Annual Groundwater Monitoring and Corrective Action Report for the East Monofill

Permit 70-SDP-16-04P
Louisa Generating Station
Muscatine, Iowa

MidAmerican Energy Company

January 31, 2025

The Power of Commitment

Certification

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Permit 70-SDP-16-04P
Louisa Generating Station
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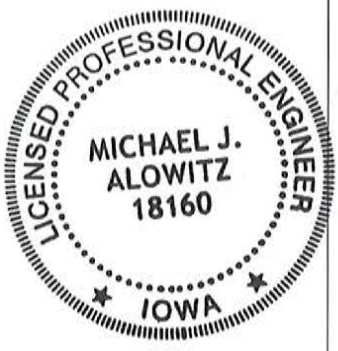
MidAmerican Energy Company

I certify this Annual Groundwater Monitoring and Corrective Action Report meets the requirements of 40 CFR §257.90(e).



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.

Michael J. Alowitz, P.E. — Date: 1/31/2025

License Number: 18160

My license renewal date is: December 31, 2026

Pages or sheets covered by this seal: Entire Document

Executive summary

In compliance with 40 CFR §257.90(e)(6), this executive summary provides an overview of the current status of groundwater monitoring and corrective action programs for the Louisa Generating Station coal combustion residual (CCR) East Monofill located near Muscatine, Iowa.

Item	Current Status
(e)(6)(i) At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95;	At the start of the current annual reporting period, this CCR unit was operating under the assessment monitoring program (40 CFR §257.95).
(e)(6)(ii) At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95;	At the end of the current annual reporting period, this CCR unit was operating under the assessment monitoring program (40 CFR §257.95).
(e)(6)(iii) If it was determined that there was a statistically significant increase over background for one or more constituents listed in appendix III to this part pursuant to §257.94(e):	
Identify those constituents listed in appendix III to this part and the names of the monitoring wells associated with such an increase; and	Verified statistically significant increases were detected for the following Appendix III constituents during the calendar year 2024 reporting period: – Calcium at MW-230, MW-231, and MW-232 – Chloride at MW-221A and MW-233 – pH at MW-232 (decrease) – Sulfate at MW-232, MW-233, and MW-234 – TDS at MW-230, MW-232, MW-233, and MW-234.
Provide the date when the assessment monitoring program was initiated for the CCR unit.	Assessment monitoring for this CCR unit was initiated in March 2021.
(e)(6)(iv) If it was determined that there was a statistically significant level above the groundwater protection standard for one or more constituents listed in appendix IV to this part pursuant to §257.95(g) include all of the following:	
Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an increase;	No Appendix IV constituents were detected at a statistically significant level above the corresponding groundwater protection standard.
Provide the date when the assessment of corrective measures was initiated for the CCR unit;	A corrective measures assessment is not required for this CCR unit.
Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and	A public meeting for assessment of corrective measures is not required for this CCR unit.
Provide the date when the assessment of corrective measures was completed for the CCR unit.	A corrective measures assessment is not required for this CCR unit.
(e)(6)(v) Whether a remedy was selected pursuant to §257.97 during the current annual reporting period, and if so, the date of remedy selection; and	A remedy selection is not required for this CCR unit.
(e)(6)(vi) Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.	No remedial activities pursuant to §257.98 occurred during the current annual reporting period for this CCR unit.

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1. Introduction

This Annual Groundwater Monitoring and Corrective Action Report was prepared by GHD on behalf of MidAmerican Energy Company (MidAmerican) in compliance with the Federal Coal Combustion Residual (CCR) rule (40 CFR Part 257) for the Louisa Generating Station (LGS) East Monofill located near Muscatine, Iowa. The East Monofill is located approximately 4 miles south of the city of Muscatine, Iowa in Section 4, Township 75N, Range 2W in Louisa County, Iowa. The Site Location Map (Figure 1.1) shows the location of the East Monofill and MidAmerican's LGS facilities. The West Monofill at the LGS facility is closed and its groundwater monitoring is reported separately from the East Monofill. The East Monofill extent, including cell layout, associated facilities, and monitoring well locations, are shown on Figure 1.2.

Construction of the East Monofill Cell 1 was completed in 2018, with the initial CCR placed in the East Monofill on October 15, 2018. Cells 2 and 3 at the East Monofill were constructed in 2019. CCR placement into Cell 2 and Cell 3 began in March 2020. MidAmerican initiated baseline groundwater monitoring in accordance with the Federal CCR rule in March 2018. The initial eight rounds of baseline sampling and analysis were completed for each monitoring well during the first six months of sampling, as required in the CCR rule for new monofills (40 CFR §257.94). The initial 6-month baseline period occurred prior to placement of CCR in the East Monofill. Subsequent monitoring at upgradient background wells demonstrated increases in parameter concentrations unrelated to the East Monofill, suggesting that the short baseline period did not represent the full extent of temporal variation occurring naturally in local groundwater. Therefore, the baseline period was modified (extended) to include samples collected through March 2020. In 2021, the East Monofill entered into assessment monitoring. Two assessment monitoring events were completed in 2024 (March 11-12 and August 26-27, 2024) and the data from these two events are included in this report.

The uppermost aquifer in the vicinity is the Mississippi River alluvial aquifer. The surficial deposits in this area consist of poorly graded, medium-grained alluvial sands and gravelly sands with isolated sand and silt deposits, and extend to depths ranging from 160 to 200 feet below ground surface (bgs) (Foth, 2016). The uppermost bedrock in the area is Cedar Valley limestones and dolomites of the Middle Devonian Period (Hansen and Steinhilber, 1977).

2. Groundwater Monitoring Activities

2.1 Groundwater Monitoring Network

The groundwater monitoring network consists of fifteen monitoring points (monitoring wells MW-202A, MW-202B, MW-210A, MW-210B, MW-213A, MW-213B, MW-221A, MW-221B, and MW-230 through MW-234, and piezometers PZ-203 and PZ-214). No changes to the groundwater monitoring network were made during this reporting period. Groundwater elevation data were collected from the fifteen wells and piezometers, and groundwater samples were collected from seven of the monitoring wells (MW-213A, MW-221A, and MW-230 through MW-234). The seven sampled monitoring wells are screened near the water table (with screened intervals from approximately 38 to 64 feet bgs), four of the remaining eight monitoring wells and piezometers are also screened near the water table, while the remaining four are screened in a deeper portion of the alluvial aquifer (approximately 70 to 80 feet bgs). Horizontal spacing between the downgradient shallow alluvial aquifer monitoring wells is approximately 200 feet. Groundwater samples are used to assess potential impacts of the East Monofill on surrounding groundwater. Groundwater elevation data are used to identify upgradient and downgradient monitoring points at the East Monofill. The monitoring well network and monitoring well details are provided in Tables 2.1 and 2.2, respectively. Table 2.2 includes monitoring wells associated with the West Monofill which are used to support groundwater elevation mapping but are not a part of the East Monofill monitoring network.

2.2 Monitoring Well Inspection

During each sampling event, the monitoring wells were visually inspected and deficient conditions of the monitoring wells were noted on the sampling forms (when applicable). 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 monitoring wells in the groundwater monitoring system consist of 2-inch nominal inner-diameter polyvinyl chloride (PVC) casing and screen. Monitoring well surface completions consist of a lockable stick-up surface casing set in a concrete pad and placement of protective bollards in locations where traffic may be of concern. All wells were found to be in generally good condition, with no issues affecting well or sample integrity. Due to the surrounding topography, sediment periodically accumulates on top of some of the monitoring well pads. The sediment is removed as necessary to allow inspection of the well pads.

On a periodic basis, the total 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 and screen occlusion calculations from the total depth measurements are presented in Table 2.3. If screen occlusion greater than 10 percent is determined to be present, the well will be redeveloped prior to the next sampling event. Total depth measurements collected in 2024 indicated no well screens of sampled monitoring wells were occluded at or above 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 on electronic well sampling records. Following stabilization, unfiltered samples were collected in laboratory-supplied containers. Copies of the groundwater sampling records for the two assessment monitoring events are included in Appendix A. During each of the assessment monitoring events, a field duplicate sample was collected from MW-231 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 IV (Tables 2.4 and 2.5) for the March and August 2024 assessment monitoring events. The majority of the laboratory analyses were conducted by Eurofins Environment Testing North Central, LLC (Eurofins) in Cedar Falls, Iowa; the radium 226 and 228 (combined) 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 (August 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 2.6 summarizes the number of groundwater samples collected for analysis from each monitoring well, the dates the samples were collected, and whether the sample was required by the baseline, detection monitoring, or assessment monitoring programs.

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

3. Groundwater Flow Conditions

3.1 Horizontal Groundwater Flow

Groundwater levels were measured at each of the monitoring wells included in the monitoring network during each monitoring event. Four of the East Monofill groundwater monitoring wells are in a nested pair with one shallow and one deep well, as illustrated on Figure 1.2 and in Table 3.1. Table 3.1 presents groundwater elevations measured in wells during the March and August 2024 sampling events. A groundwater flow map was prepared using water level measurements from each monitoring event for the alluvial aquifer (Figures 3.1 and 3.2). The groundwater flow direction at the East Monofill during the March 2024 monitoring event was inferred to be to the northwest and to the west during the August 2024 monitoring event. The variations in groundwater elevation and flow direction observed during the monitoring events are likely a result of normal seasonal variability in the amount and rate of infiltration of precipitation and are within the range of previously inferred groundwater flow directions.

3.2 Horizontal Hydraulic Gradient and Groundwater Flow Velocity

Hydraulic conductivity estimates for the alluvial aquifer at the East Monofill were derived from single well-specific capacity tests and ranged from 0.044 centimeters per second (cm/sec) to 0.162 cm/sec, for an average hydraulic conductivity of 0.1 cm/sec (86.4 meters per day [m/day]) (Foth, 2016).

The average linear groundwater flow velocity at the water table was estimated based on the hydraulic conductivity, horizontal gradient, and the estimated porosity of the formation using the following equation:

$$V = Ki/n$$

Where V equals the average linear velocity; K equals the average hydraulic conductivity (86.4 m/day); i equals the average horizontal hydraulic gradient; and n equals the effective porosity (estimated at 0.3). During the 2024 sampling events at the East Monofill, the average linear groundwater velocity at the water table (shallow alluvial aquifer) was estimated to range between 0.12 m/day (approximately 140 feet per year), calculated for the August 2024 monitoring event, and 0.28 m/day (approximately 330 feet per year), calculated for the March 2024 monitoring event. The estimated horizontal gradients and average linear groundwater flow velocities for each of the monitoring events are summarized in Table 3.2.

3.3 Vertical Hydraulic Gradient

Water levels measured in monitoring well pairs MW-202A/MW-202B, MW-210A/MW-210B, MW-213A/MW-213B, and MW-221A/MW-221B during the two 2024 gauging events, where both wells in each nest were gauged, were used to calculate vertical hydraulic gradients. The vertical hydraulic gradients were calculated by the following equation:

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

The difference in groundwater elevations between nested pairs of wells is slight, ranging from 0.01 (at the MW-202A/MW-202B well pair during the August 2024 gauging event) to a maximum difference of 0.14 feet (at the MW-213A/MW-213B well pair during the March 2024 gauging event).

The vertical hydraulic gradients ranged from -0.002 (downward-directed flow) in well cluster MW-210A/MW-210B (March 2024) to 0.005 (upward-directed flow) in well clusters MW-213A/MW-213B (March 2024).

Vertical gradients were in the upward direction during both 2024 gauging events at well clusters MW-202A/MW-202B, MW-213A/MW-213B, and MW-221A/MW-221B. The vertical gradient was in the downward direction during the 2024 monitoring events at well cluster MW-210A/MW-210B.

3.4 Monitoring Well Network Assessment

The East Monofill groundwater 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 Part 257, Section 91. Monitoring wells MW-213A and MW-221A have been identified as background sampling locations (GHD, 2019a).

4. Groundwater Monitoring

Groundwater sample collection records for the 2024 monitoring events 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 monitoring program. The cumulative groundwater analytical data from March 2018 through 2024 for the East Monofill is provided in Appendix D.

Originally, baseline monitoring under the Federal CCR rule occurred at the East Monofill during eight monitoring events conducted between March and June of 2018. These first eight events represented the selected baseline period required for both inter-well and intra-well comparisons, and the original baseline data evaluation was presented in the 2018 annual report (GHD, 2019b). A change in regional conditions was observed following that time, with parameter concentrations significantly increasing compared to baseline values in upgradient wells (i.e., not a site-related effect). Therefore, the baseline data sets were extended to update the comparison values in the 2021 Annual Report (GHD, 2022). For Appendix III analytes, which have been included in laboratory analysis during all sampling events to date, in order to avoid over-weighting the initial four months of sampling in the baseline calculations only the first sample each month (i.e., one sample from March, April, May and June of 2018) was retained in the extended baseline period, and the excluded samples are flagged as “historical” in the Appendix C time series graphs. The Appendix IV analytes were not required during Detection Monitoring sampling events and therefore have fewer historical results, and thus all initial bi-monthly 2018 data were retained for these parameters. The updated baseline values reported in the 2021 report (GHD, 2022) are used in the present evaluation.

Analytical results for groundwater samples collected from each well during their respective baseline periods (through September 2019 or March 2020, see the 2021 Annual Report for details) and the 2024 monitoring events are summarized in Tables 4.1 and 4.2, respectively.

As part of 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 versus time)
– Inter-well (upgradient) or intra-well (baseline) comparisons
– For parameters not detected above reporting limits during the baseline period, application of a double-quantification rule (DQR), to identify new parameter detections
– Per direction received from Iowa Department of Natural Resources (IDNR) (IDNR, 2022), each data set is evaluated using either inter-well or intra-well comparisons, and not both. Generally, inter-well comparisons (vs. upgradient conditions) are used for most of the data sets, with intra-well comparisons (vs. baseline conditions at the given well) are used when either significant spatial variation in upgradient groundwater is noted for a given analyte, or an alternate source determination has demonstrated that conditions for the analyte at a given well do not signify a CCR impact.

The statistical methods used in these evaluation steps for the East Monofill during routine assessment monitoring are presented the Groundwater Statistical Methods Certification for the East Monofill (Statistical Certification, GHD 2019c).

The procedures in the Statistical 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 2024 monitoring events.

4.1 Statistical Analysis Approach

Due to observation of prior statistically significant increases, groundwater monitoring at the East Monofill is currently conducted under Assessment Monitoring status per the Federal CCR rule. As such, the seven Appendix III and fourteen Appendix IV constituents (Table 2.4 and 2.5, respectively) were analyzed in the monitoring event samples conducted in March and August 2024.

No single method of statistical analysis is appropriate for each groundwater constituent dataset; instead, the statistical methods selected for use are dependent upon data characteristics 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 versus upgradient conditions) and intra-well (comparison versus baseline at individual locations) tests may be warranted. As noted above, per direction from IDNR either inter-well or intra-well comparison, not both, are applied for each data set (i.e., a given analyte at a given monitoring well (IDNR, 2022)).

The statistical methods used are selected based on data characteristics 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 current evaluation mainly considered inter-well comparisons, unless significant spatial variability in an analyte concentration was observed in the upgradient wells or an alternate source demonstration found that analyte concentrations in a given well are not CCR-related, in which cases intra-well comparisons are used. For each data set (analyte x well) the inter-well or intra-well comparison is used to determine if a statistically significant increase (SSI) has occurred at the East Monofill.

4.1.1 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, consistent with the Hydrologic Monitoring System Plan (HMSP) (Foth, 2017), the use of upper prediction limits (UPLs) was selected as being appropriate for assessment of groundwater monitoring data for the East Monofill. A UPL is a statistically-based limit above which a given sample measurement is unlikely to occur if conditions remain consistent with the reference population.

For inter-well comparisons, the reference population is the data set of constituent concentrations in upgradient background well(s), sampled during the revised baseline period. Since there are two upgradient background wells at the site (MW-213A and MW-221A), the data from these two wells are pooled to calculate the upgradient background UPLs for each constituent.

4.1.2 Intra-well Comparisons – Well-Specific Baseline Values

As noted in the Methods Certification, the statistical methods (i.e., UPLs) 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 (revised) baseline period.

Statistical analyses of baseline data were previously conducted to assess the constituent concentrations and determine the most appropriate statistical approach(es) for the data (GHD, 2019b; 2021). The data were examined for outliers, the percentage of non-detect values, and to determine the statistical distribution. Time series plots, box plots of upgradient data, and maps were used to evaluate the potential presence of temporal or spatial variations in constituent concentrations.

As specified in the HMSP (Foth, 2017) and the Groundwater Statistical Methods Certification for the East Monofill (Methods Certification) (GHD, 2019c), estimated concentrations below the laboratory reporting limit (i.e., J-qualified data) are considered as non-detects in the statistical evaluation where needed.

All of the Appendix III and IV constituents occur naturally in the environment. For constituents that occur naturally and vary substantially in concentration across the monitoring network due to natural hydrogeologic or geochemical factors (i.e., exhibiting spatial variability), an effective inter-well analysis may be prevented. Constituent concentrations greater than upgradient conditions might be incorrectly attributed to impact from the East Monofill, when the differences are actually natural and unrelated to the East Monofill due to locally varying distributions of groundwater constituents. In such cases, an intra-well approach is appropriate. Nonetheless, it is important to monitor upgradient groundwater quality to be able to detect regional changes that could affect groundwater in the downgradient wells unrelated to the East Monofill.

4.1.3 Spatial Variability

The concentrations 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 East Monofill, the uppermost groundwater occurs in alluvial deposits primarily consisting of poorly graded, medium-grained alluvial sands and gravelly sands, and isolated sand and silt deposits (Foth, 2016). In the case of the East Monofill, these differing geological materials are intersected by the screened zones of the monitoring wells and may result in spatial variability for some constituents. The shallow alluvial aquifer and the Devonian bedrock aquifers exist under unconfined conditions and are hydraulically connected (Foth, 2016). The natural geochemistry of groundwater can vary between these deposits and affect the detected concentrations of natural constituents.

Previous evaluation of revised baseline data sets (GHD, 2022) identified spatial variability between the East Monofill upgradient wells (MW-213A and MW-221A), which continues to be evident for detected constituents. Analytes with strong evidence of spatial variability are:

– Chloride
– pH
– Sulfate
– TDS

This spatial variability affects 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 East Monofill. Inter-well comparisons could not distinguish between these two possibilities. Therefore, intra-well comparisons were selected for these constituents.

4.1.4 Temporal Variability

The 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 UPLs, where data from upgradient wells (MW-213A and MW-221A) 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.

A statistically significant increasing trend during the baseline period was detected for total dissolved solids (TDS) at MW-213A and regionally considering the pooled MW-213A and MW-221A data set.

For this data set, the statistically significant trends impact or invalidate inter-well comparisons using statistical prediction limits, since the statistical methods presented in the CCR rule (40 CFR §257.93(f)) assume no trends are

present in the upgradient data. As such, the range of baseline observations and evident trend are considered in future data assessment.

4.1.5 Comparison Values – Upper Prediction Limits (UPLs)

The selected statistical UPLs are based on a "1-of-2" retesting plan and cumulative annual site-wide false positive rate (SWFPR) of 0.10, as described in Chapter 19 of USEPA's Unified Guidance (USEPA, 2009 – see page 19-11). This means there is 90 percent confidence site-wide (considering the 7 wells, and average of 7.4 detected constituents out of the 21 Appendix III and Appendix IV constituents, and semiannual sampling) that constituent concentrations above the baseline UPL in both original and verification resampling samples indicate a true SSI. Note that in cases where a non-parametric (rank-based) UPL is required (due to high proportions of non-detects, the presence of statistical outlier(s) in baseline, and/or non-normal data distributions), the level of statistical confidence is lower than the target 90 percent site-wide.

Similarly, for constituents that are not detected during the baseline period, the double-quantification rule (DQR) identifies an SSI when both regular monitoring and subsequent resampling event samples have constituent concentrations above the reporting limit where the corresponding baseline data set consists entirely of non-detect results (including estimated J-qualified results below the reporting limit).

Comparisons against these Baseline Values are to be interpreted as follows:

a. If a given future observation exceeds baseline UPL or the reporting limit for a constituent not detected in baseline, then a verification sample will be collected and analyzed (within 90 days).
b. If the verification resample is also above the baseline UPL or the baseline reporting limit, then an SSI is identified and reported.
c. If the verification resample is not above the baseline UPL or the baseline reporting limit, then the initial observation is concluded to represent natural variation and there is no SSI. In this case, the regular monitoring frequency and schedule for this constituent at the given well is resumed.

Calculations of baseline values (UPLs) were completed using the methodology and reference tables presented in USEPA's Unified Guidance (USEPA, 2009).

Where temporal trends were identified over the baseline period, prediction limits are not calculated (due to violation of the statistical assumptions of the UPL calculations) and a baseline range is provided as a reference. For affected 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.

4.1.6 Summary of Statistical Analysis Approach

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

4.2 Assessment of Baseline Data

Assessment of the baseline data for the East Monofill was initially presented in the 2018 annual report (GHD, 2019b) and updated in the 2021 annual report (GHD, 2022). If changes (i.e., trends) in regional conditions continue in the future, the baseline assessment may be revised accordingly. For convenience, the following items provide summary information from the updated baseline evaluation originally provided in the 2021 annual report (GHD, 2022).

– Baseline data trend test results are reported in Table 4.3 and included on trend plots presented in Appendix C, Figures 1 through 7 (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).

– Several statistically significant trends over time were identified during the revised baseline period evaluation. Trends were found for the following wells/constituents:
    - Increasing TDS at MW-213A (upgradient) and in the pooled upgradient background data (MW-231A and MW-221A)
    - Increasing TDS and barium at MW-230
    - Decreasing pH, increasing calcium and barium at MW-231
    - Decreasing sulfate and increasing barium at MW-232
    - Increasing calcium and barium at MW-233
    - Increasing pH and radium 226 and 228 (combined) at MW-234

Where trends were identified in a baseline data set, the methods for baseline comparisons are adjusted to account for non-stationarity during the baseline period. In particular, the baseline range and observed trend direction are to be used to evaluate future data.

– The calculated inter-well and intra-well baseline values (UPLs) for each constituent/well pair are presented in Table 4.4.
– The calculated intra-well baseline values (UPLs) for each constituent/well pair are presented in Table 4.4.
– The selected assessment method (inter-well or intra-well) for each data set (analyte x well) is listed with the data comparisons in Table 4.5.

4.3 Assessment of 2024 Assessment Monitoring Data

4.3.1 Comparisons to UPLs (Inter-Well or Intra-Well)

Comparisons of the 2024 monitoring data to the applicable inter-well or intra-well UPLs are presented in Table 4.5. The basis for comparisons at each constituent (inter-well or intra-well) are shown in Table 4.5. Inter-well comparisons are conducted unless there is strong evidence of spatial variability in upgradient groundwater, or an alternate source demonstration has found that conditions at a given well are not associated with CCR residue. The analytes with strong spatial variability in upgradient groundwater presently are chloride, pH, sulfate, and TDS.

The UPL comparisons indicate observations where one or both of the current-year's monitoring events has a constituent concentration or measurement outside of reference conditions. Note that for pH both LPL (Lower Prediction Limit) and UPL comparisons are included in the evaluation.

In a letter dated August 4, 2023, the IDNR noted changes in reporting limits for some parameters. Currently, those changes do not result in an impact on the statistical evaluation. A case-by-case description is included below:

– Boron: the reporting limit was 0.200 mg/L in 2020 at upgradient well MW-213A. The reporting limit is now 0.100 U at all wells. If a future detected concentration above 0.100 mg/L but below 0.200 mg/L occurs, this ambiguous comparison to baseline would need to be further evaluated (trend analysis) to determine if a persistent increase compared to post-baseline conditions of non-detect results with a reporting limit of 0.100 mg/L exists.
– Antimony: the reporting limit was 0.001 mg/L during baseline but changed to 0.002 mg/L during post-baseline. Antimony has not been detected in any wells except upgradient well MW-213A (one low J-estimated result during baseline). If a future detected concentration occurs (above the original reporting limit of 0.001 mg/L or the new reporting limit of 0.002 mg/L), there is no ambiguity, the concentration will be considered exceeding baseline.
– Cadmium: the reporting limit was 0.0005 mg/L during baseline but changed to 0.0001 mg/L during post-baseline, and in 2024 to 0.0002 mg/L. Cadmium has not been detected in any wells. If a future detected concentration above 0.0005 mg/L occurs, it will be considered exceeding baseline. If a future detected concentration above 0.0001 mg/L but below 0.0005 mg/L occurs, this ambiguous comparison to baseline would need to be further evaluated (trend analysis) to determine if a persistent increase compared to post-baseline conditions of non-detect results with reporting limit of 0.0001 mg/L exists.

In the following cases, the most recent 2024 sample results exceeded the applicable inter-well or intra-well UPL (or were below the LPL for pH):

- Calcium at MW-230, MW-231, and MW-232 (confirmed SSIs)
- Calcium at MW-233 (unconfirmed increase)
- Chloride at upgradient well MW-221A and MW-233 (confirmed SSIs)
- Chloride at upgradient well MW-213A (unconfirmed increase)
- pH at MW-232 (below the LPL – confirmed decrease)
- pH at MW-231 and MW-233 (below the LPL – unconfirmed decreases)
- Sulfate at MW-232, MW-233, and MW-234 (confirmed SSIs)
- Sulfate at upgradient well MW-213A (unconfirmed increase)
- TDS at MW-230, MW-232, MW-233, and MW-234 (confirmed SSIs)
- Arsenic at MW-231 (unconfirmed increase)
- Barium at MW-230, MW-231, MW-232, and MW-233 (confirmed SSIs)
- Cobalt at MW-231 (unconfirmed increase)
- Lead at MW-231 (unconfirmed increase)

For samples collected from the two upgradient wells in 2024, all observed Appendix IV constituent concentrations were consistent with the respective inter-well UPLs. However, chloride and sulfate concentrations were above their intra-well UPLs (chloride in August 2024 at well MW-213A and in March and August 2024 at well MW-221A; and sulfate in August 2024 at well MW-213A and in March 2024 at well MW-221A).

The results flagged as increases, or a decrease for pH, are further discussed below:

- Calcium in groundwater at wells MW-230, MW-231, and MW-232 was detected at concentrations above the corresponding baseline UPL values in March and August 2024, indicating confirmed increases in all three wells. The August 2024 calcium result at MW-233 is an unconfirmed increase, the value in March 2024 is below the UPL. In all four wells (MW-230, MW-231, MW-232, and MW-233) calcium concentrations indicate a potential change in conditions that will be further evaluated by future sampling results.
- Chloride concentrations at upgradient wells MW-213A and MW-221A were detected above their respective intra-well UPLs in 2024. Chloride concentrations at downgradient well MW-233 were detected above the reporting limit of 5.00 mg/L in March and August 2024. Chloride was not detected at MW-233 from 2020 through March 2022, and was not detected in September 2023, the detected values in March and August 2024 constitute a confirmed SSI. Future sampling will confirm if this pattern persists.
- At well MW-231 pH values have consistently been above 8.0 standard units (s.u.) since baseline data collection and ranged from 8.1-8.4 s.u. across 5 events with duplicate measurements between September 2020 and March 2022. The August 2024 measurement was 7.6 J / 7.6 J s.u., below the baseline LPL of 7.89 s.u. The next monitoring event will confirm if this is a statistically significant decrease. At well MW-232, both March (7.9 J s.u.) and August 2024 (7.5 J s.u.) measurements were below the LPL of 8.04 s.u., which constitutes a statistically significant decrease. At well MW-233 the August 2024 measurements were below the LPL of 7.7 J s.u. The next monitoring event will confirm if this is a statistically significant decrease.
- Sulfate concentrations at upgradient wells MW-213A and MW-221A were detected above their respective intra-well UPLs in 2024. Sulfate was not detected previously above the reporting limit of 5.00 U in 2020 - 2022 at MW-213A and was below the baseline UPL previously at MW-221A. Both cases are unconfirmed increases, therefore, future sampling will confirm if this pattern persists. At MW-232, sulfate was identified as an SSI in 2021 and has been above the UPL since 2020. The March and August 2024 results are also above the UPL, which indicates an SSI. Sulfate at MW-233 was also identified as an SSI in 2021 and has remained above the UPL since that time, confirming an SSI at this well. At MW-234 an initial increase for sulfate was observed in September 2022, and it was confirmed an SSI in 2023 and 2024, as both current results (March and August) are above the UPL. The identification of SSIs for sulfate triggered assessment monitoring.

– TDS concentrations in March and August 2024 at MW-230, MW-232, MW-233, and MW-234 were above their UPLs, resulting in SSIs in all four wells. The TDS concentration in March 2024 was above the UPL at MW-231; the August 2024 concentration did not exceed the UPL, so the exceedance at MW-231 is not an SSI.
– Arsenic was detected in the August 2024 duplicate sample collected at MW-231 at a concentration slightly above the reporting limit of 0.00200 mg/L; arsenic was not detected in the corresponding primary sample collected from MW-231. Arsenic has not been detected above the reporting limit previously at MW-231, and thus the detected value in August 2024 is not an SSI.
– Barium concentrations at MW-230, MW-231, MW-232, and MW-233 were detected above the baseline UPL in March and August 2024 and are confirmed SSIs.
– Cobalt was detected at downgradient well MW-231 in August 2024 at 0.00168 J / 0.00869 J mg/L, which was above the baseline UPL of 0.0005 U. Cobalt was not detected above the reporting limit during any previous event and thus the detected value in August 2024 is not an SSI.
– Lead concentration at downgradient well MW-231 in August 2024 was 0.00138 J / 0.00399 J mg/L, which was above the baseline UPL of 0.00086 mg/L. Lead was not detected above the reporting limit during any previous event and thus the detected value in August 2024 is not an SSI.

4.3.2 Comparisons to Maximum Contaminant Levels (MCLs)

Sample results are compared to the USEPA MCL for constituents with an MCL. During the revised baseline sampling period, no constituents were above the MCL at any of the wells. A detailed summary of the currently observed concentrations is provided in the following subsections and are summarized further in Table 4.6.

4.3.2.1 Summary of Appendix III Results

– Boron. No MCL has been established for boron. Boron concentrations were below the method reporting limit of (0.1 mg/L) in all samples, except MW-233 in August 2024, which had a reported concentration of 0.104..
– Calcium. No MCL has been established for calcium. The maximum calcium concentration detected during 2024 was 84.1 mg/L at downgradient well MW-233.
– Chloride. No MCL has been established for chloride. The maximum chloride concentration detected during 2024 was 14.0 mg/L at upgradient monitoring well MW-213A.
– Fluoride. The MCL for fluoride is 4.0 mg/L. Fluoride concentrations were below the method reporting limit of (1.00 mg/L) in all samples from all monitoring wells during the 2024 monitoring events. The reporting limit was changed from 0.05 mg/L to 1.00 U prior to the September 2023 monitoring event and maintained during the 2024 sampling events.
– pH. No MCL has been established for pH. The highest downgradient pH recorded during the 2024 monitoring events was 8.2 J (at MW-234) and the highest upgradient result was 8.0 J (MW-213A and MW-221A in March 2024). The lowest pH from all wells was 7.5 J at downgradient well MW-232 in August 2024.
– Sulfate. No MCL has been established for sulfate. The maximum sulfate concentration detected during 2024 was 86.4 mg/L at monitoring well MW-233 (March 2024).
– TDS. No MCL has been established for TDS. The maximum TDS concentration detected was 370 mg/L at downgradient monitoring well MW-233 (August 2024).

4.3.2.2 Summary of Appendix IV Results

– Antimony. Antimony concentrations were below the method reporting limit (0.00200 mg/L) and the established MCL (0.006 mg/L) in all samples from all monitoring wells during the 2024 monitoring events.
– Arsenic. Arsenic concentrations were below the established MCL (0.01 mg/L) and below the method reporting limit (0.00200 mg/L) for arsenic in all monitoring wells during the 2024 events, except at downgradient well MW-231, which had a detected concentration of 0.00208 mg/L.

- Barium. Barium was detected in all sampled wells during the 2024 monitoring events; however, the detected levels were all below the MCL for barium (2.0 mg/L), with a maximum detected concentration in the 2024 samples of 0.111 mg/L at monitoring well MW-231.
- Beryllium. Beryllium concentrations were below the method reporting limit (0.00100 mg/L) and the established MCL (0.004 mg/L) in all samples from all monitoring wells during the 2024 monitoring events.
- Cadmium. Cadmium concentrations were below the method reporting limit (0.000200 mg/L) and the established MCL (0.005 mg/L) in all samples from all monitoring wells during the 2024 monitoring events.
- Chromium. Chromium concentrations were below the method reporting limit (0.00500 mg/L) in all monitoring wells during the 2024 monitoring events, except at MW-231, which had a detected concentration of 0.00862 mg/L. All 2024 results were below the MCL of 0.1 mg/L.
- Cobalt. No MCL has been established for cobalt; the Groundwater Protection Standard (GWPS) established under 40 CFR §257.95(h)(2) for cobalt is 0.006 mg/L. Cobalt was detected at downgradient well MW-231 during the August 2024 sampling event at estimated concentrations of 0.00168 J / 0.00869 J mg/L in the primary and duplicate samples, respectively. The data were J-flagged during data verification due to poor agreement between the primary and duplicate samples. Because the results are estimated and the primary sample was below the GWPS, the MW-231 result is not considered a GWPS exceedance.
- 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. Lead concentrations were below the GWPS (0.015 mg/L) in all samples from all wells during the 2024 monitoring events. Lead was detected above the reporting limit at downgradient well MW-231 (0.00399 J mg/L).
- 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. Lithium concentrations were below the method reporting limit (0.0100 mg/L) at all wells during the 2024 monitoring events.
- Mercury. Mercury concentrations were below the method reporting limit (0.000200 mg/L) and the established MCL (0.002 mg/L) in all samples from all monitoring wells during the 2024 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 not detected at concentrations exceeding the method reporting limit (0.00200 mg/L) or GWPS in all samples from all monitoring wells during the 2024 monitoring events.
- Radium 226 and 228 (combined). The MCL for Radium 226 and 228 (combined) is 5 picocuries per liter (pCi/L). Radium 226 and 228 (combined) was detected at all monitoring wells during the 2024 sampling events. The maximum concentration detected was 0.612 pCi/L at MW-231, which is below the MCL.
- Selenium. The MCL for selenium is 0.05 mg/L and method reporting limit is 0.00500 mg/L. All samples from all wells tested below the method reporting limit during all sampling events in 2024.
- Thallium. Thallium concentrations were below the method reporting limit (0.00100 mg/L) and the established MCL (0.002 mg/L) in all samples from all monitoring wells during the 2024 monitoring events.

5. Alternate Source Determination

As described in 40 CFR §257.94(e)(2), statistically significant differences from background levels for a constituent may be evaluated to demonstrate that a source other than the CCR unit has caused the statistically significant difference from background or resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. An alternate source determination (GHD, 2019d) was completed for the East Monofill which was included as Appendix E of the 2018 annual report and is summarized below.

5.1 Description of Alternate Source Determination

As described in the 2018 Annual Groundwater Monitoring and Corrective Action Report, four SSIs were addressed in the alternate source determination:

– TDS at MW-213A (upgradient) (above the baseline range)
– Sulfate at MW-231 (downgradient)
– Calcium at MW-233 (downgradient)
– Fluoride at MW-234 (downgradient)

Inter-well comparisons of initial detection monitoring event data were conducted by comparing monitoring data to the upgradient background UPLs derived from the original baseline period data at the upgradient wells (MW-213A and MW-221A). The results of the inter-well comparisons indicated three observations where the initial detection monitoring event had a constituent concentration outside of baseline conditions in the upgradient wells. These included TDS in upgradient well MW-213A (above the baseline range); sulfate in downgradient well MW-231; and fluoride in downgradient well MW-234, which were also identified above in the discussion of intra-well comparisons.

The Alternate Source Determination Report (GHD, 2019d) addressed groundwater SSIs. Because the SSIs were initially detected prior to placement of CCR in the East Monofill, the observed SSIs cannot be related to CCR disposal in the East Monofill; the observed SSIs are due to natural variability or regional effects unrelated to the East Monofill.

Of these four cases above, none are currently SSIs (2024) based on the updated baseline periods. Sulfate at MW-232 and MW-233 led the site to transition to assessment monitoring.

5.2 Alternate Source Determination Conclusion

As demonstrated in the alternate source determination evaluation, the East Monofill is not the source of the SSIs described above.

6. Conclusions and Recommendations

6.1 Groundwater Flow and Evaluation of the Monitoring Network

Groundwater flow in the vicinity of the East Monofill is generally to the west and northwest. The groundwater flow evaluation (see Figures 3.1 through 3.2) indicates the monitoring network is sufficient and has appropriately located upgradient and downgradient well locations.

6.2 Groundwater Quality

A statistical evaluation of groundwater monitoring data collected during the revised baseline period (March 2018 to March 2020) 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 intra-well baseline values and inter-well upgradient background reference values against which future monitoring data may be evaluated. An assessment of monitoring data from samples collected during the two 2024 assessment monitoring events was conducted. Key results of the evaluation include:

– Some constituent concentrations continue to vary between the two upgradient background wells, prompting the use of intra-well comparisons. These constituents include chloride, pH, sulfate and TDS.

– Assessment of the data generated from 2024 assessment monitoring events indicates the majority of the 2024 observations are consistent with their corresponding inter-well upgradient background conditions and intra-well baseline values, with the following exceptions:
    - Calcium at MW-230, MW-231, and MW-232 (confirmed SSIs)
    - Calcium at MW-233 (unconfirmed increase)
    - Chloride at MW-221A and MW-233 (confirmed SSIs)
    - Chloride at MW-213A (unconfirmed increase)
    - pH at MW-232 (below the LPL – confirmed decrease)
    - pH at MW-231 and MW-233 (below the LPL – unconfirmed decreases)
    - Sulfate at MW-232, MW-233, and MW-234 (confirmed SSIs)
    - Sulfate at upgradient well MW-213A (unconfirmed increase)
    - TDS at MW-230, MW-232, MW-233, and MW-234 (confirmed SSIs)
    - Arsenic at MW-231 (unconfirmed increase)
    - Barium at MW-230, MW-231, MW-232, and MW-233 (confirmed SSIs)
    - Cobalt at MW-231 (unconfirmed increase)
    - Lead at MW-231 (unconfirmed increase)

The only Appendix III constituent with an MCL is fluoride. Fluoride was not detected in any of the 2024 groundwater samples from the East Monofill.

