.118 J+	0.0684	0.0674	0.0517 J+	0.0504 J+
Mercury	mg/L	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200
Molybdenum	mg/L	0.00492	0.00411 J+	<0.00200	0.00284 J+	0.00232	0.00205 J+	0.00296	0.00288	0.00305 J+	0.00291 J+
Radium-226 & 228	pCi/L	1.18	0.996	<0.0863	1.46	0.842	1.15	<0.468	0.877	1.15	0.795
Selenium	mg/L	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Thallium	mg/L	0.00146	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100

Table D.2

2023 Monitoring Analytical Results Summary
MidAmerican Energy Company
Neal North Closed CCR Monofill
Sergeant Bluff, Iowa

Location ID:		MW-231S	MW-231S	MW-1R	MW-1R	MW-1R	MW-1R	MW-3R	MW-3R	MW-5R
Sample Name:		MW231SR-GW-0323	MW231SR-GW-0923	MW01R-GW-0323	DP05-GW-0323	MW01R-GW-0923	DP05-GW-0923	MW03R-GW-0323	MW03R-GW-0923	MW05R-GW-0323
Sample Date:		03/28/2023	09/13/2023	04/03/2023	04/03/2023 (Duplicate)	09/13/2023	09/13/2023 (Duplicate)	04/03/2023	09/13/2023	04/03/2023
Parameters	Unit									
Appendix III										
Boron	mg/L	0.500	0.253	0.331	0.336	0.476	0.460	0.258	0.352	0.297
Calcium	mg/L	204	172	182	182	151	128	154	146	192
Chloride	mg/L	9.32	<1.00	34.6	34.4	61.9	61.5	10	9.02	13.7
Fluoride	mg/L	0.163	<0.200	0.500 U	0.500 U	<1.00	<1.00	0.500 U	<1.00	<0.500
pH, lab	s.u.	7.2 J	7.1 J	7.3 J	7.2 J	7.2 HF	7.1 HF	7.4 J	7.2 HF	7.3 J
Sulfate	mg/L	176	158	235	236	213	209	205	219	318
Total dissolved solids (TDS)	mg/L	788	716	926	934	872	860	756	812	920
Appendix IV										
Antimony	mg/L	<0.00200	<0.00200	--	--	<0.00200	<0.00200	--	<0.00200	--
Arsenic	mg/L	0.0121	0.00967	--	--	0.0420	0.0436	--	0.0418	--
Barium	mg/L	0.136	0.120	--	--	0.0917	0.0966	--	0.292	--
Beryllium	mg/L	<0.00100	<0.00100	--	--	<0.00100	<0.00100	--	<0.00100	--
Cadmium	mg/L	<0.000100	<0.000200	--	--	<0.000200	<0.000200	--	<0.000200	--
Chromium	mg/L	<0.00500	<0.00500	--	--	<0.00500	<0.00500	--	<0.00500	--
Cobalt	mg/L	0.00330	0.00257	--	--	<0.000500	<0.000500	--	<0.000500	--
Lead	mg/L	<0.000500	<0.000500	--	--	<0.000500	<0.000500	--	<0.000500	--
Lithium	mg/L	0.110	0.0851	--	--	0.0660	0.0600	--	0.0763	--
Mercury	mg/L	<0.000200	<0.000200	--	--	<0.000200	<0.000200	--	<0.000200	--
Molybdenum	mg/L	0.00347	0.00219	--	--	0.00489	0.00517	--	0.00236	--
Radium-226 & 228	pCi/L	<0.362	1.48	--	--	1.32	1.88	--	1.46	--
Selenium	mg/L	<0.00500	<0.00500	--	--	<0.00500	<0.00500	--	<0.00500	--
Thallium	mg/L	0.00147	<0.00100	--	--	<0.00100	<0.00400	--	<0.00100	--

Table D.2

2023 Monitoring Analytical Results Summary
MidAmerican Energy Company
Neal North Closed CCR Monofill
Sergeant Bluff, Iowa

Location ID:		MW-5R	MW-19	MW-19	MW-21	MW-21	MW-21
Sample Name:		MW05R-GW-0923	MW19-GW-0323	MW19-GW-0923	MW21-GW-0323	MW21-GW-0923	MW21-GW-1223
Sample Date:		09/13/2023	04/03/2023	09/13/2023	04/03/2023	09/13/2023	12/05/2023
Parameters	Unit						
Appendix III							
Boron	mg/L	0.427	0.584	0.606	0.329	0.519	0.337
Calcium	mg/L	92.9	415	334	523	474	--
Chloride	mg/L	10.4	18.0	19.1	7.94	8.18	--
Fluoride	mg/L	<1.00	<0.500	<1.00	0.791	<1.00	--
pH, lab	s.u.	7.3 J	6.7 J	6.7 J	6.8 J	6.7 J	--
Sulfate	mg/L	160	1020	736	1610	1550	--
Total dissolved solids (TDS)	mg/L	626	2220	2360	3050	3110	--
Appendix IV							
Antimony	mg/L	<0.00200	--	<0.00200	--	<0.00200	--
Arsenic	mg/L	0.0283	--	0.00298	--	<0.00200	--
Barium	mg/L	0.100	--	0.0166	--	0.0139	--
Beryllium	mg/L	<0.00100	--	<0.00100	--	<0.00100	--
Cadmium	mg/L	<0.000200	--	<0.000200	--	0.000346	--
Chromium	mg/L	<0.00500	--	<0.00500	--	<0.00500	--
Cobalt	mg/L	<0.000500	--	0.00670	--	0.000983	--
Lead	mg/L	<0.000500	--	<0.000500	--	<0.000500	--
Lithium	mg/L	0.0578	--	0.234	--	0.301	--
Mercury	mg/L	<0.000200	--	<0.000200	--	<0.000200	--
Molybdenum	mg/L	0.00393	--	<0.00200	--	<0.00200	--
Radium-226 & 228	pCi/L	1.04	--	0.984	--	1.17	--
Selenium	mg/L	<0.00500	--	<0.00500	--	<0.00500	--
Thallium	mg/L	<0.00100	--	<0.00100	--	<0.00100	--

Notes:

J - Estimated concentration.

< - Not detected at the associated reporting limit.

J- - Estimated concentration, result may be biased low

J+ - Estimated concentration, result may be biased high.

Table D.3

Inter-Well Comparison Values
(Statistical Upper Tolerance Limits based on Data from Upgradient Wells)
MidAmerican Energy Company
Neal North Closed CCR Monofill
Sergeant Bluff, Iowa

Analyte	Unit	Date Range	N	%ND	Summary Statistics		Statistical Outliers	Data Distribution	Mann-Kendal Trend Test			Method	Upper Tolerance Limits	
					Minimum (mg/L)	Maximum (mg/L)			Stat.	Prob.	Conclusion		95/95 UTL (mg/L)	99/95 UTL (mg/L)
Appendix III														
Boron	mg/L	9/2020 - 6/2022	36	19%	< 0.100	0.415	0	Normal	-0.67	0.748	No trend	KM Normal	0.386	0.457
Calcium	mg/L	9/2020 - 6/2022	36	0%	104	294	0	Normal	-1.95	0.974	No trend	Normal	264	300
Chloride	mg/L	9/2020 - 6/2022	36	6%	< 5.00	74.6	2	Lognormal	-0.76	0.776	No trend	KM Approx. Lognormal	49.4	84.9
Fluoride	mg/L	9/2020 - 6/2022	36	100%	< 0.100	< 0.500	3	--	--	--	100% ND	Detection Limit	< 0.500	< 0.500
pH, lab	s.u.	9/2020 - 6/2022	36	0%	7.0 J	7.9 J	0	--	2.36	0.009	Increasing	--	7.0 J - 7.9 J	7.0 J - 7.9 J
Sulfate	mg/L	9/2020 - 6/2022	36	0%	32.9	485	1	Gamma	-0.44	0.670	No trend	WH Approx. Gamma (KM)	481	708
TDS	mg/L	9/2020 - 6/2022	36	0%	240	1200	0	Normal	-0.82	0.793	No trend	Normal	1206	1397
Appendix IV														
Antimony	mg/L	9/2020 - 6/2022	36	100%	< 0.00100	< 0.00200	0	--	--	--	100% ND	Detection Limit	< 0.00200	< 0.00200
Arsenic	mg/L	9/2020 - 6/2022	36	28%	< 0.00200	0.0512	0	--	5.96	1E-09	Increasing	--	< 0.00200 - 0.0512	< 0.00200 - 0.0512
Barium	mg/L	9/2020 - 6/2022	36	0%	0.0508	0.348	0	--	3.28	0.001	Increasing	--	0.0508 - 0.348	0.0508 - 0.348
Beryllium	mg/L	9/2020 - 6/2022	36	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	Detection Limit	< 0.00100	< 0.00100
Cadmium	mg/L	9/2020 - 6/2022	36	86%	< 0.000100	0.000227	3	Not Normal	--	--	>50% ND	Non-parametric	0.000227	0.000227
Chromium	mg/L	9/2020 - 6/2022	36	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	Detection Limit	< 0.00500	< 0.00500
Cobalt	mg/L	9/2020 - 6/2022	36	19%	< 0.000500	0.00694	0	Normal	0.25	0.400	No trend	KM Approx. Normal	0.00456	0.00568
Lead	mg/L	9/2020 - 6/2022	36	100%	< 0.000500	< 0.000500	0	--	--	--	100% ND	Detection Limit	< 0.000500	< 0.000500
Lithium	mg/L	9/2020 - 6/2022	36	0%	0.0416	0.243	0	Normal	0.76	0.225	No trend	Approx. Normal	0.205	0.244
Mercury	mg/L	9/2020 - 6/2022	36	100%	< 0.000200	< 0.000200	0	--	--	--	100% ND	Detection Limit	< 0.000200	< 0.000200
Molybdenum	mg/L	9/2020 - 6/2022	36	58%	< 0.00200	0.0042	0	Normal	--	--	No trend	KM Approx. Normal	0.00351	0.00396
Radium-226 & 228	pCi/L	9/2020 - 6/2022	36	17%	< -0.0527	1.79	0	Normal	0.06	0.475	No trend	KM Normal	1.76	2.14
Selenium	mg/L	9/2020 - 6/2022	36	81%	< 0.00500	0.111	3	Lognormal	--	--	No trend	KM Approx. Lognormal	0.033	0.061
Thallium	mg/L	9/2020 - 6/2022	36	97%	< 0.00100	0.00122	0	Not Normal	--	--	>50% ND	Non-parametric	0.00122	0.00122