Cobalt was detected at downgradient well MW-231 during the August 2024 sampling event at estimated concentrations of 0.00168 J / 0.00869 J mg/L in the primary and duplicate samples, respectively. The data were J-flagged during data verification due to poor agreement between the primary and duplicate samples. The estimated cobalt concentration in the duplicate sample is above the GWPS established under §257.95(h)(2). Because the results are estimated and the primary sample was below the GWPS, the MW-231 result is not considered a GWPS exceedance. Continued monitoring of MW-231, along with other wells in the monitoring network, will allow continued evaluation of the Appendix III and IV parameters.

6.3 Recommendations

Based on the evaluation findings, the East Monofill remains in assessment monitoring. No changes to the monitoring network or sampling procedures are necessary.

7. References

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Tables

Table 2.1

Groundwater Monitoring Well Network
Louisa Generating Station - East Monofill
Muscatine, Iowa

Monitoring Well	Use in Monitoring Network	Role in Monitoring Network
MW-202A	Gauged Only	Gauging Location
MW-202B [a]	Gauged Only	Gauging Location
MW-210A	Gauged Only	Gauging Location
MW-210B [a]	Gauged Only	Gauging Location
MW-213A	Gauged and Sampled	Background Location
MW-213B [a]	Gauged Only	Gauging Location
MW-221A	Gauged and Sampled	Background Location
MW-221B [a]	Gauged Only	Gauging Location
MW-230	Gauged and Sampled	Downgradient Location
MW-231	Gauged and Sampled	Downgradient Location
MW-232	Gauged and Sampled	Downgradient Location
MW-233	Gauged and Sampled	Downgradient Location
MW-234	Gauged and Sampled	Downgradient Location
PZ-203	Gauged Only	Gauging Location
PZ-214	Gauged Only	Gauging Location

Note:
[a] Well is screened in deep portion of the alluvial aquifer.

Table 2.2

Well Construction Details
Louisa Generating Station - East Monofill
Muscatine, Iowa

			Monitoring Well Constuction					
Well Identification	Northing	Easting	Ground Surface Elevation (NAVD88)	Top of Casing (NAVD88)	Total Depth (feet BTOC)	Screen Length (feet)	Top of Screen (NAVD88)	Bottom of Screen (NAVD88)
MW-02	494018.3	2299709.5	544.12	547.03	15.48	10	541.6	531.6
MW-03	495123.7	2301386.2	578.35	580.39	58.20	10	532.2	522.2
MW-04	493249.9	2300239.6	574.49	577.00	50.29	10	536.7	526.7
MW-17R	493977.2	2300719.5	577.11	579.90	52.67	10	537.2	527.2
MW-18A	494803.6	2300036.6	546.52	549.32	22.25	10	537.1	527.1
MW-20A	495744.3	2300862.7	544.47	547.21	22.45	10	534.8	524.8
MW-21	495665.4	2301575.2	574.00	575.55	50.88	10	534.7	524.7
MW-22	493964.6	2300209.2	572.77	574.56	50.34	10	534.2	524.2
MW-202A	494993.0	2302214.5	576.41	579.05	53.00	10	536.1	526.1
MW-202B [a]	494980.9	2302218.6	575.99	578.78	82.60	10	506.2	496.2
MW-210A	493306.4	2301215.7	575.14	578.23	50.88	10	537.4	527.4
MW-210B [a]	493310.9	2301213.7	575.24	578.23	80.78	10	507.5	497.5
MW-213A [b]	493355.0	2302959.0	575.34	578.27	48.49	10	539.8	529.8
MW-213B [a]	493363.4	2302960.6	575.16	578.20	82.59	10	505.6	495.6
MW-221A	492175.1	2302315.8	576.96	579.81	53.37	10	536.4	526.4
MW-221B [a]	492178.2	2302314.3	576.88	579.50	83.52	10	506.0	496.0
MW-230	492769.3	2301796.8	573.88	579.25	54.47	10	534.8	524.8
MW-231	492968.5	2301795.2	574.76	580.10	54.90	10	535.2	525.2
MW-232	493168.6	2301794.4	573.13	578.23	54.34	10	533.9	523.9
MW-233 [b]	493368.1	2301794.6	574.27	577.62	52.67	10	535.0	525.0
MW-234 [b]	493568.2	2301795.1	575.90	579.03	53.40	10	535.6	525.6
PZ-203	494993.3	2302697.1	589.44	592.66	64.19	10	538.5	528.5
PZ-214	492786.8	2300939.7	576.02	579.22	53.26	10	536.0	526.0

Notes

[a] Well is screened in deep portion of the alluvial aquifer.

[b] Top of casing (TOC) at MW-213A, MW-233, and MW-234 was cut down on April 16, 2018 to accommodate dedicated pump installation, resulting in change of TOC reference elevation. MW-213A TOC elevation changed from 578.36 to 578.27; MW-233 from 577.77 to 577.62; MW-234 from 579.25 to 579.03.

Table 2.3

Monitoring Well Screen Occlusion Evaluation
Louisa Generating Station - East Monofill
Muscatine, Iowa

Well	Top of Casing Elevation (NAVD88)	Total Well Depth Below Top of Casing (feet BTOC)	Screen Length (feet)	13-Mar-2018		3-Mar-2020		13-Sep-2021		25-Sep-2023		11-Mar-2024	
				Measured Well Depth (feet)	Screen Occlusion (%)	Measured Well Depth (feet)	Screen Occlusion (%)	Measured Well Depth (feet)	Screen Occlusion (%)	Measured Well Depth (feet)	Screen Occlusion (%)	Measured Well Depth (feet)	Screen Occlusion (%)
MW-202A	579.05	53.00	10	52.98	0.2%	53.04	-0.4%	53.03	-0.3%	53.04	-0.4%	52.83	1.7%
MW-202B [a]	578.78	82.60	10	81.91	6.9%	82.74	-1.4%	82.74	-1.4%	81.92	6.8%	82.70	-1.0%
MW-210A	578.23	50.88	10	50.87	0.1%	50.89	-0.1%	50.88	0.0%	50.9	-0.2%	50.88	0.0%
MW-210B [a]	578.23	80.78	10	80.79	-0.1%	80.78	0.0%	80.75	0.3%	80.88	-1.0%	80.76	0.2%
MW-213A [b]	578.27	48.49	10	48.45	0.4%	48.48	0.1%	48.56	-0.7%	48.65	-1.6%	48.45	0.4%
MW-213B [a]	578.20	82.59	10	82.58	0.1%	82.58	0.1%	82.57	0.2%	82.59	0.0%	82.56	0.3%
MW-221A	579.81	53.37	10	NA	NA	53.33	0.4%	53.36 [c]	0.1%	53.39	-0.2%	53.43	-0.6%
MW-221B [a]	579.50	83.52	10	83.51	0.1%	83.52	0.0%	83.49	0.3%	83.52	0.0%	83.49	0.3%
MW-230	579.25	54.47	10	NA	NA	54.51	-0.4%	54.60	-1.3%	54.52	-0.5%	54.51	-0.4%
MW-231	580.10	54.90	10	NA	NA	54.90	0.0%	54.98 [c]	-0.8%	54.90	0.0%	55.02	-1.2%
MW-232	578.23	54.34	10	NA	NA	54.32	0.2%	54.39	-0.5%	54.34	0.0%	54.45	-1.1%
MW-233 [b]	577.62	52.67	10	NA	NA	52.66	0.1%	52.70	-0.3%	52.65	0.2%	52.60	0.7%
MW-234 [b]	579.03	53.40	10	NA	NA	53.46	-0.6%	53.52	-1.2%	53.62	-2.2%	53.59	-1.9%
PZ-203	592.66	64.19	10	64.04	1.5%	64.09	1.0%	64.07	1.2%	64.09	1.0%	64.09	1.0%
PZ-214	579.22	53.26	10	53.24	0.2%	53.22	0.4%	53.22	0.4%	53.34	-0.8%	53.25	0.1%

Notes:

NA - No data available.

% - Percent.

[a] Well is screened in deep portion of the alluvial aquifer.

[b] Top of casing (TOC) at MW-213A, MW-233, and MW-234 was cut down on April 16, 2018 to accommodate dedicated pump installation, resulting in change of TOC reference elevation. MW-213A TOC elevation changed from 578.36 to 578.27; MW-233 from 577.77 to 577.62; MW-234 from 579.25 to 579.03.

[c] Measured November 1, 2021.

Appendix III Parameters (Detection Monitoring)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Analyte	Analytical Method
Boron	EPA 6020A
Calcium	EPA 6020A
Chloride	EPA 9056A
Fluoride	EPA 9056A
pH	SM 4500 H+B
Sulfate	EPA 9056A
Total Dissolved Solids (TDS)	SM 2540C

Table 2.5

Appendix IV Parameters (Assessment Monitoring)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Analyte	Analytical Method
Antimony	EPA 6020A
Arsenic	EPA 6020A
Barium	EPA 6020A
Beryllium	EPA 6020A
Cadmium	EPA 6020A
Chromium	EPA 6020A
Cobalt	EPA 6020A
Fluoride	EPA 9056A
Lead	EPA 6020A
Lithium	EPA 6020A
Mercury	EPA 7470A
Molybdenum	EPA 6020A
Selenium	EPA 6020A
Thallium	EPA 6020A
Radium 226 and 228 combined	EPA 9315/9320

Table 2.6

Summary of Groundwater Monitoring Events
Louisa Generating Station - East Monofill
Muscatine, Iowa

	MW-213A (Upgradient)	MW-221A (Upgradient)	MW-230	MW-231	MW-232	MW-233	MW-234
Sampling Dates							
March 14 -16, 2018	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	-
March 27-28, 2018	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
April 10-11, 2018	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
April 25-26, 2018	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
May 8-9, 2018	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
May 23, 2018	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
June 11, 2018	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
June 27, 2018	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
July 10, 2018	-	-	-	-	-	-	Baseline
September 5-6, 2018	Detection	Detection	Detection	Detection	Detection	Detection	Detection
November 6, 2018	Verification	-	-	Verification	-	Verification	-
March 19-20, 2019	Detection	Detection	Detection	Detection	Detection	Detection	Detection
June 11, 2019	Verification	-	Verification	-	Verification	Verification	Verification
September 4-5, 2019	Detection	Detection	Detection	Detection	Detection	Detection	Detection
March 3-4, 2020	Detection	Detection	Detection	Detection	Detection	Detection	Detection
June 2-3, 2020	-	-	Verification	Verification	Verification	Verification	Verification
September 8-10, 2020	Detection	Detection	Detection	Detection	Detection	Detection	Detection
December 2, 2020	-	-	Verification	Verification	Verification	Verification	Verification
March 24, 2021	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
May 25-26, 2021	Verification	Verification	Verification	Verification	Verification	Verification	Verification
September 14-15, 2021	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
November 2, 2021	-	-	-	-	Verification	Verification	-
March 21-23, 2022	Assessment	Assessment	Assessment	Assessment	NS	Assessment	Assessment
September 26-29, 2022	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
March 6-9, 2023	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
September 25-28, 2023	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
March 11-12, 2024	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
August 26-27, 2024	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
Number of Samples							
Appendix III Analytes	21	21	21	21	20	21	21
Appendix IV Analytes	16	16	16	16	15	16	16

Notes:
1. Baseline monitoring events included analysis of both Appendix III (Detection Monitoring) and Appendix IV (Assessment Monitoring) analytes.
2. Detection monitoring events include the analysis of Appendix III (Detection Monitoring) analytes only.
3. Assessment monitoring events include analysis of Appendix III (Detection Monitoring) and Appendix IV (Assessment Monitoring) analytes.
4. Verification monitoring events include analysis of select Appendix III and Appendix IV analytes and are not included in total number of samples per well.
5. NS = Not Sampled, well contained insufficient water to allow sampling during the monitoring event.

Table 3.1

Groundwater Elevation Summary
Louisa Generating Station - East Monofill
Muscatine, Iowa

Well	Top of Casing Elevation (NAVD88)	Total Well Depth Below Top of Casing (feet BTOC)	13-Mar-2018 (NAVD88)	27-Mar-2018 (NAVD88)	11-Apr-2018 (NAVD88)	26-Apr-2018 (NAVD88)	8-May-2018 (NAVD88)	23-May-2018 (NAVD88)	11-Jun-2018 (NAVD88)	27-Jun-2018 (NAVD88)	10-Jul-2018 (NAVD88)	4-Sep-2018 (NAVD88)	6-Nov-2018 (NAVD88)	19-Mar-2019 (NAVD88)	21-May-2019 (NAVD88)	11-Jun-2019 (NAVD88)
MW-02	547.03	15.48	533.92				533.86				534.54	534.39		537.66	542.73	542.54
MW-03	580.39	58.20	534.02				534.19				535.81	534.92		537.96	543.46	544.03
MW-04	577.00	50.29	534.04				534.10				535.06	534.56		537.76	542.39	543.06
MW-17R	579.90	52.67	533.96				534.13				535.32	534.65		537.79	542.81	543.49
MW-18A	549.32	22.25	534.37									534.96		538.15	543.76	543.61
MW-20A	547.21	22.45	532.35				533.73				535.17	534.51		534.91	534.21	534.70
MW-21	575.55	50.88	533.84				534.06				535.78	534.79		537.82	543.43	543.87
MW-22	574.56	50.34	533.96				534.05				535.02	534.52		537.76	542.74	543.07
MW-202A	579.05	53.00	534.51				534.57				536.34	535.21	539.28	538.12	543.50	544.45
MW-202B [a]	578.78	82.60	533.96				534.57				536.36	535.23	539.27	538.14	543.52	544.49
MW-210A	578.23	50.88	534.28				534.48				535.80	535.02	537.98	537.95	542.75	544.00
MW-210B [a]	578.23	80.78	534.24				534.43				535.73	534.96	537.92	538.00	542.72	543.98
MW-213A [b]	578.27	48.49	535.16	534.99		535.33	535.86	536.87	536.91	537.24	537.73	536.06	539.60	538.59	543.38	544.94
MW-213B [a]	578.20	82.59	535.30				536.03				537.82	536.16	539.78	538.74	543.55	545.06
MW-221A	579.81	53.37	534.95	534.80	534.85	534.92	535.40	536.23	536.41	536.63	537.04	535.56	538.81	538.18	542.92	544.51
MW-221B [a]	579.50	83.52	534.02				535.44				537.07	535.61	538.95	538.31	543.04	544.59
MW-230	579.25	54.47	534.47	534.47	534.53	534.61	534.80	535.38	535.87	536.07	536.29	535.28	538.27	538.04	542.66	544.19
MW-231	580.10	54.90	534.65	534.64	534.71	534.76	534.96	535.52	536.03	536.23	536.47	535.48	538.48	538.21	542.89	545.39
MW-232	578.23	54.34	534.45	534.46	534.51	534.57	534.73	535.31	535.85	536.05	536.25	535.30	538.33	538.06	542.79	544.25
MW-233 [b]	577.62	52.67	534.41	534.40	534.45	534.53	534.69	535.24	535.82	536.01	536.22	535.26	538.36	538.06	542.86	544.34
MW-234 [b]	579.03	53.40	534.39	534.41	534.53	534.55	534.69	535.26	535.86	536.02	536.24	535.27	538.47	538.09	542.97	544.36
PZ-203	592.66	64.19	534.47				534.98				536.88	535.52	539.63	538.31	543.61	544.77
PZ-214	579.22	53.26	534.76				534.93				536.11	535.40	538.16	538.46	542.97	544.32

Table 3.1

Groundwater Elevation Summary
Louisa Generating Station - East Monofill
Muscatine, Iowa

Well	3-Sep-2019 (NAVD88)	3-Mar-2020 (NAVD88)	2-Jun-2020 (NAVD88)	8-Sep-2020 (NAVD88)	2-Dec-2020 (NAVD88)	22-Mar-2021 (NAVD88)	25-May-2021 (NAVD88)	13-Sep-2021 (NAVD88)	2-Nov-2021 (NAVD88)	21-Mar-2022 (NAVD88)	26-Sep-2022 (NAVD88)	6-Mar-2023 (NAVD88)	25-Sep-2023 (NAVD88)	11-Mar-2024 (NAVD88)	26-Aug-2024 (NAVD88)
MW-02	539.46	537.77	538.64	536.66		534.91		533.43	532.89	532.09	531.71	534.67	531.99	532.09	536.41
MW-03	540.41	538.20	539.60	537.34		535.09		533.75	532.98	532.22	532.13	532.18	532.38	532.20	537.97
MW-04	539.86	537.96	539.04	536.98		535.01		533.59	532.91	532.25	531.95	532.21	532.74	532.28	536.79
MW-17R	540.10	538.02	539.20	537.10		534.97		533.67	532.91	532.26	531.92	532.14	532.31	532.22	537.24
MW-18A	540.24	538.32	539.30	537.26		535.41		533.96	533.34	532.54	532.20	532.53	532.55	532.52	537.32
MW-20A	539.99	537.89	539.18	535.01		534.78		533.34	532.64	531.90	531.61	531.83	531.94	531.80	537.49
MW-21	540.27	538.08	539.58	537.20		534.87		533.53	532.77	532.11	531.93	531.96	532.18	531.98	538.06
MW-22	539.87	537.91	538.99	536.92		534.97		533.56	532.90	532.20	531.90	532.13	532.19	532.19	536.89
MW-202A	540.53	538.33	539.91	537.50	535.73	535.22	536.13	533.98	533.15	532.53	532.45	532.41	532.68	532.41	538.41
MW-202B [a]	540.54	538.33	539.94	537.50	535.78	535.14	536.13	533.97	533.13	532.53	532.45	532.42	532.69	532.43	538.42
MW-210A	540.39	538.35	539.65	536.23	535.76	535.22	536.18	533.94	533.13	532.57	532.42	532.49	532.65	532.59	537.66
MW-210B [a]	540.39	538.32	539.60	537.43	535.85	535.15	536.12	533.91	533.10	532.53	532.39	532.43	532.61	532.54	537.62
MW-213A [b]	540.36	538.53	540.41	537.72	536.34	535.96	536.67	534.57	533.79	533.44	533.42	533.65	533.35	533.41	538.65
MW-213B [a]	540.48	538.63	540.50	537.82	536.45	536.07	536.77	534.68	533.88	533.55	533.52	533.75	533.50	533.55	538.78
MW-221A	540.18	538.50	540.38	537.53	536.30	535.56	536.31	534.03	533.38	533.10	532.96	533.24	532.92	533.34	538.25
MW-221B [a]	540.26	538.56	540.46	537.60	536.36	535.62	536.39	534.09	533.44	533.14	533.01	533.37	533.00	533.40	538.30
MW-230	540.40	538.44	539.95	537.59	536.11	535.31	536.26	534.01	533.22	532.75	532.67	532.79	532.77	532.85	537.90
MW-231	540.60	538.60	540.09	537.76	536.23	535.47	536.42	534.20	533.38	532.92	532.84	532.92	532.90	533.00	538.14
MW-232	540.46	538.42	539.91	537.60	536.03	535.29	536.27	534.06	533.58			532.64	532.75	532.72	537.99
MW-233 [b]	540.47	538.41	540.46	537.59	536.00	535.27	536.26	534.06	533.22	532.70	532.62	532.63	533.39	532.64	537.94
MW-234 [b]	540.45	538.42	539.86	537.62	535.96	535.31	536.29	534.12	533.26	532.72	532.63	532.64	532.80	532.68	538.07
PZ-203	540.59	538.41	540.13	537.61	535.92	535.40	536.29	534.18	533.36	532.80	532.76	532.73	532.93	532.66	538.75
PZ-214	540.77	538.82	540.13	537.90	536.41	535.65	536.62	534.32	533.56	533.02	532.84	532.99	533.06	533.11	537.95

Notes:

[a] Well is screened in deep portion of the alluvial aquifer.

[b] Top of casing (TOC) at MW-213A, MW-233, and MW-234 was cut down on April 16, 2018 to accommodate dedicated pump installation, resulting in change of TOC reference elevation. MW-213A TOC elevation changed from 578.36 to 578.27; MW-233 from 577.77 to 577.62; MW-234 from 579.25 to 579.03.

Table 3.2

Horizontal Gradients and Average Groundwater Flow Velocities
Louisa Generating Station - East Monofill
Muscatine, Iowa

Date	Horizontal Hydraulic Gradient (unitless)	Average Linear Groundwater Flow Velocity (meters/day)	Average Linear Groundwater Flow Velocity (feet/year)
13-Mar-2018	0.0005	0.14	173
27-Mar-2018	0.0005	0.16	188
11-Apr-2018	0.0003	0.08	102
26-Apr-2018	0.0006	0.16	197
8-May-2018	0.0006	0.18	213
23-May-2018	0.0014	0.41	492
11-Jun-2018	0.0009	0.25	296
27-Jun-2018	0.0010	0.30	358
10-Jul-2018	0.0010	0.30	355
4-Sep-2018	0.0006	0.18	216
6-Nov-2018	0.0011	0.31	370
19-Mar-2019	0.0004	0.13	153
21-May-2019	0.0004	0.12	138
11-Jun-2019	0.0005	0.16	188
3-Sep-2019	0.0002	0.07	80
3-Mar-2020	0.0001	0.03	34
2-Jun-2020	0.0005	0.14	169
8-Sep-2020	0.0001	0.03	31
2-Dec-2020	0.0003	0.10	116
24-Mar-2021	0.0006	0.16	190
25-May-2021	0.0003	0.08	101
13-Sep-2021	0.0004	0.11	136
2-Nov-2021	0.0004	0.11	129
21-Mar-2022	0.0006	0.18	221
26-Sep-2022	0.0007	0.20	242
6-Mar-2023	0.0009	0.25	300
25-Sep-2023	0.0005	0.14	169
11-Mar-2024	0.0010	0.28	330
26-Aug-2024	0.0004	0.12	140

Table 4.1

Revised Baseline Period Groundwater Monitoring Data
Louisa Generating Station - East Monofill
Muscatine, Iowa

	Location:	MW-213A (Upgradient)								
		Sample Date								
Parameters	**Units**	**3/14/2018**	**4/10/2018**	**5/8/2018**	**6/11/2018**	**9/6/2018**	**3/19/2019**	**6/11/2019**	**9/4/2019**	**3/4/2020**
Appendix III										
Boron	mg/L	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	--	0.200 U	0.200 U
Calcium	mg/L	38.9	35.4	38.1	44.2	42	49.5	58.4	42.3	--
Chloride	mg/L	5.22	5.00 U	3.4 J	5.58	5.51	6.95	--	5.00 U	5.00 U
Fluoride	mg/L	0.588	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	--	0.500 U	0.500 U
pH, lab	s.u.	7.7	7.8	8	8	8	7.9	--	7.9	7.9
Sulfate	mg/L	7.56	8.02	7.74	10.3	10.3	7.05	--	6.99	5.00 U
Total dissolved solids (TDS)	mg/L	152	164	162	166	232	212	292	186	--

		Sample Date								
		3/14/2018	**3/28/2018**	**4/10/2018**	**4/26/2018**	**5/8/2018**	**5/23/2018**	**6/11/2018**	**6/27/2018**	**9/4/2019**
Appendix IV										
Antimony	mg/L	0.001 U	--	0.001 U	0.001 U	0.001 U	0.000446 J	0.001 U	0.001 U	0.00100 U
Arsenic	mg/L	0.002 U	--	0.002 U	0.002 U	0.002 U	0.002 U	0.000574 J	0.002 U	0.00200 U
Barium	mg/L	0.0306	--	0.0238	0.0289	0.0299	0.0262	0.0312	0.0304	0.0325
Beryllium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	--
Cadmium	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--
Chromium	mg/L	0.005 U	--	0.005 U	0.005 U	0.005 U	0.0042 J	0.000815 J	0.005 U	0.00500 U
Cobalt	mg/L	0.000232 J	--	0.0005 U	0.00021 J	0.000084 J	0.000134 J	0.000067 J	0.000063 J	0.000500 U
Lead	mg/L	0.0005 U	--	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.000500 U
Lithium	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--
Mercury	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	--
Molybdenum	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	--
Radium-226 & 228	pCi/L	0.524	--	0.245 U	0.291 U	0.565	0.424	0.405	0.38 U	0.0604 U
Selenium	mg/L	0.005 U	--	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.00500 U
Thallium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	--

Table 4.1

Revised Baseline Period Groundwater Monitoring Data
Louisa Generating Station - East Monofill
Muscatine, Iowa

	Location:	MW-221A (Upgradient)								
		Sample Date								
Parameters	**Units**	**3/15/2018**	**4/11/2018**	**5/9/2018**	**6/11/2018**	**9/6/2018**	**3/19/2019**	**6/11/2019**	**9/4/2019**	**3/4/2020**
Appendix III										
Boron	mg/L	0.200U/0.200U	0.200 U	0.200 U	0.200U/0.200U	0.200 U	0.200 U	--	0.200 U	0.200 U
Calcium	mg/L	45.2/42.9	39.7	42.6	43.9/41.7	36.3	50.8	53.3	34.4	--
Chloride	mg/L	4.21/3.24	5.00 U	4.89 J	3.77 J/3.93	5.00 U	5.21	--	5.00 U	5.00 U
Fluoride	mg/L	0.500U/0.500U	0.500 U	0.500 U	0.500U/0.500U	0.500 U	0.500 U	--	0.500 U	0.500 U
pH, lab	s.u.	7.7/7.7	8	8	8.1/8	8	8	--	7.9	7.9
Sulfate	mg/L	11.7/10.9	12	11	9.18/9.37	8.41	10.6	--	12.7	8.93
Total dissolved solids (TDS)	mg/L	168/174	180	166	164/212	156	182	--	172	174

		Sample Date								
		3/14/2018	**3/27/2018**	**4/11/2018**	**4/26/2018**	**5/9/2018**	**5/23/2018**	**6/11/2018**	**6/27/2018**	**9/4/2019**
Appendix IV										
Antimony	mg/L	0.001U/0.00100U	--	0.001 U	0.001 U	0.001 U	0.001 U	0.001U/0.001U	0.001U/0.001U	0.00100 U
Arsenic	mg/L	0.002U/0.00200U	--	0.002 U	0.002 U	0.002 U	0.002 U	0.002U/0.002U	0.002U/0.002U	0.00200 U
Barium	mg/L	0.032/0.0301	--	0.0277	0.031	0.0325	0.031	0.0312/0.0297	0.0298/0.0298	0.0202
Beryllium	mg/L	0.001U/0.00100U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001U/0.001U	0.001U/0.001U	--
Cadmium	mg/L	0.0005U/0.0005U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005U/0.0005U	0.0005U/0.0005U	--
Chromium	mg/L	0.005U/0.005U	--	0.005 U	0.000793 J	0.005 U	0.000774 J	0.000905J/0.000790J	0.005U/0.005U	0.0423
Cobalt	mg/L	0.0005U/0.0005U	--	0.000168 J	0.000155 J	0.000062 J	0.000067 J	0.0005U/0.0005U	0.0005U/0.0005U	0.000500 U
Lead	mg/L	0.0005U/0.0005U	--	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005U/0.0005U	0.0005U/0.0005U	0.000862
Lithium	mg/L	0.01U/0.01U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01U/0.01U	0.01U/0.01U	--
Mercury	mg/L	0.0002U/0.0002U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002U/0.0002U	0.0002U/0.0002U	--
Molybdenum	mg/L	0.002U/0.002U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002U/0.002U	0.002U/0.002U	--
Radium-226 & 228	pCi/L	0.0832U	--	0.509	0.139 U	0.144 U	0.301 U	0.158U/0.0652U	0.595/0.703	-0.0360 U
Selenium	mg/L	0.005U/0.005U	--	0.005 U	0.005 U	0.005 U	0.005 U	0.005U/0.005U	0.005U/0.005U	0.0238 U
Thallium	mg/L	0.001U/0.001U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001U/0.001U	0.001U/0.001U	--

Table 4.1

Revised Baseline Period Groundwater Monitoring Data
Louisa Generating Station - East Monofill
Muscatine, Iowa

Location: MW-230

Parameters	Units	Sample Date 3/15/2018	4/11/2018	5/9/2018	6/11/2018	9/6/2018	3/20/2019	6/11/2019	9/4/2019	3/4/2020
Appendix III										
Boron	mg/L	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U / 0.200 U	--	0.200 U	0.200 U
Calcium	mg/L	24.4	22.3	22.4	25.8	21.8	31.6 / 31.2	22.3	37.3	--
Chloride	mg/L	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U / 5.00 U	--	5.00 U	5.00 U
Fluoride	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
pH, lab	s.u.	8.3	8.3	7.6	8.3	8.3	8.1 / 8.1	--	8	8.2
Sulfate	mg/L	5.28	7.01	4.93 J	4.6 J	5.00 U	20.0 / 20.3	5.74	31.4	--
Total dissolved solids (TDS)	mg/L	102	108	104	112	74	132 / 128	142	198	--

		Sample Date 3/15/2018	3/28/2018	4/11/2018	4/26/2018	5/9/2018	5/23/2018	6/11/2018	6/27/2018	9/4/2019
Appendix IV										
Antimony	mg/L	0.001 U	--	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00100 U
Arsenic	mg/L	0.002 U	--	0.002 U	0.002 U	0.002 U	0.000651 J	0.0006 J	0.000688 J	0.00200 U
Barium	mg/L	0.0145	--	0.0124	0.0126	0.0135	0.0145	0.015	0.0148	0.0220
Beryllium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	--
Cadmium	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--
Chromium	mg/L	0.000758 J	--	0.005 U	0.00101 J	0.005 U	0.000847 J	0.00104 J	0.000833 J	0.00500 U
Cobalt	mg/L	0.000101 J	--	0.000103 J	0.000097 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.000500 U
Lead	mg/L	0.0005 U	--	0.0005 U	0.000273 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.000579
Lithium	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--
Mercury	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	--
Molybdenum	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	--
Radium-226 & 228	pCi/L	0.344	--	0.0563 U	0.177 U	0.343 U	0.218 U	0.182 U	0.218 U	0.151 U
Selenium	mg/L	0.005 U	--	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.00500 U
Thallium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	--

Table 4.1

Revised Baseline Period Groundwater Monitoring Data
Louisa Generating Station - East Monofill
Muscatine, Iowa

Location: MW-231

Parameters	Units	Sample Date 3/15/2018	4/11/2018	5/9/2018	6/11/2018	9/6/2018	11/6/2018	3/20/2019	9/4/2019	3/4/2020
Appendix III										
Boron	mg/L	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	--	0.200 U	0.200U/0.200 U	0.200U/0.200 U
Calcium	mg/L	22	20.4	23.5	26.4	21.1	--	29.6	37.6 / 40.6	47.1 / 46.8
Chloride	mg/L	2.83 J	5.00 U	5.00 U	5.00 U	5.00 U	--	5.00 U	5.00U/5.00 U	5.00U/5.00 U
Fluoride	mg/L	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	--	0.500 U	0.500U/0.500 U	0.500U/0.500 U
pH, lab	s.u.	8.3	8.2	8.3	8.2	8.3	--	8.1	8.1 / 8.1	8.0 / 8.1
Sulfate	mg/L	5.00 U	5.3	4.15 J	4.17 J	34.6	9	5.00 U	44.9 / 45.2	--
Total dissolved solids (TDS)	mg/L	128	66	92	168	82	--	114	212 / 202	190 / 194

		Sample Date 3/15/2018	3/28/2018	4/11/2018	4/25/2018	5/9/2018	5/23/2018	6/11/2018	6/27/2018	9/4/2019
Appendix IV										
Antimony	mg/L	0.001 U	--	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00100U/0.00100U
Arsenic	mg/L	0.002 U	--	0.000661 J	0.000763 J	0.000801 J	0.000793 J	0.000737 J	0.00066 J	0.00200U/0.00200U
Barium	mg/L	0.0143	--	0.0124	0.0148	0.0178	0.0167	0.0182	0.0168	0.0246/0.0283
Beryllium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	--
Cadmium	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--
Chromium	mg/L	0.000774 J	--	0.005 U	0.000835 J	0.00086 J	0.000844 J	0.000877 J	0.000934 J	0.00500U/0.00500U
Cobalt	mg/L	0.000105 J	--	0.0005 U	0.000283 J	0.000166 J	0.000152 J	0.000084 J	0.000066 J	0.000500U/0.000500U
Lead	mg/L	0.0005 U	--	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.000500U/0.000500U
Lithium	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--
Mercury	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	--
Molybdenum	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	--
Radium-226 & 228	pCi/L	0.163 U	--	0.385	0.204 U	0.391	0.18 U	-0.0138 U	0.237 U	0.113U/0.170U
Selenium	mg/L	0.005 U	--	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.00500U/0.00500U
Thallium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	--

Table 4.1

Revised Baseline Period Groundwater Monitoring Data
Louisa Generating Station - East Monofill
Muscatine, Iowa

Location: MW-232

Parameters	Units	Sample Date 3/15/2018	4/11/2018	5/8/2018	6/11/2018	9/6/2018	3/19/2019	6/11/2019	9/4/2019	3/4/2020
Appendix III										
Boron	mg/L	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	--	0.200 U	0.200 U
Calcium	mg/L	19.5	19.4	17.5	21	18.7	24.8	27.1	24.9	--
Chloride	mg/L	5.71	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	--	5.00 U	5.00 U
Fluoride	mg/L	1.26	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	--	0.500 U	0.500 U
pH, lab	s.u.	8.3	8.2	8.4	8.3	8.3	8.2	8.2	8.2	--
Sulfate	mg/L	5.8	5.48	4.1 J	3.99 J	5.00 U	5.00 U	--	5.00 U	5.00 U
Total dissolved solids (TDS)	mg/L	70	72	112	76	62	138	--	132	140

		Sample Date 3/15/2018	3/28/2018	4/11/2018	4/25/2018	5/8/2018	5/23/2018	6/11/2018	6/27/2018	9/4/2019
Appendix IV										
Antimony	mg/L	0.001 U	--	0.001 U	0.001U/0.001U	0.001 U	0.001 U	0.001 U	0.001 U	0.00100 U
Arsenic	mg/L	0.002 U	--	0.000908 J	0.00094J/0.000988J	0.00112 J	0.00106 J	0.000894 J	0.00103 J	0.00200 U
Barium	mg/L	0.012	--	0.0121	0.0128/0.0119	0.0139	0.0125	0.0137	0.0135	0.0184
Beryllium	mg/L	0.001 U	0.001 U	0.001 U	0.001U/0.001U	0.001 U	0.001 U	0.001 U	0.001 U	--
Cadmium	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005U/0.0005U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--
Chromium	mg/L	0.000783 J	--	0.005 U	0.000829J/0.000786J	0.005 U	0.005 U	0.000891 J	0.00107 J	0.00500 U
Cobalt	mg/L	0.00008 J	--	0.0005 U	0.0005U/0.0005U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.000500 U
Lead	mg/L	0.0005 U	--	0.0005 U	0.0005U/0.0005U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.000500 U
Lithium	mg/L	0.01 U	0.01 U	0.01 U	0.01U/0.01U	0.01 U	0.01 U	0.01 U	0.01 U	--
Mercury	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002U/0.0002U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	--
Molybdenum	mg/L	0.002 U	0.002 U	0.002 U	0.002U/0.002U	0.002 U	0.002 U	0.002 U	0.002 U	--
Radium-226 & 228	pCi/L	0.0143 U	--	0.281 U	0.167U/0.120U	0.152 U	0.252 U	-0.0431 U	0.00512 U	0.151 U
Selenium	mg/L	0.005 U	--	0.005 U	0.005U/0.005U	0.005 U	0.005 U	0.005 U	0.005 U	0.00500 U
Thallium	mg/L	0.001 U	0.001 U	0.001 U	0.001U/0.001U	0.001 U	0.001 U	0.001 U	0.001 U	--

Table 4.1

Revised Baseline Period Groundwater Monitoring Data
Louisa Generating Station - East Monofill
Muscatine, Iowa

Location: MW-233

Parameters	Units	Sample Date 3/16/2018	4/10/2018	5/8/2018	6/11/2018	9/5/2018	3/19/2019	6/11/2019	9/4/2019	3/4/2020
Appendix III										
Boron	mg/L	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	--	0.200 U	0.200 U
Calcium	mg/L	24.6	25.1	25.3	26.1	28.6	31.6	28.1	31.8	--
Chloride	mg/L	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	--	5.00 U	5.00 U
Fluoride	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
pH, lab	s.u.	8.1	8.1	8.3	8.2	8.2	8.2	8.1	8	--
Sulfate	mg/L	4.43 J	5.26	4.3 J	4.46 J	5.00 U	5.00 U	--	5.00 U	5.15
Total dissolved solids (TDS)	mg/L	116	100	112	112	116	150	--	190	166

		Sample Date 3/16/2018	3/27/2018	4/10/2018	4/25/2018	5/8/2018	5/23/2018	6/11/2018	6/27/2018	9/4/2019
Appendix IV										
Antimony	mg/L	0.001 U	--	0.001U/0.001U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00100 U
Arsenic	mg/L	0.002 U	--	0.000725J/0.000693J	0.00072 J	0.000817 J	0.000848 J	0.000803 J	0.000875 J	0.00200 U
Barium	mg/L	0.0161	--	0.0142/0.0134	0.0153	0.0174	0.0164	0.0183	0.0178	0.0190
Beryllium	mg/L	0.001 U	0.001 U	0.001U/0.001U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	--
Cadmium	mg/L	0.0005 U	0.0005 U	0.0005U/0.0005U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--
Chromium	mg/L	0.000871 J	--	0.005U/0.005U	0.000806 J	0.000833 J	0.000777 J	0.000937 J	0.005 U	0.00500 U
Cobalt	mg/L	0.000119 J	--	0.0005U/0.0005U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.000500 U
Lead	mg/L	0.0005 U	--	0.0005U/0.0005U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.000500 U
Lithium	mg/L	0.01 U	0.01 U	0.01U/0.01U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--
Mercury	mg/L	0.0002 U	0.0002 U	0.0002U/0.0002U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	--
Molybdenum	mg/L	0.002 U	0.002 U	0.002U/0.002U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	--
Radium-226 & 228	pCi/L	0.163 U	--	0.365/1.08	0.288 U	0.122 U	0.152 U	-0.0805 U	0.191 U	0.176 U
Selenium	mg/L	0.005 U	--	0.005U/0.005U	0.005 U	0.00103 J	0.005 U	0.005 U	0.005 U	0.00500 U
Thallium	mg/L	0.001 U	0.001 U	0.001U/0.001U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	--

Table 4.1

Revised Baseline Period Groundwater Monitoring Data
Louisa Generating Station - East Monofill
Muscatine, Iowa

Location: MW-234

Parameters	Units	Sample Date 3/27/2018	4/10/2018	5/8/2018	6/11/2018	7/10/2018	9/5/2018	3/19/2019	6/11/2019	9/4/2019
Appendix III										
Boron	mg/L	0.200U/0.200U	0.200 U	0.200U/0.200U	0.200 U	0.2 U / 0.2 U	0.200U/0.200U	0.200 U	--	0.200 U
Calcium	mg/L	18.7 / 18.2	18.7	20 /19.6	20	20 / 19.6	21.7 / 20.8	20.3	--	14.4
Chloride	mg/L	5.00U/5.00U	5.00 U	5.00U/5.00U	5.00 U	85.8 J / 1.6 U	9.60 / 5.00 U	5.00 U	--	5.00 U
Fluoride	mg/L	0.500U/0.500U	0.500 U	0.500U/0.500U	0.491 J	0.836 / 0.462 U	2.28 / 0.500 U	0.500 U	--	0.500 U
pH, lab	s.u.	--	8.2	8.4	8.2	8.2 J / 8.3 J	8.4 / 8.4	8.3	8.4	8.5
Sulfate	mg/L	4.6J / 3.82J	11.8	4.96 J / 6.51 J	4.78 J	16.2 J / 3.57 J	5.00 U / 5.00 U	5.00 U	--	11.5
Total dissolved solids (TDS)	mg/L	106 / 96	66	66 / 54	94	80 / 96.0	82 / 68	106	--	100

		Sample Date 3/27/2018	4/10/2018	4/25/2018	5/8/2018	5/23/2018	6/11/2018	6/27/2018	7/10/2018	9/4/2019
Appendix IV										
Antimony	mg/L	--	0.001 U	0.001 U	0.001U/0.001U	0.001U/0.001U	0.001 U	0.001 U	0.001U/0.001U	0.00100 U
Arsenic	mg/L	--	0.002 U	0.002 U	0.002U/0.000589J	0.002U/0.002U	0.000667 J	0.002 U	0.002U/0.002U	0.00200 U
Barium	mg/L	--	0.00942	0.0116	0.0129/0.0126	0.0125/0.0128	0.0129	0.0126	0.0107/0.0107	0.0104
Beryllium	mg/L	0.001U/0.001U	0.001 U	0.001 U	0.001U/0.001U	0.001U/0.001U	0.001 U	0.001 U	0.001U/0.001U	--
Cadmium	mg/L	0.0005U/0.0005U	0.0005 U	0.0005 U	0.0005U/0.0005U	0.0005U/0.0005U	0.0005 U	0.0005 U	0.0005U/0.0005U	--
Chromium	mg/L	--	0.005 U	0.000782 J	0.005U/0.000826J	0.005U/0.005U	0.000859 J	0.005 U	0.005U/0.005U	0.00500 U
Cobalt	mg/L	--	0.000061 J	0.000152 J	0.0005U/0.0005U	0.0005U/0.0005U	0.0005 U	0.0005 U	0.0005U/0.0005U	0.000500 U
Lead	mg/L	--	0.0005 U	0.0005 U	0.0005U/0.0005U	0.0005U/0.0005U	0.0005 U	0.0005 U	0.0005U/0.0005U	0.000500 U
Lithium	mg/L	0.01U/0.01U	0.01 U	0.01 U	0.01U/0.01U	0.01U/0.01U	0.01 U	0.01 U	0.01U/0.01U	--
Mercury	mg/L	0.0002U/0.0002U	0.0002 U	0.0002 U	0.0002U/0.0002U	0.0002U/0.0002U	0.0002 U	0.0002 U	0.0002U/0.0002U	--
Molybdenum	mg/L	0.002U/0.002U	0.002 U	0.002 U	0.002U/0.002U	0.002U/0.002U	0.002 U	0.002 U	0.002U/0.002U	--
Radium-226 & 228	pCi/L	0.127 U	0.0121 U	-0.0492 U	0.291U/0.395U	0.395U/0.0430U	0.428	0.585	0.214J/0.759	0.515
Selenium	mg/L	--	0.005 U	0.005 U	0.00135J/0.00143J	0.005U/0.000967J	0.001 J	0.005 U	0.005U/0.005U	0.00500 U
Thallium	mg/L	0.001U/0.001U	0.001 U	0.001 U	0.001U/0.001U	0.001U/0.001U	0.001 U	0.001 U	0.001U/0.001U	--

Notes:
U - Not detected above reporting limit listed
J - Estimated value
UJ - Not detected; associated reporting limit is estimated.

Table 4.2

2024 Monitoring Data
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:			MW-213A	MW-213A	MW-221A	MW-221A	MW-230	MW-230	MW-231
Sample ID:			MW-213A_24_03	MW-213A_24_08	MW-221A_24_03	MW-221A_24_08	MW-230_24_03	MW-230_24_08	MW-231_24_03
Sample Date:			3/11/2024 (Upgradient)	8/26/2024 (Upgradient)	3/11/2024 (Upgradient)	8/27/2024 (Upgradient)	3/12/2024	8/27/2024	3/12/2024
Parameters	**Units**	**Site-Specific GWPS**							
Appendix III									
Boron	mg/L	None	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Calcium	mg/L	None	45.0	50.7	45.4	39.8	68.5	67.2	81.1
Chloride	mg/L	None	6.18	14.0	10.4	7.07	5.00 U	5.00 U	5.00 U
Fluoride	mg/L	4	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
pH, lab	s.u.	None	8.0 J	7.8 J	8.0 J	7.9 J	8.0 J	7.7 J	7.9 J
Sulfate	mg/L	None	7.24	18.5	24.6	9.62	21.9	27.4	8.63
Total dissolved solids (TDS)	mg/L	None	136	206	188	150	264	250	286
Appendix IV									
Antimony	mg/L	0.006	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	0.01	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	2	0.0346	0.0343	0.0336	0.0270	0.0529	0.0437	0.0736
Beryllium	mg/L	0.004	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.005	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Chromium	mg/L	0.1	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Cobalt	mg/L	0.006	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.015	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.04	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U
Mercury	mg/L	0.002	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.1	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	5	-0.106 U	0.437	0.212 U	0.0437	-0.0200 U	0.391	0.223 U
Selenium	mg/L	0.05	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.002	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Field									
Conductivity, field	mS/cm		0.32	0.36	0.34	0.3	0.49	0.48	0.56
Dissolved oxygen (DO), field	mg/L		7.01	5.59	8.79	8.48	9.06	9.42	7.16
Oxidation reduction potential (ORP), field	millivolts		131.2	134.9	123.3	119.3	127.3	135.8	116.9
pH, field	s.u.		7.62	7.54	7.65	7.53	7.46	7.29	7.41
Temperature, sample	Deg C		14.37	14.49	14.53	14.95	15.35	17.02	14.34
Turbidity, field	NTU		0	0.4	0	0.32	1.27	6.58	3.3

Table 4.2

2024 Monitoring Data
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-231	MW-231	MW-231	MW-232	MW-232	MW-233	MW-233	MW-234	MW-234
Sample ID:		FD-1_24_03	MW-231_24_08	FD-1_24_08	MW-232_24_03	MW-232_24_08	MW-233_24_03	MW-233_24_08	MW-234_24_03	MW-234_24_08
Sample Date:		3/12/2024 (Duplicate)	8/27/2024	8/27/2024 (Duplicate)	3/12/2024	8/27/2024	3/12/2024	8/27/2024	3/11/2024	8/27/2024
Parameters	**Units**									
Appendix III										
Boron	mg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.104	0.100 U	0.100 U
Calcium	mg/L	79.7	77.4	77.1	69.1	81.5	56.8	84.1	43.0	35.3
Chloride	mg/L	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.26	8.04	5.00 U	6.24
Fluoride	mg/L	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
pH, lab	s.u.	7.9 J	7.6 J	7.6 J	7.9 J	7.5 J	8.0 J	7.7 J	8.0 J	8.2 J
Sulfate	mg/L	8.72	14.5	16.3	28.4	20.0	86.4	64.8	27.9	32.4
Total dissolved solids (TDS)	mg/L	296	264	274	278	314	284	370	192	156
Appendix IV										
Antimony	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	0.00200 U	0.00200 U	0.00208	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	0.0711	0.0935	0.111	0.0566	0.0655	0.0477	0.0692	0.0304	0.0231
Beryllium	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
Cadmium	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
Chromium	mg/L	0.00500 U	0.00500 U	0.00862	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Cobalt	mg/L	0.000500 U	0.00168 J	0.00869 J	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.000500 U	0.00138 J	0.00399 J	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000700	0.000500 U
Lithium	mg/L	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U
Mercury	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
Molybdenum	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	0.346 U	0.389	0.612	0.0312 U	0.538	0.170 U	-0.329	0.127 U	0.249
Selenium	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
Thallium	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
Field										
Conductivity, field	mS/cm	--	0.51	--	0.49	0.59	0.46	0.66	0.34	0.28
Dissolved oxygen (DO), field	mg/L	--	6.82	--	9.55	7.72	10.51	8.25	10.44	10.25
Oxidation reduction potential (ORP), field	millivolts	--	130.2	--	134.4	128.6	126.6	148.4	118.7	165.5
pH, field	s.u.	--	7.27	--	7.7	7.36	7.86	7.45	7.87	7.89
Temperature, sample	Deg C	--	19.07	--	13.49	17.36	13.04	16.51	14.61	16.31
Turbidity, field	NTU	--	4.14	--	0	0.24	1.68	4.13	0.76	5.28

Table 4.3

Revised Baseline Monitoring Statistical Trend Tests Results for Constituents in Groundwater
Louisa Generating Station - East Monofill
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Well	Constituent	N	Baseline Period Statistics				Mann-Kendall Trend Test			Sen's Slope
			Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Statistic	Probability	Conclusion	
Inter-well Trends (based on pooled upgradient wells MW-213A and MW-221A)										
	Appendix III									
	Boron (total)	16	2018-03 - 2020-03	100%	0.200 U	0.200 U	--	--	100% ND	--
	Calcium (total)	16	2018-03 - 2019-09	0%	34.4	58.4	1.31	0.095	No trend identified	--
	Chloride	16	2018-03 - 2020-03	44%	3.24 J	6.95	--	--	No test performed[1]	--
	Fluoride (total)	16	2018-03 - 2020-03	94%	0.500 U	0.588	--	--	>50% ND	--
	pH, lab	16	2018-03 - 2020-03	0%	7.7	8.1	0	0.500	No trend identified	--
	Sulfate	16	2018-03 - 2020-03	6%	5.00 U	12.7	-1.75	0.960	No trend identified	--
	Total Dissolved Solids	16	2018-03 - 2019-09	0%	152	292	1.66	0.048	**Increasing trend**	--
	Appendix IV									
	Antimony	16	2018-03 - 2019-09	94%	0.000446 J	0.001 U	--	--	>50% ND	--
	Arsenic	16	2018-03 - 2019-09	94%	0.000574 J	0.002 U	--	--	>50% ND	--
	Barium	16	2018-03 - 2019-09	0%	0.0202	0.0325	-1.00	0.570	No trend identified	--
	Beryllium	16	2018-03 - 2018-06	100%	0.001 U	0.001 U	--	--	100% ND	--
	Cadmium	16	2018-03 - 2018-06	100%	0.0005 U	0.0005 U	--	--	100% ND	--
	Chromium	16	2018-03 - 2019-09	63%	0.000774 J	0.0423	--	--	>50% ND	--
	Cobalt	16	2018-03 - 2019-09	38%	0.000062 J	0.0005 U	-17.00	0.998	No trend identified	--
	Lead	16	2018-03 - 2019-09	94%	0.0005 U	0.000862	--	--	>50% ND	--
	Lithium	16	2018-03 - 2018-06	100%	0.01 U	0.01 U	--	--	100% ND	--
	Mercury	16	2018-03 - 2018-06	100%	0.0002 U	0.0002 U	--	--	100% ND	--
	Molybdenum	16	2018-03 - 2018-06	100%	0.002 U	0.002 U	--	--	100% ND	--
	Radium-226 & 228	16	2018-03 - 2019-09	63%	-0.0360 U	0.703	--	--	>50% ND	--
	Selenium	16	2018-03 - 2019-09	100%	0.005 U	0.0238 U	--	--	100% ND	--
	Thallium	16	2018-03 - 2018-06	100%	0.001 U	0.001 U	--	--	100% ND	--

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Louisa Generating Station - East Monofill
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Well	Constituent	N	Baseline Period Statistics				Mann-Kendall Trend Test			Sen's Slope
			Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Statistic	Probability	Conclusion	
Intra-well Trends										
MW-213A	***Appendix III***									
	Boron (total)	8	2018-03 - 2020-03	100%	0.200 U	0.200 U	--	--	100% ND	--
	Calcium (total)	8	2018-03 - 2019-09	0%	35.4	58.4	16	0.062	No trend identified	--
	Chloride	8	2018-03 - 2020-03	38%	3.4 J	6.95	0	1	No trend identified	--
	Fluoride (total)	8	2018-03 - 2020-03	88%	0.500 U	0.588	--	--	>50% ND	--
	pH, lab	8	2018-03 - 2020-03	0%	7.7	8	4	0.72	No trend identified	--
	Sulfate	8	2018-03 - 2020-03	13%	5.00 U	10.3	-11	0.227	No trend identified	--
	Total Dissolved Solids	8	2018-03 - 2019-09	0%	152	292	18	0.032	**Increasing Trend**	0.16
	Appendix IV									
	Antimony	8	2018-03 - 2019-09	88%	0.000446 J	< 0.001	--	--	>50% ND	--
	Arsenic	8	2018-03 - 2019-09	88%	0.000574 J	< 0.002	--	--	>50% ND	--
	Barium	8	2018-03 - 2019-09	0%	0.0238	0.0325	12	0.178	No trend identified	--
	Beryllium	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	--	--	100% ND	--
	Cadmium	8	2018-03 - 2018-06	100%	< 0.0005	< 0.0005	--	--	100% ND	--
	Chromium	8	2018-03 - 2019-09	75%	0.000815 J	< 0.005	--	--	>50% ND	--
	Cobalt	8	2018-03 - 2019-09	25%	0.000063 J	< 0.0005	-15	0.085	No trend identified	--
	Lead	8	2018-03 - 2019-09	100%	0.0005 U	0.0005 U	--	--	100% ND	--
	Lithium	8	2018-03 - 2018-06	100%	0.01 U	0.01 U	--	--	100% ND	--
	Mercury	8	2018-03 - 2018-06	100%	< 0.0002	< 0.0002	--	--	100% ND	--
	Molybdenum	8	2018-03 - 2018-06	100%	< 0.002	< 0.002	--	--	100% ND	--
	Radium-226 & 228	8	2018-03 - 2019-09	50%	0.0604 U	0.565	-8	0.398	No trend identified	--
	Selenium	8	2018-03 - 2019-09	100%	< 0.005	< 0.005	--	--	100% ND	--
	Thallium	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	--	--	100% ND	--

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Louisa Generating Station - East Monofill
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Well	Constituent	N	Baseline Period Statistics				Mann-Kendall Trend Test			Sen's Slope
			Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Statistic	Probability	Conclusion	
MW-221A	***Appendix III***									
	Boron (total)	8	2018-03 - 2020-03	100%	0.200 U	0.200 U	--	--	100% ND	--
	Calcium (total)	8	2018-03 - 2019-09	0%	34.4	53.3	0	1	No trend identified	--
	Chloride	8	2018-03 - 2020-03	50%	3.73	5.21	-4	0.72	No trend identified	--
	Fluoride (total)	8	2018-03 - 2020-03	100%	0.500 U	0.500 U	--	--	100% ND	--
	pH, lab	8	2018-03 - 2020-03	0%	7.7	8.05	-3	0.812	No trend identified	--
	Sulfate	8	2018-03 - 2020-03	0%	8.41	12.7	-8	0.398	No trend identified	--
	Total Dissolved Solids	8	2018-03 - 2020-03	0%	156	188	2	0.904	No trend identified	--
	Appendix IV									
	Antimony	8	2018-03 - 2019-09	100%	< 0.001	< 0.001	--	--	100% ND	--
	Arsenic	8	2018-03 - 2019-09	100%	< 0.002	< 0.002	--	--	100% ND	--
	Barium	8	2018-03 - 2018-06	0%	0.0277	0.0325	-1	1.000	No trend identified	--
	Beryllium	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	--	--	100% ND	--
	Cadmium	8	2018-03 - 2018-06	100%	< 0.0005	< 0.0005	--	--	100% ND	--
	Chromium	8	2018-03 - 2019-09	50%	0.000774 J	0.0423	12	0.178	No trend identified	--
	Cobalt	8	2018-03 - 2019-09	50%	0.000062 J	< 0.0005	-12	0.178	No trend identified	--
	Lead	8	2018-03 - 2019-09	88%	0.0005U / 0.0005U	0.000862	--	--	>50% ND	--
	Lithium	8	2018-03 - 2018-06	100%	0.01U / 0.01U	0.01U / 0.01U	--	--	100% ND	--
	Mercury	8	2018-03 - 2018-06	100%	< 0.0002	< 0.0002	--	--	100% ND	--
	Molybdenum	8	2018-03 - 2018-06	100%	< 0.002	< 0.002	--	--	100% ND	--
	Radium-226 & 228	8	2018-03 - 2019-09	75%	-0.0360 U	0.595	--	--	>50% ND	--
	Selenium	8	2018-03 - 2019-09	100%	< 0.005	0.0238 U	--	--	100% ND	--
	Thallium	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	--	--	100% ND	--

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Well	Constituent	N	Baseline Period Statistics				Mann-Kendall Trend Test			Sen's Slope
			Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Statistic	Probability	Conclusion	
MW-230	***Appendix III***									
	Boron (total)	8	2018-03 - 2020-03	100%	0.200 U	0.200 U	--	--	100% ND	--
	Calcium (total)	8	2018-03 - 2019-09	0%	21.8	37.3	7	0.473	No trend identified	--
	Chloride	8	2018-03 - 2020-03	100%	< 5	< 5	--	--	100% ND	--
	Fluoride (total)	8	2018-03 - 2020-03	100%	0.500 U	0.500 U	--	--	100% ND	--
	pH, lab	8	2018-03 - 2020-03	0%	7.6	8.3	-8	0.398	No trend identified	--
	Sulfate	8	2018-03 - 2019-09	13%	4.6 J	31.4	7	0.382	No trend identified	--
	Total Dissolved Solids	8	2018-03 - 2019-09	0%	74	198	18	0.032	**Increasing Trend**	0.09
	Appendix IV									
	Antimony	8	2018-03 - 2019-09	100%	< 0.001	< 0.001	--	--	100% ND	--
	Arsenic	8	2018-03 - 2019-09	63%	0.0006 J	< 0.002	--	--	>50% ND	--
	Barium	8	2018-03 - 2019-09	0%	0.0124	0.0220	19	0.023	**Increasing Trend**	1.8E-05
	Beryllium	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	--	--	100% ND	--
	Cadmium	8	2018-03 - 2018-06	100%	< 0.0005	< 0.0005	--	--	100% ND	--
	Chromium	8	2018-03 - 2019-09	38%	0.000758 J	< 0.005	1	1.000	No trend identified	--
	Cobalt	8	2018-03 - 2019-09	63%	0.000097 J	< 0.0005	--	--	>50% ND	--
	Lead	8	2018-03 - 2019-09	75%	0.000273 J	0.000579	--	--	>50% ND	--
	Lithium	8	2018-03 - 2018-06	100%	0.01 U	0.01 U	--	--	100% ND	--
	Mercury	8	2018-03 - 2018-06	100%	< 0.0002	< 0.0002	--	--	100% ND	--
	Molybdenum	8	2018-03 - 2018-06	100%	< 0.002	< 0.002	--	--	100% ND	--
	Radium-226 & 228	8	2018-03 - 2019-09	88%	0.0563 U	0.344	--	--	>50% ND	--
	Selenium	8	2018-03 - 2019-09	100%	< 0.005	< 0.005	--	--	100% ND	--
	Thallium	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	--	--	100% ND	--

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Louisa Generating Station - East Monofill
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Well	Constituent	N	Baseline Period Statistics				Mann-Kendall Trend Test			Sen's Slope
			Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Statistic	Probability	Conclusion	
MW-231	***Appendix III***									
	Boron (total)	8	2018-03 - 2020-03	100%	0.200 U	0.200 U	--	--	100% ND	--
	Calcium (total)	8	2018-03 - 2020-03	0%	20.4	47.0	20	0.014	**Increasing Trend**	0.03
	Chloride	8	2018-03 - 2020-03	88%	2.83 J	5.00 U	--	--	>50% ND	--
	Fluoride (total)	8	2018-03 - 2020-03	100%	0.500 U	0.500 U	--	--	100% ND	--
	pH, lab	8	2018-03 - 2020-03	0%	8.05	8.3	-17	0.047	**Decreasing Trend**	-0.0003
	Sulfate	8	2018-03 - 2019-09	25%	1.61	3.56	9	0.136	No trend identified	--
	Total Dissolved Solids	8	2018-03 - 2020-03	0%	66	207	12	0.178	No trend identified	--
	Appendix IV									
	Antimony	8	2018-03 - 2019-09	100%	< 0.001	< 0.001	--	--	100% ND	--
	Arsenic	8	2018-03 - 2019-09	25%	0.00066 J	< 0.002	-3	0.812	No trend identified	--
	Barium	8	2018-03 - 2019-09	0%	0.0124	0.0246/0.0283	20	0.014	**Increasing Trend**	2.5E-05
	Beryllium	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	--	--	100% ND	--
	Cadmium	8	2018-03 - 2018-06	100%	< 0.0005	< 0.0005	--	--	100% ND	--
	Chromium	8	2018-03 - 2019-09	25%	0.000774 J	< 0.005	11	0.227	No trend identified	--
	Cobalt	8	2018-03 - 2019-09	25%	0.000066 J	< 0.0005	-11	0.227	No trend identified	--
	Lead	8	2018-03 - 2019-09	100%	0.0005 U	0.0005 U	--	--	100% ND	--
	Lithium	8	2018-03 - 2018-06	100%	0.01 U	0.01 U	--	--	100% ND	--
	Mercury	8	2018-03 - 2018-06	100%	< 0.0002	< 0.0002	--	--	100% ND	--
	Molybdenum	8	2018-03 - 2018-06	100%	< 0.002	< 0.002	--	--	100% ND	--
	Radium-226 & 228	8	2018-03 - 2019-09	75%	-0.0138 U	0.391	--	--	>50% ND	--
	Selenium	8	2018-03 - 2019-09	100%	< 0.005	< 0.005	--	--	100% ND	--
	Thallium	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	--	--	100% ND	--

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Well	Constituent	N	Baseline Period Statistics				Mann-Kendall Trend Test			Sen's Slope
			Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Statistic	Probability	Conclusion	
MW-232	***Appendix III***									
	Boron (total)	8	2018-03 - 2020-03	100%	0.200 U	0.200 U	--	--	100% ND	--
	Calcium (total)	8	2018-03 - 2019-09	0%	17.5	27.1	14	0.108	No trend identified	--
	Chloride	8	2018-03 - 2020-03	88%	5.00 U	5.71	--	--	>50% ND	--
	Fluoride (total)	8	2018-03 - 2020-03	88%	0.500 U	1.26	--	--	>50% ND	--
	pH, lab	8	2018-03 - 2019-09	0%	8.2	8.4	-11	0.227	No trend identified	--
	Sulfate	8	2018-03 - 2020-03	50%	3.99 J	5.8	-22	0.006	**Decreasing Trend**	-0.0003
	Total Dissolved Solids	8	2018-03 - 2020-03	0%	62	140	16	0.062	No trend identified	--
	Appendix IV									
	Antimony	8	2018-03 - 2019-09	100%	< 0.001	< 0.001	--	--	100% ND	--
	Arsenic	8	2018-03 - 2019-09	25%	0.000894 J	< 0.002	1	1.000	No trend identified	--
	Barium	8	2018-03 - 2019-09	0%	0.012	0.0184	18	0.032	**Increasing Trend**	1.2E-05
	Beryllium	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	--	--	100% ND	--
	Cadmium	8	2018-03 - 2018-06	100%	< 0.0005	< 0.0005	--	--	100% ND	--
	Chromium	8	2018-03 - 2019-09	50%	0.000783 J	< 0.005	4	0.720	No trend identified	--
	Cobalt	8	2018-03 - 2019-09	88%	0.00008 J	< 0.0005	--	--	>50% ND	--
	Lead	8	2018-03 - 2019-09	100%	0.0005 U	0.0005 U	--	--	100% ND	--
	Lithium	8	2018-03 - 2018-06	100%	0.01 U	0.01 U	--	--	100% ND	--
	Mercury	8	2018-03 - 2018-06	100%	< 0.0002	< 0.0002	--	--	100% ND	--
	Molybdenum	8	2018-03 - 2018-06	100%	< 0.002	< 0.002	--	--	100% ND	--
	Radium-226 & 228	8	2018-03 - 2019-09	100%	-0.0431 U	0.281 U	--	--	100% ND	--
	Selenium	8	2018-03 - 2019-09	100%	< 0.005	< 0.005	--	--	100% ND	--
	Thallium	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	--	--	100% ND	--

Table 4.3

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Well	Constituent	N	Baseline Period Statistics				Mann-Kendall Trend Test			Sen's Slope
			Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Statistic	Probability	Conclusion	
MW-233	***Appendix III***									
	Boron (total)	8	2018-03 - 2020-03	100%	0.200 U	0.200 U	--	--	100% ND	--
	Calcium (total)	8	2018-03 - 2019-09	0%	24.6	31.8	24	0.002	**Increasing Trend**	0.01
	Chloride	8	2018-03 - 2020-03	100%	5.00 U	5.00 U	--	--	100% ND	--
	Fluoride (total)	8	2018-03 - 2020-03	100%	0.500 U	0.500 U	--	--	100% ND	--
	pH, lab	8	2018-03 - 2019-09	0%	8	8.3	-6	0.548	No trend identified	--
	Sulfate	8	2018-03 - 2020-03	38%	4.30 J	5.19	-7	0.473	No trend identified	--
	Total Dissolved Solids	8	2018-03 - 2020-03	0%	112	190	14	0.108	No trend identified	--
	Appendix IV									
	Antimony	8	2018-03 - 2019-09	100%	< 0.001	< 0.001	--	--	100% ND	--
	Arsenic	8	2018-03 - 2019-09	25%	0.00072 J	< 0.002	9	0.337	No trend identified	--
	Barium	8	2018-03 - 2019-09	0%	0.0142	0.0190	20	0.014	**Increasing Trend**	1.9E-05
	Beryllium	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	--	--	100% ND	--
	Cadmium	8	2018-03 - 2018-06	100%	< 0.0005	< 0.0005	--	--	100% ND	--
	Chromium	8	2018-03 - 2019-09	38%	0.000777 J	< 0.005	-7	0.473	No trend identified	--
	Cobalt	8	2018-03 - 2019-09	88%	0.000119 J	< 0.0005	--	--	>50% ND	--
	Lead	8	2018-03 - 2019-09	100%	0.0005 U	0.0005 U	--	--	100% ND	--
	Lithium	8	2018-03 - 2018-06	100%	0.01 U	0.01 U	--	--	100% ND	--
	Mercury	8	2018-03 - 2018-06	100%	< 0.0002	< 0.0002	--	--	100% ND	--
	Molybdenum	8	2018-03 - 2018-06	100%	< 0.002	< 0.002	--	--	100% ND	--
	Radium-226 & 228	8	2018-03 - 2019-09	88%	-0.0805 U	0.365	--	--	>50% ND	--
	Selenium	8	2018-03 - 2019-09	88%	0.00103 J	< 0.005	--	--	>50% ND	--
	Thallium	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	--	--	100% ND	--

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Well	Constituent	N	Baseline Period Statistics				Mann-Kendall Trend Test			Sen's Slope
			Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Statistic	Probability	Conclusion	
MW-234	***Appendix III***									
	Boron (total)	8	2018-03 - 2020-03	100%	0.200 U	0.200 U	--	--	100% ND	--
	Calcium (total)	8	2018-03 - 2020-03	0%	14.4	27.7	14	0.108	No trend identified	--
	Chloride	8	2018-03 - 2020-03	88%	5.00 U	9.60	--	--	>50% ND	--
	Fluoride (total)	8	2018-03 - 2020-03	75%	0.491 J	2.28	--	--	>50% ND	--
	pH, lab	8	2018-03 - 2019-09	0%	8.1	8.5	20	0.0142	**Increasing Trend**	0.0006
	Sulfate	8	2018-03 - 2020-03	25%	4.21	11.8	3	0.72	No trend identified	--
	Total Dissolved Solids	8	2018-03 - 2020-03	0%	60	128	12	0.178	No trend identified	--
	Appendix IV									
	Antimony	8	2018-03 - 2019-09	100%	0.001 U	0.001 U	--	--	100% ND	--
	Arsenic	8	2018-03 - 2019-09	75%	0.000667 J	0.002 U	--	--	>50% ND	--
	Barium	8	2018-03 - 2019-09	0%	0.00942	0.0129	-2	0.904	No trend identified	--
	Beryllium	8	2018-03 - 2018-07	100%	0.001U/0.001U	0.001U/0.001U	--	--	100% ND	--
	Cadmium	8	2018-03 - 2018-07	100%	0.0005U/0.0005U	0.0005U/0.0005U	--	--	100% ND	--
	Chromium	8	2018-03 - 2019-09	63%	0.000782 J	0.005 U	--	--	>50% ND	--
	Cobalt	8	2018-03 - 2019-09	75%	0.000061 J	0.0005U/0.0005U	--	--	>50% ND	--
	Lead	8	2018-03 - 2019-09	100%	0.0005 U	0.0005 U	--	--	100% ND	--
	Lithium	8	2018-03 - 2018-07	100%	0.01U/0.01U	0.01U/0.01U	--	--	100% ND	--
	Mercury	8	2018-03 - 2018-07	100%	0.0002U/0.0002U	0.0002U/0.0002U	--	--	100% ND	--
	Molybdenum	8	2018-03 - 2018-07	100%	0.002U/0.002U	0.002U/0.002U	--	--	100% ND	--
	Radium-226 & 228	8	2018-03 - 2019-09	50%	-0.0492 U	0.585	18	0.032	**Increasing Trend**	0.005
	Selenium	8	2018-03 - 2019-09	63%	0.001 J	0.005 U	--	--	>50% ND	--
	Thallium	8	2018-03 - 2018-07	100%	0.001U/0.001U	0.001U/0.001U	--	--	100% ND	--

Notes:
N = Number of samples
% ND = Percentage of non-detect results
[1] Due to a large proportion of low-concentration estimated value (causing ambiguous comparisons to non-detects), no appropriate trend test could be performed.

Table 4.4

Revised Baseline Monitoring Inter-well and Intra-well Predictions Limits for Constituents in Groundwater
Louisa Generating Station - East Monofill
Muscatine, Iowa

Well	Constituent	Baseline Period Statistics						
		N	Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Background method	Value (mg/L)
Inter-well Comparison Values (based on pooled upgradient wells MW-213A and MW-221A)								
MW-213A and MW-221A								
	Appendix III							
	Boron (total)	16	2018-03 - 2020-03	100%	0.200 U	0.200 U	DQR	< 0.200
	Calcium (total)	16	2018-03 - 2019-09	0%	34.4	58.4	Normal UPL	64.6
	Chloride	16	2018-03 - 2020-03	44%	3.4 J	6.95	Normal UPL	7.65
	Fluoride (total)	16	2018-03 - 2020-03	94%	0.500 U	0.588	Non-parametric UPL	0.588
	pH, lab	16	2018-03 - 2020-03	0%	7.7	8.1 / 8.0	Normal UPL	8.05
	- lower limit							7.70
	Sulfate	16	2018-03 - 2020-03	6%	5.00 U	12.7	KM Normal UPL	15.3
	Total Dissolved Solids (TDS)	16	2018-03 - 2019-09	0%	152	292	**<< Increasing trend in baseline -- UPL not calculated >>**	**152 - 292**
	Appendix IV							
	Antimony (total)	16	2018-03 - 2020-03	93.8%	0.000446 J	0.001 U	DQR	< 0.001
	Arsenic (total)	16	2018-03 - 2020-03	93.8%	0.000574 J	0.002 U	DQR	< 0.002
	Barium (total)	16	2018-03 - 2020-03	0.0%	0.0202	0.0325	Normal UPL	0.0396
	Beryllium (total)	16	2018-03 - 2019-09	100.0%	0.001 U	0.001 U	DQR	< 0.001
	Cadmium (total)	16	2018-03 - 2019-09	100.0%	0.0005 U	0.0005 U	DQR	< 0.0005
	Chromium (total)	16	2018-03 - 2020-03	62.5%	0.000774 J	0.0423	Non-parametric UPL	0.0423
	Cobalt (total)	16	2018-03 - 2020-03	37.5%	0.000062 J	0.0005 U	DQR	< 0.0005
	Lead (total)	16	2018-03 - 2020-03	93.8%	0.0005 U	0.000862	Non-parametric UPL	0.000862
	Lithium (total)	16	2018-03 - 2019-09	100.0%	0.01 U	0.01 U	DQR	< 0.01
	Mercury (total)	16	2018-03 - 2019-09	100.0%	0.0002 U	0.0002 U	DQR	< 0.0002
	Molybdenum (total)	16	2018-03 - 2019-09	100.0%	0.0002 U	0.002U/0.002U	DQR	< 0.002
	Radium 226+228	16	2018-03 - 2020-03	62.5%	-0.0360 U	0.59/0.703	Normal UPL	1.03
	Selenium (total)	16	2018-03 - 2020-03	100.0%	0.005 U	0.0238 U	DQR	< 0.0238
	Thallium (total)	16	2018-03 - 2019-09	100.0%	0.001 U	0.001 U	DQR	< 0.001

Revised Baseline Monitoring Inter-well and Intra-well Predictions Limits for Constituents in Groundwater
Louisa Generating Station - East Monofill
Muscatine, Iowa

Well	Constituent	Baseline Period Statistics N	Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Background method	Value (mg/L)
Intra-well Comparison Values								
MW-213A (Upgradient)	***Appendix III***							
	Boron (total)	8	2018-03 - 2020-03	100%	0.200 U	0.200 U	DQR	< 0.200
	Calcium (total)	8	2018-03 - 2019-09	0%	35.4	58.4	Normal UPL	63.9
	Chloride	8	2018-03 - 2020-03	38%	3.4 J	6.95	Normal UPL	8.44
	Fluoride (total)	8	2018-03 - 2020-03	88%	0.500 U	0.588	Non-parametric UPL	0.588
	pH, lab	8	2018-03 - 2020-03	0%	7.7	8	Normal UPL	8.22
	- lower limit							7.58
	Sulfate	8	2018-03 - 2020-03	13%	5.00 U	10.3	Normal UPL	12.7
	Total Dissolved Solids (TDS)	8	2018-03 - 2019-09	0%	152	292	**<< Increasing trend in baseline -- UPL not calculated >>**	**152 - 292**
MW-213A (Upgradient)	***Appendix IV***							
	Antimony (total)	8	2018-03 - 2019-09	88%	0.000446 J	< 0.001	DQR	< 0.001
	Arsenic (total)	8	2018-03 - 2019-09	88%	0.000574 J	< 0.002	DQR	< 0.002
	Barium (total)	8	2018-03 - 2019-09	0%	0.0238	0.0325	Normal UPL	0.0376
	Beryllium (total)	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	DQR	< 0.001
	Cadmium (total)	8	2018-03 - 2018-06	100%	< 0.0005	< 0.0005	DQR	< 0.0005
	Chromium (total)	8	2018-03 - 2019-09	75%	0.000815 J	< 0.005	DQR	< 0.005
	Cobalt (total)	8	2018-03 - 2019-09	25%	0.000063 J	< 0.0005	DQR	< 0.0005
	Lead (total)	8	2018-03 - 2019-09	100%	0.0005 U	0.0005 U	DQR	< 0.0005
	Lithium (total)	8	2018-03 - 2018-06	100%	0.01 U	0.01 U	DQR	< 0.01
	Mercury (total)	8	2018-03 - 2018-06	100%	< 0.0002	< 0.0002	DQR	< 0.0002
	Molybdenum (total)	8	2018-03 - 2018-06	100%	< 0.002	< 0.002	DQR	< 0.002
	Radium 226+228	8	2018-03 - 2019-09	50%	0.0604 U	0.565	KM Normal UPL	0.905
	Selenium (total)	8	2018-03 - 2019-09	100%	< 0.005	< 0.005	DQR	< 0.005
	Thallium (total)	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	DQR	< 0.001

Revised Baseline Monitoring Inter-well and Intra-well Predictions Limits for Constituents in Groundwater
Louisa Generating Station - East Monofill
Muscatine, Iowa

Well	Constituent	Baseline Period Statistics						
		N	Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Background method	Value (mg/L)
MW-221A (Upgradient)	***Appendix III***							
	Boron (total)	8	2018-03 - 2020-03	100%	0.200 U	0.200 U	DQR	< 0.2
	Calcium (total)	8	2018-03 - 2019-09	0%	34.4	53.3	Normal UPL	61.0
	Chloride	8	2018-03 - 2020-03	50%	4.21 J/3.24 J	5.21	Non-parametric UPL	5.21
	Fluoride (total)	8	2018-03 - 2020-03	100%	0.500 U	0.500 U	DQR	< 0.5
	pH, lab	8	2018-03 - 2020-03	0%	7.7 / 7.7	8.1 / 8.0	Normal UPL	8.27
	- lower limit							7.61
	Sulfate	8	2018-03 - 2020-03	0%	8.41	12.7	Normal UPL	14.8
	Total Dissolved Solids (TDS)	8	2018-03 - 2020-03	0%	156	164 J / 212	Normal UPL	201
MW-221A (Upgradient)	***Appendix IV***							
	Antimony (total)	8	2018-03 - 2019-09	100%	< 0.001	< 0.001	DQR	< 0.001
	Arsenic (total)	8	2018-03 - 2019-09	100%	< 0.002	< 0.002	DQR	< 0.002
	Barium (total)	8	2018-03 - 2018-06	0%	0.0277	0.0325	Normal UPL	0.0351
	Beryllium (total)	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	DQR	< 0.001
	Cadmium (total)	8	2018-03 - 2018-06	100%	< 0.0005	< 0.0005	DQR	< 0.0005
	Chromium (total)	8	2018-03 - 2019-09	50%	0.000774 J	0.0423	KM Log UPL	0.0638
	Cobalt (total)	8	2018-03 - 2019-09	50%	0.000062 J	< 0.0005	DQR	< 0.0005
	Lead (total)	8	2018-03 - 2019-09	88%	0.0005U/0.0005U	0.000862	Non-parametric UPL	0.000862
	Lithium (total)	8	2018-03 - 2018-06	100%	0.01U/0.01U	0.01 U/0.01 U	DQR	< 0.01
	Mercury (total)	8	2018-03 - 2018-06	100%	< 0.0002	< 0.0002	DQR	< 0.0002
	Molybdenum (total)	8	2018-03 - 2018-06	100%	< 0.002	< 0.002	DQR	< 0.002
	Radium 226+228	8	2018-03 - 2019-09	75%	-0.0360 U	0.595	Non-parametric UPL	0.595
	Selenium (total)	8	2018-03 - 2019-09	100%	< 0.005	0.0238 U	DQR	< 0.0238
	Thallium (total)	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	DQR	< 0.001