Notes:

< 100 - Not detected at the associated reporting limit.

7.0 J - Estimated concentration.

Data distribution was determined by ProUCL using detects only.

Statistic: calculated as the sum of the signs of all possible pair-wise data comparisons.

Probability of significance: A value less than 0.05 indicates greater than 95 percent confidence of a statistically significant trend.

UTLs were calculated using pooled data from Upgradient wells MW-13, MW-27, MW-29, MW-223S, and MW-231S.

Non-parametric UTLs with 36 baseline samples have an actual confidence coefficient of 0.84 (i.e., 84 percent confidence) at 95 percent coverage.

Non-parametric UTLs with 36 baseline samples have an actual confidence coefficient of 0.304 (i.e., 30 percent confidence) at 99 percent coverage.

KM - UTLs were calculated using Kaplan-Meier estimates for non-detects.

WH - UTLs were calculated using gamma distribution and the Wilson-Hilferty method.

TDS - Total dissolved solids.

Table D.4

Intra-Well Comparison Values
(Upper Tolerance Limits based on Baseline Period Data at each Well)
MidAmerican Energy Company
Neal North Closed CCR Monofill
Sergeant Bluff, Iowa

Well	Analyte	Date Range	N	%ND	Summary Statistics		Statistical Outliers	Data Distribution	Mann-Kendall Trend Test			Sen's Slope	Upper Tolerance Limits		
					Minimum	Maximum			Stat.	Prob.	Conclusion		Method	95/95 UTL	99/95 UTL
MW-13 (Upgradient)	Appendix III														
	Boron	9/2020 - 6/2022	6	17%	< 0.100	0.139	1	Normal	-3	0.72	No trend	--	KM Normal	0.17	0.189
	Calcium	9/2020 - 6/2022	6	0%	127.5	205	0	Normal	-7	0.272	No trend	--	Normal	258	293
	Chloride	9/2020 - 6/2022	6	0%	15.3	73.95	0	Normal	12	0.036	Increasing	0.07	--	15.3 - 73.9	15.3 - 73.9
	Fluoride	9/2020 - 6/2022	6	100%	< 0.500	< 0.500	0	--	--	--	100% ND	--	Detection Limit	< 0.500	< 0.500
	pH, lab	9/2020 - 6/2022	6	0%	7.2 J	7.4 J	1	Normal	1	1.000	No trend	--	Normal	6.94 - 7.54	6.84 - 7.65
	Sulfate	9/2020 - 6/2022	6	0%	47.5	79	0	Normal	-7	0.272	No trend	--	Normal	111	128
	TDS	9/2020 - 6/2022	6	0%	506	862	0	Normal	-3	0.72	No trend	--	Normal	1175	1364
	Appendix IV														
	Antimony	9/2020 - 6/2022	6	100%	< 0.00100	< 0.00200	0	--	--	--	100% ND	--	Detection Limit	< 0.00200	< 0.00200
	Arsenic	9/2020 - 6/2022	6	33%	< 0.00200	0.0505	0	Normal	10	0.096	No trend	--	KM Normal	0.108	0.136
	Barium	9/2020 - 6/2022	6	0%	0.119	0.267	1	Normal	11	0.056	No trend	--	Normal	0.431	0.506
	Beryllium	9/2020 - 6/2022	6	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100
	Cadmium	9/2020 - 6/2022	6	83%	< 0.000100	0.000227	1	Not Normal	--	--	>50% ND	--	Non-parametric	0.000227	0.000227
	Chromium	9/2020 - 6/2022	6	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
	Cobalt	9/2020 - 6/2022	6	33%	< 0.000500	0.00335	1	Normal	4	0.595	No trend	--	KM Normal	0.0049	0.0062
	Lead	9/2020 - 6/2022	6	100%	< 0.000500	< 0.000500	0	--	--	--	100% ND	--	Detection Limit	< 0.000500	< 0.000500
	Lithium	9/2020 - 6/2022	6	0%	0.0582	0.13	0	Normal	-5	0.470	No trend	--	Normal	0.178	0.210
	Mercury	9/2020 - 6/2022	6	100%	< 0.000200	< 0.000200	0	--	--	--	100% ND	--	Detection Limit	< 0.000200	< 0.000200
	Molybdenum	9/2020 - 6/2022	6	17%	< 0.00200	0.0042	0	Normal	7	0.272	No trend	--	KM Normal	0.00594	0.00699
	Radium-226 & 228	9/2020 - 6/2022	6	17%	< 0.595	1.53	0	Normal	5	0.470	No trend	--	KM Normal	2.11	2.51
	Selenium	9/2020 - 6/2022	6	67%	< 0.00500	0.111	0	Not Normal	--	--	>50% ND	--	Non-parametric	0.111	0.111
	Thallium	9/2020 - 6/2022	6	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100
MW-27 (Upgradient)	Appendix III														
	Boron	9/2020 - 6/2022	8	0%	0.203	0.305	0	Normal	-20	0.014	Decreasing	-0.0001	--	0.203 - 0.305	0.203 - 0.305
	Calcium	9/2020 - 6/2022	8	0%	118	212	2	Normal	-7	0.272	No trend	--	Normal	254	285
	Chloride	9/2020 - 6/2022	8	0%	11.8	28.5	0	Normal	12	0.036	Increasing	0.07	--	11.8 - 28.5	11.8 - 28.5
	Fluoride	9/2020 - 6/2022	8	100%	< 0.500	< 0.500	0	--	--	--	100% ND	--	Detection Limit	< 0.500	< 0.500
	pH, lab	9/2020 - 6/2022	8	0%	7.0 J	7.3 J	0	Normal	1	1.000	No trend	--	Normal	6.80 - 7.43	6.68 - 7.54
	Sulfate	9/2020 - 6/2022	8	0%	100	311	0	Normal	-7	0.272	No trend	--	Normal	419	504
	TDS	9/2020 - 6/2022	8	0%	496	1160	0	Normal	-3	0.720	No trend	--	Normal	1487	1744
	Appendix IV														
	Antimony	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00200	0	--	--	--	100% ND	--	Detection Limit	< 0.00200	< 0.00200
	Arsenic	9/2020 - 6/2022	8	0%	0.00527	0.0414	0	Normal	10	0.096	No trend	--	Normal	0.058	0.073
	Barium	9/2020 - 6/2022	8	0%	0.0847	0.123	0	Normal	11	0.056	No trend	--	Normal	0.143	0.157
	Beryllium	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100
	Cadmium	9/2020 - 6/2022	8	88%	< 0.000100	0.000114	1	Not Normal	--	--	>50% ND	--	Non-parametric	0.000114	0.000114
	Chromium	9/2020 - 6/2022	8	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
	Cobalt	9/2020 - 6/2022	8	0%	0.000666	0.00154	0	Normal	4	0.595	No trend	--	Normal	0.00203	0.00241
	Lead	9/2020 - 6/2022	8	100%	< 0.000500	< 0.000500	0	--	--	--	100% ND	--	Detection Limit	< 0.000500	< 0.000500
	Lithium	9/2020 - 6/2022	8	0%	0.115	0.243	0	Normal	-5	0.470	No trend	--	Normal	0.306	0.355
	Mercury	9/2020 - 6/2022	8	100%	< 0.000200	< 0.000200	0	--	--	--	100% ND	--	Detection Limit	< 0.000200	< 0.000200
	Molybdenum	9/2020 - 6/2022	8	100%	< 0.00200	< 0.00200	0	--	7	0.272	100% ND	--	Detection Limit	< 0.00200	< 0.00200
	Radium-226 & 228	9/2020 - 6/2022	8	13%	< 0.361	1.14	0	Normal	5	0.470	No trend	--	KM Normal	1.52	1.79
	Selenium	9/2020 - 6/2022	8	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
	Thallium	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100

Table D.4

Intra-Well Comparison Values
(Upper Tolerance Limits based on Baseline Period Data at each Well)
MidAmerican Energy Company
Neal North Closed CCR Monofill
Sergeant Bluff, Iowa

MW-29**(Upgradient) Appendix III**

Boron	9/2020 - 6/2022	6	0%	0.144	0.23	0	Normal	-3	0.720	No trend	--	Normal	0.295	0.333
Calcium	9/2020 - 6/2022	6	0%	136	209	0	Normal	-7	0.272	No trend	--	Normal	297	340
Chloride	9/2020 - 6/2022	6	0%	9.75 J-	12.1	0	Normal	12	0.036	Increasing	0.071	--	9.75 J - 12.1	9.75 J - 12.1
Fluoride	9/2020 - 6/2022	6	100%	< 0.500	< 0.500	0	--	--	--	100% ND	--	Detection Limit	< 0.500	< 0.500
pH, lab	9/2020 - 6/2022	6	0%	7.0 J	7.2 J	0	Normal	1	1	No trend	--	Normal	6.77 - 7.43	6.65 - 7.55
Sulfate	9/2020 - 6/2022	6	0%	67	191	0	Normal	-7	0.272	No trend	--	Normal	353	435
TDS	9/2020 - 6/2022	6	0%	594	856	0	Normal	-3	0.720	No trend	--	Normal	1122	1261

Appendix IV

Antimony	9/2020 - 6/2022	6	100%	< 0.00100	< 0.00200	0	--	--	--	100% ND	--	Detection Limit	< 0.00200	< 0.00200
Arsenic	9/2020 - 6/2022	6	17%	< 0.00200	0.032	0	Normal	10	0.096	No trend	--	KM Normal	0.0631	0.0788
Barium	9/2020 - 6/2022	6	0%	0.195	0.289	0	Normal	11	0.056	No trend	--	Normal	0.378	0.425
Beryllium	9/2020 - 6/2022	6	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100
Cadmium	9/2020 - 6/2022	6	100%	< 0.000100	< 0.000100	0	--	--	--	100% ND	--	Detection Limit	< 0.000100	< 0.000100
Chromium	9/2020 - 6/2022	6	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
Cobalt	9/2020 - 6/2022	6	17%	< 0.000500	0.00694	0	Normal	4	0.595	No trend	--	KM Normal	0.0107	0.0134
Lead	9/2020 - 6/2022	6	100%	< 0.000500	< 0.000500	0	--	--	--	100% ND	--	Detection Limit	< 0.000500	< 0.000500
Lithium	9/2020 - 6/2022	6	0%	0.0865	0.131	0	Normal	-5	0.470	No trend	--	Normal	0.17449258	0.198664857
Mercury	9/2020 - 6/2022	6	100%	< 0.000200	< 0.000200	0	--	--	--	100% ND	--	Detection Limit	< 0.000200	< 0.000200
Molybdenum	9/2020 - 6/2022	6	83%	< 0.00200	0.00335	1	Not Normal	7	0.272	>50% ND	--	Non-parametric	0.00335	0.00335
Radium-226 & 228	9/2020 - 6/2022	6	0%	0.579	1.79	0	Normal	5	0.470	No trend	--	Normal	2.96	3.58
Selenium	9/2020 - 6/2022	6	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
Thallium	9/2020 - 6/2022	6	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100

MW-223S**(Upgradient) Appendix III**

Boron	9/2020 - 6/2022	8	75%	ND(0.1)	0.1165	0	Not Normal	--	--	>50% ND	--	Non-parametric	0.1165	0.1165
Calcium	9/2020 - 6/2022	8	0%	104.5	127.5	0	Normal	-7	0.272	No trend	--	Normal	143	153
Chloride	9/2020 - 6/2022	8	25%	< 5.00	7.15	0	Normal	12	0.036	Increasing	0.071	--	< 5.00 - 7.15	< 5.00 - 7.15
Fluoride	9/2020 - 6/2022	8	100%	< 0.100	< 0.500	1	--	--	--	100% ND	--	Detection Limit	< 0.500	< 0.500
pH, lab	9/2020 - 6/2022	8	0%	7.4 J	7.65	0	Normal	1	1.00	No trend	--	Normal	7.22 - 7.79	7.11 - 7.90
Sulfate	9/2020 - 6/2022	8	0%	32.9	113	0	Normal	-7	0.272	No trend	--	Normal	145	179
TDS	9/2020 - 6/2022	8	0%	265	524	0	Normal	-3	0.720	No trend	--	Normal	688	788

Appendix IV

Antimony	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00200	0	--	--	--	100% ND	--	Detection Limit	< 0.00200	< 0.00200
Arsenic	9/2020 - 6/2022	8	13%	< 0.00200	0.00969	0	Normal	10	0.096	No trend	--	KM Normal	0.0143	0.0178
Barium	9/2020 - 6/2022	8	0%	0.206	0.341	0	Normal	11	0.056	No trend	--	Normal	0.418	0.471
Beryllium	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100
Cadmium	9/2020 - 6/2022	8	88%	< 0.000100	0.000123	1	Not Normal	--	--	>50% ND	--	Non-parametric	0.000123	0.000123
Chromium	9/2020 - 6/2022	8	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
Cobalt	9/2020 - 6/2022	8	38%	< 0.000500	0.00123	0	Normal	4	0.595	No trend	--	KM Normal	0.00158	0.00188
Lead	9/2020 - 6/2022	8	100%	< 0.000500	< 0.000500	0	--	--	--	100% ND	--	Detection Limit	< 0.000500	< 0.000500
Lithium	9/2020 - 6/2022	8	0%	0.0417	0.0581	0	Normal	-5	0.470	No trend	--	Normal	0.070	0.076
Mercury	9/2020 - 6/2022	8	100%	< 0.000200	< 0.000200	0	--	--	--	100% ND	--	Detection Limit	< 0.000200	< 0.000200
Molybdenum	9/2020 - 6/2022	8	13%	< 0.00200	0.00316	2	Not Normal	7	0.272	No trend	--	Non-parametric	0.00316	0.00316
Radium-226 & 228	9/2020 - 6/2022	8	13%	< 0.01925	1.37	1	Normal	5	0.470	No trend	--	KM Normal	1.80	2.22
Selenium	9/2020 - 6/2022	8	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
Thallium	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100

Table D.4

Intra-Well Comparison Values
(Upper Tolerance Limits based on Baseline Period Data at each Well)
MidAmerican Energy Company
Neal North Closed CCR Monofill
Sergeant Bluff, Iowa

MW-231S
(Upgradient)

Appendix III

Boron	9/2020 - 6/2022	8	0%	0.196	0.415	0	Normal	10	0.276	No trend	--	Normal	0.532	0.620
Calcium	9/2020 - 6/2022	8	0%	178	294	0	Normal	-7	0.272	No trend	--	Normal	336	378
Chloride	9/2020 - 6/2022	8	0%	5.37	12.8	0	Normal	12	0.036	Increasing	0.071	--	5.37 - 12.8	5.37 - 12.8
Fluoride	9/2020 - 6/2022	8	100%	< 0.100	< 0.500	1	--	--	--	100% ND	--	Detection Limit	< 0.500	< 0.500
pH, lab	9/2020 - 6/2022	8	0%	7.1 J	7.4 J	0	Not Normal	1	1.00	No trend	--	Non-parametric	7.1 J - 7.4 J	7.1 J - 7.4 J
Sulfate	9/2020 - 6/2022	8	0%	127	485	2	Normal	-7	0.272	No trend	--	Normal	614	727
TDS	9/2020 - 6/2022	8	0%	706	1200	0	Normal	-3	0.720	No trend	--	Normal	1394	1560