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Muscatine, Iowa

Well	Constituent	Baseline Period Statistics N	Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Background method	Value (mg/L)
MW-230	***Appendix III***							
	Boron (total)	8	2018-03 - 2020-03	100%	< 0.2	< 0.2	DQR	< 0.2
	Calcium (total)	8	2018-03 - 2019-09	0%	21.8	37.3	Normal UPL	41.4
	Chloride	8	2018-03 - 2020-03	100%	< 5	< 5	DQR	< 5
	Fluoride (total)	8	2018-03 - 2020-03	100%	< 0.5	< 0.5	DQR	< 0.5
	pH, lab	8	2018-03 - 2020-03	0%	7.6	8.3	Normal UPL	8.86
	- lower limit							7.41
	Sulfate	8	2018-03 - 2019-09	13%	4.6 J	31.4	Non-parametric UPL	31.4
	Total Dissolved Solids (TDS)	8	2018-03 - 2019-09	0%	74	198	**<< Increasing trend in baseline -- UPL not calculated >>**	**74 - 198**
MW-230	***Appendix IV***							
	Antimony (total)	8	2018-03 - 2019-09	100%	< 0.001	< 0.001	DQR	< 0.001
	Arsenic (total)	8	2018-03 - 2019-09	63%	0.0006 J	< 0.002	DQR	< 0.002
	Barium (total)	8	2018-03 - 2019-09	0%	0.0124	0.0220	Non-parametric UPL	0.0220
	Beryllium (total)	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	DQR	< 0.001
	Cadmium (total)	8	2018-03 - 2018-06	100%	< 0.0005	< 0.0005	DQR	< 0.0005
	Chromium (total)	8	2018-03 - 2019-09	38%	0.000758 J	< 0.005	DQR	< 0.005
	Cobalt (total)	8	2018-03 - 2019-09	63%	0.000097 J	< 0.0005	DQR	< 0.0005
	Lead (total)	8	2018-03 - 2019-09	75%	0.000273 J	0.000579	Non-parametric UPL	0.000579
	Lithium (total)	8	2018-03 - 2018-06	100%	0.01 U	0.01 U	DQR	< 0.01
	Mercury (total)	8	2018-03 - 2018-06	100%	< 0.0002	< 0.0002	DQR	< 0.0002
	Molybdenum (total)	8	2018-03 - 2018-06	100%	< 0.002	< 0.002	DQR	< 0.002
	Radium 226+228	8	2018-03 - 2019-09	88%	0.0563 U	0.344	Non-parametric UPL	0.344
	Selenium (total)	8	2018-03 - 2019-09	100%	< 0.005	< 0.005	DQR	< 0.005
	Thallium (total)	8	2018-03 - 2018-06	100%	< 0.001	< 0.001	DQR	< 0.001

Revised Baseline Monitoring Inter-well and Intra-well Predictions Limits for Constituents in Groundwater
Louisa Generating Station - East Monofill
Muscatine, Iowa

Well	Constituent	Baseline Period Statistics						
		N	Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Background method	Value (mg/L)
MW-231	***Appendix III***							
	Boron (total)	8	2018-03 - 2020-03	100%	< 0.2	< 0.2	DQR	< 0.2
	Calcium (total)	8	2018-03 - 2020-03	0%	20.4	47.1 / 46.8	**<< Increasing trend in baseline -- UPL not calculated >>**	**20.4 - 46.95**
	Chloride	8	2018-03 - 2020-03	88%	2.83 J	< 5	DQR	< 5
	Fluoride (total)	8	2018-03 - 2020-03	100%	< 0.5	< 0.5	DQR	< 0.5
	pH, lab	8	2018-03 - 2020-03	0.0%	8 / 8.1	8.3	**<< Decreasing trend in baseline -- UPL not calculated >>**	**8.05 - 8.3**
	Sulfate	8	2018-03 - 2019-09	25%	4.15 J	44.9 / 45.2	KM Gamma UPL	78.8
	Total Dissolved Solids (TDS)	8	2018-03 - 2020-03	0%	66	212 / 202	Normal UPL	276
MW-231	***Appendix IV***							
	Antimony (total)	8	2018-03 - 2019-09	100.0%	< 0.001	< 0.001	DQR	< 0.001
	Arsenic (total)	8	2018-03 - 2019-09	25.0%	0.00066 J	< 0.002	DQR	< 0.002
	Barium (total)	8	2018-03 - 2019-09	0.0%	0.0124	0.0246/0.0283	Normal UPL	0.0297
	Beryllium (total)	8	2018-03 - 2018-06	100.0%	< 0.001	< 0.001	DQR	< 0.001
	Cadmium (total)	8	2018-03 - 2018-06	100.0%	< 0.0005	< 0.0005	DQR	< 0.0005
	Chromium (total)	8	2018-03 - 2019-09	25.0%	0.000774 J	< 0.005	DQR	< 0.005
	Cobalt (total)	8	2018-03 - 2019-09	25.0%	0.000066 J	< 0.0005	DQR	< 0.0005
	Lead (total)	8	2018-03 - 2019-09	100.0%	0.0005 U	0.0005 U	DQR	< 0.0005
	Lithium (total)	8	2018-03 - 2018-06	100.0%	0.01 U	0.01 U	DQR	< 0.01
	Mercury (total)	8	2018-03 - 2018-06	100.0%	< 0.0002	< 0.0002	DQR	< 0.0002
	Molybdenum (total)	8	2018-03 - 2018-06	100.0%	< 0.002	< 0.002	DQR	< 0.002
	Radium 226+228	8	2018-03 - 2019-09	75.0%	-0.0138 U	0.391	Non-parametric UPL	0.391
	Selenium (total)	8	2018-03 - 2019-09	100.0%	< 0.005	< 0.005	DQR	< 0.005
	Thallium (total)	8	2018-03 - 2018-06	100.0%	< 0.001	< 0.001	DQR	< 0.001

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Louisa Generating Station - East Monofill
Muscatine, Iowa

Well	Constituent	Baseline Period Statistics N	Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Background method	Value (mg/L)
MW-232	***Appendix III***							
	Boron (total)	8	2018-03 - 2020-03	100%	< 0.2	< 0.2	DQR	< 0.2
	Calcium (total)	8	2018-03 - 2019-09	0%	17.5	27.1	Normal UPL	31.3
	Chloride	8	2018-03 - 2020-03	88%	< 5	5.71	Non-parametric UPL	5.71
	Fluoride (total)	8	2018-03 - 2020-03	88%	< 0.5	1.26	Non-parametric UPL	1.26
	pH, lab	8	2018-03 - 2019-09	0%	8.2	8.4	Normal UPL	8.48
	- lower limit							8.04
	Sulfate	8	2018-03 - 2020-03	50%	3.99 J	5.8	**<< Decreasing trend in baseline -- UPL not calculated >>**	**3.99 J - 5.8**
	Total Dissolved Solids (TDS)	8	2018-03 - 2020-03	0%	62.0	140	Normal UPL	193
MW-232	***Appendix IV***							
	Antimony (total)	8	2018-03 - 2019-09	100.0%	< 0.001	< 0.001	DQR	< 0.001
	Arsenic (total)	8	2018-03 - 2019-09	25.0%	0.000894 J	< 0.002	DQR	< 0.002
	Barium (total)	8	2018-03 - 2019-09	0.0%	0.012	0.0184	Non-parametric UPL	0.0184
	Beryllium (total)	8	2018-03 - 2018-06	100.0%	< 0.001	< 0.001	DQR	< 0.001
	Cadmium (total)	8	2018-03 - 2018-06	100.0%	< 0.0005	< 0.0005	DQR	< 0.0005
	Chromium (total)	8	2018-03 - 2019-09	50.0%	0.000783 J	< 0.005	DQR	< 0.005
	Cobalt (total)	8	2018-03 - 2019-09	87.5%	0.00008 J	< 0.0005	DQR	< 0.0005
	Lead (total)	8	2018-03 - 2019-09	100.0%	0.0005 U	0.0005 U	DQR	< 0.0005
	Lithium (total)	8	2018-03 - 2018-06	100.0%	0.01 U	0.01 U	DQR	< 0.01
	Mercury (total)	8	2018-03 - 2018-06	100.0%	< 0.0002	< 0.0002	DQR	< 0.0002
	Molybdenum (total)	8	2018-03 - 2018-06	100.0%	< 0.002	< 0.002	DQR	< 0.002
	Radium 226+228	8	2018-03 - 2019-09	100.0%	-0.0431 U	0.281 U	DQR	< 0.281
	Selenium (total)	8	2018-03 - 2019-09	100.0%	< 0.005	< 0.005	DQR	< 0.005
	Thallium (total)	8	2018-03 - 2018-06	100.0%	< 0.001	< 0.001	DQR	< 0.001

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Louisa Generating Station - East Monofill
Muscatine, Iowa

Well	Constituent	Baseline Period Statistics						
		N	Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Background method	Value (mg/L)
MW-233	***Appendix III***							
	Boron (total)	8	2018-03 - 2020-03	100%	< 0.2	< 0.2	DQR	< 0.2
	Calcium (total)	8	2018-03 - 2019-09	0%	24.6	31.8	**<< Increasing trend in baseline -- UPL not calculated >>**	**24.6 - 31.8**
	Chloride	8	2018-03 - 2020-03	100%	< 5	< 5	DQR	< 5
	Fluoride (total)	8	2018-03 - 2020-03	100%	< 0.5	< 0.5	DQR	< 0.5
	pH, lab	8	2018-03 - 2019-09	0%	8	8.3	Normal UPL	8.42
	- lower limit							7.88
	Sulfate	8	2018-03 - 2020-03	38%	4.30 J	5.26 / 5.12	KM Normal UPL	5.6
	Total Dissolved Solids (TDS)	8	2018-03 - 2020-03	0%	112	190	Normal UPL	217
MW-233	***Appendix IV***							
	Antimony (total)	8	2018-03 - 2019-09	100.0%	< 0.001	< 0.001	DQR	< 0.001
	Arsenic (total)	8	2018-03 - 2019-09	25.0%	0.00072 J	< 0.002	DQR	< 0.002
	Barium (total)	8	2018-03 - 2019-09	0.0%	0.0142	0.0190	Normal UPL	0.0216
	Beryllium (total)	8	2018-03 - 2018-06	100.0%	< 0.001	< 0.001	DQR	< 0.001
	Cadmium (total)	8	2018-03 - 2018-06	100.0%	< 0.0005	< 0.0005	DQR	< 0.0005
	Chromium (total)	8	2018-03 - 2019-09	37.5%	0.000777 J	< 0.005	DQR	< 0.005
	Cobalt (total)	8	2018-03 - 2019-09	87.5%	0.000119 J	< 0.0005	DQR	< 0.0005
	Lead (total)	8	2018-03 - 2019-09	100.0%	0.0005 U	0.0005 U	DQR	0.0005 U
	Lithium (total)	8	2018-03 - 2018-06	100.0%	0.01 U	0.01 U	DQR	0.01 U
	Mercury (total)	8	2018-03 - 2018-06	100.0%	< 0.0002	< 0.0002	DQR	< 0.0002
	Molybdenum (total)	8	2018-03 - 2018-06	100.0%	< 0.002	< 0.002	DQR	< 0.002
	Radium 226+228	8	2018-03 - 2019-09	87.5%	-0.0805 U	0.365	Non-parametric UPL	0.365
	Selenium (total)	8	2018-03 - 2019-09	87.5%	0.00103 J	< 0.005	DQR	< 0.005
	Thallium (total)	8	2018-03 - 2018-06	100.0%	< 0.001	< 0.001	DQR	< 0.001

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Louisa Generating Station - East Monofill
Muscatine, Iowa

Well	Constituent	Baseline Period Statistics						
		N	Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Background method	Value (mg/L)
MW-234	***Appendix III***							
	Boron (total)	8	2018-03 - 2020-03	100%	0.2U / 0.2U	0.2U / 0.2U	DQR	< 0.200
	Calcium (total)	8	2018-03 - 2020-03	0%	14.4	27.7	Normal UPL	30.3
	Chloride	8	2018-03 - 2020-03	88%	5U / 5U	9.60 / 5.00 U	Non-parametric UPL	9.60
	Fluoride (total)	8	2018-03 - 2020-03	75%	0.491 J	2.28 / 0.500 U	Non-parametric UPL	2.28
	pH, lab	8	2018-03 - 2019-09	0%	8.1 / 8.1	8.5	**<< Increasing trend in baseline -- UPL not calculated >>**	**8.1 - 8.5**
	Sulfate	8	2018-03 - 2020-03	25%	4.6J / 3.82J	11.8	KM Normal UPL	16.5
	Total Dissolved Solids (TDS)	8	2018-03 - 2020-03	0%	66 / 54	128	Normal UPL	154
MW-234	***Appendix IV***							
	Antimony (total)	8	2018-03 - 2019-09	100.0%	0.001 U	0.001 U	DQR	< 0.001
	Arsenic (total)	8	2018-03 - 2019-09	75.0%	0.000667 J	0.002 U	DQR	< 0.002
	Barium (total)	8	2018-03 - 2019-09	0.0%	0.00942	0.0129	Normal UPL	0.0155
	Beryllium (total)	8	2018-03 - 2018-07	100.0%	0.001U/0.001U	0.001U/0.001U	DQR	< 0.001
	Cadmium (total)	8	2018-03 - 2018-07	100.0%	0.0005U/0.0005U	0.0005U/0.0005U	DQR	< 0.0005
	Chromium (total)	8	2018-03 - 2019-09	62.5%	0.000782 J	0.005 U	DQR	< 0.005
	Cobalt (total)	8	2018-03 - 2019-09	75.0%	0.000061 J	0.0005U/0.0005U	DQR	< 0.0005
	Lead (total)	8	2018-03 - 2019-09	100.0%	0.0005 U	0.0005 U	DQR	< 0.0005
	Lithium (total)	8	2018-03 - 2018-07	100.0%	0.01U/0.01U	0.01U/0.01U	DQR	< 0.01
	Mercury (total)	8	2018-03 - 2018-07	100.0%	0.0002U/0.0002U	0.0002U/0.0002U	DQR	< 0.0002
	Molybdenum (total)	8	2018-03 - 2018-07	100.0%	0.002U/0.002U	0.002U/0.002U	DQR	< 0.002
	Radium 226+228	8	2018-03 - 2019-09	37.5%	-0.0492 U	0.585	Normal UPL	0.585
	Selenium (total)	8	2018-03 - 2019-09	62.5%	0.001 J	0.005 U	DQR	< 0.005
	Thallium (total)	8	2018-03 - 2018-07	100.0%	0.001U/0.001U	0.001U/0.001U	DQR	< 0.001

Revised Baseline Monitoring Inter-well and Intra-well Predictions Limits for Constituents in Groundwater
Louisa Generating Station - East Monofill
Muscatine, Iowa

Well	Constituent	Baseline Period Statistics						
		N	Date Range	% ND	Minimum (mg/L)	Maximum (mg/L)	Background method	Value (mg/L)

Notes:
N = Number of samples
% ND = Percentage of non-detect results
CAS = Chemical Abstracts Service
EPA = United States Environmental Protection Agency
SM = Standard Method
DQR = Double Quantification Rule. Constituents that are "never detected" above the analytical reporting limit (i.e., not including J-qualified data below the reporting limit) in background (inter-well) or baseline (intra-well) are evaluated through observing if two subsequent detections above the reporting limit occur (which would indicate astatistically significant increase).
UPL = An Upper Prediction Limit (UPL) based on a "1-of-2" retesting approach and site-wide false positive rate (SWFPR) of 0.10 (see Chapter 19 of USEPA, 2009)
Normal UPL = UPL for a normal distribution (for data sets with no non-detect results)
KM Normal UPL = UPL for a normal distribution using the Kapal-Meier method for non-detects (for data sets with between 15 to 50 percent non-detects)
Gamma UPL = UPL for a gamma distribution (for data sets with no non-detect results), utilitizing the Wilson-Hilferty (cube root) transformation
Non-parametric UPL = Rank-based UPL for non-normal data sets or data sets containing more than 50 percent non-detects
Non-Parametric UTLs with 16 upgradient background samples have a coverage of only 0.78 (i.e., 78th percentile) at 95 percent confidence.

Table 4.5

Comparison of 2024 Monitoring Results to Intra-well and Inter-well Prediction Limits for Constituents in Groundwater
Louisa Generating Station - East Monofill
Muscatine, Iowa

		Appendix III							Appendix IV													
		Boron	Calcium	Chloride	Fluoride	pH, lab	Sulfate	Total Dissolved Solids (TDS)	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Lead	Lithium	Mercury	Molybdenum	Radium-226 & 228	Selenium	Thallium
		mg/L	mg/L	mg/L	mg/L	s.u.	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pCi/L	mg/L	mg/L
	MCL/GWPS	None	None	None	4.0 MCL	None	None	None	0.006 MCL	0.01 MCL	2.0 MCL	0.004 MCL	0.005 MCL	0.1 MCL	0.006 GWPS	0.015 GWPS	0.040 GWPS	0.002 MCL	0.100 GWPS	5 MCL	0.05 MCL	0.002 MCL
Comparison Basis		*inter-well*	*inter-well*	*intra-well*	*inter-well*	*intra-well*	*intra-well*	*intra-well*	*inter-well*	*inter-well*	*inter-well*	*inter-well*	*inter-well*	*inter-well*	*inter-well*	*inter-well*	*inter-well*	*inter-well*	*inter-well*	*inter-well*	*inter-well*	*inter-well*
Well ***Sample Date***	***Monitoring Event***																					
MW-213A (Upgradient)																						
Comparison value		*< 0.200*	*64.6*	*8.44*	*0.588*	*7.58 - 8.22*	*12.7*	*152 - 292 †*	*< 0.001*	*< 0.002*	*0.0396*	*< 0.001*	*< 0.0005*	*0.0423*	*< 0.0005*	*0.000862*	*0.01 U*	*< 0.0002*	*< 0.002*	*1.026*	*< 0.0238*	*< 0.001*
Comparison value method		*DQR*	*UPL*	*UPL*	*UPL (NP)*	*LPL - UPL*	*UPL*	*Baseline range*	*DQR*	*DQR*	*UPL*	*DQR*	*DQR*	*UPL (NP)*	*DQR*	*UPL (NP)*	*DQR*	*DQR*	*DQR*	*UPL*	*DQR*	*DQR*
3/11/2024	Assessment	0.100 U	45	6.18	*1.00 U*	8.0 J	7.24	136	*0.002 U*	0.002 U	0.0346	0.001 U	0.0002 U	0.005 U	0.0005 U	0.0005 U	0.010 U	0.0002 U	0.002 U	-0.106 U	0.005 U	0.001 U
8/26/2024	Assessment	0.100 U	50.7	**14**	*1.00 U*	7.8 J	**18.5**	206	*0.002 U*	0.002 U	0.0343	0.001 U	0.0002 U	0.005 U	0.0005 U	0.0005 U	0.010 U	0.0002 U	0.002 U	0.437	0.005 U	0.001 U
MW-221A (Upgradient)																						
Comparison value		*< 0.200*	*64.6*	*5.21*	*0.588*	*7.61 - 8.27*	*14.8*	*201*	*< 0.001*	*< 0.002*	*0.0396*	*< 0.001*	*< 0.0005*	*0.0423*	*< 0.0005*	*0.000862*	*< 0.010*	*< 0.0002*	*< 0.002*	*1.026*	*< 0.0238*	*< 0.001*
Comparison value method		*DQR*	*UPL*	*UPL (NP)*	*UPL (NP)*	*LPL - UPL*	*UPL*	*UPL*	*DQR*	*DQR*	*UPL*	*DQR*	*DQR*	*UPL (NP)*	*DQR*	*UPL (NP)*	*DQR*	*DQR*	*DQR*	*UPL*	*DQR*	*DQR*
3/11/2024	Assessment	0.100 U	45.4	**10.4**	*1.00 U*	8.0 J	**24.6**	188	*0.002 U*	0.002 U	0.0336	0.001 U	0.0002 U	0.005 U	0.0005 U	0.0005 U	0.010 U	0.0002 U	0.002 U	0.212 U	0.005 U	0.001 U
8/27/2024	Assessment	0.100 U	39.8	**7.07**	*1.00 U*	7.9 J	9.62	150	*0.002 U*	0.002 U	0.0270	0.001 U	0.0002 U	0.005 U	0.0005 U	0.0005 U	0.010 U	0.0002 U	0.002 U	0.0437	0.005 U	0.001 U
MW-230																						
Comparison value		*< 0.200*	*64.6*	*< 5.0*	*0.588*	*7.41 - 8.86*	*31.4*	*74.0 - 198*	*< 0.001*	*< 0.002*	*0.0396*	*< 0.001*	*< 0.0005*	*0.0423*	*< 0.0005*	*0.000862*	*< 0.010*	*< 0.0002*	*< 0.002*	*1.026*	*< 0.0238*	*< 0.001*
Comparison value method		*DQR*	*UPL*	*DQR*	*UPL (NP)*	*LPL - UPL*	*UPL (NP)*	*Baseline range*	*DQR*	*DQR*	*UPL*	*DQR*	*DQR*	*UPL (NP)*	*DQR*	*UPL (NP)*	*DQR*	*DQR*	*DQR*	*UPL*	*DQR*	*DQR*
3/12/2024	Assessment	0.100 U	**68.5**	5.00 U	*1.00 U*	8.0 J	21.9	**264**	*0.002 U*	0.002 U	**0.0529**	0.001 U	0.0002 U	0.005 U	0.0005 U	0.0005 U	0.010 U	0.0002 U	0.002 U	-0.0200 U	0.005 U	0.001 U
8/27/2024	Assessment	0.100 U	**67.2**	5.00 U	*1.00 U*	7.7 J	27.4	**250**	*0.002 U*	0.002 U	**0.0437**	0.001 U	0.0002 U	0.005 U	0.0005 U	0.0005 U	0.010 U	0.0002 U	0.002 U	0.391	0.005 U	0.001 U
MW-231																						
Comparison value		*< 0.200*	*64.6*	*< 5*	*0.588*	*7.89 - 8.49*	*45.2*	*276*	*< 0.001*	*< 0.002*	*0.0396*	*< 0.001*	*< 0.0005*	*0.0423*	*< 0.0005*	*0.000862*	*< 0.010*	*< 0.0002*	*< 0.002*	*1.026*	*< 0.0238*	*< 0.001*
Comparison value method		*DQR*	*UPL*	*DQR*	*UPL (NP)*	*Baseline range*	*UPL (NP)*	*UPL*	*DQR*	*DQR*	*UPL*	*DQR*	*DQR*	*UPL (NP)*	*DQR*	*UPL (NP)*	*DQR*	*DQR*	*DQR*	*UPL*	*DQR*	*DQR*
3/12/2024	Assessment	0.100 U / 0.100 U	**81.1 / 79.7**	5.00 U / 5.00 U	*1.00 U / 1.00 U*	7.9 J /7.9 J	8.63 /8.72	**286 / 296**	*0.002 U / 0.002 U*	0.002 U / 0.002 U	**0.0736 / 0.0711**	0.001 U / 0.001 U	0.0002 U / 0.0002 U	0.005 U / 0.005 U	0.0005 U / 0.0005 U	0.000500 U /0.000500 U	0.0100 U / 0.0100 U	0.0002 U / 0.0002 U	0.002 U / 0.002 U	0.223 U / 0.346 U	0.005 U / 0.005 U	0.001 U / 0.001 U
8/27/2024	Assessment	0.100 U / 0.100 U	**77.4 / 77.1**	5.00 U / 5.00 U	*1.00 U / 1.00 U*	**7.6 J / 7.6 J**	14.5 /16.3	264 / 274	*0.002 U / 0.002 U*	**0.002 U / 0.00208**	**0.0935 / 0.111**	0.001 U / 0.001 U	0.0002 U / 0.0002 U	0.005 U / 0.00862	**0.00168 J / 0.00869 J**	**0.00138 J / 0.00399 J**	0.0100 U / 0.0100 U	0.0002 U / 0.0002 U	0.002 U / 0.002 U	0.389 / 0.612	0.005 U / 0.005 U	0.001 U / 0.001 U
MW-232																						
Comparison value		*< 0.200*	*64.6*	*5.71*	*0.588*	*8.04 - 8.48*	*3.99 - 5.80*	*193*	*< 0.001*	*< 0.002*	*0.0396*	*< 0.001*	*< 0.0005*	*0.0423*	*< 0.0005*	*0.000862*	*< 0.010*	*< 0.0002*	*< 0.002*	*1.026*	*< 0.0238*	*< 0.001*
Comparison value method		*DQR*	*UPL*	*UPL (NP)*	*UPL (NP)*	*LPL - UPL*	*Baseline range*	*UPL*	*DQR*	*DQR*	*UPL*	*DQR*	*DQR*	*UPL (NP)*	*DQR*	*UPL (NP)*	*DQR*	*DQR*	*DQR*	*UPL*	*DQR*	*DQR*
3/12/2024	Assessment	0.100 U	**69.1**	5.00 U	*1.00 U*	**7.9 J**	**28.4**	**278**	*0.002 U*	0.002 U	**0.0566**	0.001 U	0.0002 U	0.005 U	0.0005 U	0.0005 U	0.010 U	0.0002 U	0.002 U	0.0312 U	0.005 U	0.001 U
8/27/2024	Assessment	0.100 U	**81.5**	5.00 U	*1.00 U*	**7.5 J**	**20**	**314**	*0.002 U*	0.002 U	**0.0655**	0.001 U	0.0002 U	0.005 U	0.0005 U	0.0005 U	0.010 U	0.0002 U	0.002 U	0.538	0.005 U	0.001 U
MW-233																						
Comparison value		*< 0.200*	*64.6*	*< 5.0*	*0.588*	*7.88 - 8.42*	*5.6*	*217*	*< 0.001*	*< 0.002*	*0.0396*	*< 0.001*	*< 0.0005*	*0.0423*	*< 0.0005*	*0.000862*	*< 0.010*	*< 0.0002*	*< 0.002*	*1.026*	*< 0.0238*	*< 0.001*
Comparison value method		*DQR*	*UPL*	*DQR*	*UPL (NP)*	*LPL - UPL*	*UPL*	*UPL (NP)*	*DQR*	*DQR*	*UPL*	*DQR*	*DQR*	*UPL (NP)*	*DQR*	*UPL (NP)*	*DQR*	*DQR*	*DQR*	*UPL*	*DQR*	*DQR*
3/12/2024	Assessment	0.100 U	56.8	**5.26**	*1.00 U*	8.0 J	**86.4**	**284**	*0.002 U*	0.002 U	**0.0477**	0.001 U	0.0002 U	0.005 U	0.0005 U	0.0005 U	0.010 U	0.0002 U	0.002 U	0.170 U	0.005 U	0.001 U
8/27/2024	Assessment	0.104	**84.1**	**8.04**	*1.00 U*	**7.7 J**	**64.8**	**370**	*0.002 U*	0.002 U	**0.0692**	0.001 U	0.0002 U	0.005 U	0.0005 U	0.0005 U	0.010 U	0.0002 U	0.002 U	-0.329	0.005 U	0.001 U
MW-234																						
Comparison value		*< 0.200*	*64.6*	*9.60*	*0.588*	*8.1 - 8.5*	*16.5*	*154*	*< 0.001*	*< 0.002*	*0.0396*	*< 0.001*	*< 0.0005*	*0.0423*	*< 0.0005*	*0.000862*	*< 0.010*	*< 0.0002*	*< 0.002*	*1.026*	*< 0.0238*	*< 0.001*
Comparison value method		*DQR*	*UPL*	*UPL (NP)*	*UPL (NP)*	*Baseline range*	*UPL (NP)*	*UPL*	*DQR*	*DQR*	*UPL*	*DQR*	*DQR*	*UPL (NP)*	*DQR*	*UPL (NP)*	*DQR*	*DQR*	*DQR*	*UPL*	*DQR*	*DQR*
3/11/2024	Assessment	0.100 U	43.0	5.00 U	*1.00 U*	**8.0 J**	**27.9**	**192**	*0.002 U*	0.002 U	0.0304	0.002 U	0.0002 U	0.005 U	0.0005 U	0.0007	0.010 U	0.0002 U	0.0002 U	0.127 U	0.005 U	0.001 U
8/27/2024	Assessment	0.100 U	35.3	6.24	*1.00 U*	8.2 J	**32.4**	**156**	*0.002 U*	0.002 U	0.0231	0.002 U	0.0002 U	0.005 U	0.0005 U	0.0005 U	0.010 U	0.0002 U	0.0002 U	0.249	0.005 U	0.001 U

Notes:

368/370 - Field duplicate results.
U - Not detected at the associated reporting limit.
J - Estimated concentration.
232 Value exceeds comparison baseline values and/or baseline ranges.
† - Trend present during baseline period, no UTL values calculated (baseline range listed for comparison).
Values in italics indicate newer data with higher reporting limits than observed during the baseline period, but are not interpreted as a concentration increase.

MCL - Maximum contaminant level.
GWPS - Groundwater protection standard established under 40 CFR 257.95(h)(2).
DQR - Double Quantification Rule.
UPL - Upper Prediction Limit.
UPL (NP) - Upper Prediction Limit (Non-parametric).

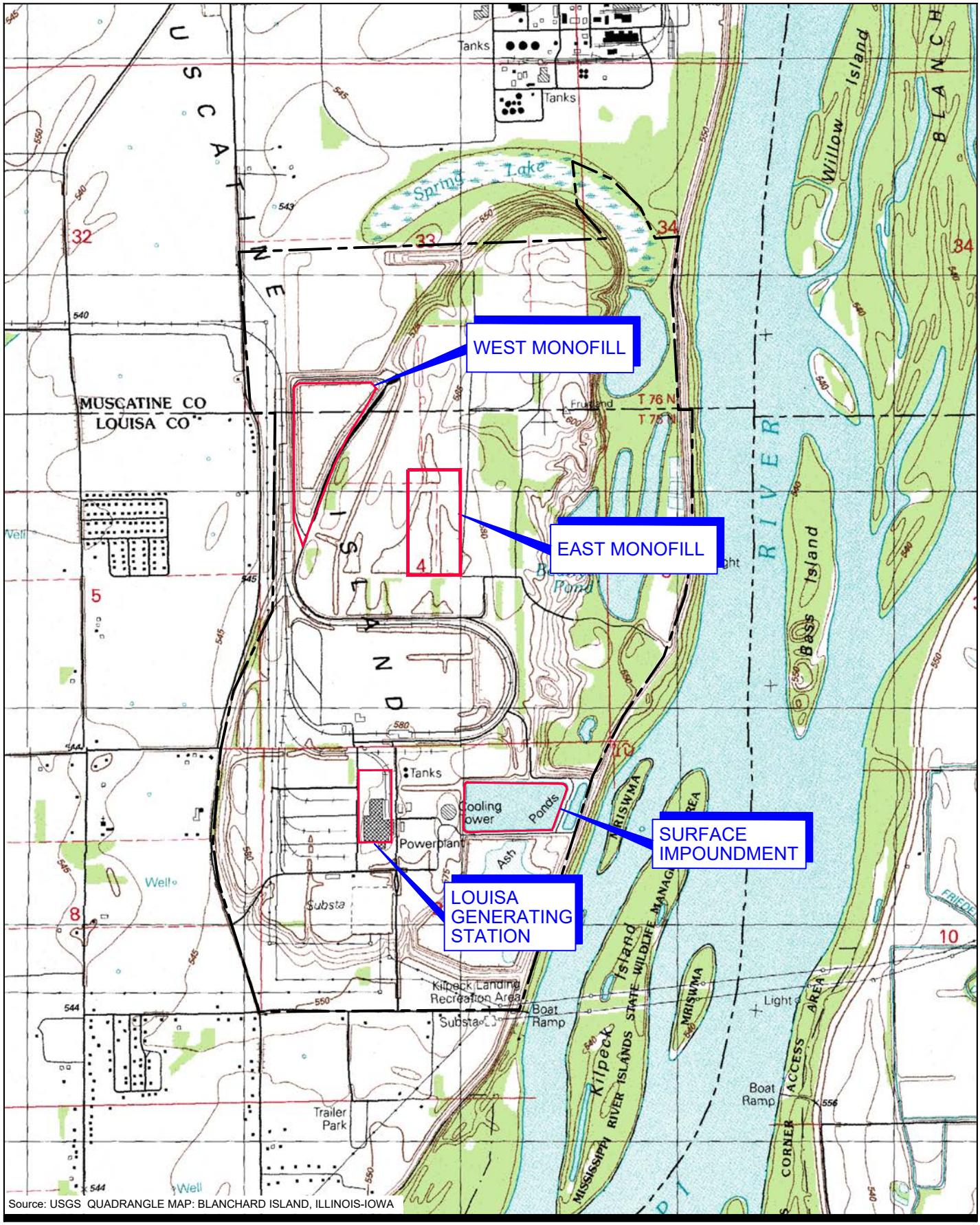
Table 4.6

Groundwater Protection Standards for East Monofill Groundwater
Louisa Generating Station - East Monofill
Muscatine, Iowa

Parameters	Units	MCL [a] 40 CFR 257.95(h)(1)	GWPS [b] 40 CFR 257.95(h)(2)	Background [c] 40 CFR 257.95(h)(3)	Site-Specific GWPS	Maximum 2024 Concentration Downgradient [d]	2024 Conclusion
Appendix IV							
Antimony	mg/L	0.006 [a]	NA	< 0.001	0.006 [a]	0.00200 U	Below GWPS
Arsenic	mg/L	0.01 [a]	NA	< 0.002	0.01 [a]	0.00208	Below GWPS
Barium	mg/L	2.0 [a]	NA	0.0396	2.0 [a]	0.111	Below GWPS
Beryllium	mg/L	0.004 [a]	NA	< 0.001	0.004 [a]	0.00100 U	Below GWPS
Cadmium	mg/L	0.005 [a]	NA	< 0.0005	0.005 [a]	0.000200 U	Below GWPS
Chromium	mg/L	0.1 [a]	NA	0.0423	0.1 [a]	0.00862	Below GWPS
Cobalt	mg/L	NA	0.006 [b]	< 0.0005	0.006 [b]	0.00168 J / 0.00869 J	Below GWPS [e]
Fluoride	mg/L	4.0 [a]	NA	0.588	4.0 [a]	1.00 U	Below GWPS
Lead	mg/L	NA	0.015 [b]	0.000862	0.015 [b]	0.00399 J	Below GWPS
Lithium	mg/L	NA	0.040 [b]	< 0.01	0.040 [b]	0.0100 U	Below GWPS
Mercury	mg/L	0.002 [a]	NA	< 0.0002	0.002 [a]	0.000200 U	Below GWPS
Molybdenum	mg/L	NA	0.100 [b]	< 0.002	0.100 [b]	0.00200 U	Below GWPS
Radium-226 & 228	pCi/L	5 [a]	NA	1.026	5 [a]	0.612	Below GWPS
Selenium	mg/L	0.05 [a]	NA	< 0.0238	0.05 [a]	0.00500 U	Below GWPS
Thallium	mg/L	0.002 [a]	NA	< 0.001	0.002 [a]	0.00100 U	Below GWPS

Notes:
MCL - Maximum Contaminant Level.
NA - Not applicable.
J - Estimated concentration.
U - Not detected at the associated reporting limit.
[a] Maximum contaminant level (MCL).
[b] Groundwater protection standard (GWPS) established under 40 CFR 257.95(h)(2).
[c] Determined from baseline data set for MW-213A and MW-221A.
[d] Determined from downgradient wells data set for MW-230, MW-231, MW-232, MW-233, MW-234.
[e] The duplicate sample result was above the GWPS, but the associated primary sample was below the GWPS. The results are J-flagged as estimated data.