Appendix IV

Antimony	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00200	0	--	--	--	100% ND	--	Detection Limit	< 0.00200	< 0.00200
Arsenic	9/2020 - 6/2022	8	75%	< 0.00200	0.0085	0	Not Normal	10	0.096	>50% ND	--	Non-parametric	0.0085	0.0085
Barium	9/2020 - 6/2022	8	0%	0.0508	0.125	0	Normal	11	0.056	No trend	--	Normal	0.178	0.207
Beryllium	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100
Cadmium	9/2020 - 6/2022	8	75%	< 0.000100	0.000139	0	Not Normal	--	--	>50% ND	--	Non-parametric	0.000139	0.000139
Chromium	9/2020 - 6/2022	8	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
Cobalt	9/2020 - 6/2022	8	13%	< 0.000500	0.00351	0	Normal	4	0.595	No trend	--	KM Normal	0.00498	0.0061
Lead	9/2020 - 6/2022	8	100%	< 0.000500	< 0.000500	0	--	--	--	100% ND	--	Detection Limit	< 0.000500	< 0.000500
Lithium	9/2020 - 6/2022	8	0%	0.0776	0.109	1	Normal	-5	0.470	No trend	--	Normal	0.126	0.136
Mercury	9/2020 - 6/2022	8	100%	< 0.000200	< 0.000200	0	--	--	--	100% ND	--	Detection Limit	< 0.000200	< 0.000200
Molybdenum	9/2020 - 6/2022	8	75%	< 0.00200	0.00242	0	Not Normal	7	0.272	>50% ND	--	Non-parametric	0.00242	0.00242
Radium-226 & 228	9/2020 - 6/2022	8	38%	< 0.291	0.994	0	Normal	5	0.470	No trend	--	KM Normal	1.63	1.99
Selenium	9/2020 - 6/2022	8	38%	< 0.00500	0.0174	0	Normal	--	--	No trend	--	KM Normal	0.0261	0.032
Thallium	9/2020 - 6/2022	8	88%	< 0.00100	0.00122	1	Not Normal	--	--	>50% ND	--	Non-parametric	0.00122	0.00122

MW-1R

Appendix III

Boron	9/2020 - 6/2022	8	0%	0.342	0.417	0	Normal	-16	0.062	No trend	--	Normal	0.470	0.500
Calcium	9/2020 - 6/2022	8	0%	127	167	0	Normal	10	0.276	No trend	--	Normal	187	202
Chloride	9/2020 - 6/2022	8	0%	27.4	68	1	Not Normal	17	0.047	Increasing	0.017	--	27.4 - 68	27.4 - 68
Fluoride	9/2020 - 6/2022	8	88%	< 0.500	0.808	1	Not Normal	--	--	>50% ND	--	Non-parametric	0.808	0.808
pH, lab	9/2020 - 6/2022	8	0%	7.2 J	7.6 J	1	Normal	-3	0.812	No trend	--	Normal	6.88 - 7.72	6.73 - 7.87
Sulfate	9/2020 - 6/2022	8	0%	204	262	0	Normal	-6	0.548	No trend	--	Normal	285	307
TDS	9/2020 - 6/2022	8	0%	750	908	0	Normal	0	1.000	No trend	--	Normal	997	1057

Appendix IV

Antimony	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00200	0	--	--	--	100% ND	--	Detection Limit	< 0.00200	< 0.00200
Arsenic	9/2020 - 6/2022	8	0%	0.014	0.0452	0	Normal	8	0.398	No trend	--	Normal	0.064	0.078
Barium	9/2020 - 6/2022	8	0%	0.0668	0.118	0	Normal	14	0.108	No trend	--	Normal	0.138	0.155
Beryllium	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100
Cadmium	9/2020 - 6/2022	8	88%	< 0.000100	0.000409	1	Not Normal	--	--	>50% ND	--	Non-parametric	0.000409	0.000409
Chromium	9/2020 - 6/2022	8	100%	< 0.00500	< 0.00500	0	100% ND	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
Cobalt	9/2020 - 6/2022	8	50%	< 0.000500	0.00104	0	Not Normal	-20	0.014	Decreasing	-2E-06	--	< 0.000500 - 0.00104	< 0.000500 - 0.00104
Lead	9/2020 - 6/2022	8	100%	< 0.000500	< 0.000500	0	--	--	--	100% ND	--	Detection Limit	< 0.000500	< 0.000500
Lithium	9/2020 - 6/2022	8	0%	0.0503	0.0813	0	Normal	-2	0.904	No trend	--	Normal	0.103	0.115
Mercury	9/2020 - 6/2022	8	100%	< 0.000200	< 0.000200	0	--	--	--	100% ND	--	Detection Limit	< 0.000200	< 0.000200
Molybdenum	9/2020 - 6/2022	8	0%	0.00394	0.00568	0	Normal	6	0.548	No trend	--	Normal	0.00699	0.00777
Radium-226 & 228	9/2020 - 6/2022	8	50%	< -0.0461	1.58	0	Normal	6	0.548	No trend	--	KM Normal	2.18	2.81
Selenium	9/2020 - 6/2022	8	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
Thallium	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100

Table D.4

Intra-Well Comparison Values
(Upper Tolerance Limits based on Baseline Period Data at each Well)
MidAmerican Energy Company
Neal North Closed CCR Monofill
Sergeant Bluff, Iowa

MW-3R**Appendix III**

Boron	9/2020 - 6/2022	8	0%	0.289	0.9185	0	Normal	-12	0.178	No trend	--	Normal	1.26	1.55
Calcium	9/2020 - 6/2022	8	0%	129	161.5	0	Normal	-11	0.227	No trend	--	Normal	184	200
Chloride	9/2020 - 6/2022	8	0%	7.64	21.2	0	Normal	-8	0.398	No trend	--	Normal	32.6	38.3
Fluoride	9/2020 - 6/2022	8	88%	< 0.500	0.631	1	Not Normal	--	--	>50% ND	--	Non-parametric	0.631	0.631
pH, lab	9/2020 - 6/2022	8	0%	7.1	7.5 J	0	Normal	4	0.72	No trend	--	Normal	6.92 - 7.71	6.77 - 7.86
Sulfate	9/2020 - 6/2022	8	0%	128	241	0	Gamma	-10	0.276	No trend	--	Normal	277	320
TDS	9/2020 - 6/2022	8	0%	614	894	0	Normal	-20	0.014	Decreasing	-0.36	--	614 - 894	614 - 894

Appendix IV

Antimony	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00200	0	--	--	--	100% ND	--	Detection Limit	< 0.00200	< 0.00200
Arsenic	9/2020 - 6/2022	8	0%	0.0314	0.0448	0	Normal	0	1.000	No trend	--	Normal	0.0550	0.0608
Barium	9/2020 - 6/2022	8	0%	0.1565	0.306	0	Normal	8	0.398	No trend	--	Normal	0.4245	0.4913
Beryllium	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100
Cadmium	9/2020 - 6/2022	8	88%	< 0.000100	0.000776	1	Not Normal	--	--	>50% ND	--	Non-parametric	0.000776	0.000776
Chromium	9/2020 - 6/2022	8	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
Cobalt	9/2020 - 6/2022	8	38%	< 0.000500	0.00158	0	Normal	-19	0.023	Decreasing	-2E-06	--	< 0.000500 - 0.00158	< 0.000500 - 0.00158
Lead	9/2020 - 6/2022	8	88%	< 0.000500	0.0016	1	Not Normal	--	--	>50% ND	--	Non-parametric	0.0016	0.0016
Lithium	9/2020 - 6/2022	8	0%	0.0615	0.0976	1	Normal	-13	0.143	No trend	--	Normal	0.116	0.127
Mercury	9/2020 - 6/2022	8	100%	< 0.000200	< 0.000200	0	--	--	--	100% ND	--	Detection Limit	< 0.000200	< 0.000200
Molybdenum	9/2020 - 6/2022	8	25%	< 0.00200	0.00651	1	Not Normal	8	0.398	No trend	--	Non-parametric	0.00651	0.00651
Radium-226 & 228	9/2020 - 6/2022	8	13%	< 0.470	1.23	0	Normal	-9	0.337	No trend	--	KM Normal	1.74	2.07
Selenium	9/2020 - 6/2022	8	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
Thallium	9/2020 - 6/2022	8	88%	< 0.00100	0.00694	1	Not Normal	--	--	>50% ND	--	Non-parametric	0.00694	0.00694

MW-5R**Appendix III**

Boron	9/2020 - 6/2022	8	0%	0.177	0.418	0	Normal	8	0.398	No trend	--	Normal	0.508	0.602
Calcium	9/2020 - 6/2022	8	0%	92.8	175	0	Normal	13	0.143	No trend	--	Normal	213	245
Chloride	9/2020 - 6/2022	8	0%	8.33	13.1	0	Normal	8	0.398	No trend	--	Normal	15.0	16.9
Fluoride	9/2020 - 6/2022	8	88%	< 0.500	0.675	1	Not Normal	--	--	>50% ND	--	Non-parametric	0.675	0.675
pH, lab	9/2020 - 6/2022	8	0%	7.2 J	7.5 J	0	Normal	1	1.00	No trend	--	Normal	6.95 - 7.67	6.82 - 7.80
Sulfate	9/2020 - 6/2022	8	0%	109	340	0	Normal	6	0.548	No trend	--	Normal	472	577
TDS	9/2020 - 6/2022	8	0%	470	918	0	Normal	6	0.548	No trend	--	Normal	1188	1384

Appendix IV

Antimony	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00200	0	--	--	--	100% ND	--	Detection Limit	< 0.00200	< 0.00200
Arsenic	9/2020 - 6/2022	8	0%	0.0279	0.0446	2	Normal	8	0.398	No trend	--	Normal	0.0502	0.0557
Barium	9/2020 - 6/2022	8	0%	0.142	0.278	1	Normal	4	0.720	No trend	--	Normal	0.320	0.368
Beryllium	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100
Cadmium	9/2020 - 6/2022	8	100%	< 0.000100	< 0.000100	0	--	--	--	100% ND	--	Detection Limit	< 0.000100	< 0.000100
Chromium	9/2020 - 6/2022	8	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
Cobalt	9/2020 - 6/2022	8	25%	< 0.000500	0.00073	0	Normal	8	0.398	No trend	--	KM Normal	0.00081	0.00089
Lead	9/2020 - 6/2022	8	100%	< 0.000500	< 0.000500	0	--	--	--	100% ND	--	Detection Limit	< 0.000500	< 0.000500
Lithium	9/2020 - 6/2022	8	0%	0.0489	0.0808	0	Normal	14	0.108	No trend	--	Normal	0.0986	0.1102
Mercury	9/2020 - 6/2022	8	100%	< 0.000200	< 0.000200	0	--	--	--	100% ND	--	Detection Limit	< 0.000200	< 0.000200
Molybdenum	9/2020 - 6/2022	8	0%	0.00355	0.00448	0	Normal	-9	0.337	No trend	--	Normal	0.00491	0.00527
Radium-226 & 228	9/2020 - 6/2022	8	50%	< -0.0292	0.734	0	Normal	4	0.720	No trend	--	KM Normal	1.50	1.91
Selenium	9/2020 - 6/2022	8	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
Thallium	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100

Intra-Well Comparison Values
(Upper Tolerance Limits based on Baseline Period Data at each Well)
MidAmerican Energy Company
Neal North Closed CCR Monofill
Sergeant Bluff, Iowa

MW-19**Appendix III**

Boron	9/2020 - 6/2022	8	0%	0.466	0.74	0	Normal	0	1.00	No trend	--	Normal	0.903	1.00
Calcium	9/2020 - 6/2022	8	0%	301	562	1	Normal	6	0.548	No trend	--	Normal	639	733
Chloride	9/2020 - 6/2022	8	0%	15.9	19.4	0	Normal	-2	0.904	No trend	--	Normal	21.9	23.4
Fluoride	9/2020 - 6/2022	8	88%	< 0.500	2.36	1	Not Normal	--	--	>50% ND	--	Non-parametric	2.36	2.36
pH, lab	9/2020 - 6/2022	8	0%	6.6 J	7.1 J	0	Normal	-2	0.904	No trend	--	Normal	6.29 - 7.28	6.11 - 7.46
Sulfate	9/2020 - 6/2022	8	0%	607	1140	0	Normal	6	0.548	No trend	--	Normal	1449	1646
TDS	9/2020 - 6/2022	8	0%	1570	2590	0	Normal	2	0.904	No trend	--	Normal	3189	3601

Appendix IV

Antimony	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00200	0	--	--	--	100% ND	--	Detection Limit	< 0.00200	< 0.00200
Arsenic	9/2020 - 6/2022	8	13%	< 0.00200	0.00821	2	Normal	0	1.00	No trend	--	KM Normal	0.00973	0.0117
Barium	9/2020 - 6/2022	8	0%	0.0207	0.0251	0	Normal	-2	0.904	No trend	--	Normal	0.0269	0.0286
Beryllium	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100
Cadmium	9/2020 - 6/2022	8	100%	< 0.000100	< 0.000100	0	--	--	--	100% ND	--	Detection Limit	< 0.000100	< 0.000100
Chromium	9/2020 - 6/2022	8	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
Cobalt	9/2020 - 6/2022	8	0%	0.00389	0.0225	1	Normal	0	1.00	No trend	--	Normal	0.0278	0.0341
Lead	9/2020 - 6/2022	8	88%	< 0.000500	0.000747	1	Not Normal	--	--	>50% ND	--	Non-parametric	0.000747	0.000747
Lithium	9/2020 - 6/2022	8	0%	0.200	0.300	0	Normal	7	0.473	No trend	--	Normal	0.345	0.381
Mercury	9/2020 - 6/2022	8	100%	< 0.000200	< 0.000200	0	--	--	--	100% ND	--	Detection Limit	< 0.000200	< 0.000200
Molybdenum	9/2020 - 6/2022	8	100%	< 0.00200	< 0.00200	0	--	--	--	100% ND	--	Detection Limit	< 0.00200	< 0.00200
Radium-226 & 228	9/2020 - 6/2022	8	38%	< 0.123	0.92	0	Normal	-3	0.812	No trend	--	KM Normal	1.57	1.95
Selenium	9/2020 - 6/2022	8	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
Thallium	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100

MW-21**Appendix III**

Boron	9/2020 - 6/2022	8	0%	0.297 J	0.474	0	Normal	0	1	No trend	--	Normal	0.542	0.612
Calcium	9/2020 - 6/2022	8	0%	188	509	0	Normal	10	0.276	No trend	--	Normal	744	875
Chloride	9/2020 - 6/2022	8	13%	< 5.00	7.63	1	Normal	-2	0.904	No trend	--	KM Normal	9.09	9.98
Fluoride	9/2020 - 6/2022	8	88%	< 0.500	2.85	1	Not Normal	--	--	>50% ND	--	Non-parametric	2.85	2.85
pH, lab	9/2020 - 6/2022	8	0%	6.8 J	7.2 J	0	Normal	-16	0.062	No trend	--	Normal	6.42 - 7.53	6.21 - 7.74
Sulfate	9/2020 - 6/2022	8	0%	299	1540	0	Normal	8	0.398	No trend	--	Normal	2507	3070
TDS	9/2020 - 6/2022	8	0%	730	2790	0	Normal	4	0.720	No trend	--	Normal	4440	5319

Appendix IV

Antimony	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00400	1	--	--	--	100% ND	--	Detection Limit	< 0.00400	< 0.00400
Arsenic	9/2020 - 6/2022	8	100%	< 0.00200	< 0.00200	0	--	--	--	100% ND	--	Detection Limit	< 0.00200	< 0.00200
Barium	9/2020 - 6/2022	8	0%	0.0187	0.0639	0	Normal	-6	0.548	No trend	--	Normal	0.0870	0.106
Beryllium	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100
Cadmium	9/2020 - 6/2022	8	75%	< 0.000100	0.000173	0	Not Normal	--	--	>50% ND	--	Non-parametric	0.000173	0.000173
Chromium	9/2020 - 6/2022	8	100%	< 0.00500	< 0.00500	0	--	--	--	100% ND	--	Detection Limit	< 0.00500	< 0.00500
Cobalt	9/2020 - 6/2022	8	38%	< 0.000500	0.00664	0	Normal	1	1.000	No trend	--	KM Normal	0.00861	0.0111
Lead	9/2020 - 6/2022	8	88%	< 0.000500	0.000899	1	Not Normal	--	--	>50% ND	--	Non-parametric	0.000899	0.000899
Lithium	9/2020 - 6/2022	8	0%	0.188	0.334	0	Normal	4	0.720	No trend	--	Normal	0.463	0.533
Mercury	9/2020 - 6/2022	8	100%	< 0.000200	< 0.000200	0	--	--	--	100% ND	--	Detection Limit	< 0.000200	< 0.000200
Molybdenum	9/2020 - 6/2022	8	100%	< 0.00200	< 0.00200	0	--	--	--	100% ND	--	Detection Limit	< 0.00200	< 0.00200
Radium-226 & 228	9/2020 - 6/2022	8	38%	< 0.120	1.17	0	Normal	5	0.634	No trend	--	KM Normal	1.56	1.95
Selenium	9/2020 - 6/2022	8	75%	< 0.00500	0.0398	1	Not Normal	--	--	>50% ND	--	Non-parametric	0.0398	0.0398
Thallium	9/2020 - 6/2022	8	100%	< 0.00100	< 0.00100	0	--	--	--	100% ND	--	Detection Limit	< 0.00100	< 0.00100