Figures



0 1000 2000 ft

1" = 2000 ft

Coordinate System:
NAD83 State PLane
Iowa South Feet

N

GHD

MIDAMERICAN ENERGY COMPANY
LOUISA GENERATING STATION
EAST MONOFILL
MUSCATINE, IOWA

SITE LOCATION MAP

Project No. **12575233**
Date **May 2024**

FIGURE 1.1

Filename: N:\US\Des Moines\Projects\563\12575233\Digital_Design\ACAD\Figures\RPT014\12575233-GHD-00-00-RPT-EN-D101_DE-014.DWG
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0 200 400 ft

1" = 400 ft

Coordinate System:
NAD83 State Plane
Iowa South Feet

N

GHD

MIDAMERICAN ENERGY COMPANY
LOUISA GENERATING STATION
EAST MONOFILL
MUSCATINE, IOWA

Project No. **12575233**
Date **May 2024**

SITE MAP AND MONITORING NETWORK

FIGURE 1.2

Filename: N:\US\Des Moines\Projects\563\12575233\Digital_Design\ACAD\Figures\RPT014\12575233-GHD-00-00-RPT-EN-D102_DE-014.DWG
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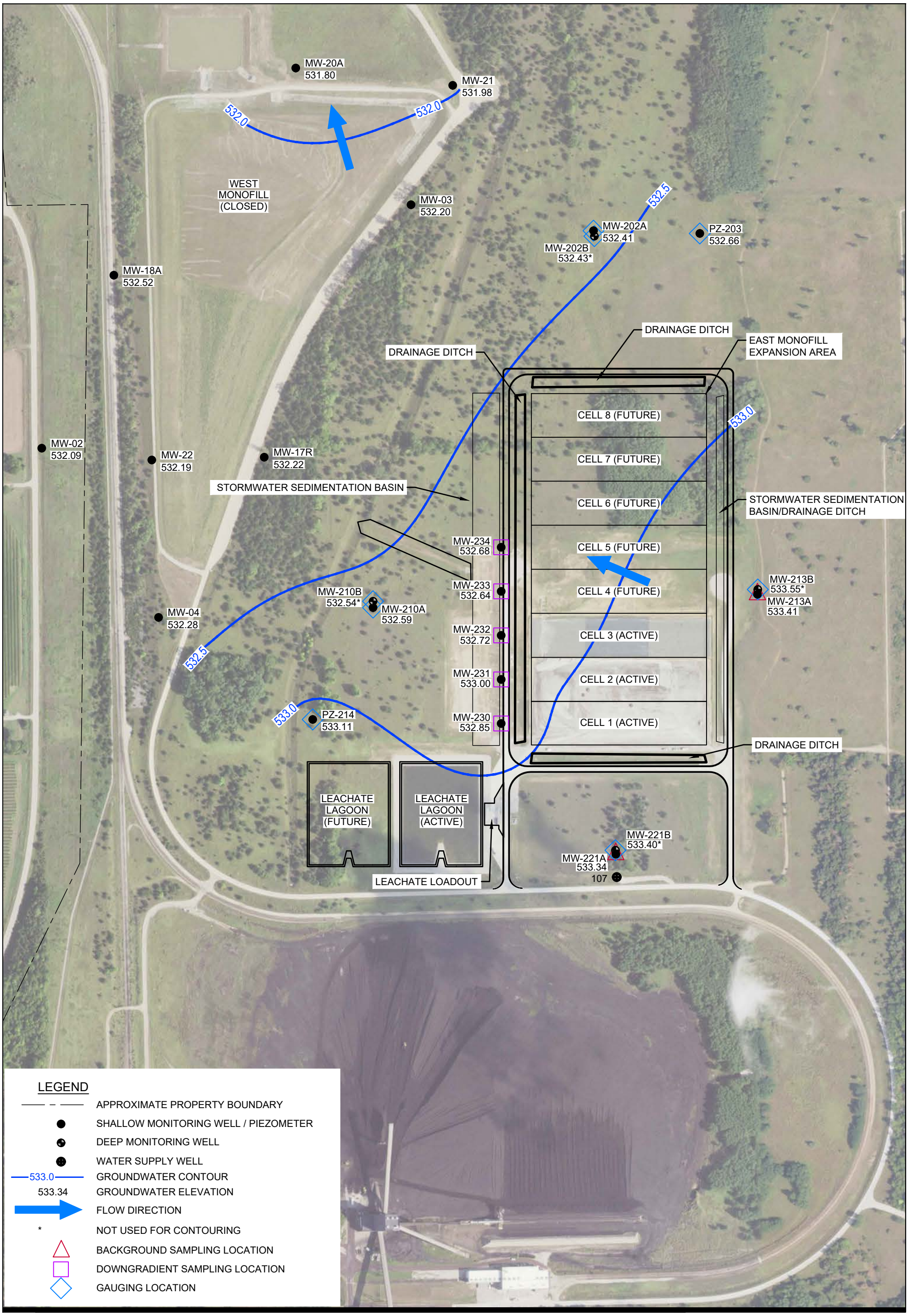

0 200 400 ft

1" = 400 ft

Coordinate System:
NAD83 State Plane
Iowa South Feet

N

GHD

MIDAMERICAN ENERGY COMPANY
LOUISA GENERATING STATION
EAST MONOFILL
MUSCATINE, IOWA

GROUNDWATER FLOW MAP
MARCH 11, 2024

Project No. **12575233**
Date **May 2024**

FIGURE 3.1

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Plot Date: 15 May 2024 7:41 PM

MW-20A
537.49

MW-21
538.06

538.0

537.5

WEST
MONOFILL
(CLOSED)

MW-03
537.97

538.5

MW-202A
538.41

MW-202B
538.42*

PZ-203
538.75

MW-18A
537.32

537.0

DRAINAGE DITCH

EAST MONOFILL
EXPANSION AREA

DRAINAGE DITCH

536.5

MW-02
536.41

MW-22
536.89

MW-17R
537.24

536.5

STORMWATER SEDIMENTATION BASIN

CELL 8 (FUTURE)

CELL 7 (FUTURE)

CELL 6 (FUTURE)

STORMWATER SEDIMENTATION
BASIN/DRAINAGE DITCH

MW-234
538.07

CELL 5 (FUTURE)

MW-233
537.94

CELL 4 (FUTURE)

MW-213B
538.78*

MW-213A
538.65

MW-210B
537.62*

MW-210A
537.66

MW-04
536.79

537.0

MW-232
537.99

CELL 3 (ACTIVE)

MW-231
538.14

CELL 2 (ACTIVE)

538.5

537.5

PZ-214
537.95

MW-230
537.9

CELL 1 (ACTIVE)

DRAINAGE DITCH

LEACHATE
LAGOON
(FUTURE)

LEACHATE
LAGOON
(ACTIVE)

538.0

MW-221B
538.30*

MW-221A
538.25

107

LEACHATE LOADOUT

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- SHALLOW MONITORING WELL / PIEZOMETER
- DEEP MONITORING WELL
- WATER SUPPLY WELL
- 533.0 GROUNDWATER CONTOUR
- 533.34 GROUNDWATER ELEVATION
- FLOW DIRECTION
- * NOT USED FOR CONTOURING
- BACKGROUND SAMPLING LOCATION
- DOWNGRADIENT SAMPLING LOCATION
- GAUGING LOCATION

0 200 400 ft

1" = 400 ft

Coordinate System:
NAD83 State Plane
Iowa South Feet

N

GHD

MIDAMERICAN ENERGY COMPANY
LOUISA GENERATING STATION
EAST MONOFILL
MUSCATINE, IOWA

GROUNDWATER FLOW MAP
AUGUST 26, 2024

Project No. 12575233
Date December 2024

FIGURE 3.2

Filename: N:\US\Des Moines\Projects\563\12575233\Digital_Design\ACAD\Figures\RPT014\12575233-GHD-00-00-RPT-EN-D103_DE-014.DWG
Plot Date: 16 December 2024 11:03 AM

Appendices

Appendix A

Groundwater Sample Collection Records

Low-Flow Test Report:

Test Date / Time: 3/11/2024 3:58:08 PM
Project: LGS East Monofill MW-213A (5)
Operator Name: Brooke Wasson

Location Name: MW-213A **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 38.5 ft** **Total Depth: 48.5 ft** **Initial Depth to Water: 44.86 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: 44.5 ft** **Pump Intake From TOC: 46.5 ft** **Estimated Total Volume Pumped: 3120.833 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 876572**

Test Notes:
Sampled 1610

Weather Conditions:
68 degrees F sunny windy

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	
3/11/2024 3:58 PM	00:00	7.06 pH	15.48 °C	0.33 mS/cm	6.90 mg/L	0.88 NTU	152.5 mV	44.86 ft	250.00 ml/min
3/11/2024 3:59 PM	01:47	7.42 pH	14.74 °C	0.32 mS/cm	6.79 mg/L	0.00 NTU	146.6 mV	44.86 ft	250.00 ml/min
3/11/2024 4:01 PM	03:34	7.51 pH	14.50 °C	0.32 mS/cm	6.89 mg/L	0.00 NTU	153.8 mV	44.86 ft	250.00 ml/min
3/11/2024 4:03 PM	05:21	7.54 pH	14.46 °C	0.32 mS/cm	6.93 mg/L	0.00 NTU	149.1 mV	44.86 ft	250.00 ml/min
3/11/2024 4:05 PM	07:08	7.57 pH	14.49 °C	0.32 mS/cm	6.95 mg/L	0.00 NTU	136.7 mV	44.86 ft	250.00 ml/min
3/11/2024 4:07 PM	08:55	7.59 pH	14.41 °C	0.32 mS/cm	7.01 mg/L	0.00 NTU	124.9 mV	44.86 ft	250.00 ml/min
3/11/2024 4:08 PM	10:42	7.62 pH	14.37 °C	0.32 mS/cm	7.01 mg/L	0.00 NTU	131.2 mV	44.86 ft	250.00 ml/min
3/11/2024 4:10 PM	12:29	7.68 pH	15.91 °C	0.00 mS/cm	9.72 mg/L	10.86 NTU	157.5 mV	44.86 ft	250.00 ml/min

Samples

Sample ID:	Description:

MW-213A_24_03	2 plastic 1 liter nitric acid 1 plastic 1 liter unpreserved 1 plastic 250mL nitric 1 plastic 250mL unpreserved

Low-Flow Test Report:

Test Date / Time: 3/11/2024 4:45:45 PM
Project: LGS East Monofill MW-221A (4)
Operator Name: Brooke Wasson

Location Name: MW-221A **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 40.6 ft** **Total Depth: 53.4 ft** **Initial Depth to Water: 46.47 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: 49.4 ft** **Pump Intake From TOC: 51.4 ft** **Estimated Total Volume Pumped: 2750 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 876572**

Test Notes:
Sampled 1655

Weather Conditions:
69 degrees F sunny windy

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	
3/11/2024 4:45 PM	00:00	7.35 pH	21.64 °C	0.32 mS/cm	8.36 mg/L	2.73 NTU	158.5 mV	46.47 ft	300.00 ml/min
3/11/2024 4:47 PM	01:50	7.67 pH	15.20 °C	0.33 mS/cm	8.82 mg/L	0.00 NTU	128.1 mV	46.47 ft	300.00 ml/min
3/11/2024 4:49 PM	03:40	7.70 pH	14.60 °C	0.34 mS/cm	8.70 mg/L	0.00 NTU	133.5 mV	46.47 ft	300.00 ml/min
3/11/2024 4:51 PM	05:30	7.67 pH	14.45 °C	0.34 mS/cm	8.71 mg/L	0.00 NTU	128.3 mV	46.47 ft	300.00 ml/min
3/11/2024 4:53 PM	07:20	7.65 pH	14.53 °C	0.34 mS/cm	8.74 mg/L	0.00 NTU	127.9 mV	46.47 ft	300.00 ml/min
3/11/2024 4:54 PM	09:10	7.65 pH	14.53 °C	0.34 mS/cm	8.79 mg/L	0.00 NTU	123.3 mV	46.47 ft	300.00 ml/min

Samples

Sample ID:	Description:

MW-221A_24_03	2 plastic 1 liter nitric acid 1 plastic 1 liter unpreserved 1 plastic 250mL nitric 1 plastic 250mL unpreserved

Low-Flow Test Report:

Test Date / Time: 3/11/2024 5:33:01 PM
Project: LGS East Monofill MW-234 (4)
Operator Name: Brooke Wasson

Location Name: MW-234 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 43.4 ft** **Total Depth: 53.4 ft** **Initial Depth to Water: 46.32 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: 49.4 ft** **Pump Intake From TOC: 51.4 ft** **Estimated Total Volume Pumped: 2200 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 876572**

Test Notes:
Sampled 1745

Weather Conditions:
67 degrees F sunny windy

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	
3/11/2024 5:33 PM	00:00	7.68 pH	17.37 °C	0.31 mS/cm	8.69 mg/L	0.53 NTU	143.8 mV	46.32 ft	200.00 ml/min
3/11/2024 5:34 PM	01:50	7.89 pH	14.92 °C	0.34 mS/cm	10.32 mg/L	17.74 NTU	117.5 mV	46.32 ft	200.00 ml/min
3/11/2024 5:36 PM	03:40	7.89 pH	14.64 °C	0.35 mS/cm	10.42 mg/L	12.75 NTU	108.3 mV	46.32 ft	200.00 ml/min
3/11/2024 5:38 PM	05:30	7.87 pH	14.55 °C	0.34 mS/cm	10.41 mg/L	6.87 NTU	122.0 mV	46.32 ft	200.00 ml/min
3/11/2024 5:40 PM	07:20	7.85 pH	14.60 °C	0.34 mS/cm	10.42 mg/L	3.48 NTU	124.0 mV	46.32 ft	200.00 ml/min
3/11/2024 5:42 PM	09:10	7.86 pH	14.53 °C	0.34 mS/cm	10.43 mg/L	0.91 NTU	118.7 mV	46.32 ft	200.00 ml/min
3/11/2024 5:44 PM	11:00	7.87 pH	14.61 °C	0.34 mS/cm	10.44 mg/L	0.76 NTU	118.7 mV	46.32 ft	200.00 ml/min

Samples

Sample ID:	Description:

MW-234_24_03	2 plastic 1 liter nitric acid 1 plastic1 liter unpreserved 1 plastic 250mL nitric acid 1 plastic 250mL unpreserved

Low-Flow Test Report:

Test Date / Time: 3/12/2024 8:12:18 AM
Project: LGS East Monofill MW-233 (4)
Operator Name: Brooke Wasson

Location Name: MW-233 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 42.6 ft** **Total Depth: 52.7 ft** **Initial Depth to Water: 44.95 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: 48.7 ft** **Pump Intake From TOC: 50.7 ft** **Estimated Total Volume Pumped: 3815 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 876572**

Test Notes:
Sampled 0820

Weather Conditions:
48 degrees F partly cloudy

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	
3/12/2024 8:12 AM	00:00	7.39 pH	12.68 °C	0.50 mS/cm	10.50 mg/L	1.69 NTU	184.8 mV	44.95 ft	300.00 ml/min
3/12/2024 8:14 AM	01:49	7.73 pH	12.92 °C	0.46 mS/cm	10.60 mg/L	1.83 NTU	150.0 mV	44.95 ft	300.00 ml/min
3/12/2024 8:15 AM	03:38	7.81 pH	13.00 °C	0.46 mS/cm	10.61 mg/L	0.25 NTU	158.9 mV	44.95 ft	300.00 ml/min
3/12/2024 8:17 AM	05:27	7.84 pH	13.00 °C	0.46 mS/cm	10.62 mg/L	0.00 NTU	143.9 mV	44.95 ft	300.00 ml/min
3/12/2024 8:19 AM	07:16	7.85 pH	13.00 °C	0.38 mS/cm	10.58 mg/L	0.00 NTU	129.0 mV	44.95 ft	300.00 ml/min
3/12/2024 8:21 AM	09:05	7.86 pH	13.03 °C	0.46 mS/cm	10.57 mg/L	0.45 NTU	126.7 mV	44.95 ft	300.00 ml/min
3/12/2024 8:23 AM	10:54	7.86 pH	13.06 °C	0.46 mS/cm	10.54 mg/L	0.48 NTU	126.9 mV	44.95 ft	300.00 ml/min
3/12/2024 8:25 AM	12:43	7.86 pH	13.04 °C	0.46 mS/cm	10.51 mg/L	1.68 NTU	126.6 mV	44.95 ft	300.00 ml/min

Samples

Sample ID:	Description:

MW-233_24_03	2 plastic 1 liter nitric acid 1 plastic 1 liter unpreserved 1 plastic 250mL nitric acid 1 plastic 250mL unpreserved

Low-Flow Test Report:

Test Date / Time: 3/12/2024 8:54:21 AM
Project: LGS East Monofill MW-232
Operator Name: Brooke Wasson

Location Name: MW-232 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 44.3 ft** **Total Depth: 54.3 ft** **Initial Depth to Water: 45.52 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: 50.3 ft** **Pump Intake From TOC: 52.3 ft** **Estimated Total Volume Pumped: 2291.667 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 250 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 876572**

Test Notes:
Water level below pump
Collected FB-1_24_03

Weather Conditions:
48 degrees F sunny

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	
3/12/2024 8:54 AM	00:00	7.69 pH	12.01 °C	0.46 mS/cm	10.63 mg/L	3.11 NTU	185.1 mV	45.52 ft	250.00 ml/min
3/12/2024 8:56 AM	01:50	7.77 pH	12.96 °C	0.47 mS/cm	9.83 mg/L	1.29 NTU	151.1 mV	45.52 ft	250.00 ml/min
3/12/2024 8:58 AM	03:40	7.75 pH	13.30 °C	0.47 mS/cm	9.68 mg/L	0.00 NTU	142.6 mV	45.52 ft	250.00 ml/min
3/12/2024 8:59 AM	05:30	7.73 pH	13.39 °C	0.48 mS/cm	9.62 mg/L	0.00 NTU	138.3 mV	45.52 ft	250.00 ml/min
3/12/2024 9:01 AM	07:20	7.72 pH	13.44 °C	0.49 mS/cm	9.58 mg/L	0.00 NTU	137.5 mV	45.52 ft	250.00 ml/min
3/12/2024 9:03 AM	09:10	7.70 pH	13.49 °C	0.49 mS/cm	9.55 mg/L	0.00 NTU	134.4 mV	45.52 ft	250.00 ml/min

Samples

Sample ID:	Description:

MW-232_24_03	2 plastic 1 liter nitric acid 1 plastic 1 liter unpreserved 1 plastic 250mL nitric acid 1 plastic 250mL unpreserved

Low-Flow Test Report:

Test Date / Time: 3/12/2024 9:37:40 AM
Project: LGS East Monofill MW-231 (4)
Operator Name: Brooke Wasson

Location Name: MW-231 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 44.9 ft** **Total Depth: 54.9 ft** **Initial Depth to Water: 47.1 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: 50.9 ft** **Pump Intake From TOC: 52.9 ft** **Estimated Total Volume Pumped: 1665 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 100 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 876572**

Test Notes:
Sampled 0955
Collected FD-1_24_03

Weather Conditions:
52 degrees F sunny breezy

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	
3/12/2024 9:37 AM	00:00	7.66 pH	13.44 °C	0.52 mS/cm	9.63 mg/L	23.04 NTU	156.4 mV	47.10 ft	100.00 ml/min
3/12/2024 9:39 AM	01:51	7.52 pH	13.69 °C	0.54 mS/cm	8.21 mg/L	12.32 NTU	140.5 mV	47.10 ft	100.00 ml/min
3/12/2024 9:41 AM	03:42	7.47 pH	13.82 °C	0.55 mS/cm	7.61 mg/L	15.04 NTU	135.2 mV	47.10 ft	100.00 ml/min
3/12/2024 9:43 AM	05:33	7.44 pH	13.92 °C	0.55 mS/cm	7.35 mg/L	14.60 NTU	132.2 mV	47.10 ft	100.00 ml/min
3/12/2024 9:45 AM	07:24	7.42 pH	13.97 °C	0.55 mS/cm	7.25 mg/L	12.21 NTU	130.9 mV	47.10 ft	100.00 ml/min
3/12/2024 9:46 AM	09:15	7.40 pH	14.08 °C	0.55 mS/cm	7.16 mg/L	10.54 NTU	125.7 mV	47.10 ft	100.00 ml/min
3/12/2024 9:48 AM	11:06	7.40 pH	14.10 °C	0.55 mS/cm	7.15 mg/L	7.36 NTU	127.2 mV	47.10 ft	100.00 ml/min
3/12/2024 9:50 AM	12:57	7.41 pH	14.18 °C	0.56 mS/cm	7.15 mg/L	5.06 NTU	122.7 mV	47.10 ft	100.00 ml/min
3/12/2024 9:52 AM	14:48	7.41 pH	14.23 °C	0.56 mS/cm	7.15 mg/L	5.00 NTU	121.1 mV	47.10 ft	100.00 ml/min
3/12/2024 9:54 AM	16:39	7.41 pH	14.34 °C	0.56 mS/cm	7.16 mg/L	3.30 NTU	116.9 mV	47.10 ft	100.00 ml/min

Samples

Sample ID:	Description:
MW-231_24_03	2 plastic 1 liter nitric acid 1 plastic 1 liter unpreserved 1 plastic 250mL nitric acid 1 plastic 250mL unpreserved

Low-Flow Test Report:

Test Date / Time: 3/12/2024 12:38:28 PM
Project: LGS East Monofill MW-230 (4)
Operator Name: Brooke Wasson

Location Name: MW-230 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 44.5 ft** **Total Depth: 54.5 ft** **Initial Depth to Water: 46.39 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: 50.5 ft** **Pump Intake From TOC: 52.5 ft** **Estimated Total Volume Pumped: 3300 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 876572**

Test Notes:
Sampled 1250

Weather Conditions:
65 degrees F sunny windy

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	
3/12/2024 12:38 PM	00:00	7.64 pH	16.47 °C	0.43 mS/cm	9.11 mg/L	3.26 NTU	172.4 mV	46.39 ft	300.00 ml/min
3/12/2024 12:40 PM	01:50	7.60 pH	15.62 °C	0.48 mS/cm	9.37 mg/L	10.44 NTU	147.1 mV	46.39 ft	300.00 ml/min
3/12/2024 12:42 PM	03:40	7.49 pH	15.54 °C	0.49 mS/cm	9.23 mg/L	8.97 NTU	146.8 mV	46.39 ft	300.00 ml/min
3/12/2024 12:43 PM	05:30	7.46 pH	15.41 °C	0.49 mS/cm	9.15 mg/L	4.37 NTU	143.1 mV	46.39 ft	300.00 ml/min
3/12/2024 12:45 PM	07:20	7.45 pH	15.32 °C	0.49 mS/cm	9.12 mg/L	3.31 NTU	134.1 mV	46.39 ft	300.00 ml/min
3/12/2024 12:47 PM	09:10	7.45 pH	15.38 °C	0.49 mS/cm	9.09 mg/L	2.27 NTU	115.2 mV	46.39 ft	300.00 ml/min
3/12/2024 12:49 PM	11:00	7.46 pH	15.35 °C	0.49 mS/cm	9.06 mg/L	1.27 NTU	127.3 mV	46.39 ft	300.00 ml/min

Samples

Sample ID:	Description:

MW-230_24_03	2 plastic 1 liter nitric acid 1 plastic 1 liter unpreserved 1 plastic 250mL nitric acid 1 plastic 250mL unpreserved

Low-Flow Test Report:

Test Date / Time: 8/26/2024 8:55:55 PM
Project: LGS East Monofill MW-213A (2)
Operator Name: Brooke Wasson

Location Name: MW-213A **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 38.5 ft** **Total Depth: 48.5 ft** **Initial Depth to Water: 39 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: 44.5 ft** **Pump Intake From TOC: 46.5 ft** **Estimated Total Volume Pumped: 5885 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.03 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 955645**

Test Notes:
Initial 39.62
Final 39.65

Weather Conditions:
Sunny 89 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	
8/26/2024 8:55 PM	00:00	7.83 pH	15.71 °C	0.38 mS/cm	4.50 mg/L	1.84 NTU	132.0 mV	39.62 ft	300.00 ml/min
8/26/2024 8:57 PM	01:47	7.68 pH	15.12 °C	0.36 mS/cm	4.60 mg/L	1.47 NTU	138.6 mV	39.63 ft	300.00 ml/min
8/26/2024 8:59 PM	03:34	7.64 pH	15.19 °C	0.36 mS/cm	5.07 mg/L	2.47 NTU	140.8 mV	39.64 ft	300.00 ml/min
8/26/2024 9:01 PM	05:21	7.59 pH	14.94 °C	0.36 mS/cm	5.41 mg/L	5.45 NTU	140.7 mV	39.65 ft	300.00 ml/min
8/26/2024 9:03 PM	07:08	7.60 pH	14.76 °C	0.36 mS/cm	5.52 mg/L	10.90 NTU	138.6 mV	39.65 ft	300.00 ml/min
8/26/2024 9:04 PM	08:55	7.58 pH	14.80 °C	0.36 mS/cm	5.54 mg/L	20.52 NTU	138.1 mV	39.65 ft	300.00 ml/min
8/26/2024 9:06 PM	10:42	7.58 pH	14.63 °C	0.36 mS/cm	5.53 mg/L	22.10 NTU	137.2 mV	39.65 ft	300.00 ml/min
8/26/2024 9:08 PM	12:29	7.57 pH	14.57 °C	0.36 mS/cm	5.50 mg/L	27.92 NTU	137.9 mV	39.65 ft	300.00 ml/min
8/26/2024 9:10 PM	14:16	7.54 pH	14.78 °C	0.37 mS/cm	6.03 mg/L	0.72 NTU	135.8 mV	39.65 ft	300.00 ml/min
8/26/2024 9:11 PM	16:03	7.56 pH	14.60 °C	0.36 mS/cm	5.57 mg/L	0.36 NTU	135.5 mV	39.65 ft	300.00 ml/min

8/26/2024 9:13 PM	17:50	7.55 pH	14.56 °C	0.36 mS/cm	5.55 mg/L	0.38 NTU	133.8 mV	39.65 ft	300.00 ml/min
8/26/2024 9:15 PM	19:37	7.54 pH	14.49 °C	0.36 mS/cm	5.59 mg/L	0.40 NTU	134.9 mV	39.65 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-213A_08_24	

Low-Flow Test Report:

Test Date / Time: 8/27/2024 8:33:55 AM
Project: LGS East Monofill MW-221A
Operator Name: Brooke Wasson

Location Name: MW-221A **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 40.6 ft** **Total Depth: 53.4 ft** **Initial Depth to Water: 41.61 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: 49.4 ft** **Pump Intake From TOC: 51.4 ft** **Estimated Total Volume Pumped: 3300 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 955645**

Test Notes:
Sampled 0745

Weather Conditions:
76 degrees F sunny

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	
8/27/2024 8:33 AM	00:00	7.56 pH	19.61 °C	0.37 mS/cm	9.10 mg/L	4.23 NTU	93.4 mV	41.61 ft	300.00 ml/min
8/27/2024 8:35 AM	01:50	7.62 pH	16.03 °C	0.31 mS/cm	8.59 mg/L	0.35 NTU	111.7 mV	41.61 ft	300.00 ml/min
8/27/2024 8:37 AM	03:40	7.57 pH	15.42 °C	0.30 mS/cm	8.08 mg/L	0.22 NTU	117.1 mV	41.61 ft	300.00 ml/min
8/27/2024 8:39 AM	05:30	7.56 pH	15.02 °C	0.30 mS/cm	8.23 mg/L	0.11 NTU	118.8 mV	41.61 ft	300.00 ml/min
8/27/2024 8:41 AM	07:20	7.56 pH	15.02 °C	0.30 mS/cm	8.37 mg/L	0.10 NTU	119.0 mV	41.61 ft	300.00 ml/min
8/27/2024 8:43 AM	09:10	7.57 pH	15.02 °C	0.30 mS/cm	8.47 mg/L	0.12 NTU	118.5 mV	41.61 ft	300.00 ml/min
8/27/2024 8:44 AM	11:00	7.53 pH	14.95 °C	0.30 mS/cm	8.48 mg/L	0.32 NTU	119.3 mV	41.61 ft	300.00 ml/min

Samples

Sample ID:	Description:

MW-221A_24_08	

Low-Flow Test Report:

Test Date / Time: 8/27/2024 12:46:02 PM
Project: LGS East Monofill MW-230
Operator Name: Brooke Wasson

Location Name: MW-230 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 44.5 ft** **Total Depth: 54.5 ft** **Initial Depth to Water: 41.39 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: 50.5 ft** **Pump Intake From TOC: 52.5 ft** **Estimated Total Volume Pumped: 2750 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 955645**

Test Notes:
Sampled 1155

Weather Conditions:
90 degrees sunny

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	
8/27/2024 12:46 PM	00:00	7.55 pH	21.31 °C	0.46 mS/cm	9.18 mg/L	1.39 NTU	119.7 mV	41.39 ft	300.00 ml/min
8/27/2024 12:47 PM	01:50	7.45 pH	17.91 °C	0.48 mS/cm	9.50 mg/L	1.95 NTU	129.3 mV	41.39 ft	300.00 ml/min
8/27/2024 12:49 PM	03:40	7.34 pH	17.17 °C	0.48 mS/cm	9.31 mg/L	1.06 NTU	134.5 mV	41.39 ft	300.00 ml/min
8/27/2024 12:51 PM	05:30	7.31 pH	16.86 °C	0.49 mS/cm	9.48 mg/L	1.43 NTU	135.7 mV	41.39 ft	300.00 ml/min
8/27/2024 12:53 PM	07:20	7.30 pH	16.95 °C	0.49 mS/cm	9.57 mg/L	2.25 NTU	135.7 mV	41.39 ft	300.00 ml/min
8/27/2024 12:55 PM	09:10	7.29 pH	17.02 °C	0.48 mS/cm	9.42 mg/L	6.58 NTU	135.8 mV	41.39 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-230_24_08	

Low-Flow Test Report:

Test Date / Time: 8/27/2024 11:45:47 AM
Project: LGS East Monofill MW-231
Operator Name: Brooke Wasson

Location Name: MW-231 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 44.9 ft** **Total Depth: 54.9 ft** **Initial Depth to Water: 41.99 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: 50.9 ft** **Pump Intake From TOC: 52.9 ft** **Estimated Total Volume Pumped: 2220 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0.01 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 955645**

Test Notes:
Sampled 1055

Weather Conditions:
85 degrees sunny breezy

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	
8/27/2024 11:45 AM	00:00	7.39 pH	24.27 °C	0.55 mS/cm	8.22 mg/L	40.92 NTU	125.6 mV	41.99 ft	200.00 ml/min
8/27/2024 11:47 AM	01:51	7.36 pH	20.45 °C	0.51 mS/cm	7.05 mg/L	18.75 NTU	129.9 mV	42.00 ft	200.00 ml/min
8/27/2024 11:49 AM	03:42	7.28 pH	19.35 °C	0.51 mS/cm	7.09 mg/L	11.24 NTU	133.2 mV	42.00 ft	200.00 ml/min
8/27/2024 11:51 AM	05:33	7.26 pH	19.29 °C	0.51 mS/cm	6.98 mg/L	9.27 NTU	133.1 mV	42.00 ft	200.00 ml/min
8/27/2024 11:53 AM	07:24	7.26 pH	19.14 °C	0.51 mS/cm	6.90 mg/L	8.52 NTU	132.6 mV	42.00 ft	200.00 ml/min
8/27/2024 11:55 AM	09:15	7.26 pH	19.19 °C	0.51 mS/cm	6.85 mg/L	5.30 NTU	131.4 mV	42.00 ft	200.00 ml/min
8/27/2024 11:56 AM	11:06	7.27 pH	19.07 °C	0.51 mS/cm	6.82 mg/L	4.17 NTU	130.2 mV	42.00 ft	200.00 ml/min

Samples

Sample ID:	Description:

MW-231_24_08	
FD-1_24_08	

Low-Flow Test Report:

Test Date / Time: 8/27/2024 10:44:03 AM
Project: LGS East Monofill MW-232
Operator Name: Brooke Wasson

Location Name: MW-232 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 44.3 ft** **Total Depth: 54.3 ft** **Initial Depth to Water: 40.27 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: 50.3 ft** **Pump Intake From TOC: 52.3 ft** **Estimated Total Volume Pumped: 6233.333 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 955645**

Test Notes:
Sampled 1015

Weather Conditions:
82 degrees sunny

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	
8/27/2024 10:44 AM	00:00	7.66 pH	19.84 °C	0.52 mS/cm	9.57 mg/L	0.62 NTU	132.7 mV	40.27 ft	200.00 ml/min
8/27/2024 10:45 AM	01:50	7.57 pH	18.31 °C	0.54 mS/cm	9.89 mg/L	0.36 NTU	135.6 mV	40.27 ft	200.00 ml/min
8/27/2024 10:47 AM	03:40	7.54 pH	17.71 °C	0.54 mS/cm	9.96 mg/L	2.59 NTU	135.6 mV	40.27 ft	200.00 ml/min
8/27/2024 10:49 AM	05:30	7.51 pH	17.38 °C	0.54 mS/cm	9.80 mg/L	4.37 NTU	135.7 mV	40.27 ft	200.00 ml/min
8/27/2024 10:51 AM	07:20	7.49 pH	17.23 °C	0.54 mS/cm	9.65 mg/L	6.19 NTU	135.8 mV	40.27 ft	200.00 ml/min
8/27/2024 10:53 AM	09:10	7.43 pH	17.44 °C	0.55 mS/cm	9.24 mg/L	10.12 NTU	136.9 mV	40.27 ft	200.00 ml/min
8/27/2024 10:55 AM	11:00	7.40 pH	18.03 °C	0.56 mS/cm	8.79 mg/L	18.55 NTU	136.6 mV	40.27 ft	200.00 ml/min
8/27/2024 10:56 AM	12:50	7.40 pH	17.97 °C	0.56 mS/cm	8.72 mg/L	28.32 NTU	135.5 mV	40.27 ft	200.00 ml/min
8/27/2024 10:58 AM	14:40	7.38 pH	17.96 °C	0.57 mS/cm	8.52 mg/L	53.96 NTU	134.9 mV	40.27 ft	200.00 ml/min
8/27/2024 11:00 AM	16:30	7.38 pH	17.95 °C	0.57 mS/cm	8.20 mg/L	66.03 NTU	134.2 mV	40.27 ft	200.00 ml/min
8/27/2024 11:02 AM	18:20	7.37 pH	17.82 °C	0.57 mS/cm	8.15 mg/L	102.94 NTU	133.7 mV	40.27 ft	200.00 ml/min

8/27/2024 11:04 AM	20:10	7.36 pH	17.75 °C	0.58 mS/cm	8.09 mg/L	127.51 NTU	133.3 mV	40.27 ft	200.00 ml/min
8/27/2024 11:06 AM	22:00	7.37 pH	17.64 °C	0.58 mS/cm	7.89 mg/L	168.40 NTU	132.6 mV	40.27 ft	200.00 ml/min
8/27/2024 11:07 AM	23:50	7.41 pH	17.70 °C	0.58 mS/cm	8.17 mg/L	0.46 NTU	130.3 mV	40.27 ft	200.00 ml/min
8/27/2024 11:09 AM	25:40	7.38 pH	17.57 °C	0.58 mS/cm	7.95 mg/L	0.03 NTU	129.9 mV	40.27 ft	200.00 ml/min
8/27/2024 11:11 AM	27:30	7.37 pH	17.38 °C	0.58 mS/cm	7.73 mg/L	0.10 NTU	129.3 mV	40.27 ft	200.00 ml/min
8/27/2024 11:13 AM	29:20	7.36 pH	17.37 °C	0.58 mS/cm	7.76 mg/L	0.08 NTU	129.0 mV	40.27 ft	200.00 ml/min
8/27/2024 11:15 AM	31:10	7.36 pH	17.36 °C	0.59 mS/cm	7.72 mg/L	0.24 NTU	128.6 mV	40.27 ft	200.00 ml/min

Samples

Sample ID:	Description:
MW-232_24_08	

Low-Flow Test Report:

Test Date / Time: 8/27/2024 10:08:51 AM
Project: LGS East Monofill MW-233
Operator Name: Brooke Wasson

Location Name: MW-233 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 42.6 ft** **Total Depth: 52.7 ft** **Initial Depth to Water: 39.7 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: 48.7 ft** **Pump Intake From TOC: 50.7 ft** **Estimated Total Volume Pumped: 1635 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 955645**

Test Notes:
Sampled 0920

Weather Conditions:
81 degrees sunny

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	
8/27/2024 10:08 AM	00:00	7.53 pH	17.14 °C	0.62 mS/cm	8.56 mg/L	12.41 NTU	150.4 mV	39.70 ft	200.00 ml/min
8/27/2024 10:10 AM	01:49	7.46 pH	17.03 °C	0.65 mS/cm	8.32 mg/L	14.78 NTU	151.2 mV	39.70 ft	200.00 ml/min
8/27/2024 10:12 AM	03:38	7.45 pH	16.70 °C	0.66 mS/cm	8.29 mg/L	11.53 NTU	151.0 mV	39.70 ft	200.00 ml/min
8/27/2024 10:14 AM	05:27	7.45 pH	16.52 °C	0.66 mS/cm	8.28 mg/L	8.65 NTU	149.8 mV	39.70 ft	300.00 ml/min
8/27/2024 10:16 AM	07:16	7.45 pH	16.51 °C	0.66 mS/cm	8.25 mg/L	4.13 NTU	148.4 mV	39.70 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-233_24_08	

Low-Flow Test Report:

Test Date / Time: 8/27/2024 9:18:02 AM
Project: LGS East Monofill MW-234
Operator Name: Brooke Wasson

Location Name: MW-234 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 43.4 ft** **Total Depth: 53.4 ft** **Initial Depth to Water: 40.99 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: 49.4 ft** **Pump Intake From TOC: 51.4 ft** **Estimated Total Volume Pumped: 4400 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.01 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 955645**

Test Notes:
Sampled 0835

Weather Conditions:
78 degrees F sunny

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	
8/27/2024 9:18 AM	00:00	7.86 pH	18.44 °C	0.29 mS/cm	9.96 mg/L	11.24 NTU	118.4 mV	40.99 ft	300.00 ml/min
8/27/2024 9:19 AM	01:50	8.00 pH	16.70 °C	0.22 mS/cm	10.17 mg/L	36.03 NTU	140.6 mV	41.02 ft	300.00 ml/min
8/27/2024 9:21 AM	03:40	8.03 pH	16.46 °C	0.21 mS/cm	10.27 mg/L	44.37 NTU	153.1 mV	41.00 ft	300.00 ml/min
8/27/2024 9:23 AM	05:30	8.00 pH	16.19 °C	0.23 mS/cm	10.25 mg/L	41.78 NTU	161.9 mV	41.00 ft	300.00 ml/min
8/27/2024 9:25 AM	07:20	7.93 pH	16.13 °C	0.25 mS/cm	10.35 mg/L	24.12 NTU	168.3 mV	41.00 ft	300.00 ml/min
8/27/2024 9:27 AM	09:10	7.90 pH	15.96 °C	0.27 mS/cm	10.30 mg/L	11.11 NTU	169.1 mV	41.00 ft	300.00 ml/min
8/27/2024 9:29 AM	11:00	7.90 pH	15.94 °C	0.27 mS/cm	10.26 mg/L	7.30 NTU	168.0 mV	41.00 ft	300.00 ml/min
8/27/2024 9:30 AM	12:50	7.88 pH	16.12 °C	0.28 mS/cm	10.29 mg/L	4.98 NTU	167.2 mV	41.00 ft	300.00 ml/min
8/27/2024 9:32 AM	14:40	7.89 pH	16.31 °C	0.28 mS/cm	10.25 mg/L	5.28 NTU	165.5 mV	41.00 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-234_24_08	

Appendix B

Laboratory Analytical Reports

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

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

Generated 4/11/2024 2:32:25 PM

JOB DESCRIPTION

MEC Louisa East CCR Monofill

JOB NUMBER

310-276637-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

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

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4/11/2024 2:32:25 PM

Authorized for release by
Zach Bindert, Client Service Manager
Zach.Bindert@et.eurofinsus.com
(319)277-2401

Table of Contents

Job Narrative
310-276637-1

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 3/13/2024 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 0.7°C and 5.8°C.