Table D.4
Intra-Well Comparison Values
(Upper Tolerance Limits based on Baseline Period Data at each Well)
MidAmerican Energy Company
Neal North Closed CCR Monofill
Sergeant Bluff, Iowa

Notes:
N - number of samples
%ND - percent non-detects
Data distribution was determined by ProUCL using detects only.
Statistic: calculated as the sum of the signs of all possible pair-wise data comparisons.
Probability of significance: A value less than 0.05 indicates greater than 95 percent confidence of a statistically significant trend.
< 100 - Not detected at the associated reporting limit.
7.0 J - Estimated concentration.
When a trend is present during the baseline period, no UTL was calculated. Instead, the baseline range is listed for comparison.
Non-parametric UTLs with 6 baseline samples have an actual confidence coefficient of 0.27 (i.e., 27 percent confidence) and 8 baseline samples have an actual confidence coefficient of 0.34 (i.e., 34 percent confidence), at 95 percent coverage.
Non-parametric UTLs with 6 baseline samples have an actual confidence coefficient of 0.059 (i.e., 5.9 percent confidence) and 8 baseline samples have an actual confidence coefficient of 0.077 (i.e., 7.7 percent confidence), at 99 percent coverage.
KM - UTLs were calculated using Kaplan-Meyer estimates for non-detects.
WH - UTLs were calculated using gamma distribution and the Wilson-Hilferty method.
TDS - Total dissolved solids

Table D.5

Inter-Well Comparisons for 2023 Monitoring Data vs. Upgradient Background UTLs
MidAmerican Energy Company
Neal North Closed CCR Monofill
Sergeant Bluff, Iowa

Well	Observation	Monitoring Event	Appendix III Analytes							Appendix IV Analytes				
			Boron mg/L	Calcium mg/L	Chloride mg/L	Fluoride mg/L	pH, lab s.u.	Sulfate mg/L	TDS mg/L	Antimony mg/L	Arsenic mg/L	Barium mg/L	Beryllium mg/L	Cadmium mg/L
Combined Upgradient	Baseline 95/95 UTL		0.386	264	49.4	< 0.500	7.0 J - 7.9 J †	481	1206	0.00200 U	0.00200 U - 0.0512 †	0.0508 - 0.348 †	0.00100 U	0.000227
	Baseline 99/95 UTL		0.457	300	84.9	< 0.500	7.0 J - 7.9 J †	708	1397	0.00200 U	0.00200 U - 0.0512 †	0.0508 - 0.348 †	0.00100 U	0.000227
	MCL/GWPS		None	None	None	4.0 ^a	None	None	None	0.006 ^a	0.01 ^a	2.0 ^a	0.004 ^a	0.005 ^a
MW-1R	04/03/2023	Detection	0.331 /0.336	182 /182	34.6 /34.4	0.500 U /0.500 U	7.3 J /7.2 J	235 /236	926 /934	--	--	--	--	--
	09/13/2023	Assessment	0.476 /0.460	144 /122	61.9 /61.5	1.00 U /1.00 U	7.2 J /7.1 J	213 /209	872 /860	0.00200 U /0.00200 U	0.0420 /0.0436	0.0917 /0.0966	0.00100 U /0.00100 U	0.000200 U /0.000200 U
MW-3R	04/03/2023	Detection	0.258	154	10	0.500 U	7.4 J	205	756	--	--	--	--	--
	09/13/2023	Assessment	0.352	143	9.02	1.00 U	7.2 J	219	812	0.00200 U	0.0418	0.292	0.00100 U	0.000200 U
MW-5R	04/03/2023	Detection	0.297	192	13.7	0.500 U	7.3 J	318	920	--	--	--	--	--
	09/13/2023	Assessment	0.427	92.9	10.4	1.00 U	7.3 J	160	626	0.00200 U	0.0283	0.1	0.00100 U	0.000200 U
MW-19	04/03/2023	Detection	0.584	415	18	0.500 U	6.7 J	1020	2220	--	--	--	--	--
	09/13/2023	Assessment	0.606	334	19.1	1.00 U	6.7 J	736	2360	0.00200 U	0.00298	0.0166	0.00100 U	0.000200 U
MW-21	04/03/2023	Detection	0.329	523	7.94	0.791	6.8 J	1610	3050	--	--	--	--	--
	09/13/2023	Assessment	0.519	474	8.18	1.00 U	6.7 J	1550	3110	0.00200 U	0.00200 U	0.0139	0.00100 U	0.000346
	12/05/2023	Verification	0.337	--	--	--	--	--	--	--	--	--	--	--

Table D.5

Inter-Well Comparisons for 2023 Monitoring Data vs. Upgradient Background UTLs
MidAmerican Energy Company
Neal North Closed CCR Monofill
Sergeant Bluff, Iowa

Well	Observation	Monitoring Event	Appendix IV Analytes								
			Chromium mg/L	Cobalt mg/L	Lead mg/L	Lithium mg/L	Mercury mg/L	Molybdenum mg/L	Radium-226 & 228 pCi/L	Selenium mg/L	Thallium mg/L
Combined Upgradient	Baseline 95/95 UTL		0.00500 U	0.00456	0.000500 U	0.205	0.000200 U	0.00351	1.76	0.033	0.00122
	Baseline 99/95 UTL		0.00500 U	0.00568	0.000500 U	0.244	0.000200 U	0.00396	2.14	0.061	0.00122
	MCL/GWPS		0.1 ^a	0.006 ^b	0.015 ^b	0.040 ^b	0.002 ^a	0.100 ^b	5 ^a	0.05 ^a	0.002 ^a
MW-1R	04/03/2023	Detection	--	--	--	--	--	--	--	--	--
	09/13/2023	Assessment	0.00500 U / 0.00500 U	0.000500 U / 0.000500 U	0.000500 U / 0.000500 U	0.0660 / 0.0600	0.000200 U / 0.000200 U	0.00489 / 0.00517	1.32 / 1.88	0.00500 U / 0.00500 U	0.00100 U / 0.00100 U
MW-3R	04/03/2023	Detection	--	--	--	--	--	--	--	--	--
	09/13/2023	Assessment	0.00500 U	0.000500 U	0.000500 U	0.0763	0.000200 U	0.00236	1.46	0.00500 U	0.00100 U
MW-5R	04/03/2023	Detection	--	--	--	--	--	--	--	--	--
	09/13/2023	Assessment	0.00500 U	0.000500 U	0.000500 U	0.0578	0.000200 U	0.00393	1.04	0.00500 U	0.00100 U
MW-19	04/03/2023	Detection	--	--	--	--	--	--	--	--	--
	09/13/2023	Assessment	0.00500 U	0.0067	0.000500 U	0.234	0.000200 U	0.00200 U	0.984	0.00500 U	0.00100 U
MW-21	04/03/2023	Detection	--	--	--	--	--	--	--	--	--
	09/13/2023	Assessment	0.00500 U	0.000983	0.000500 U	0.301	0.000200 U	0.00200 U	1.17	0.00500 U	0.00100 U
	12/05/2023	Verification	--	--	--	--	--	--	--	--	--

Notes:
0.395 / 0.375 - Field duplicate results.
U - Not detected at the associated reporting limit.
62.5 / 64.5 Value exceeds inter-well baseline 95/95 UTL or is outside of baseline range.
0.619 Value exceeds inter-well baseline 99/95 UTL.
† - Trend present during baseline period, no UTL values calculated (baseline range listed for comparison).
Pooled Background consists of MW-13, MW-27, MW-29, MW-223S, and MW-231S.
None - No MCL established.
^a Maximum contaminant level (MCL).
^b Groundwater protection standard (GWPS) established under 40 CFR 257.95(h)(2).