HPLC/IC
Method 9056A_ORGFM_28D: The following samples were diluted due to the nature of the sample matrix: MW-213A_24_03 (310-276637-1), MW-221A_24_03 (310-276637-2) and MW-234_24_03 (310-276637-7). Elevated reporting limits (RLs) are provided.

Method 9056A_ORGFM_28D: The following samples were diluted due to the nature of the sample matrix: MW-230_24_03 (310-276637-3), MW-231_24_03 (310-276637-4), MW-232_24_03 (310-276637-5), MW-233_24_03 (310-276637-6) and FD-1_24_03 (310-276637-8). 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.

Job ID: 310-276637-2 Eurofins Cedar Falls

Job Narrative
310-276637-2

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 3/13/2024 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 0.7°C and 5.8°C.

Gas Flow Proportional Counter
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 Louisa East CCR Monofill

Job ID: 310-276637-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-276637-1	MW-213A_24_03	Water	03/11/24 16:10	03/13/24 09:10
310-276637-2	MW-221A_24_03	Water	03/11/24 16:55	03/13/24 09:10
310-276637-3	MW-230_24_03	Water	03/12/24 12:50	03/13/24 09:10
310-276637-4	MW-231_24_03	Water	03/12/24 09:55	03/13/24 09:10
310-276637-5	MW-232_24_03	Water	03/12/24 09:05	03/13/24 09:10
310-276637-6	MW-233_24_03	Water	03/12/24 08:20	03/13/24 09:10
310-276637-7	MW-234_24_03	Water	03/11/24 17:45	03/13/24 09:10
310-276637-8	FD-1_24_03	Water	03/12/24 00:00	03/13/24 09:10
310-276637-9	FB-1_24_03	Water	03/12/24 08:55	03/13/24 09:10

Detection Summary

Client: GHD Services Inc.
Project/Site: MEC Louisa East CCR Monofill

Job ID: 310-276637-1

Client Sample ID: MW-213A_24_03 — Lab Sample ID: 310-276637-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	6.18		5.00		mg/L	5		9056A	Total/NA
Sulfate	7.24		5.00		mg/L	5		9056A	Total/NA
Barium	0.0346		0.00200		mg/L	1		6020B	Total/NA
Calcium	45.0		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	136		50.0		mg/L	1		SM 2540C	Total/NA
pH	8.0	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-221A_24_03 — Lab Sample ID: 310-276637-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	10.4		5.00		mg/L	5		9056A	Total/NA
Sulfate	24.6		5.00		mg/L	5		9056A	Total/NA
Barium	0.0336		0.00200		mg/L	1		6020B	Total/NA
Calcium	45.4		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	188		50.0		mg/L	1		SM 2540C	Total/NA
pH	8.0	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-230_24_03 — Lab Sample ID: 310-276637-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	21.9		5.00		mg/L	5		9056A	Total/NA
Barium	0.0529		0.00200		mg/L	1		6020B	Total/NA
Calcium	68.5		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	264		50.0		mg/L	1		SM 2540C	Total/NA
pH	8.0	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-231_24_03 — Lab Sample ID: 310-276637-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	8.63		5.00		mg/L	5		9056A	Total/NA
Barium	0.0736		0.00200		mg/L	1		6020B	Total/NA
Calcium	81.1		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	286		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.9	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-232_24_03 — Lab Sample ID: 310-276637-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	28.4		5.00		mg/L	5		9056A	Total/NA
Barium	0.0566		0.00200		mg/L	1		6020B	Total/NA
Calcium	69.1		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	278		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.9	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-233_24_03 — Lab Sample ID: 310-276637-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	5.26		5.00		mg/L	5		9056A	Total/NA
Sulfate	86.4		5.00		mg/L	5		9056A	Total/NA
Barium	0.0477		0.00200		mg/L	1		6020B	Total/NA
Calcium	56.8		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	284		50.0		mg/L	1		SM 2540C	Total/NA
pH	8.0	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GHD Services Inc.
Project/Site: MEC Louisa East CCR Monofill

Job ID: 310-276637-1

Client Sample ID: MW-234_24_03 — Lab Sample ID: 310-276637-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	27.9		5.00		mg/L	5		9056A	Total/NA
Barium	0.0304		0.00200		mg/L	1		6020B	Total/NA
Calcium	43.0		0.500		mg/L	1		6020B	Total/NA
Lead	0.000700		0.000500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	192		50.0		mg/L	1		SM 2540C	Total/NA
pH	8.0	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: FD-1_24_03 — Lab Sample ID: 310-276637-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	8.72		5.00		mg/L	5		9056A	Total/NA
Barium	0.0711		0.00200		mg/L	1		6020B	Total/NA
Calcium	79.7		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	296		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.9	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: FB-1_24_03 — Lab Sample ID: 310-276637-9

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	5.7	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-213A_24_03

Date Collected: 03/11/24 16:10
Date Received: 03/13/24 09:10

Lab Sample ID: 310-276637-1

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**6.18**		5.00		mg/L			03/15/24 17:10	5
Fluoride	<1.00		1.00		mg/L			03/15/24 17:10	5
Sulfate	**7.24**		5.00		mg/L			03/15/24 17:10	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		03/15/24 09:00	03/15/24 17:33	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:33	1
Barium	**0.0346**		0.00200		mg/L		03/15/24 09:00	03/15/24 17:33	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 17:33	1
Boron	<0.100		0.100		mg/L		03/15/24 09:00	03/15/24 17:33	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 17:33	1
Calcium	**45.0**		0.500		mg/L		03/15/24 09:00	03/15/24 17:33	1
Chromium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:33	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 17:33	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 17:33	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 17:33	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:33	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:33	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 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		03/15/24 10:52	03/18/24 09:50	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**136**		50.0		mg/L			03/13/24 16:42	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**8.0**	**HF**	1.0		SU			03/13/24 15:55	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	U	0.0853	0.0856	1.00	0.138	pCi/L	03/15/24 10:09	04/09/24 15:15	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*96.1*		*30 - 110*	*03/15/24 10:09*	*04/09/24 15:15*	*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	<0.553	U	0.269	0.270	1.00	0.553	pCi/L	03/15/24 10:24	04/05/24 11:34	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*96.1*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:34*	*1*
Y Carrier	*81.1*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:34*	*1*

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Louisa East CCR Monofill

Job ID: 310-276637-1

Client Sample ID: MW-213A_24_03

Date Collected: 03/11/24 16:10
Date Received: 03/13/24 09:10

Lab Sample ID: 310-276637-1

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	<0.553	U	0.282	0.283	5.00	0.553	pCi/L		04/11/24 10:00	1

Client Sample ID: MW-221A_24_03

Date Collected: 03/11/24 16:55
Date Received: 03/13/24 09:10

Lab Sample ID: 310-276637-2

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**10.4**		5.00		mg/L			03/15/24 17:24	5
Fluoride	<1.00		1.00		mg/L			03/15/24 17:24	5
Sulfate	**24.6**		5.00		mg/L			03/15/24 17:24	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		03/15/24 09:00	03/15/24 17:38	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:38	1
Barium	**0.0336**		0.00200		mg/L		03/15/24 09:00	03/15/24 17:38	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 17:38	1
Boron	<0.100		0.100		mg/L		03/15/24 09:00	03/15/24 17:38	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 17:38	1
Calcium	**45.4**		0.500		mg/L		03/15/24 09:00	03/15/24 17:38	1
Chromium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:38	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 17:38	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 17:38	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 17:38	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:38	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:38	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 17:38	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		03/15/24 10:52	03/18/24 09:52	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**188**		50.0		mg/L			03/13/24 16:42	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**8.0**	**HF**	1.0		SU			03/13/24 15:41	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	**0.165**		0.108	0.109	1.00	0.148	pCi/L	03/15/24 10:09	04/09/24 16:23	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*89.4*		*30 - 110*	*03/15/24 10:09*	*04/09/24 16:23*	*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	<0.476	U	0.257	0.257	1.00	0.476	pCi/L	03/15/24 10:24	04/05/24 11:34	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*89.4*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:34*	*1*
Y Carrier	*82.2*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:34*	*1*

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Louisa East CCR Monofill

Job ID: 310-276637-1

Client Sample ID: MW-221A_24_03

Date Collected: 03/11/24 16:55
Date Received: 03/13/24 09:10

Lab Sample ID: 310-276637-2

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	<0.476	U	0.279	0.279	5.00	0.476	pCi/L		04/11/24 10:00	1

Client Sample ID: MW-230_24_03
Lab Sample ID: 310-276637-3

Date Collected: 03/12/24 12:50
Matrix: Water
Date Received: 03/13/24 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			03/15/24 18:31	5
Fluoride	<1.00		1.00		mg/L			03/15/24 18:31	5
Sulfate	**21.9**		5.00		mg/L			03/15/24 18:31	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		03/15/24 09:00	03/15/24 17:40	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:40	1
Barium	**0.0529**		0.00200		mg/L		03/15/24 09:00	03/15/24 17:40	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 17:40	1
Boron	<0.100		0.100		mg/L		03/15/24 09:00	03/15/24 17:40	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 17:40	1
Calcium	**68.5**		0.500		mg/L		03/15/24 09:00	03/15/24 17:40	1
Chromium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:40	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 17:40	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 17:40	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 17:40	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:40	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:40	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 17:40	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		03/15/24 10:52	03/18/24 09:54	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**264**		50.0		mg/L			03/13/24 16:42	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**8.0**	**HF**	1.0		SU			03/13/24 15:33	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	<0.102	U	0.0604	0.0606	1.00	0.102	pCi/L	03/15/24 10:09	04/10/24 07:16	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*99.5*		*30 - 110*	*03/15/24 10:09*	*04/10/24 07:16*	*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	<0.414	U	0.202	0.202	1.00	0.414	pCi/L	03/15/24 10:24	04/05/24 11:34	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*99.5*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:34*	*1*
Y Carrier	*81.5*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:34*	*1*

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Louisa East CCR Monofill

Job ID: 310-276637-1

Client Sample ID: MW-230_24_03
Date Collected: 03/12/24 12:50
Date Received: 03/13/24 09:10

Lab Sample ID: 310-276637-3
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	<0.414	U	0.211	0.211	5.00	0.414	pCi/L		04/11/24 10:00	1

Client Sample ID: MW-231_24_03
Lab Sample ID: 310-276637-4

Date Collected: 03/12/24 09:55
Matrix: Water
Date Received: 03/13/24 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			03/15/24 18:44	5
Fluoride	<1.00		1.00		mg/L			03/15/24 18:44	5
Sulfate	**8.63**		5.00		mg/L			03/15/24 18:44	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		03/15/24 09:00	03/15/24 17:42	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:42	1
Barium	**0.0736**		0.00200		mg/L		03/15/24 09:00	03/15/24 17:42	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 17:42	1
Boron	<0.100		0.100		mg/L		03/15/24 09:00	03/15/24 17:42	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 17:42	1
Calcium	**81.1**		0.500		mg/L		03/15/24 09:00	03/15/24 17:42	1
Chromium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:42	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 17:42	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 17:42	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 17:42	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:42	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:42	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 17:42	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		03/15/24 10:52	03/18/24 09:56	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**286**		50.0		mg/L			03/13/24 16:42	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.9**	**HF**	1.0		SU			03/13/24 15:29	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	<0.100	U	0.0705	0.0709	1.00	0.100	pCi/L	03/15/24 10:09	04/09/24 17:08	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*96.4*		*30 - 110*	*03/15/24 10:09*	*04/09/24 17:08*	*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	<0.479	U	0.275	0.275	1.00	0.479	pCi/L	03/15/24 10:24	04/05/24 11:36	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*96.4*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:36*	*1*
Y Carrier	*81.1*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:36*	*1*

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Louisa East CCR Monofill

Job ID: 310-276637-1

Client Sample ID: MW-231_24_03
Date Collected: 03/12/24 09:55
Date Received: 03/13/24 09:10

Lab Sample ID: 310-276637-4
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	<0.479	U	0.284	0.284	5.00	0.479	pCi/L		04/11/24 10:00	1

Client Sample ID: MW-232_24_03

Date Collected: 03/12/24 09:05
Date Received: 03/13/24 09:10

Lab Sample ID: 310-276637-5

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			03/15/24 18:57	5
Fluoride	<1.00		1.00		mg/L			03/15/24 18:57	5
Sulfate	**28.4**		5.00		mg/L			03/15/24 18:57	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		03/15/24 09:00	03/15/24 17:44	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:44	1
Barium	**0.0566**		0.00200		mg/L		03/15/24 09:00	03/15/24 17:44	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 17:44	1
Boron	<0.100		0.100		mg/L		03/15/24 09:00	03/15/24 17:44	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 17:44	1
Calcium	**69.1**		0.500		mg/L		03/15/24 09:00	03/15/24 17:44	1
Chromium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:44	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 17:44	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 17:44	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 17:44	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:44	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:44	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 17:44	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		03/15/24 10:52	03/18/24 10:03	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**278**		50.0		mg/L			03/13/24 16:42	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.9**	**HF**	1.0		SU			03/13/24 15:51	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	<0.135	U	0.0748	0.0748	1.00	0.135	pCi/L	03/15/24 10:09	04/09/24 17:08	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*95.1*		*30 - 110*	*03/15/24 10:09*	*04/09/24 17:08*	*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	<0.480	U	0.254	0.254	1.00	0.480	pCi/L	03/15/24 10:24	04/05/24 11:35	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*95.1*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:35*	*1*
Y Carrier	*84.1*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:35*	*1*

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Louisa East CCR Monofill

Job ID: 310-276637-1

Client Sample ID: MW-232_24_03
Date Collected: 03/12/24 09:05
Date Received: 03/13/24 09:10

Lab Sample ID: 310-276637-5
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	<0.480	U	0.265	0.265	5.00	0.480	pCi/L		04/11/24 10:03	1

Client Sample ID: MW-233_24_03

Date Collected: 03/12/24 08:20
Date Received: 03/13/24 09:10

Lab Sample ID: 310-276637-6

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**5.26**		5.00		mg/L			03/15/24 19:10	5
Fluoride	<1.00		1.00		mg/L			03/15/24 19:10	5
Sulfate	**86.4**		5.00		mg/L			03/15/24 19:10	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		03/15/24 09:00	03/15/24 17:47	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:47	1
Barium	**0.0477**		0.00200		mg/L		03/15/24 09:00	03/15/24 17:47	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 17:47	1
Boron	<0.100		0.100		mg/L		03/15/24 09:00	03/15/24 17:47	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 17:47	1
Calcium	**56.8**		0.500		mg/L		03/15/24 09:00	03/15/24 17:47	1
Chromium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:47	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 17:47	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 17:47	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 17:47	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:47	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:47	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 17:47	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		03/15/24 10:52	03/18/24 10:05	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**284**		50.0		mg/L			03/13/24 16:42	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**8.0**	**HF**	1.0		SU			03/13/24 16:03	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	<0.123	U	0.0663	0.0664	1.00	0.123	pCi/L	03/15/24 10:09	04/09/24 17:08	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*97.4*		*30 - 110*	*03/15/24 10:09*	*04/09/24 17:08*	*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	<0.492	U	0.283	0.283	1.00	0.492	pCi/L	03/15/24 10:24	04/05/24 11:35	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*97.4*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:35*	*1*
Y Carrier	*83.4*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:35*	*1*

Client: GHD Services Inc.
Job ID: 310-276637-1
Project/Site: MEC Louisa East CCR Monofill

Client Sample ID: MW-233_24_03
Lab Sample ID: 310-276637-6
Date Collected: 03/12/24 08:20
Matrix: Water
Date Received: 03/13/24 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	<0.492	U	0.291	0.291	5.00	0.492	pCi/L		04/11/24 10:03	1

Client Sample ID: MW-234_24_03
Lab Sample ID: 310-276637-7

Date Collected: 03/11/24 17:45
Matrix: Water
Date Received: 03/13/24 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			03/15/24 17:38	5
Fluoride	<1.00		1.00		mg/L			03/15/24 17:38	5
Sulfate	**27.9**		5.00		mg/L			03/15/24 17:38	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		03/15/24 09:00	03/15/24 17:49	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:49	1
Barium	**0.0304**		0.00200		mg/L		03/15/24 09:00	03/15/24 17:49	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 17:49	1
Boron	<0.100		0.100		mg/L		03/15/24 09:00	03/15/24 17:49	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 17:49	1
Calcium	**43.0**		0.500		mg/L		03/15/24 09:00	03/15/24 17:49	1
Chromium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:49	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 17:49	1
Lead	**0.000700**		0.000500		mg/L		03/15/24 09:00	03/15/24 17:49	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 17:49	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:49	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:49	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 17:49	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		03/15/24 10:52	03/18/24 10:07	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**192**		50.0		mg/L			03/13/24 16:42	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**8.0**	**HF**	1.0		SU			03/13/24 15:37	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	<0.110	U	0.0697	0.0699	1.00	0.110	pCi/L	03/15/24 10:09	04/09/24 17:08	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*93.3*		*30 - 110*	*03/15/24 10:09*	*04/09/24 17:08*	*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	<0.481	U	0.263	0.263	1.00	0.481	pCi/L	03/15/24 10:24	04/05/24 11:35	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*93.3*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:35*	*1*
Y Carrier	*82.2*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:35*	*1*

Client: GHD Services Inc.
Job ID: 310-276637-1
Project/Site: MEC Louisa East CCR Monofill

Client Sample ID: MW-234_24_03
Lab Sample ID: 310-276637-7
Date Collected: 03/11/24 17:45
Matrix: Water
Date Received: 03/13/24 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	<0.481	U	0.272	0.272	5.00	0.481	pCi/L		04/11/24 10:03	1

Client Sample ID: FD-1_24_03

Date Collected: 03/12/24 00:00
Date Received: 03/13/24 09:10

Lab Sample ID: 310-276637-8

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			03/15/24 19:24	5
Fluoride	<1.00		1.00		mg/L			03/15/24 19:24	5
Sulfate	**8.72**		5.00		mg/L			03/15/24 19:24	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		03/15/24 09:00	03/15/24 18:00	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:00	1
Barium	**0.0711**		0.00200		mg/L		03/15/24 09:00	03/15/24 18:00	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:00	1
Boron	<0.100		0.100		mg/L		03/15/24 09:00	03/15/24 18:00	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 18:00	1
Calcium	**79.7**		0.500		mg/L		03/15/24 09:00	03/15/24 18:00	1
Chromium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:00	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:00	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:00	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 18:00	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:00	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:00	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:00	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		03/15/24 10:52	03/18/24 10:09	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**296**		50.0		mg/L			03/13/24 16:42	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.9**	**HF**	1.0		SU			03/13/24 15:18	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	**0.120**		0.0875	0.0882	1.00	0.118	pCi/L	03/15/24 10:09	04/09/24 17:08	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*88.1*		*30 - 110*	*03/15/24 10:09*	*04/09/24 17:08*	*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	<0.547	U	0.324	0.325	1.00	0.547	pCi/L	03/15/24 10:24	04/05/24 11:35	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*88.1*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:35*	*1*
Y Carrier	*81.9*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:35*	*1*

Client: GHD Services Inc.
Job ID: 310-276637-1
Project/Site: MEC Louisa East CCR Monofill

Client Sample ID: FD-1_24_03
Lab Sample ID: 310-276637-8
Date Collected: 03/12/24 00:00
Matrix: Water
Date Received: 03/13/24 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	<0.547	U	0.336	0.337	5.00	0.547	pCi/L		04/11/24 10:03	1

Client Sample ID: FB-1_24_03
Lab Sample ID: 310-276637-9

Date Collected: 03/12/24 08:55
Matrix: Water
Date Received: 03/13/24 09:10

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			03/15/24 19:37	1
Fluoride	<0.200		0.200		mg/L			03/15/24 19:37	1
Sulfate	<1.00		1.00		mg/L			03/15/24 19:37	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		03/15/24 09:00	03/15/24 18:02	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:02	1
Barium	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:02	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:02	1
Boron	<0.100		0.100		mg/L		03/15/24 09:00	03/15/24 18:02	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 18:02	1
Calcium	<0.500		0.500		mg/L		03/15/24 09:00	03/15/24 18:02	1
Chromium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:02	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:02	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:02	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 18:02	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:02	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:02	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:02	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		03/15/24 10:52	03/18/24 10:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	<50.0		50.0		mg/L			03/13/24 16:42	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**5.7**	**HF**	1.0		SU			03/13/24 15:07	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	<0.168	U	0.0852	0.0852	1.00	0.168	pCi/L	03/15/24 10:09	04/09/24 17:08	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*99.5*		*30 - 110*	*03/15/24 10:09*	*04/09/24 17:08*	*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	<0.451	U	0.277	0.278	1.00	0.451	pCi/L	03/15/24 10:24	04/05/24 11:35	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*99.5*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:35*	*1*
Y Carrier	*85.6*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:35*	*1*

Client: GHD Services Inc.
Job ID: 310-276637-1
Project/Site: MEC Louisa East CCR Monofill

Client Sample ID: FB-1_24_03
Lab Sample ID: 310-276637-9
Date Collected: 03/12/24 08:55
Matrix: Water
Date Received: 03/13/24 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	<0.451	U	0.290	0.291	5.00	0.451	pCi/L		04/11/24 10:03	1

Definitions/Glossary

Client: GHD Services Inc.
Job ID: 310-276637-1
Project/Site: MEC Louisa East CCR Monofill

Qualifiers

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

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-416228/3
Matrix: Water
Analysis Batch: 416228

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			03/15/24 11:32	1
Fluoride	<0.200		0.200		mg/L			03/15/24 11:32	1
Sulfate	<1.00		1.00		mg/L			03/15/24 11:32	1

Lab Sample ID: LCS 310-416228/38
Matrix: Water
Analysis Batch: 416228

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	10.25		mg/L		103	90 - 110
Fluoride	2.00	2.196		mg/L		110	90 - 110
Sulfate	10.0	10.72		mg/L		107	90 - 110

Lab Sample ID: MB 310-416333/3
Matrix: Water
Analysis Batch: 416333

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			03/15/24 18:05	1
Fluoride	<0.200		0.200		mg/L			03/15/24 18:05	1
Sulfate	<1.00		1.00		mg/L			03/15/24 18:05	1

Lab Sample ID: LCS 310-416333/4
Matrix: Water
Analysis Batch: 416333

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	9.848		mg/L		98	90 - 110
Fluoride	2.00	2.053		mg/L		103	90 - 110
Sulfate	10.0	10.40		mg/L		104	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-416034/1-A
Matrix: Water
Analysis Batch: 416229

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 416034

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:28	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:28	1
Barium	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:28	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 17:28	1
Boron	<0.100		0.100		mg/L		03/15/24 09:00	03/15/24 17:28	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 17:28	1
Calcium	<0.500		0.500		mg/L		03/15/24 09:00	03/15/24 17:28	1
Chromium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:28	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 17:28	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 17:28	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 17:28	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 17:28	1

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

Lab Sample ID: MB 310-416034/1-A
Matrix: Water
Analysis Batch: 416229

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 416034

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 17:28	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 17:28	1

Lab Sample ID: LCS 310-416034/2-A
Matrix: Water
Analysis Batch: 416229

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 416034

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	0.200	0.2244		mg/L		112	80 - 120
Arsenic	0.200	0.2152		mg/L		108	80 - 120
Barium	0.100	0.1084		mg/L		108	80 - 120
Beryllium	0.100	0.1054		mg/L		105	80 - 120
Boron	0.200	0.1792		mg/L		90	80 - 120
Cadmium	0.100	0.1045		mg/L		104	80 - 120
Calcium	2.00	1.911		mg/L		96	80 - 120
Chromium	0.100	0.1035		mg/L		104	80 - 120
Cobalt	0.100	0.1023		mg/L		102	80 - 120
Lead	0.200	0.2145		mg/L		107	80 - 120
Lithium	0.200	0.2247		mg/L		112	80 - 120
Molybdenum	0.200	0.2037		mg/L		102	80 - 120
Selenium	0.400	0.4015		mg/L		100	80 - 120
Thallium	0.100	0.1126		mg/L		113	80 - 120

Lab Sample ID: 310-276637-1 DU
Matrix: Water
Analysis Batch: 416229

Client Sample ID: MW-213A_24_03
Prep Type: Total/NA
Prep Batch: 416034

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	<0.00200		<0.00200		mg/L		NC	20
Arsenic	<0.00200		<0.00200		mg/L		NC	20
Barium	0.0346		0.03403		mg/L		2	20
Beryllium	<0.00100		<0.00100		mg/L		NC	20
Boron	<0.100		<0.100		mg/L		NC	20
Cadmium	<0.000200		<0.000200		mg/L		NC	20
Calcium	45.0		43.22		mg/L		4	20
Chromium	<0.00500		<0.00500		mg/L		NC	20
Cobalt	<0.000500		<0.000500		mg/L		NC	20
Lead	<0.000500		<0.000500		mg/L		NC	20
Lithium	<0.0100		<0.0100		mg/L		NC	20
Molybdenum	<0.00200		<0.00200		mg/L		NC	20
Selenium	<0.00500		<0.00500		mg/L		NC	20
Thallium	<0.00100		<0.00100		mg/L		NC	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-416093/1-A
Matrix: Water
Analysis Batch: 416244

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 416093

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		03/15/24 10:51	03/18/24 09:41	1

Lab Sample ID: LCS 310-416093/2-A
Matrix: Water
Analysis Batch: 416244

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 416093

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Mercury			0.00167	0.001953		mg/L		117	80 - 120		

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

Lab Sample ID: MB 310-415917/1
Matrix: Water
Analysis Batch: 415917

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			03/13/24 16:42	1

Lab Sample ID: LCS 310-415917/2
Matrix: Water
Analysis Batch: 415917

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	936.0		mg/L		94	90 - 110		

Lab Sample ID: 310-276637-1 DU
Matrix: Water
Analysis Batch: 415917

Client Sample ID: MW-213A_24_03
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Dissolved Solids	136			154.0		mg/L				12	20

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-416002/1
Matrix: Water
Analysis Batch: 416002

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: 310-276637-1 DU
Matrix: Water
Analysis Batch: 416002

Client Sample ID: MW-213A_24_03
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH	8.0	HF		8.0		SU				0.2	20

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-652671/1-A
Matrix: Water
Analysis Batch: 656033

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 652671

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.2895		0.121	0.124	1.00	0.133	pCi/L	03/15/24 10:09	04/09/24 15:23	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*99.5*		*30 - 110*	*03/15/24 10:09*	*04/09/24 15:23*	*1*

Lab Sample ID: LCS 160-652671/2-A
Matrix: Water
Analysis Batch: 656033

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 652671

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-226			11.3	10.36		1.14	1.00	0.179	pCi/L	91	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*94.8*		*30 - 110*

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-652672/1-A
Matrix: Water
Analysis Batch: 655551

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 652672

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.433	U	0.209	0.210	1.00	0.433	pCi/L	03/15/24 10:24	04/05/24 11:34	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*99.5*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:34*	*1*
Y Carrier	*83.0*		*30 - 110*	*03/15/24 10:24*	*04/05/24 11:34*	*1*

Lab Sample ID: LCS 160-652672/2-A
Matrix: Water
Analysis Batch: 655551

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 652672

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-228			9.06	11.01		1.43	1.00	0.495	pCi/L	121	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*94.8*		*30 - 110*
Y Carrier	*81.1*		*30 - 110*

HPLC/IC

Analysis Batch: 416228

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276637-1	MW-213A_24_03	Total/NA	Water	9056A	
310-276637-2	MW-221A_24_03	Total/NA	Water	9056A	
310-276637-7	MW-234_24_03	Total/NA	Water	9056A	
MB 310-416228/3	Method Blank	Total/NA	Water	9056A	
LCS 310-416228/38	Lab Control Sample	Total/NA	Water	9056A	

Analysis Batch: 416333

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276637-3	MW-230_24_03	Total/NA	Water	9056A	
310-276637-4	MW-231_24_03	Total/NA	Water	9056A	
310-276637-5	MW-232_24_03	Total/NA	Water	9056A	
310-276637-6	MW-233_24_03	Total/NA	Water	9056A	
310-276637-8	FD-1_24_03	Total/NA	Water	9056A	
310-276637-9	FB-1_24_03	Total/NA	Water	9056A	
MB 310-416333/3	Method Blank	Total/NA	Water	9056A	
LCS 310-416333/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 416034

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276637-1	MW-213A_24_03	Total/NA	Water	3005A	
310-276637-2	MW-221A_24_03	Total/NA	Water	3005A	
310-276637-3	MW-230_24_03	Total/NA	Water	3005A	
310-276637-4	MW-231_24_03	Total/NA	Water	3005A	
310-276637-5	MW-232_24_03	Total/NA	Water	3005A	
310-276637-6	MW-233_24_03	Total/NA	Water	3005A	
310-276637-7	MW-234_24_03	Total/NA	Water	3005A	
310-276637-8	FD-1_24_03	Total/NA	Water	3005A	
310-276637-9	FB-1_24_03	Total/NA	Water	3005A	
MB 310-416034/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-416034/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-276637-1 DU	MW-213A_24_03	Total/NA	Water	3005A	

Prep Batch: 416093

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276637-1	MW-213A_24_03	Total/NA	Water	7470A	
310-276637-2	MW-221A_24_03	Total/NA	Water	7470A	
310-276637-3	MW-230_24_03	Total/NA	Water	7470A	
310-276637-4	MW-231_24_03	Total/NA	Water	7470A	
310-276637-5	MW-232_24_03	Total/NA	Water	7470A	
310-276637-6	MW-233_24_03	Total/NA	Water	7470A	
310-276637-7	MW-234_24_03	Total/NA	Water	7470A	
310-276637-8	FD-1_24_03	Total/NA	Water	7470A	
310-276637-9	FB-1_24_03	Total/NA	Water	7470A	
MB 310-416093/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-416093/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 416229

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276637-1	MW-213A_24_03	Total/NA	Water	6020B	416034

Metals (Continued)

Analysis Batch: 416229 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276637-2	MW-221A_24_03	Total/NA	Water	6020B	416034
310-276637-3	MW-230_24_03	Total/NA	Water	6020B	416034
310-276637-4	MW-231_24_03	Total/NA	Water	6020B	416034
310-276637-5	MW-232_24_03	Total/NA	Water	6020B	416034
310-276637-6	MW-233_24_03	Total/NA	Water	6020B	416034
310-276637-7	MW-234_24_03	Total/NA	Water	6020B	416034
310-276637-8	FD-1_24_03	Total/NA	Water	6020B	416034
310-276637-9	FB-1_24_03	Total/NA	Water	6020B	416034
MB 310-416034/1-A	Method Blank	Total/NA	Water	6020B	416034
LCS 310-416034/2-A	Lab Control Sample	Total/NA	Water	6020B	416034
310-276637-1 DU	MW-213A_24_03	Total/NA	Water	6020B	416034

Analysis Batch: 416244

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276637-1	MW-213A_24_03	Total/NA	Water	7470A	416093
310-276637-2	MW-221A_24_03	Total/NA	Water	7470A	416093
310-276637-3	MW-230_24_03	Total/NA	Water	7470A	416093
310-276637-4	MW-231_24_03	Total/NA	Water	7470A	416093
310-276637-5	MW-232_24_03	Total/NA	Water	7470A	416093
310-276637-6	MW-233_24_03	Total/NA	Water	7470A	416093
310-276637-7	MW-234_24_03	Total/NA	Water	7470A	416093
310-276637-8	FD-1_24_03	Total/NA	Water	7470A	416093
310-276637-9	FB-1_24_03	Total/NA	Water	7470A	416093
MB 310-416093/1-A	Method Blank	Total/NA	Water	7470A	416093
LCS 310-416093/2-A	Lab Control Sample	Total/NA	Water	7470A	416093

General Chemistry

Analysis Batch: 415917

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276637-1	MW-213A_24_03	Total/NA	Water	SM 2540C	
310-276637-2	MW-221A_24_03	Total/NA	Water	SM 2540C	
310-276637-3	MW-230_24_03	Total/NA	Water	SM 2540C	
310-276637-4	MW-231_24_03	Total/NA	Water	SM 2540C	
310-276637-5	MW-232_24_03	Total/NA	Water	SM 2540C	
310-276637-6	MW-233_24_03	Total/NA	Water	SM 2540C	
310-276637-7	MW-234_24_03	Total/NA	Water	SM 2540C	
310-276637-8	FD-1_24_03	Total/NA	Water	SM 2540C	
310-276637-9	FB-1_24_03	Total/NA	Water	SM 2540C	
MB 310-415917/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-415917/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-276637-1 DU	MW-213A_24_03	Total/NA	Water	SM 2540C	

Analysis Batch: 416002

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276637-1	MW-213A_24_03	Total/NA	Water	SM 4500 H+ B	
310-276637-2	MW-221A_24_03	Total/NA	Water	SM 4500 H+ B	
310-276637-3	MW-230_24_03	Total/NA	Water	SM 4500 H+ B	
310-276637-4	MW-231_24_03	Total/NA	Water	SM 4500 H+ B	
310-276637-5	MW-232_24_03	Total/NA	Water	SM 4500 H+ B	
310-276637-6	MW-233_24_03	Total/NA	Water	SM 4500 H+ B	

General Chemistry (Continued)

Analysis Batch: 416002 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276637-7	MW-234_24_03	Total/NA	Water	SM 4500 H+ B	
310-276637-8	FD-1_24_03	Total/NA	Water	SM 4500 H+ B	
310-276637-9	FB-1_24_03	Total/NA	Water	SM 4500 H+ B	
LCS 310-416002/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-276637-1 DU	MW-213A_24_03	Total/NA	Water	SM 4500 H+ B	

Rad

Prep Batch: 652671

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276637-1	MW-213A_24_03	Total/NA	Water	PrecSep-21	
310-276637-2	MW-221A_24_03	Total/NA	Water	PrecSep-21	
310-276637-3	MW-230_24_03	Total/NA	Water	PrecSep-21	
310-276637-4	MW-231_24_03	Total/NA	Water	PrecSep-21	
310-276637-5	MW-232_24_03	Total/NA	Water	PrecSep-21	
310-276637-6	MW-233_24_03	Total/NA	Water	PrecSep-21	
310-276637-7	MW-234_24_03	Total/NA	Water	PrecSep-21	
310-276637-8	FD-1_24_03	Total/NA	Water	PrecSep-21	
310-276637-9	FB-1_24_03	Total/NA	Water	PrecSep-21	
MB 160-652671/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-652671/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	

Prep Batch: 652672

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276637-1	MW-213A_24_03	Total/NA	Water	PrecSep_0	
310-276637-2	MW-221A_24_03	Total/NA	Water	PrecSep_0	
310-276637-3	MW-230_24_03	Total/NA	Water	PrecSep_0	
310-276637-4	MW-231_24_03	Total/NA	Water	PrecSep_0	
310-276637-5	MW-232_24_03	Total/NA	Water	PrecSep_0	
310-276637-6	MW-233_24_03	Total/NA	Water	PrecSep_0	
310-276637-7	MW-234_24_03	Total/NA	Water	PrecSep_0	
310-276637-8	FD-1_24_03	Total/NA	Water	PrecSep_0	
310-276637-9	FB-1_24_03	Total/NA	Water	PrecSep_0	
MB 160-652672/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-652672/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-276637-1
Project/Site: MEC Louisa East CCR Monofill

Client Sample ID: MW-213A_24_03
Lab Sample ID: 310-276637-1
Date Collected: 03/11/24 16:10
Matrix: Water
Date Received: 03/13/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416228	QTZ5	EET CF	03/15/24 17:10
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 17:33
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 09:50
Total/NA	Analysis	SM 2540C		1	415917	D7CP	EET CF	03/13/24 16:42
Total/NA	Analysis	SM 4500 H+ B		1	416002	WZC8	EET CF	03/13/24 15:55
Total/NA	Prep	PrecSep-21			652671	KAK	EET SL	03/15/24 10:09
Total/NA	Analysis	9315		1	656034	SWS	EET SL	04/09/24 15:15
Total/NA	Prep	PrecSep_0			652672	KAK	EET SL	03/15/24 10:24
Total/NA	Analysis	9320		1	655551	SCB	EET SL	04/05/24 11:34
Total/NA	Analysis	Ra226_Ra228		1	656458	FLC	EET SL	04/11/24 10:00

Client Sample ID: MW-221A_24_03
Lab Sample ID: 310-276637-2
Date Collected: 03/11/24 16:55
Matrix: Water
Date Received: 03/13/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416228	QTZ5	EET CF	03/15/24 17:24
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 17:38
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 09:52
Total/NA	Analysis	SM 2540C		1	415917	D7CP	EET CF	03/13/24 16:42
Total/NA	Analysis	SM 4500 H+ B		1	416002	WZC8	EET CF	03/13/24 15:41
Total/NA	Prep	PrecSep-21			652671	KAK	EET SL	03/15/24 10:09
Total/NA	Analysis	9315		1	656032	SWS	EET SL	04/09/24 16:23
Total/NA	Prep	PrecSep_0			652672	KAK	EET SL	03/15/24 10:24
Total/NA	Analysis	9320		1	655551	SCB	EET SL	04/05/24 11:34
Total/NA	Analysis	Ra226_Ra228		1	656458	FLC	EET SL	04/11/24 10:00

Client Sample ID: MW-230_24_03
Lab Sample ID: 310-276637-3
Date Collected: 03/12/24 12:50
Matrix: Water
Date Received: 03/13/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416333	QTZ5	EET CF	03/15/24 18:31
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 17:40
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 09:54
Total/NA	Analysis	SM 2540C		1	415917	D7CP	EET CF	03/13/24 16:42
Total/NA	Analysis	SM 4500 H+ B		1	416002	WZC8	EET CF	03/13/24 15:33

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-276637-1
Project/Site: MEC Louisa East CCR Monofill

Client Sample ID: MW-230_24_03
Lab Sample ID: 310-276637-3
Date Collected: 03/12/24 12:50
Matrix: Water
Date Received: 03/13/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			652671	KAK	EET SL	03/15/24 10:09
Total/NA	Analysis	9315		1	656281	SCB	EET SL	04/10/24 07:16
Total/NA	Prep	PrecSep_0			652672	KAK	EET SL	03/15/24 10:24
Total/NA	Analysis	9320		1	655551	SCB	EET SL	04/05/24 11:34
Total/NA	Analysis	Ra226_Ra228		1	656458	FLC	EET SL	04/11/24 10:00

Client Sample ID: MW-231_24_03
Lab Sample ID: 310-276637-4
Date Collected: 03/12/24 09:55
Matrix: Water
Date Received: 03/13/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416333	QTZ5	EET CF	03/15/24 18:44
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 17:42
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 09:56
Total/NA	Analysis	SM 2540C		1	415917	D7CP	EET CF	03/13/24 16:42
Total/NA	Analysis	SM 4500 H+ B		1	416002	WZC8	EET CF	03/13/24 15:29
Total/NA	Prep	PrecSep-21			652671	KAK	EET SL	03/15/24 10:09
Total/NA	Analysis	9315		1	656032	SWS	EET SL	04/09/24 17:08
Total/NA	Prep	PrecSep_0			652672	KAK	EET SL	03/15/24 10:24
Total/NA	Analysis	9320		1	655551	SCB	EET SL	04/05/24 11:36
Total/NA	Analysis	Ra226_Ra228		1	656458	FLC	EET SL	04/11/24 10:00

Client Sample ID: MW-232_24_03
Lab Sample ID: 310-276637-5
Date Collected: 03/12/24 09:05
Matrix: Water
Date Received: 03/13/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416333	QTZ5	EET CF	03/15/24 18:57
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 17:44
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 10:03
Total/NA	Analysis	SM 2540C		1	415917	D7CP	EET CF	03/13/24 16:42
Total/NA	Analysis	SM 4500 H+ B		1	416002	WZC8	EET CF	03/13/24 15:51
Total/NA	Prep	PrecSep-21			652671	KAK	EET SL	03/15/24 10:09
Total/NA	Analysis	9315		1	656032	SWS	EET SL	04/09/24 17:08
Total/NA	Prep	PrecSep_0			652672	KAK	EET SL	03/15/24 10:24
Total/NA	Analysis	9320		1	655551	SCB	EET SL	04/05/24 11:35
Total/NA	Analysis	Ra226_Ra228		1	656458	FLC	EET SL	04/11/24 10:03

Client Sample ID: MW-233_24_03

Lab Sample ID: 310-276637-6

Date Collected: 03/12/24 08:20

Matrix: Water

Date Received: 03/13/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416333	QTZ5	EET CF	03/15/24 19:10
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 17:47
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 10:05
Total/NA	Analysis	SM 2540C		1	415917	D7CP	EET CF	03/13/24 16:42
Total/NA	Analysis	SM 4500 H+ B		1	416002	WZC8	EET CF	03/13/24 16:03
Total/NA	Prep	PrecSep-21			652671	KAK	EET SL	03/15/24 10:09
Total/NA	Analysis	9315		1	656032	SWS	EET SL	04/09/24 17:08
Total/NA	Prep	PrecSep_0			652672	KAK	EET SL	03/15/24 10:24
Total/NA	Analysis	9320		1	655551	SCB	EET SL	04/05/24 11:35
Total/NA	Analysis	Ra226_Ra228		1	656458	FLC	EET SL	04/11/24 10:03

Client Sample ID: MW-234_24_03

Lab Sample ID: 310-276637-7

Date Collected: 03/11/24 17:45

Matrix: Water

Date Received: 03/13/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416228	QTZ5	EET CF	03/15/24 17:38
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 17:49
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 10:07
Total/NA	Analysis	SM 2540C		1	415917	D7CP	EET CF	03/13/24 16:42
Total/NA	Analysis	SM 4500 H+ B		1	416002	WZC8	EET CF	03/13/24 15:37
Total/NA	Prep	PrecSep-21			652671	KAK	EET SL	03/15/24 10:09
Total/NA	Analysis	9315		1	656032	SWS	EET SL	04/09/24 17:08
Total/NA	Prep	PrecSep_0			652672	KAK	EET SL	03/15/24 10:24
Total/NA	Analysis	9320		1	655551	SCB	EET SL	04/05/24 11:35
Total/NA	Analysis	Ra226_Ra228		1	656458	FLC	EET SL	04/11/24 10:03

Client Sample ID: FD-1_24_03

Lab Sample ID: 310-276637-8

Date Collected: 03/12/24 00:00

Matrix: Water

Date Received: 03/13/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416333	QTZ5	EET CF	03/15/24 19:24
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 18:00
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 10:09
Total/NA	Analysis	SM 2540C		1	415917	D7CP	EET CF	03/13/24 16:42
Total/NA	Analysis	SM 4500 H+ B		1	416002	WZC8	EET CF	03/13/24 15:18

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-276637-1
Project/Site: MEC Louisa East CCR Monofill

Client Sample ID: FD-1_24_03
Lab Sample ID: 310-276637-8
Date Collected: 03/12/24 00:00
Matrix: Water
Date Received: 03/13/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			652671	KAK	EET SL	03/15/24 10:09
Total/NA	Analysis	9315		1	656032	SWS	EET SL	04/09/24 17:08
Total/NA	Prep	PrecSep_0			652672	KAK	EET SL	03/15/24 10:24
Total/NA	Analysis	9320		1	655551	SCB	EET SL	04/05/24 11:35
Total/NA	Analysis	Ra226_Ra228		1	656458	FLC	EET SL	04/11/24 10:03

Client Sample ID: FB-1_24_03
Lab Sample ID: 310-276637-9
Date Collected: 03/12/24 08:55
Matrix: Water
Date Received: 03/13/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	416333	QTZ5	EET CF	03/15/24 19:37
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 18:02
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 10:11
Total/NA	Analysis	SM 2540C		1	415917	D7CP	EET CF	03/13/24 16:42
Total/NA	Analysis	SM 4500 H+ B		1	416002	WZC8	EET CF	03/13/24 15:07
Total/NA	Prep	PrecSep-21			652671	KAK	EET SL	03/15/24 10:09
Total/NA	Analysis	9315		1	656032	SWS	EET SL	04/09/24 17:08
Total/NA	Prep	PrecSep_0			652672	KAK	EET SL	03/15/24 10:24
Total/NA	Analysis	9320		1	655551	SCB	EET SL	04/05/24 11:35
Total/NA	Analysis	Ra226_Ra228		1	656458	FLC	EET SL	04/11/24 10:03

Laboratory References:

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

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Accreditation/Certification Summary

Client: GHD Services Inc. Job ID: 310-276637-1
Project/Site: MEC Louisa East CCR Monofill

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	12-01-25

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

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
9315	PrecSep-21	Water	Radium-226
9320	PrecSep_0	Water	Radium-228
Ra226_Ra228		Water	Combined Radium 226 + 228

Method Summary

Client: GHD Services Inc.
Project/Site: MEC Louisa East CCR Monofill

Job ID: 310-276637-1

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
9315	Radium-226 (GFPC)	SW846	EET SL
9320	Radium-228 (GFPC)	SW846	EET SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	EET SL
3005A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF
PrecSep_0	Preparation, Precipitate Separation	None	EET SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	EET SL

Protocol References:

None = None

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.

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

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

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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Place COC

310-276637 Chain of Custody

Cooler/Sample Receipt and Temperatur

Client Information

Client: GHD

City/State: CITY | STATE: TX | Project:

Receipt Information

Date/Time Received: DATE 3/13/24 TIME 0910 | Received By:

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 # 1 of 2
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: T | Correction Factor (°C): +0.0

• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 5.8 | Corrected Temp (°C): 5.8

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:		
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 | Environment Testing America

Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: GHD

City/State: CITY | STATE | Project:

Receipt Information

Date/Time Received: DATE 3/13/24 TIME 0810 | Received By: h

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: 2
Multiple Coolers?	☒ Yes	☐ No	*If yes:* Cooler # 2 of 2
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: T | Correction Factor (°C): +0.2

• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 0.7 | Corrected Temp (°C): 0.7

• Sample Container Temperature

	CONTAINER 1	CONTAINER 2
Container(s) used:		
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

DSM 214

eurofins | Environment Testing

Client Information	Sampler: Brooke Wasson	Lab PM: Zach T Bindert	Carrier Tracking No(s).	COC No:
Client Contact: Kevin Armstrong	Phone: 563-568-7524	E-Mail: Zach.Bindert@et.eurofinsus.com	State of Origin: Iowa	Page: Page 1 of 1
Company: GHD Services Inc.	PWSID:			Job #: 12575233
Address: 11228 Aurora Avenue	Due Date Requested:			
City: Des Moines	TAT Requested (days): Standard			
State, Zip: IA, 50322-7905	Compliance Project: Δ Yes Δ No			
Phone: 515-414-3935	PO #: 340-017016			
Email: Kevin.Armstrong@ghd com	WO #: 12575233-003			
Project Name: MEC Louisa East CCR Monofill	Project #: 31007299			
Site: MEC Louisa East CCR Monofill	SSOW#: 12575233-003			

Analysis Requested

Preservation Codes.

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9315_Ra226 - Standard Target List	9320_Ra228 Standard Target List	9056A_ORGFM_28D - Chloride, Fluoride, Sulfate	6020B, 7470A - CCR Metals List	2540C_Calcd, SM4500_H+	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D	N	D	N		
MW-213A_24_03	3/11	1610	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW-221A_24_03	3/11	1655	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW-230_24_03	3/12	1250	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW-231_24_03	3/12	0955	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW-232_24_03	3/12	0905	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW-233_24_03	3/12	0820	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW-234_24_03	3/11	1745	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
FD-1_24_03	3/12	—	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
FB-1_24_03	3/12	0855	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ■ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested I, II III IV Other (specify)

Special Instructions/QC Requirements. Database Facility Code: 11114676-GD-MidAmeri

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	B Watson	3/12/24	GHD	Pack + Ship	3/12/24	
2						
3					3/13/24 0910	

Custody Seals Intact: Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-276637-1

Login Number: 276637
List Number: 1
Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is </= 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 <6mm (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 Louisa East CCR Monofill

Job ID: 310-276637-1

Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(30-110)
310-276637-1	MW-213A_24_03	96.1
310-276637-2	MW-221A_24_03	89.4
310-276637-3	MW-230_24_03	99.5
310-276637-4	MW-231_24_03	96.4
310-276637-5	MW-232_24_03	95.1
310-276637-6	MW-233_24_03	97.4
310-276637-7	MW-234_24_03	93.3
310-276637-8	FD-1_24_03	88.1
310-276637-9	FB-1_24_03	99.5
LCS 160-652671/2-A	Lab Control Sample	94.8
MB 160-652671/1-A	Method Blank	99.5

Tracer/Carrier Legend

Ba = Barium

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)
310-276637-1	MW-213A_24_03	96.1	81.1
310-276637-2	MW-221A_24_03	89.4	82.2
310-276637-3	MW-230_24_03	99.5	81.5
310-276637-4	MW-231_24_03	96.4	81.1
310-276637-5	MW-232_24_03	95.1	84.1
310-276637-6	MW-233_24_03	97.4	83.4
310-276637-7	MW-234_24_03	93.3	82.2
310-276637-8	FD-1_24_03	88.1	81.9
310-276637-9	FB-1_24_03	99.5	85.6
LCS 160-652672/2-A	Lab Control Sample	94.8	81.1
MB 160-652672/1-A	Method Blank	99.5	83.0

Tracer/Carrier Legend

Ba = Barium
Y = Y Carrier

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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 Louisa East CCR Monofill

JOB NUMBER

310-289115-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

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

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Authorized for release by
Zach Bindert, Senior Project Manager
Zach.Bindert@et.eurofinsus.com
(319)595-2016

Table of Contents

Job ID: 310-289115-1 Eurofins Cedar Falls

Job Narrative
310-289115-1

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 and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided 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 8/28/2024 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 3 coolers at receipt time were 2.8°C, 2.9°C and 4.5°C.

HPLC/IC
Method 9056A_ORGFM_28D: The following sample was diluted due to the nature of the sample matrix: MW-213A_24_08 (310-289115-1). Elevated reporting limits (RLs) are provided.

Method 9056A_ORGFM_28D: The following samples were diluted due to the nature of the sample matrix: MW-221A_24_08 (310-289115-2), MW-230_24_08 (310-289115-3), MW-231_24_08 (310-289115-4), MW-232_24_08 (310-289115-5), MW-233_24_08 (310-289115-6), MW-234_24_08 (310-289115-7) and FD-1_24_08 (310-289115-8). 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.

Job ID: 310-289115-2 Eurofins Cedar Falls

Job Narrative
310-289115-2

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 and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided 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 8/28/2024 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 3 coolers at receipt time were 2.8°C, 2.9°C and 4.5°C.

Gas Flow Proportional Counter
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 Louisa East CCR Monofill

Job ID: 310-289115-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-289115-1	MW-213A_24_08	Water	08/26/24 20:20	08/28/24 09:10
310-289115-2	MW-221A_24_08	Water	08/27/24 07:45	08/28/24 09:10
310-289115-3	MW-230_24_08	Water	08/27/24 11:55	08/28/24 09:10
310-289115-4	MW-231_24_08	Water	08/27/24 10:55	08/28/24 09:10
310-289115-5	MW-232_24_08	Water	08/27/24 10:15	08/28/24 09:10
310-289115-6	MW-233_24_08	Water	08/27/24 09:20	08/28/24 09:10
310-289115-7	MW-234_24_08	Water	08/27/24 08:35	08/28/24 09:10
310-289115-8	FD-1_24_08	Water	08/27/24 00:00	08/28/24 09:10
310-289115-9	FB-1_24_08	Water	08/27/24 09:45	08/28/24 09:10

Detection Summary

Client: GHD Services Inc.
Project/Site: MEC Louisa East CCR Monofill

Job ID: 310-289115-1

Client Sample ID: MW-213A_24_08 — Lab Sample ID: 310-289115-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	14.0		5.00		mg/L	5		9056A	Total/NA
Sulfate	18.5		5.00		mg/L	5		9056A	Total/NA
Barium	0.0343		0.00200		mg/L	1		6020B	Total/NA
Calcium	50.7		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	206		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.8	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-221A_24_08 — Lab Sample ID: 310-289115-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	7.07		5.00		mg/L	5		9056A	Total/NA
Sulfate	9.62		5.00		mg/L	5		9056A	Total/NA
Barium	0.0270		0.00200		mg/L	1		6020B	Total/NA
Calcium	39.8		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	150		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.9	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-230_24_08 — Lab Sample ID: 310-289115-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	27.4		5.00		mg/L	5		9056A	Total/NA
Barium	0.0437		0.00200		mg/L	1		6020B	Total/NA
Calcium	67.2		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	250		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.7	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-231_24_08 — Lab Sample ID: 310-289115-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	14.5		5.00		mg/L	5		9056A	Total/NA
Barium	0.0935		0.00200		mg/L	1		6020B	Total/NA
Calcium	77.4		0.500		mg/L	1		6020B	Total/NA
Cobalt	0.00168		0.000500		mg/L	1		6020B	Total/NA
Lead	0.00138		0.000500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	264		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.6	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-232_24_08 — Lab Sample ID: 310-289115-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	20.0		5.00		mg/L	5		9056A	Total/NA
Barium	0.0655		0.00200		mg/L	1		6020B	Total/NA
Calcium	81.5		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	314		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-233_24_08 — Lab Sample ID: 310-289115-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	8.04		5.00		mg/L	5		9056A	Total/NA
Sulfate	64.8		5.00		mg/L	5		9056A	Total/NA
Barium	0.0692		0.00200		mg/L	1		6020B	Total/NA
Boron	0.104		0.100		mg/L	1		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-233_24_08 (Continued) — Lab Sample ID: 310-289115-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	84.1		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	370		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.7	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-234_24_08 — Lab Sample ID: 310-289115-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	6.24		5.00		mg/L	5		9056A	Total/NA
Sulfate	32.4		5.00		mg/L	5		9056A	Total/NA
Barium	0.0231		0.00200		mg/L	1		6020B	Total/NA
Calcium	35.3		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	156		50.0		mg/L	1		SM 2540C	Total/NA
pH	8.2	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: FD-1_24_08 — Lab Sample ID: 310-289115-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	16.3		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00208		0.00200		mg/L	1		6020B	Total/NA
Barium	0.111		0.00200		mg/L	1		6020B	Total/NA
Calcium	77.1		0.500		mg/L	1		6020B	Total/NA
Chromium	0.00862		0.00500		mg/L	1		6020B	Total/NA
Cobalt	0.00869		0.000500		mg/L	1		6020B	Total/NA
Lead	0.00399		0.000500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	274		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.6	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: FB-1_24_08 — Lab Sample ID: 310-289115-9

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	5.6	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-213A_24_08

Date Collected: 08/26/24 20:20
Date Received: 08/28/24 09:10

Lab Sample ID: 310-289115-1

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**14.0**		5.00		mg/L			08/28/24 19:25	5
Fluoride	<1.00		1.00		mg/L			08/28/24 19:25	5
Sulfate	**18.5**		5.00		mg/L			08/28/24 19:25	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		08/29/24 09:00	09/03/24 13:30	1
Arsenic	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 19:54	1
Barium	**0.0343**		0.00200		mg/L		08/29/24 09:00	08/30/24 19:54	1
Beryllium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 19:54	1
Boron	<0.100		0.100		mg/L		08/29/24 09:00	08/30/24 19:54	1
Cadmium	<0.000200		0.000200		mg/L		08/29/24 09:00	08/30/24 19:54	1
Calcium	**50.7**		0.500		mg/L		08/29/24 09:00	08/30/24 19:54	1
Chromium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 19:54	1
Cobalt	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 19:54	1
Lead	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 19:54	1
Lithium	<0.0100		0.0100		mg/L		08/29/24 09:00	08/30/24 19:54	1
Molybdenum	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 19:54	1
Selenium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 19:54	1
Thallium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 19:54	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/03/24 14:45	09/04/24 16:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**206**		50.0		mg/L			08/29/24 14:11	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.8**	**HF**	1.0		SU			08/28/24 11:08	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	<0.294	U	0.0992	0.0996	1.00	0.294	pCi/L	08/30/24 08:40	09/25/24 22:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*82.0*		*30 - 110*	*08/30/24 08:40*	*09/25/24 22:40*	*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	<0.699	U	0.448	0.450	1.00	0.699	pCi/L	08/30/24 08:52	09/25/24 11:51	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*82.0*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:51*	*1*
Y Carrier	*72.1*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:51*	*1*

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Louisa East CCR Monofill

Job ID: 310-289115-1

Client Sample ID: MW-213A_24_08

Date Collected: 08/26/24 20:20
Date Received: 08/28/24 09:10

Lab Sample ID: 310-289115-1

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	<0.699	U	0.459	0.461	5.00	0.699	pCi/L		09/27/24 12:38	1

Client Sample ID: MW-221A_24_08

Date Collected: 08/27/24 07:45
Date Received: 08/28/24 09:10

Lab Sample ID: 310-289115-2

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**7.07**		5.00		mg/L			09/03/24 10:40	5
Fluoride	<1.00		1.00		mg/L			09/03/24 10:40	5
Sulfate	**9.62**		5.00		mg/L			09/03/24 10:40	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		08/29/24 09:00	09/03/24 13:35	1
Arsenic	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:01	1
Barium	**0.0270**		0.00200		mg/L		08/29/24 09:00	08/30/24 20:01	1
Beryllium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:01	1
Boron	<0.100		0.100		mg/L		08/29/24 09:00	08/30/24 20:01	1
Cadmium	<0.000200		0.000200		mg/L		08/29/24 09:00	08/30/24 20:01	1
Calcium	**39.8**		0.500		mg/L		08/29/24 09:00	08/30/24 20:01	1
Chromium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 20:01	1
Cobalt	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 20:01	1
Lead	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 20:01	1
Lithium	<0.0100		0.0100		mg/L		08/29/24 09:00	08/30/24 20:01	1
Molybdenum	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:01	1
Selenium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 20:01	1
Thallium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:01	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/03/24 14:45	09/04/24 16:13	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**150**		50.0		mg/L			08/29/24 14:11	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.9**	**HF**	1.0		SU			08/28/24 11:09	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	<0.304	U	0.132	0.132	1.00	0.304	pCi/L	08/30/24 08:40	09/25/24 22:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*90.1*		*30 - 110*	*08/30/24 08:40*	*09/25/24 22:40*	*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	<0.648	U	0.361	0.361	1.00	0.648	pCi/L	08/30/24 08:52	09/25/24 11:51	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*90.1*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:51*	*1*
Y Carrier	*72.5*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:51*	*1*

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Louisa East CCR Monofill

Job ID: 310-289115-1

Client Sample ID: MW-221A_24_08

Date Collected: 08/27/24 07:45
Date Received: 08/28/24 09:10

Lab Sample ID: 310-289115-2

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	<0.648	U	0.384	0.384	5.00	0.648	pCi/L		09/27/24 12:38	1

Client Sample ID: MW-230_24_08
Lab Sample ID: 310-289115-3

Date Collected: 08/27/24 11:55
Matrix: Water
Date Received: 08/28/24 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			09/03/24 11:25	5
Fluoride	<1.00		1.00		mg/L			09/03/24 11:25	5
Sulfate	**27.4**		5.00		mg/L			09/03/24 11:25	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		08/29/24 09:00	09/03/24 13:37	1
Arsenic	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:05	1
Barium	**0.0437**		0.00200		mg/L		08/29/24 09:00	08/30/24 20:05	1
Beryllium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:05	1
Boron	<0.100		0.100		mg/L		08/29/24 09:00	08/30/24 20:05	1
Cadmium	<0.000200		0.000200		mg/L		08/29/24 09:00	08/30/24 20:05	1
Calcium	**67.2**		0.500		mg/L		08/29/24 09:00	08/30/24 20:05	1
Chromium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 20:05	1
Cobalt	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 20:05	1
Lead	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 20:05	1
Lithium	<0.0100		0.0100		mg/L		08/29/24 09:00	08/30/24 20:05	1
Molybdenum	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:05	1
Selenium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 20:05	1
Thallium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:05	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/03/24 14:45	09/04/24 16:15	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**250**		50.0		mg/L			08/29/24 14:11	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.7**	**HF**	1.0		SU			08/28/24 11:10	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	<0.272	U	0.165	0.165	1.00	0.272	pCi/L	08/30/24 08:40	09/25/24 22:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*93.1*		*30 - 110*	*08/30/24 08:40*	*09/25/24 22:40*	*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	<0.546	U	0.328	0.329	1.00	0.546	pCi/L	08/30/24 08:52	09/25/24 11:51	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*93.1*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:51*	*1*
Y Carrier	*77.4*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:51*	*1*

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Louisa East CCR Monofill

Job ID: 310-289115-1

Client Sample ID: MW-230_24_08

Date Collected: 08/27/24 11:55
Date Received: 08/28/24 09:10

Lab Sample ID: 310-289115-3

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	<0.546	U	0.367	0.368	5.00	0.546	pCi/L		09/27/24 12:38	1

Client Sample ID: MW-231_24_08

Date Collected: 08/27/24 10:55
Date Received: 08/28/24 09:10

Lab Sample ID: 310-289115-4

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			09/03/24 11:37	5
Fluoride	<1.00		1.00		mg/L			09/03/24 11:37	5
Sulfate	**14.5**		5.00		mg/L			09/03/24 11:37	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		08/29/24 09:00	09/03/24 13:48	1
Arsenic	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:09	1
Barium	**0.0935**		0.00200		mg/L		08/29/24 09:00	08/30/24 20:09	1
Beryllium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:09	1
Boron	<0.100		0.100		mg/L		08/29/24 09:00	08/30/24 20:09	1
Cadmium	<0.000200		0.000200		mg/L		08/29/24 09:00	08/30/24 20:09	1
Calcium	**77.4**		0.500		mg/L		08/29/24 09:00	08/30/24 20:09	1
Chromium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 20:09	1
Cobalt	**0.00168**		0.000500		mg/L		08/29/24 09:00	08/30/24 20:09	1
Lead	**0.00138**		0.000500		mg/L		08/29/24 09:00	08/30/24 20:09	1
Lithium	<0.0100		0.0100		mg/L		08/29/24 09:00	08/30/24 20:09	1
Molybdenum	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:09	1
Selenium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 20:09	1
Thallium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:09	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/03/24 14:45	09/04/24 16:18	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**264**		50.0		mg/L			08/29/24 14:11	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.6**	**HF**	1.0		SU			08/28/24 11:11	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	<0.328	U	0.148	0.148	1.00	0.328	pCi/L	08/30/24 08:40	09/25/24 22:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*85.7*		*30 - 110*	*08/30/24 08:40*	*09/25/24 22:40*	*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	<0.771	U	0.467	0.468	1.00	0.771	pCi/L	08/30/24 08:52	09/25/24 11:51	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*85.7*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:51*	*1*
Y Carrier	*74.0*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:51*	*1*

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Louisa East CCR Monofill

Job ID: 310-289115-1

Client Sample ID: MW-231_24_08

Date Collected: 08/27/24 10:55
Date Received: 08/28/24 09:10

Lab Sample ID: 310-289115-4

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	<0.771	U	0.490	0.491	5.00	0.771	pCi/L		09/27/24 12:38	1

Client Sample ID: MW-232_24_08

Date Collected: 08/27/24 10:15
Date Received: 08/28/24 09:10

Lab Sample ID: 310-289115-5

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			09/03/24 11:50	5
Fluoride	<1.00		1.00		mg/L			09/03/24 11:50	5
Sulfate	**20.0**		5.00		mg/L			09/03/24 11:50	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		08/29/24 09:00	09/03/24 13:51	1
Arsenic	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:12	1
Barium	**0.0655**		0.00200		mg/L		08/29/24 09:00	08/30/24 20:12	1
Beryllium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:12	1
Boron	<0.100		0.100		mg/L		08/29/24 09:00	08/30/24 20:12	1
Cadmium	<0.000200		0.000200		mg/L		08/29/24 09:00	08/30/24 20:12	1
Calcium	**81.5**		0.500		mg/L		08/29/24 09:00	08/30/24 20:12	1
Chromium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 20:12	1
Cobalt	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 20:12	1
Lead	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 20:12	1
Lithium	<0.0100		0.0100		mg/L		08/29/24 09:00	08/30/24 20:12	1
Molybdenum	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:12	1
Selenium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 20:12	1
Thallium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:12	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/03/24 14:45	09/04/24 16:24	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**314**		50.0		mg/L			08/29/24 14:11	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.5**	**HF**	1.0		SU			08/28/24 11:12	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	<0.319	U	0.130	0.130	1.00	0.319	pCi/L	08/30/24 08:40	09/25/24 22:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*93.6*		*30 - 110*	*08/30/24 08:40*	*09/25/24 22:45*	*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	**0.637**		0.383	0.388	1.00	0.559	pCi/L	08/30/24 08:52	09/25/24 11:51	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*93.6*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:51*	*1*
Y Carrier	*78.5*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:51*	*1*

Client: GHD Services Inc.
Job ID: 310-289115-1
Project/Site: MEC Louisa East CCR Monofill

Client Sample ID: MW-232_24_08
Lab Sample ID: 310-289115-5
Date Collected: 08/27/24 10:15
Matrix: Water
Date Received: 08/28/24 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	<0.559	U	0.404	0.409	5.00	0.559	pCi/L		09/27/24 12:38	1

Client Sample ID: MW-233_24_08
Lab Sample ID: 310-289115-6

Date Collected: 08/27/24 09:20
Matrix: Water
Date Received: 08/28/24 09:10

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**8.04**		5.00		mg/L			09/03/24 12:02	5
Fluoride	<1.00		1.00		mg/L			09/03/24 12:02	5
Sulfate	**64.8**		5.00		mg/L			09/03/24 12:02	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		08/29/24 09:00	09/03/24 13:53	1
Arsenic	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:31	1
Barium	**0.0692**		0.00200		mg/L		08/29/24 09:00	08/30/24 20:31	1
Beryllium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:31	1
Boron	**0.104**		0.100		mg/L		08/29/24 09:00	08/30/24 20:31	1
Cadmium	<0.000200		0.000200		mg/L		08/29/24 09:00	08/30/24 20:31	1
Calcium	**84.1**		0.500		mg/L		08/29/24 09:00	08/30/24 20:31	1
Chromium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 20:31	1
Cobalt	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 20:31	1
Lead	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 20:31	1
Lithium	<0.0100		0.0100		mg/L		08/29/24 09:00	08/30/24 20:31	1
Molybdenum	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:31	1
Selenium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 20:31	1
Thallium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:31	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/03/24 14:45	09/04/24 16:26	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**370**		50.0		mg/L			08/29/24 14:11	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.7**	**HF**	1.0		SU			08/28/24 11:13	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	<0.365	U	0.182	0.182	1.00	0.365	pCi/L	08/30/24 08:40	09/25/24 22:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*81.5*		*30 - 110*	*08/30/24 08:40*	*09/25/24 22:45*	*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	<0.736	U	0.349	0.350	1.00	0.736	pCi/L	08/30/24 08:52	09/25/24 11:51	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*81.5*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:51*	*1*
Y Carrier	*77.0*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:51*	*1*

Client Sample Results

Client: GHD Services Inc.
Project/Site: MEC Louisa East CCR Monofill

Job ID: 310-289115-1

Client Sample ID: MW-233_24_08

Date Collected: 08/27/24 09:20
Date Received: 08/28/24 09:10

Lab Sample ID: 310-289115-6

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	<0.736	U	0.394	0.394	5.00	0.736	pCi/L		09/27/24 12:38	1

Client Sample ID: MW-234_24_08

Date Collected: 08/27/24 08:35
Date Received: 08/28/24 09:10

Lab Sample ID: 310-289115-7

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**6.24**		5.00		mg/L			09/03/24 12:40	5
Fluoride	<1.00		1.00		mg/L			09/03/24 12:40	5
Sulfate	**32.4**		5.00		mg/L			09/03/24 12:40	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		08/29/24 09:00	09/03/24 13:55	1
Arsenic	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:34	1
Barium	**0.0231**		0.00200		mg/L		08/29/24 09:00	08/30/24 20:34	1
Beryllium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:34	1
Boron	<0.100		0.100		mg/L		08/29/24 09:00	08/30/24 20:34	1
Cadmium	<0.000200		0.000200		mg/L		08/29/24 09:00	08/30/24 20:34	1
Calcium	**35.3**		0.500		mg/L		08/29/24 09:00	08/30/24 20:34	1
Chromium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 20:34	1
Cobalt	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 20:34	1
Lead	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 20:34	1
Lithium	<0.0100		0.0100		mg/L		08/29/24 09:00	08/30/24 20:34	1
Molybdenum	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:34	1
Selenium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 20:34	1
Thallium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:34	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/03/24 14:45	09/04/24 16:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**156**		50.0		mg/L			08/29/24 14:11	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**8.2**	**HF**	1.0		SU			08/28/24 11:14	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	<0.343	U	0.153	0.154	1.00	0.343	pCi/L	08/30/24 08:40	09/25/24 22:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*86.0*		*30 - 110*	*08/30/24 08:40*	*09/25/24 22:45*	*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	<0.473	U	0.297	0.298	1.00	0.473	pCi/L	08/30/24 08:52	09/25/24 11:51	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*86.0*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:51*	*1*
Y Carrier	*88.2*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:51*	*1*

Client: GHD Services Inc.
Job ID: 310-289115-1
Project/Site: MEC Louisa East CCR Monofill

Client Sample ID: MW-234_24_08
Lab Sample ID: 310-289115-7
Date Collected: 08/27/24 08:35
Matrix: Water
Date Received: 08/28/24 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	<0.473	U	0.334	0.335	5.00	0.473	pCi/L		09/27/24 12:38	1

Client Sample ID: FD-1_24_08

Date Collected: 08/27/24 00:00
Date Received: 08/28/24 09:10

Lab Sample ID: 310-289115-8

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			09/03/24 12:53	5
Fluoride	<1.00		1.00		mg/L			09/03/24 12:53	5
Sulfate	**16.3**		5.00		mg/L			09/03/24 12:53	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		08/29/24 09:00	09/03/24 13:57	1
Arsenic	**0.00208**		0.00200		mg/L		08/29/24 09:00	08/30/24 20:38	1
Barium	**0.111**		0.00200		mg/L		08/29/24 09:00	08/30/24 20:38	1
Beryllium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:38	1
Boron	<0.100		0.100		mg/L		08/29/24 09:00	08/30/24 20:38	1
Cadmium	<0.000200		0.000200		mg/L		08/29/24 09:00	08/30/24 20:38	1
Calcium	**77.1**		0.500		mg/L		08/29/24 09:00	08/30/24 20:38	1
Chromium	**0.00862**		0.00500		mg/L		08/29/24 09:00	08/30/24 20:38	1
Cobalt	**0.00869**		0.000500		mg/L		08/29/24 09:00	08/30/24 20:38	1
Lead	**0.00399**		0.000500		mg/L		08/29/24 09:00	08/30/24 20:38	1
Lithium	<0.0100		0.0100		mg/L		08/29/24 09:00	08/30/24 20:38	1
Molybdenum	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:38	1
Selenium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 20:38	1
Thallium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:38	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/03/24 14:45	09/04/24 16:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**274**		50.0		mg/L			08/29/24 14:11	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.6**	**HF**	1.0		SU			08/28/24 11:03	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	<0.436	U	0.249	0.250	1.00	0.436	pCi/L	08/30/24 08:40	09/25/24 22:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*89.9*		*30 - 110*	*08/30/24 08:40*	*09/25/24 22:45*	*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	<0.756	U	0.470	0.472	1.00	0.756	pCi/L	08/30/24 08:52	09/25/24 11:52	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*89.9*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:52*	*1*
Y Carrier	*81.9*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:52*	*1*

Client: GHD Services Inc.
Job ID: 310-289115-1
Project/Site: MEC Louisa East CCR Monofill

Client Sample ID: FD-1_24_08
Lab Sample ID: 310-289115-8
Date Collected: 08/27/24 00:00
Matrix: Water
Date Received: 08/28/24 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	<0.756	U	0.532	0.534	5.00	0.756	pCi/L		09/27/24 12:38	1

Client Sample ID: FB-1_24_08

Date Collected: 08/27/24 09:45
Date Received: 08/28/24 09:10

Lab Sample ID: 310-289115-9

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			09/03/24 13:05	1
Fluoride	<0.200		0.200		mg/L			09/03/24 13:05	1
Sulfate	<1.00		1.00		mg/L			09/03/24 13:05	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		08/29/24 09:00	09/03/24 13:59	1
Arsenic	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:42	1
Barium	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:42	1
Beryllium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:42	1
Boron	<0.100		0.100		mg/L		08/29/24 09:00	08/30/24 20:42	1
Cadmium	<0.000200		0.000200		mg/L		08/29/24 09:00	08/30/24 20:42	1
Calcium	<0.500		0.500		mg/L		08/29/24 09:00	08/30/24 20:42	1
Chromium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 20:42	1
Cobalt	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 20:42	1
Lead	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 20:42	1
Lithium	<0.0100		0.0100		mg/L		08/29/24 09:00	08/30/24 20:42	1
Molybdenum	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 20:42	1
Selenium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 20:42	1
Thallium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 20:42	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/03/24 14:45	09/04/24 16:33	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	<50.0		50.0		mg/L			08/29/24 14:11	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**5.6**	**HF**	1.0		SU			08/29/24 07:28	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	<0.272	U	0.195	0.196	1.00	0.272	pCi/L	08/30/24 08:40	09/25/24 22:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*90.6*		*30 - 110*	*08/30/24 08:40*	*09/25/24 22:45*	*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	**0.610**		0.390	0.394	1.00	0.579	pCi/L	08/30/24 08:52	09/25/24 11:52	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*90.6*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:52*	*1*
Y Carrier	*82.6*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:52*	*1*

Client: GHD Services Inc.
Job ID: 310-289115-1
Project/Site: MEC Louisa East CCR Monofill

Client Sample ID: FB-1_24_08
Lab Sample ID: 310-289115-9
Date Collected: 08/27/24 09:45
Matrix: Water
Date Received: 08/28/24 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	0.877		0.436	0.440	5.00	0.579	pCi/L		09/27/24 12:38	1

Definitions/Glossary

Client: GHD Services Inc.
Job ID: 310-289115-1
Project/Site: MEC Louisa East CCR Monofill

Qualifiers

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

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-431769/3
Matrix: Water
Analysis Batch: 431769

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			08/28/24 15:11	1
Fluoride	<0.200		0.200		mg/L			08/28/24 15:11	1
Sulfate	<1.00		1.00		mg/L			08/28/24 15:11	1

Lab Sample ID: LCS 310-431769/4
Matrix: Water
Analysis Batch: 431769

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	9.687		mg/L		97	90 - 110
Fluoride	2.00	2.028		mg/L		101	90 - 110
Sulfate	10.0	10.20		mg/L		102	90 - 110

Lab Sample ID: MB 310-432166/3
Matrix: Water
Analysis Batch: 432166

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			09/03/24 10:03	1
Fluoride	<0.200		0.200		mg/L			09/03/24 10:03	1
Sulfate	<1.00		1.00		mg/L			09/03/24 10:03	1

Lab Sample ID: LCS 310-432166/4
Matrix: Water
Analysis Batch: 432166

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	9.331		mg/L		93	90 - 110
Fluoride	2.00	1.984		mg/L		99	90 - 110
Sulfate	10.0	9.912		mg/L		99	90 - 110

Lab Sample ID: 310-289115-2 MS
Matrix: Water
Analysis Batch: 432166

Client Sample ID: MW-221A_24_08
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	7.07		25.0	28.62		mg/L		86	80 - 120
Fluoride	<1.00		5.00	4.959		mg/L		99	80 - 120
Sulfate	9.62		25.0	33.80		mg/L		97	80 - 120

Lab Sample ID: 310-289115-2 MSD
Matrix: Water
Analysis Batch: 432166

Client Sample ID: MW-221A_24_08
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	7.07		25.0	28.60		mg/L		86	80 - 120	0	15
Fluoride	<1.00		5.00	4.944		mg/L		99	80 - 120	0	15
Sulfate	9.62		25.0	34.36		mg/L		99	80 - 120	2	15

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-431695/1-A
Matrix: Water
Analysis Batch: 431999