Table D.6

Intra-Well Comparisons for 2023 Monitoring Data
MidAmerican Energy Company
Neal North Closed CCR Monofill - Sergeant Bluff, Iowa

Well	Observation	Monitoring Event	Appendix III Analytes							Appendix IV Analytes			
			Boron mg/L	Calcium mg/L	Chloride mg/L	Fluoride mg/L	pH, lab s.u.	Sulfate mg/L	TDS mg/L	Antimony mg/L	Arsenic mg/L	Barium mg/L	Beryllium mg/L
			MCL/GWPS	None	None	None	4.0 ^a	None	None	0.006 ^a	0.01 ^a	2.0 ^a	0.004 ^a
MW-13 (Upgradient)	Baseline 95/95 UTL		0.170	258	15.3 - 73.9 †	< 0.500	6.94 - 7.54	111	1175	0.00200 U	0.108	0.431	0.00100 U
	Baseline 99/95 UTL		0.189	293	15.3 - 73.9 †	< 0.500	6.84 - 7.65	128	1364	0.00200 U	0.136	0.506	0.00100 U
	3/27/2023	Detection	0.138	130	18.9	0.500 U	7.3 J	68.4	502	0.00200 U	0.051	0.2	0.00100 U
	9/12/2023	Assessment	0.122 J+	135	12.3	1.00 U	7.2 J	58.6	542	0.00200 U	0.0483 J+	0.210 J+	0.00100 U
MW-27 (Upgradient)	Baseline 95/95 UTL		0.203 - 0.305 †	254	11.8 - 28.5 †	< 0.500	6.80 - 7.43	419	1487	0.00200 U	0.058	0.143	0.00100 U
	Baseline 99/95 UTL		0.203 - 0.305 †	285	11.8 - 28.5 †	< 0.500	6.68 - 7.54	504	1744	0.00200 U	0.073	0.157	0.00100 U
	3/29/2023	Detection	0.246	158	11.9	0.500 U	7.1 J	96.4	634	0.00200 U	0.0513	0.13	0.00100 U
	9/12/2023	Assessment	0.222 J+	169	13.9	1.00 U	7.1 J	97.1	716	0.00200 U	0.0616 J+	0.164 J+	0.00100 U
MW-29 (Upgradient)	Baseline 95/95 UTL		0.295	297	9.75 J - 12.1 †	< 0.500	6.77 - 7.43	353	1122	0.00200 U	0.0631	0.378	0.00100 U
	Baseline 99/95 UTL		0.333	340	9.75 J - 12.1 †	< 0.500	6.65 - 7.55	435	1261	0.00200 U	0.0788	0.425	0.00100 U
	3/29/2023	Detection	0.158	200	11.9	0.500 U	7.1 J	121	724	0.00200 U	0.0258	0.261	0.00100 U
	9/12/2023	Assessment	0.184 J+	222	10.8	1.00 U	7.0 J	205	906	0.00200 U	0.0233 J+	0.248 J+	0.00100 U
MW-223S (Upgradient)	Baseline 95/95 UTL		0.117	143	< 5.00 - 7.15 †	< 0.500	7.22 - 7.79	145	688	0.00200 U	0.0143	0.418	0.00100 U
	Baseline 99/95 UTL		0.117	153	< 5.00 - 7.15 †	< 0.500	7.11 - 7.90	179	788	0.00200 U	0.0178	0.471	0.00100 U
	3/29/2023	Detection	0.140 /0.137	186 /188	1.00 UJ/6.06 J	0.269 /0.500 U	7.4 J /7.4 J	113 /64.3	600 /606	0.00200 U/0.00200 U	0.0172 /0.0133 J+	0.377 /0.382	0.00100 U/0.00100 U
	9/12/2023	Assessment	0.149 J+/0.154 J+	126 /122	4.37 /5.00	0.200 U/1.00 U	7.5 J /7.4 J	64.3 /61.1	474 /456	0.00200 U/0.00200 U	0.0133 J+/0.0132 J+	0.256 J+/0.244 J+	0.00100 U/0.00100 U
MW-231S (Upgradient)	Baseline 95/95 UTL		0.532	336	5.37 - 12.8 †	< 0.500	7.1 J - 7.4 J	614	1394	0.00200 U	0.0085	0.178	0.00100 U
	Baseline 99/95 UTL		0.620	378	5.37 - 12.8 †	< 0.500	7.1 J - 7.4 J	727	1560	0.00200 U	0.0085	0.207	0.00100 U
	3/28/2023	Detection	0.500	204	9.32	0.163	7.2 J	176	788	0.00200 U	0.0121	0.136	0.00100 U
	9/12/2023	Assessment	0.253	172	1.00 U	0.200 U	7.1 J	158	716	0.00200 U	0.00967	0.12	0.00100 U

Table D.6

Intra-Well Comparisons for 2023 Monitoring Data
MidAmerican Energy Company
Neal North Closed CCR Monofill - Sergeant Bluff, Iowa

Well	Observation	Monitoring Event	Appendix III Analytes							Appendix IV Analytes			
			Boron mg/L	Calcium mg/L	Chloride mg/L	Fluoride mg/L	pH, lab s.u.	Sulfate mg/L	TDS mg/L	Antimony mg/L	Arsenic mg/L	Barium mg/L	Beryllium mg/L
			MCL/GWPS None	None	None	4.0 ^a	None	None	None	0.006 ^a	0.01 ^a	2.0 ^a	0.004 ^a
MW-1R	Baseline 95/95 UTL		0.470	187	27.4 - 68 †	0.808	6.88 - 7.72	285	997	0.00200 U	0.064	0.138	0.00100 U
	Baseline 99/95 UTL		0.500	202	27.4 - 68 †	0.808	6.73 - 7.87	307	1057	0.00200 U	0.078	0.155	0.00100 U
	04/03/2023	Detection	0.331 /0.336	182 /182	34.6 /34.4	0.500 U /0.500 U	7.3 J /7.2 J	235 /236	926 /934	--	--	--	--
	09/13/2023	Assessment	0.476 /0.460	144 /122	61.9 /61.5	1.00 U /1.00 U	7.2 J /7.1 J	213 /209	872 /860	0.00200 U /0.00200 U	0.0420 /0.0436	0.0917 /0.0966	0.00100 U /0.00100 U
MW-3R	Baseline 95/95 UTL		1.26	184	32.6	0.631	6.92 - 7.71	277	614 - 894 †	0.00200 U	0.055	0.4245	0.00100 U
	Baseline 99/95 UTL		1.55	200	38.3	0.631	6.77 - 7.86	320	614 - 894 †	0.00200 U	0.0608	0.4913	0.00100 U
	04/03/2023	Detection	0.258	154	10	0.500 U	7.4 J	205	756	--	--	--	--
	09/13/2023	Assessment	0.352	143	9.02	1.00 U	7.2 J	219	812	0.00200 U	0.0418	0.292	0.00100 U
MW-5R	Baseline 95/95 UTL		0.508	213	15.0	0.675	6.95 - 7.67	472	1188	0.00200 U	0.0502	0.32	0.00100 U
	Baseline 99/95 UTL		0.602	245	16.9	0.675	6.82 - 7.80	577	1384	0.00200 U	0.0557	0.368	0.00100 U
	04/03/2023	Detection	0.297	192	13.7	0.500 U	7.3 J	318	920	--	--	--	--
	09/13/2023	Assessment	0.427	92.9	10.4	1.00 U	7.3 J	160	626	0.00200 U	0.0283	0.1	0.00100 U
MW-19	Baseline 95/95 UTL		0.903	639	21.9	2.36	6.29 - 7.28	1449	3189	0.00200 U	0.00973	0.0269	0.00100 U
	Baseline 99/95 UTL		1.00	733	23.4	2.36	6.11 - 7.46	1646	3601	0.00200 U	0.0117	0.0286	0.00100 U
	04/03/2023	Detection	0.584	415	18	0.500 U	6.7 J	1020	2220	--	--	--	--
	09/13/2023	Assessment	0.606	334	19.1	1.00 U	6.7 J	736	2360	0.00200 U	0.00298	0.0166	0.00100 U
MW-21	Baseline 95/95 UTL		0.542	744	9.09	2.85	6.42 - 7.53	2507	4440	0.00400 U	0.00200 U	0.087	0.00100 U
	Baseline 99/95 UTL		0.612	875	10.0	2.85	6.21 - 7.74	3070	5319	0.00400 U	0.00200 U	0.106	0.00100 U
	04/03/2023	Detection	0.329	523	7.94	0.791	6.8 J	1610	3050	--	--	--	--
	09/13/2023	Assessment	0.519	474	8.18	1.00 U	6.7 J	1550	3110	0.00200 U	0.00200 U	0.0139	0.00100 U
	12/05/2023	Verification	0.337	--	--	--	--	--	--	--	--	--	--

Table D.6

Intra-Well Comparisons for 2023 Monitoring Data
MidAmerican Energy Company
Neal North Closed CCR Monofill - Sergeant Bluff, Iowa

Well	Observation	Monitoring Event	Appendix IV Analytes									
			Cadmium mg/L	Chromium mg/L	Cobalt mg/L	Lead mg/L	Lithium mg/L	Mercury mg/L	Molybdenum mg/L	Radium-226 & 228 pCi/L	Selenium mg/L	Thallium mg/L
	MCL/GWPS		0.005 ^a	0.1 ^a	0.006 ^b	0.015 ^b	0.040 ^b	0.002 ^a	0.100 ^b	5 ^a	0.05 ^a	0.002 ^a
MW-13 (Upgradient)	Baseline 95/95 UTL		0.000227	0.00500 U	0.0049	0.000500 U	0.178	0.000200 U	0.00594	2.11	0.111	0.00100 U
	Baseline 99/95 UTL		0.000227	0.00500 U	0.0062	0.000500 U	0.210	0.000200 U	0.00699	2.51	0.111	0.00100 U
	3/27/2023	Detection	0.000211	0.00500 U	0.00105	0.000593	0.0873	0.000200 U	0.00492	1.18	0.00500 U	0.00146
	9/12/2023	Assessment	0.000200 U	0.00500 U	0.000806 J+	0.000500 U	0.0880 J+	0.000200 U	0.00411 J+	0.996	0.00500 U	0.00100 U
MW-27 (Upgradient)	Baseline 95/95 UTL		0.000114	0.00500 U	0.00203	0.000500 U	0.306	0.000200 U	0.00200 U	1.52	0.00500 U	0.00100 U
	Baseline 99/95 UTL		0.000114	0.00500 U	0.00241	0.000500 U	0.355	0.000200 U	0.00200 U	1.79	0.00500 U	0.00100 U
	3/29/2023	Detection	0.000200 U	0.00500 U	0.000561	0.000500 U	0.129	0.000200 U	0.00200 U	0.0863 U	0.00500 U	0.00100 U
	9/12/2023	Assessment	0.000207 J+	0.00500 U	0.000978 J+	0.000513 J+	0.113 J+	0.000200 U	0.00284 J+	1.46	0.00500 U	0.00100 U
MW-29 (Upgradient)	Baseline 95/95 UTL		0.000100 U	0.00500 U	0.0107	0.000500 U	0.174	0.000200 U	0.00335	2.96	0.00500 U	0.00100 U
	Baseline 99/95 UTL		0.000100 U	0.00500 U	0.0134	0.000500 U	0.199	0.000200 U	0.00335	3.58	0.00500 U	0.00100 U
	3/29/2023	Detection	0.000100 U	0.00500 U	0.00265	0.000500 U	0.109	0.000200 U	0.00232	0.842	0.00500 U	0.00100 U
	9/12/2023	Assessment	0.000200 U	0.00500 U	0.00270 J+	0.000500 U	0.118 J+	0.000200 U	0.00205 J+	1.15	0.00500 U	0.00100 U
MW-223S (Upgradient)	Baseline 95/95 UTL		0.000123	0.00500 U	0.00158	0.000500 U	0.07	0.000200 U	0.00316	1.8	0.00500 U	0.00100 U
	Baseline 99/95 UTL		0.000123	0.00500 U	0.00188	0.000500 U	0.076	0.000200 U	0.00316	2.22	0.00500 U	0.00100 U
	3/29/2023	Detection	0.000100 U/0.000100 U	0.00500 U/0.00500 U	0.00107 /0.00103	0.000500 U/0.000500 U	0.0684 /0.0674	0.000200 U/0.000200 U	0.00296 /0.00288	0.468 U/0.877	0.00500 U/0.00500 U	0.00100 U/0.00100 U
	9/12/2023	Assessment	0.000200 U/0.000200 U	0.00500 U/0.00500 U	0.000667 J+/0.000638 J+	0.000500 U/0.000500 U	0.0517 J+/0.0504 J+	0.000200 U/0.000200 U	0.00305 J+/0.00291 J+	1.15 /0.795	0.00500 U/0.00500 U	0.00100 U/0.00100 U
MW-231S (Upgradient)	Baseline 95/95 UTL		0.000139	0.00500 U	0.00498	0.000500 U	0.126	0.000200 U	0.00242	1.63	0.0261	0.00122
	Baseline 99/95 UTL		0.000139	0.00500 U	0.0061	0.000500 U	0.136	0.000200 U	0.00242	1.99	0.032	0.00122
	3/28/2023	Detection	0.000100 U	0.00500 U	0.0033	0.000500 U	0.11	0.000200 U	0.00347	0.362 U	0.00500 U	0.00147
	9/12/2023	Assessment	0.000200 U	0.00500 U	0.00257	0.000500 U	0.0851	0.000200 U	0.00219	1.48	0.00500 U	0.00100 U

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Intra-Well Comparisons for 2023 Monitoring Data
MidAmerican Energy Company
Neal North Closed CCR Monofill - Sergeant Bluff, Iowa

Well	Observation	Monitoring Event	Appendix IV Analytes									
			Cadmium mg/L	Chromium mg/L	Cobalt mg/L	Lead mg/L	Lithium mg/L	Mercury mg/L	Molybdenum mg/L	Radium-226 & 228 pCi/L	Selenium mg/L	Thallium mg/L
	MCL/GWPS		0.005 ^a	0.1 ^a	0.006 ^b	0.015 ^b	0.040 ^b	0.002 ^a	0.100 ^b	5 ^a	0.05 ^a	0.002 ^a
MW-1R	Baseline 95/95 UTL		0.000409	0.00500 U	0.000500 U - 0.00104 †	0.000500 U	0.103	0.000200 U	0.00699	2.18	0.00500 U	0.00100 U
	Baseline 99/95 UTL		0.000409	0.00500 U	0.000500 U - 0.00104 †	0.000500 U	0.115	0.000200 U	0.00777	2.81	0.00500 U	0.00100 U
	04/03/2023	Detection	--	--	--	--	--	--	--	--	--	--
	09/13/2023	Assessment	0.000200 U / 0.000200 U	0.00500 U / 0.00500 U	0.000500 U / 0.000500 U	0.000500 U / 0.000500 U	0.0660 / 0.0600	0.000200 U / 0.000200 U	0.00489 / 0.00517	1.32 / 1.88	0.00500 U / 0.00500 U	0.00100 U / 0.00100 U
MW-3R	Baseline 95/95 UTL		0.000776	0.00500 U	0.000500 U - 0.00158 †	0.0016	0.116	0.000200 U	0.00651	1.74	0.00500 U	0.00694
	Baseline 99/95 UTL		0.000776	0.00500 U	0.000500 U - 0.00158 †	0.0016	0.127	0.000200 U	0.00651	2.07	0.00500 U	0.00694
	04/03/2023	Detection	--	--	--	--	--	--	--	--	--	--
	09/13/2023	Assessment	0.000200 U	0.00500 U	0.000500 U	0.000500 U	0.0763	0.000200 U	0.00236	1.46	0.00500 U	0.00100 U
MW-5R	Baseline 95/95 UTL		0.000100 U	0.00500 U	0.00081	0.000500 U	0.0986	0.000200 U	0.00491	1.5	0.00500 U	0.00100 U
	Baseline 99/95 UTL		0.000100 U	0.00500 U	0.00089	0.000500 U	0.1102	0.000200 U	0.00527	1.91	0.00500 U	0.00100 U
	04/03/2023	Detection	--	--	--	--	--	--	--	--	--	--
	09/13/2023	Assessment	0.000200 U	0.00500 U	0.000500 U	0.000500 U	0.0578	0.000200 U	0.00393	1.04	0.00500 U	0.00100 U
MW-19	Baseline 95/95 UTL		0.000100 U	0.00500 U	0.0278	0.000747	0.345	0.000200 U	0.00200 U	1.57	0.00500 U	0.00100 U
	Baseline 99/95 UTL		0.000100 U	0.00500 U	0.0341	0.000747	0.381	0.000200 U	0.00200 U	1.95	0.00500 U	0.00100 U
	04/03/2023	Detection	--	--	--	--	--	--	--	--	--	--
	09/13/2023	Assessment	0.000200 U	0.00500 U	0.0067	0.000500 U	0.234	0.000200 U	0.00200 U	0.984	0.00500 U	0.00100 U
MW-21	Baseline 95/95 UTL		0.000173	0.00500 U	0.00861	0.000899	0.463	0.000200 U	0.00200 U	1.56	0.0398	0.00100 U
	Baseline 99/95 UTL		0.000173	0.00500 U	0.0111	0.000899	0.533	0.000200 U	0.00200 U	1.95	0.0398	0.00100 U
	04/03/2023	Detection	--	--	--	--	--	--	--	--	--	--
	09/13/2023	Assessment	0.000346	0.00500 U	0.000983	0.000500 U	0.301	0.000200 U	0.00200 U	1.17	0.00500 U	0.00100 U
	12/05/2023	Verification	--	--	--	--	--	--	--	--	--	--

Notes:
0.100 / 0.106 - Field duplicate results.
< 0.500 - Not detected at the associated reporting limit.
J - Estimated concentration.
0.888 Value exceeds intra-well baseline 95/95 UTL or is outside of baseline range (for baseline data sets with temporal trends).
None - No MCL established.
^a Maximum contaminant level (MCL).
^b Groundwater protection standard (GWPS) established under 40 CFR 257.95(h)(2).
8.2 J Value exceeds intra-well baseline 99/95 UTL.
† - Trend present during baseline period, no UTL values calculated (baseline range listed for comparison).



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