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 431695

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 18:27	1
Barium	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 18:27	1
Beryllium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 18:27	1
Boron	<0.100		0.100		mg/L		08/29/24 09:00	08/30/24 18:27	1
Cadmium	<0.000200		0.000200		mg/L		08/29/24 09:00	08/30/24 18:27	1
Calcium	<0.500		0.500		mg/L		08/29/24 09:00	08/30/24 18:27	1
Chromium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 18:27	1
Cobalt	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 18:27	1
Lead	<0.000500		0.000500		mg/L		08/29/24 09:00	08/30/24 18:27	1
Lithium	<0.0100		0.0100		mg/L		08/29/24 09:00	08/30/24 18:27	1
Molybdenum	<0.00200		0.00200		mg/L		08/29/24 09:00	08/30/24 18:27	1
Selenium	<0.00500		0.00500		mg/L		08/29/24 09:00	08/30/24 18:27	1
Thallium	<0.00100		0.00100		mg/L		08/29/24 09:00	08/30/24 18:27	1

Lab Sample ID: MB 310-431695/1-A
Matrix: Water
Analysis Batch: 432145

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 431695

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		08/29/24 09:00	09/03/24 13:17	1

Lab Sample ID: LCS 310-431695/2-A
Matrix: Water
Analysis Batch: 431999

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 431695

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	0.200	0.1955		mg/L		98	80 - 120
Barium	0.100	0.1005		mg/L		101	80 - 120
Beryllium	0.100	0.1032		mg/L		103	80 - 120
Boron	0.200	0.1863		mg/L		93	80 - 120
Cadmium	0.100	0.09646		mg/L		96	80 - 120
Calcium	2.00	1.947		mg/L		97	80 - 120
Chromium	0.100	0.1021		mg/L		102	80 - 120
Cobalt	0.100	0.1057		mg/L		106	80 - 120
Lead	0.200	0.2112		mg/L		106	80 - 120
Lithium	0.200	0.2163		mg/L		108	80 - 120
Molybdenum	0.200	0.2052		mg/L		103	80 - 120
Selenium	0.400	0.3553		mg/L		89	80 - 120
Thallium	0.100	0.08965		mg/L		90	80 - 120

Lab Sample ID: LCS 310-431695/2-A
Matrix: Water
Analysis Batch: 432145

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 431695

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	0.200	0.2174		mg/L		109	80 - 120

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

Lab Sample ID: 310-289115-1 DU
Matrix: Water
Analysis Batch: 431999

Client Sample ID: MW-213A_24_08
Prep Type: Total/NA
Prep Batch: 431695

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Arsenic	<0.00200		<0.00200		mg/L		NC	20
Barium	0.0343		0.03339		mg/L		3	20
Beryllium	<0.00100		<0.00100		mg/L		NC	20
Boron	<0.100		<0.100		mg/L		NC	20
Cadmium	<0.000200		<0.000200		mg/L		NC	20
Calcium	50.7		49.99		mg/L		1	20
Chromium	<0.00500		<0.00500		mg/L		NC	20
Cobalt	<0.000500		<0.000500		mg/L		NC	20
Lead	<0.000500		<0.000500		mg/L		NC	20
Lithium	<0.0100		<0.0100		mg/L		NC	20
Molybdenum	<0.00200		<0.00200		mg/L		NC	20
Selenium	<0.00500		<0.00500		mg/L		NC	20
Thallium	<0.00100		<0.00100		mg/L		NC	20

Lab Sample ID: 310-289115-1 DU
Matrix: Water
Analysis Batch: 432145

Client Sample ID: MW-213A_24_08
Prep Type: Total/NA
Prep Batch: 431695

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	<0.00200		<0.00200		mg/L		NC	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-432040/1-A
Matrix: Water
Analysis Batch: 432233

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 432040

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/03/24 14:45	09/04/24 16:01	1

Lab Sample ID: LCS 310-432040/2-A
Matrix: Water
Analysis Batch: 432233

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 432040

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001674		mg/L		100	80 - 120

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

Lab Sample ID: MB 310-431806/1
Matrix: Water
Analysis Batch: 431806

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			08/29/24 14:11	1

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

Lab Sample ID: LCS 310-431806/2
Matrix: Water
Analysis Batch: 431806

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	960.0		mg/L		96	88 - 110

Lab Sample ID: 310-289115-6 DU
Matrix: Water
Analysis Batch: 431806

Client Sample ID: MW-233_24_08
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	370		368.0		mg/L		0.5	16

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-431638/1
Matrix: Water
Analysis Batch: 431638

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: LCS 310-431718/1
Matrix: Water
Analysis Batch: 431718

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 160-677419/1-A
Matrix: Water
Analysis Batch: 680835

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 677419

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.306	U	0.148	0.148	1.00	0.306	pCi/L	08/30/24 08:40	09/25/24 22:40	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*89.9*		*30 - 110*	*08/30/24 08:40*	*09/25/24 22:40*	*1*

Lab Sample ID: LCS 160-677419/2-A
Matrix: Water
Analysis Batch: 680835

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 677419

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-226	9.58	9.313		1.23	1.00	0.299	pCi/L	97	75 - 125

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*86.2*		*30 - 110*

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

Lab Sample ID: 310-289115-1 DU
Matrix: Water
Analysis Batch: 680835

Client Sample ID: MW-213A_24_08
Prep Type: Total/NA
Prep Batch: 677419

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-226	<0.294	U		<0.232	U	0.136	1.00	0.232	pCi/L			0.83	1

Carrier	*DU %Yield*	*DU Qualifier*	*Limits*
Barium	*91.4*		*30 - 110*

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-677424/1-A
Matrix: Water
Analysis Batch: 680954

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 677424

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.8168		0.431	0.438	1.00	0.616	pCi/L	08/30/24 08:52	09/25/24 11:50	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*89.9*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:50*	*1*
Y Carrier	*80.4*		*30 - 110*	*08/30/24 08:52*	*09/25/24 11:50*	*1*

Lab Sample ID: LCS 160-677424/2-A
Matrix: Water
Analysis Batch: 680954

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 677424

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-228			8.48	9.520		1.35	1.00	0.638	pCi/L	112	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*86.2*		*30 - 110*
Y Carrier	*80.0*		*30 - 110*

Lab Sample ID: 310-289115-1 DU
Matrix: Water
Analysis Batch: 680954

Client Sample ID: MW-213A_24_08
Prep Type: Total/NA
Prep Batch: 677424

Analyte	Sample Result	Sample Qual		DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit			RER	RER Limit
Radium-228	<0.699	U		<0.564	U	0.303	1.00	0.564	pCi/L			0.68	1

Carrier	*DU %Yield*	*DU Qualifier*	*Limits*
Barium	*91.4*		*30 - 110*
Y Carrier	*73.3*		*30 - 110*

QC Association Summary

Client: GHD Services Inc.
Job ID: 310-289115-1
Project/Site: MEC Louisa East CCR Monofill

HPLC/IC

Analysis Batch: 431769

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289115-1	MW-213A_24_08	Total/NA	Water	9056A	
MB 310-431769/3	Method Blank	Total/NA	Water	9056A	
LCS 310-431769/4	Lab Control Sample	Total/NA	Water	9056A	

Analysis Batch: 432166

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289115-2	MW-221A_24_08	Total/NA	Water	9056A	
310-289115-3	MW-230_24_08	Total/NA	Water	9056A	
310-289115-4	MW-231_24_08	Total/NA	Water	9056A	
310-289115-5	MW-232_24_08	Total/NA	Water	9056A	
310-289115-6	MW-233_24_08	Total/NA	Water	9056A	
310-289115-7	MW-234_24_08	Total/NA	Water	9056A	
310-289115-8	FD-1_24_08	Total/NA	Water	9056A	
310-289115-9	FB-1_24_08	Total/NA	Water	9056A	
MB 310-432166/3	Method Blank	Total/NA	Water	9056A	
LCS 310-432166/4	Lab Control Sample	Total/NA	Water	9056A	
310-289115-2 MS	MW-221A_24_08	Total/NA	Water	9056A	
310-289115-2 MSD	MW-221A_24_08	Total/NA	Water	9056A	

Metals

Prep Batch: 431695

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289115-1	MW-213A_24_08	Total/NA	Water	3005A	
310-289115-2	MW-221A_24_08	Total/NA	Water	3005A	
310-289115-3	MW-230_24_08	Total/NA	Water	3005A	
310-289115-4	MW-231_24_08	Total/NA	Water	3005A	
310-289115-5	MW-232_24_08	Total/NA	Water	3005A	
310-289115-6	MW-233_24_08	Total/NA	Water	3005A	
310-289115-7	MW-234_24_08	Total/NA	Water	3005A	
310-289115-8	FD-1_24_08	Total/NA	Water	3005A	
310-289115-9	FB-1_24_08	Total/NA	Water	3005A	
MB 310-431695/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-431695/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-289115-1 DU	MW-213A_24_08	Total/NA	Water	3005A	

Analysis Batch: 431999

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289115-1	MW-213A_24_08	Total/NA	Water	6020B	431695
310-289115-2	MW-221A_24_08	Total/NA	Water	6020B	431695
310-289115-3	MW-230_24_08	Total/NA	Water	6020B	431695
310-289115-4	MW-231_24_08	Total/NA	Water	6020B	431695
310-289115-5	MW-232_24_08	Total/NA	Water	6020B	431695
310-289115-6	MW-233_24_08	Total/NA	Water	6020B	431695
310-289115-7	MW-234_24_08	Total/NA	Water	6020B	431695
310-289115-8	FD-1_24_08	Total/NA	Water	6020B	431695
310-289115-9	FB-1_24_08	Total/NA	Water	6020B	431695
MB 310-431695/1-A	Method Blank	Total/NA	Water	6020B	431695
LCS 310-431695/2-A	Lab Control Sample	Total/NA	Water	6020B	431695
310-289115-1 DU	MW-213A_24_08	Total/NA	Water	6020B	431695

Metals

Prep Batch: 432040

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289115-1	MW-213A_24_08	Total/NA	Water	7470A	
310-289115-2	MW-221A_24_08	Total/NA	Water	7470A	
310-289115-3	MW-230_24_08	Total/NA	Water	7470A	
310-289115-4	MW-231_24_08	Total/NA	Water	7470A	
310-289115-5	MW-232_24_08	Total/NA	Water	7470A	
310-289115-6	MW-233_24_08	Total/NA	Water	7470A	
310-289115-7	MW-234_24_08	Total/NA	Water	7470A	
310-289115-8	FD-1_24_08	Total/NA	Water	7470A	
310-289115-9	FB-1_24_08	Total/NA	Water	7470A	
MB 310-432040/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-432040/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 432145

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289115-1	MW-213A_24_08	Total/NA	Water	6020B	431695
310-289115-2	MW-221A_24_08	Total/NA	Water	6020B	431695
310-289115-3	MW-230_24_08	Total/NA	Water	6020B	431695
310-289115-4	MW-231_24_08	Total/NA	Water	6020B	431695
310-289115-5	MW-232_24_08	Total/NA	Water	6020B	431695
310-289115-6	MW-233_24_08	Total/NA	Water	6020B	431695
310-289115-7	MW-234_24_08	Total/NA	Water	6020B	431695
310-289115-8	FD-1_24_08	Total/NA	Water	6020B	431695
310-289115-9	FB-1_24_08	Total/NA	Water	6020B	431695
MB 310-431695/1-A	Method Blank	Total/NA	Water	6020B	431695
LCS 310-431695/2-A	Lab Control Sample	Total/NA	Water	6020B	431695
310-289115-1 DU	MW-213A_24_08	Total/NA	Water	6020B	431695

Analysis Batch: 432233

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289115-1	MW-213A_24_08	Total/NA	Water	7470A	432040
310-289115-2	MW-221A_24_08	Total/NA	Water	7470A	432040
310-289115-3	MW-230_24_08	Total/NA	Water	7470A	432040
310-289115-4	MW-231_24_08	Total/NA	Water	7470A	432040
310-289115-5	MW-232_24_08	Total/NA	Water	7470A	432040
310-289115-6	MW-233_24_08	Total/NA	Water	7470A	432040
310-289115-7	MW-234_24_08	Total/NA	Water	7470A	432040
310-289115-8	FD-1_24_08	Total/NA	Water	7470A	432040
310-289115-9	FB-1_24_08	Total/NA	Water	7470A	432040
MB 310-432040/1-A	Method Blank	Total/NA	Water	7470A	432040
LCS 310-432040/2-A	Lab Control Sample	Total/NA	Water	7470A	432040

General Chemistry

Analysis Batch: 431638

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289115-1	MW-213A_24_08	Total/NA	Water	SM 4500 H+ B	
310-289115-2	MW-221A_24_08	Total/NA	Water	SM 4500 H+ B	
310-289115-3	MW-230_24_08	Total/NA	Water	SM 4500 H+ B	
310-289115-4	MW-231_24_08	Total/NA	Water	SM 4500 H+ B	
310-289115-5	MW-232_24_08	Total/NA	Water	SM 4500 H+ B	
310-289115-6	MW-233_24_08	Total/NA	Water	SM 4500 H+ B	

General Chemistry (Continued)

Analysis Batch: 431638 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289115-7	MW-234_24_08	Total/NA	Water	SM 4500 H+ B	
310-289115-8	FD-1_24_08	Total/NA	Water	SM 4500 H+ B	
LCS 310-431638/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 431718

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289115-9	FB-1_24_08	Total/NA	Water	SM 4500 H+ B	
LCS 310-431718/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 431806

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289115-1	MW-213A_24_08	Total/NA	Water	SM 2540C	
310-289115-2	MW-221A_24_08	Total/NA	Water	SM 2540C	
310-289115-3	MW-230_24_08	Total/NA	Water	SM 2540C	
310-289115-4	MW-231_24_08	Total/NA	Water	SM 2540C	
310-289115-5	MW-232_24_08	Total/NA	Water	SM 2540C	
310-289115-6	MW-233_24_08	Total/NA	Water	SM 2540C	
310-289115-7	MW-234_24_08	Total/NA	Water	SM 2540C	
310-289115-8	FD-1_24_08	Total/NA	Water	SM 2540C	
310-289115-9	FB-1_24_08	Total/NA	Water	SM 2540C	
MB 310-431806/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-431806/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-289115-6 DU	MW-233_24_08	Total/NA	Water	SM 2540C	

Rad

Prep Batch: 677419

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289115-1	MW-213A_24_08	Total/NA	Water	PrecSep-21	
310-289115-2	MW-221A_24_08	Total/NA	Water	PrecSep-21	
310-289115-3	MW-230_24_08	Total/NA	Water	PrecSep-21	
310-289115-4	MW-231_24_08	Total/NA	Water	PrecSep-21	
310-289115-5	MW-232_24_08	Total/NA	Water	PrecSep-21	
310-289115-6	MW-233_24_08	Total/NA	Water	PrecSep-21	
310-289115-7	MW-234_24_08	Total/NA	Water	PrecSep-21	
310-289115-8	FD-1_24_08	Total/NA	Water	PrecSep-21	
310-289115-9	FB-1_24_08	Total/NA	Water	PrecSep-21	
MB 160-677419/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-677419/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
310-289115-1 DU	MW-213A_24_08	Total/NA	Water	PrecSep-21	

Prep Batch: 677424

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289115-1	MW-213A_24_08	Total/NA	Water	PrecSep_0	
310-289115-2	MW-221A_24_08	Total/NA	Water	PrecSep_0	
310-289115-3	MW-230_24_08	Total/NA	Water	PrecSep_0	
310-289115-4	MW-231_24_08	Total/NA	Water	PrecSep_0	
310-289115-5	MW-232_24_08	Total/NA	Water	PrecSep_0	
310-289115-6	MW-233_24_08	Total/NA	Water	PrecSep_0	
310-289115-7	MW-234_24_08	Total/NA	Water	PrecSep_0	
310-289115-8	FD-1_24_08	Total/NA	Water	PrecSep_0	

Rad (Continued)

Prep Batch: 677424 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289115-9	FB-1_24_08	Total/NA	Water	PrecSep_0	
MB 160-677424/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-677424/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
310-289115-1 DU	MW-213A_24_08	Total/NA	Water	PrecSep_0	

Client Sample ID: MW-213A_24_08

Lab Sample ID: 310-289115-1

Date Collected: 08/26/24 20:20

Matrix: Water

Date Received: 08/28/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	431769	QTZ5	EET CF	08/28/24 19:25
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	431999	NFT2	EET CF	08/30/24 19:54
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 13:30
Total/NA	Prep	7470A			432040	DHM5	EET CF	09/03/24 14:45
Total/NA	Analysis	7470A		1	432233	DHM5	EET CF	09/04/24 16:11
Total/NA	Analysis	SM 2540C		1	431806	MDU9	EET CF	08/29/24 14:11
Total/NA	Analysis	SM 4500 H+ B		1	431638	W9YR	EET CF	08/28/24 11:08
Total/NA	Prep	PrecSep-21			677419	MLT	EET SL	08/30/24 08:40
Total/NA	Analysis	9315		1	680835	FLC	EET SL	09/25/24 22:40
Total/NA	Prep	PrecSep_0			677424	MLT	EET SL	08/30/24 08:52
Total/NA	Analysis	9320		1	680954	FLC	EET SL	09/25/24 11:51
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 12:38

Client Sample ID: MW-221A_24_08

Lab Sample ID: 310-289115-2

Date Collected: 08/27/24 07:45

Matrix: Water

Date Received: 08/28/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	432166	QTZ5	EET CF	09/03/24 10:40
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	431999	NFT2	EET CF	08/30/24 20:01
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 13:35
Total/NA	Prep	7470A			432040	DHM5	EET CF	09/03/24 14:45
Total/NA	Analysis	7470A		1	432233	DHM5	EET CF	09/04/24 16:13
Total/NA	Analysis	SM 2540C		1	431806	MDU9	EET CF	08/29/24 14:11
Total/NA	Analysis	SM 4500 H+ B		1	431638	W9YR	EET CF	08/28/24 11:09
Total/NA	Prep	PrecSep-21			677419	MLT	EET SL	08/30/24 08:40
Total/NA	Analysis	9315		1	680835	FLC	EET SL	09/25/24 22:40
Total/NA	Prep	PrecSep_0			677424	MLT	EET SL	08/30/24 08:52
Total/NA	Analysis	9320		1	680954	FLC	EET SL	09/25/24 11:51
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 12:38

Client Sample ID: MW-230_24_08

Lab Sample ID: 310-289115-3

Date Collected: 08/27/24 11:55

Matrix: Water

Date Received: 08/28/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	432166	QTZ5	EET CF	09/03/24 11:25
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	431999	NFT2	EET CF	08/30/24 20:05

Client Sample ID: MW-230_24_08

Lab Sample ID: 310-289115-3

Date Collected: 08/27/24 11:55

Matrix: Water

Date Received: 08/28/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 13:37
Total/NA	Prep	7470A			432040	DHM5	EET CF	09/03/24 14:45
Total/NA	Analysis	7470A		1	432233	DHM5	EET CF	09/04/24 16:15
Total/NA	Analysis	SM 2540C		1	431806	MDU9	EET CF	08/29/24 14:11
Total/NA	Analysis	SM 4500 H+ B		1	431638	W9YR	EET CF	08/28/24 11:10
Total/NA	Prep	PrecSep-21			677419	MLT	EET SL	08/30/24 08:40
Total/NA	Analysis	9315		1	680835	FLC	EET SL	09/25/24 22:40
Total/NA	Prep	PrecSep_0			677424	MLT	EET SL	08/30/24 08:52
Total/NA	Analysis	9320		1	680954	FLC	EET SL	09/25/24 11:51
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 12:38

Client Sample ID: MW-231_24_08

Lab Sample ID: 310-289115-4

Date Collected: 08/27/24 10:55

Matrix: Water

Date Received: 08/28/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	432166	QTZ5	EET CF	09/03/24 11:37
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	431999	NFT2	EET CF	08/30/24 20:09
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 13:48
Total/NA	Prep	7470A			432040	DHM5	EET CF	09/03/24 14:45
Total/NA	Analysis	7470A		1	432233	DHM5	EET CF	09/04/24 16:18
Total/NA	Analysis	SM 2540C		1	431806	MDU9	EET CF	08/29/24 14:11
Total/NA	Analysis	SM 4500 H+ B		1	431638	W9YR	EET CF	08/28/24 11:11
Total/NA	Prep	PrecSep-21			677419	MLT	EET SL	08/30/24 08:40
Total/NA	Analysis	9315		1	680835	FLC	EET SL	09/25/24 22:40
Total/NA	Prep	PrecSep_0			677424	MLT	EET SL	08/30/24 08:52
Total/NA	Analysis	9320		1	680954	FLC	EET SL	09/25/24 11:51
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 12:38

Client Sample ID: MW-232_24_08

Lab Sample ID: 310-289115-5

Date Collected: 08/27/24 10:15

Matrix: Water

Date Received: 08/28/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	432166	QTZ5	EET CF	09/03/24 11:50
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	431999	NFT2	EET CF	08/30/24 20:12
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 13:51
Total/NA	Prep	7470A			432040	DHM5	EET CF	09/03/24 14:45
Total/NA	Analysis	7470A		1	432233	DHM5	EET CF	09/04/24 16:24

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-289115-1
Project/Site: MEC Louisa East CCR Monofill

Client Sample ID: MW-232_24_08
Lab Sample ID: 310-289115-5
Date Collected: 08/27/24 10:15
Matrix: Water
Date Received: 08/28/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 2540C		1	431806	MDU9	EET CF	08/29/24 14:11
Total/NA	Analysis	SM 4500 H+ B		1	431638	W9YR	EET CF	08/28/24 11:12
Total/NA	Prep	PrecSep-21			677419	MLT	EET SL	08/30/24 08:40
Total/NA	Analysis	9315		1	680954	FLC	EET SL	09/25/24 22:45
Total/NA	Prep	PrecSep_0			677424	MLT	EET SL	08/30/24 08:52
Total/NA	Analysis	9320		1	680954	FLC	EET SL	09/25/24 11:51
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 12:38

Client Sample ID: MW-233_24_08
Lab Sample ID: 310-289115-6
Date Collected: 08/27/24 09:20
Matrix: Water
Date Received: 08/28/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	432166	QTZ5	EET CF	09/03/24 12:02
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	431999	NFT2	EET CF	08/30/24 20:31
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 13:53
Total/NA	Prep	7470A			432040	DHM5	EET CF	09/03/24 14:45
Total/NA	Analysis	7470A		1	432233	DHM5	EET CF	09/04/24 16:26
Total/NA	Analysis	SM 2540C		1	431806	MDU9	EET CF	08/29/24 14:11
Total/NA	Analysis	SM 4500 H+ B		1	431638	W9YR	EET CF	08/28/24 11:13
Total/NA	Prep	PrecSep-21			677419	MLT	EET SL	08/30/24 08:40
Total/NA	Analysis	9315		1	680954	FLC	EET SL	09/25/24 22:45
Total/NA	Prep	PrecSep_0			677424	MLT	EET SL	08/30/24 08:52
Total/NA	Analysis	9320		1	680954	FLC	EET SL	09/25/24 11:51
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 12:38

Client Sample ID: MW-234_24_08
Lab Sample ID: 310-289115-7
Date Collected: 08/27/24 08:35
Matrix: Water
Date Received: 08/28/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	432166	QTZ5	EET CF	09/03/24 12:40
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	431999	NFT2	EET CF	08/30/24 20:34
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 13:55
Total/NA	Prep	7470A			432040	DHM5	EET CF	09/03/24 14:45
Total/NA	Analysis	7470A		1	432233	DHM5	EET CF	09/04/24 16:28
Total/NA	Analysis	SM 2540C		1	431806	MDU9	EET CF	08/29/24 14:11
Total/NA	Analysis	SM 4500 H+ B		1	431638	W9YR	EET CF	08/28/24 11:14
Total/NA	Prep	PrecSep-21			677419	MLT	EET SL	08/30/24 08:40
Total/NA	Analysis	9315		1	680954	FLC	EET SL	09/25/24 22:45

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-289115-1
Project/Site: MEC Louisa East CCR Monofill

Client Sample ID: MW-234_24_08
Lab Sample ID: 310-289115-7
Date Collected: 08/27/24 08:35
Matrix: Water
Date Received: 08/28/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep_0			677424	MLT	EET SL	08/30/24 08:52
Total/NA	Analysis	9320		1	680954	FLC	EET SL	09/25/24 11:51
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 12:38

Client Sample ID: FD-1_24_08
Lab Sample ID: 310-289115-8
Date Collected: 08/27/24 00:00
Matrix: Water
Date Received: 08/28/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	432166	QTZ5	EET CF	09/03/24 12:53
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	431999	NFT2	EET CF	08/30/24 20:38
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 13:57
Total/NA	Prep	7470A			432040	DHM5	EET CF	09/03/24 14:45
Total/NA	Analysis	7470A		1	432233	DHM5	EET CF	09/04/24 16:30
Total/NA	Analysis	SM 2540C		1	431806	MDU9	EET CF	08/29/24 14:11
Total/NA	Analysis	SM 4500 H+ B		1	431638	W9YR	EET CF	08/28/24 11:03
Total/NA	Prep	PrecSep-21			677419	MLT	EET SL	08/30/24 08:40
Total/NA	Analysis	9315		1	680954	FLC	EET SL	09/25/24 22:45
Total/NA	Prep	PrecSep_0			677424	MLT	EET SL	08/30/24 08:52
Total/NA	Analysis	9320		1	680954	FLC	EET SL	09/25/24 11:52
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 12:38

Client Sample ID: FB-1_24_08
Lab Sample ID: 310-289115-9
Date Collected: 08/27/24 09:45
Matrix: Water
Date Received: 08/28/24 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	432166	QTZ5	EET CF	09/03/24 13:05
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	431999	NFT2	EET CF	08/30/24 20:42
Total/NA	Prep	3005A			431695	QTZ5	EET CF	08/29/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 13:59
Total/NA	Prep	7470A			432040	DHM5	EET CF	09/03/24 14:45
Total/NA	Analysis	7470A		1	432233	DHM5	EET CF	09/04/24 16:33
Total/NA	Analysis	SM 2540C		1	431806	MDU9	EET CF	08/29/24 14:11
Total/NA	Analysis	SM 4500 H+ B		1	431718	W9YR	EET CF	08/29/24 07:28
Total/NA	Prep	PrecSep-21			677419	MLT	EET SL	08/30/24 08:40
Total/NA	Analysis	9315		1	680954	FLC	EET SL	09/25/24 22:45
Total/NA	Prep	PrecSep_0			677424	MLT	EET SL	08/30/24 08:52
Total/NA	Analysis	9320		1	680954	FLC	EET SL	09/25/24 11:52
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 12:38

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-289115-1
Project/Site: MEC Louisa East CCR Monofill

Laboratory References:

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

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Accreditation/Certification Summary

Client: GHD Services Inc. Job ID: 310-289115-1
Project/Site: MEC Louisa East CCR Monofill

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	12-01-25

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

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
9315	PrecSep-21	Water	Radium-226
9320	PrecSep_0	Water	Radium-228
Ra226_Ra228		Water	Combined Radium 226 + 228

Method Summary

Client: GHD Services Inc.
Job ID: 310-289115-1
Project/Site: MEC Louisa East CCR Monofill

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
9315	Radium-226 (GFPC)	SW846	EET SL
9320	Radium-228 (GFPC)	SW846	EET SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	EET SL
3005A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF
PrecSep_0	Preparation, Precipitate Separation	None	EET SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	EET SL

Protocol References:

None = None

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.

TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

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

EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

eurofins | Environment Testing America

310-289115 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: GHD

City/State: CITY DESMOINES | STATE IA | Project:

Receipt Information

Date/Time Received: DATE 8/28/24 | TIME 0910 | Received By: JL

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 # 1 of 3

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: 2 | 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): 2.0 | Corrected Temp (°C): 2.0

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:		
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 | Environment Testing America

Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: GHD

City/State: CITY Des Moines STATE IA Project:

Receipt Information

Date/Time Received. DATE 8/28/24 TIME 0910 Received By: JA

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 # 2 of 3

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: 2 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): 2.9 Corrected Temp (°C): 2.9

• Sample Container Temperature

	CONTAINER 1	CONTAINER 2
Container(s) used:		
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 | Environment Testing America

Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: GHD

City/State: CITY Des Moines STATE IA Project:

Receipt Information

Date/Time Received: DATE 8/28/24 TIME 0910 Received By: JL

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 3

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: 2 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): 4.5 Corrected Temp (°C): 4.5

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:		
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

TestAmerica Des Moines SC
214

eurofins

Client Information	Sampler: Brooke Wasson	Lab PM: Zach T Bindert	Carrier Tracking No(s):	COC No:
Client Contact: Kevin Armstrong	Phone: 563-568-7524	E-Mail: Zach.Bindert@et.eurofinsus.com	State of Origin: Iowa	Page: Page 1 of 1
Company: GHD Services Inc.	PWSID:			Job #:
Address: 11228 Aurora Avenue	Due Date Requested:			
City: Des Moines	TAT Requested (days): Standard			
State, Zip: IA, 50322-7905	Compliance Project: Δ Yes Δ No			
Phone: 515-414-3935	PO #: 340-017016			
Email: Kevin.Armstrong@ghd.com	WO #: 12575233-003			
Project Name: MEC Louisa East CCR Monofill	Project #: 31007299			
Site: MEC Louisa East CCR Monofill	SSOW#: 12575233-003			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9315_Ra226 - Standard Target List	9320_Ra228 - Standard Target List	9056A_ORGFM_28D - Chloride, Fluoride, Sulfate	6020B, 7470A - CCR Metals List	2540C_Calcd, SM4500_H+	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D	N	D	N		
MW-213A_24_08	8/26/24	2020	G	W	N		X	X	X	X	X		All Appendix III and Appendix IV constituents
MW-221A_24_08	8/27/24	0745	G	W	N		X	X	X	X	X		All Appendix III and Appendix IV constituents
MW-230_24_08	8/27/24	1155	G	W	N		X	X	X	X	X		All Appendix III and Appendix IV constituents
MW-231_24_08	8/27/24	1055	G	W	N		X	X	X	X	X		All Appendix III and Appendix IV constituents
MW-232_24_08	8/27/24	1015	G	W	N		X	X	X	X	X		All Appendix III and Appendix IV constituents
MW-233_24_08	8/27/24	0920	G	W	N		X	X	X	X	X		All Appendix III and Appendix IV constituents
MW-234_24_08	8/27/24	0835	G	W	N		X	X	X	X	X		All Appendix III and Appendix IV constituents
FD-1_24_08	8/27/24	—	G	W	N		X	X	X	X	X		All Appendix III and Appendix IV constituents
FB-1_24_08	8/27/24	0945	G	W	N		X	X	X	X	X		All Appendix III and Appendix IV constituents

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ■ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ■ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: Database Facility Code 11114676-GD-MidAmeri

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Brooke Wasson	8/27	GHD	Fedex	8/27	
2						
3					8/28/24	0910

Custody Seals Intact: Δ Yes Δ No | Custody Seal No

Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-289115-1
SDG Number:

Login Number: 289115
List Number: 1
Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is </= 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 <6mm (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.
Job ID: 310-289115-1
Project/Site: MEC Louisa East CCR Monofill

Method: 9315 - Radium-226 (GFPC)

Matrix: Water — **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Ba (30-110)
310-289115-1	MW-213A_24_08	82.0
310-289115-1 DU	MW-213A_24_08	91.4
310-289115-2	MW-221A_24_08	90.1
310-289115-3	MW-230_24_08	93.1
310-289115-4	MW-231_24_08	85.7
310-289115-5	MW-232_24_08	93.6
310-289115-6	MW-233_24_08	81.5
310-289115-7	MW-234_24_08	86.0
310-289115-8	FD-1_24_08	89.9
310-289115-9	FB-1_24_08	90.6
LCS 160-677419/2-A	Lab Control Sample	86.2
MB 160-677419/1-A	Method Blank	89.9

Tracer/Carrier Legend

Ba = Barium

Method: 9320 - Radium-228 (GFPC)

Matrix: Water — **Prep Type: Total/NA**

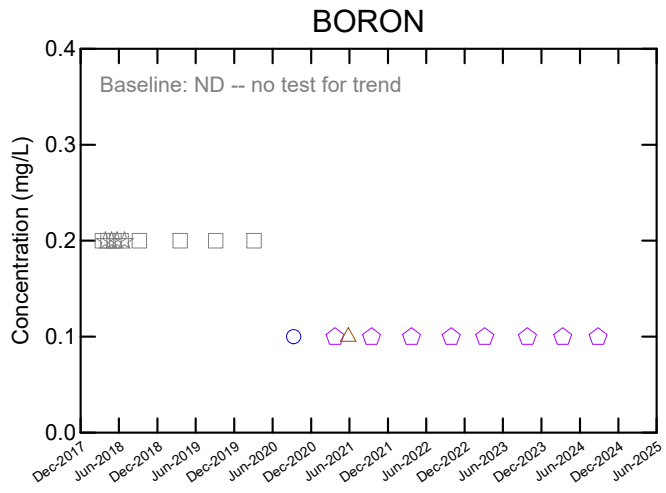
		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)
310-289115-1	MW-213A_24_08	82.0	72.1
310-289115-1 DU	MW-213A_24_08	91.4	73.3
310-289115-2	MW-221A_24_08	90.1	72.5
310-289115-3	MW-230_24_08	93.1	77.4
310-289115-4	MW-231_24_08	85.7	74.0
310-289115-5	MW-232_24_08	93.6	78.5
310-289115-6	MW-233_24_08	81.5	77.0
310-289115-7	MW-234_24_08	86.0	88.2
310-289115-8	FD-1_24_08	89.9	81.9
310-289115-9	FB-1_24_08	90.6	82.6
LCS 160-677424/2-A	Lab Control Sample	86.2	80.0
MB 160-677424/1-A	Method Blank	89.9	80.4

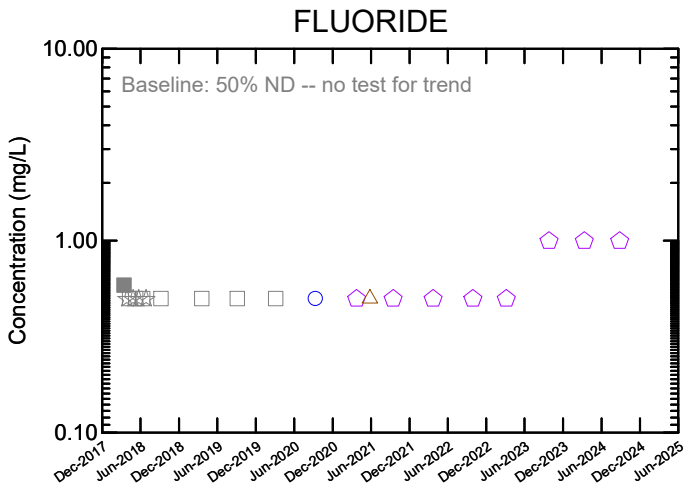
Tracer/Carrier Legend

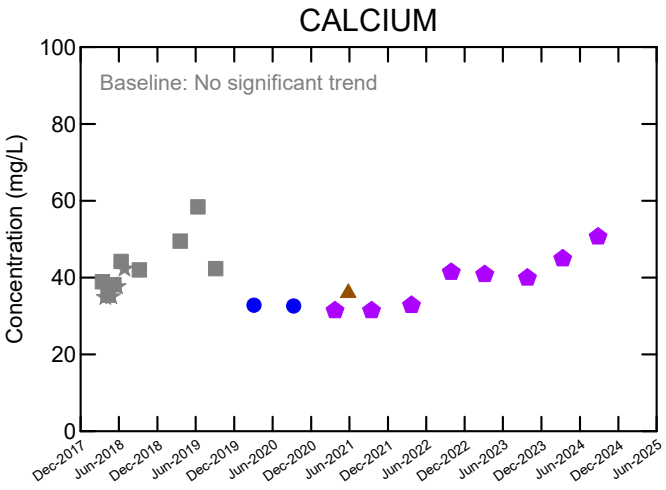
Ba = Barium
Y = Y Carrier

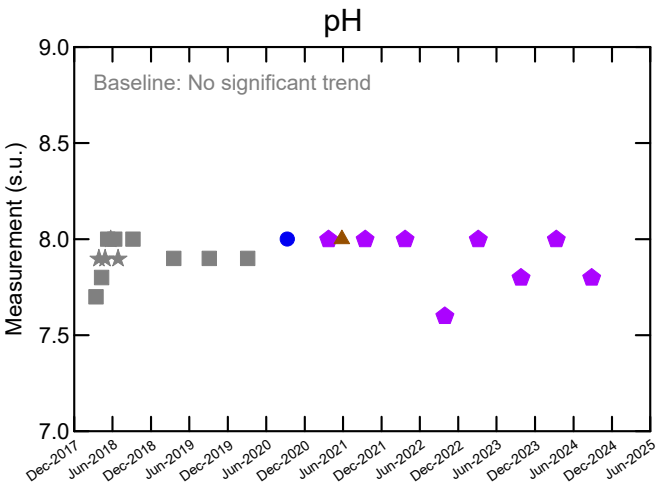
Appendix C

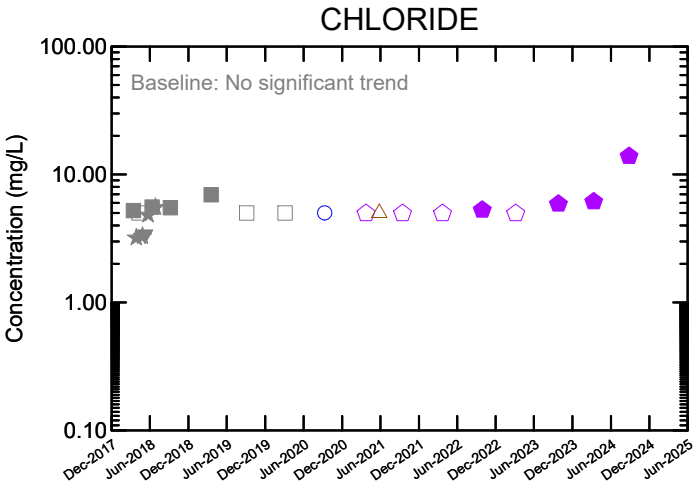
Time Series Plots











Legend:
- Baseline Result
- Historical Result (not used in baseline calcs)
- Baseline J-qualified value
- Detection Monitoring Result
- Assessment Monitoring Result
- Verification or Supplemental Result

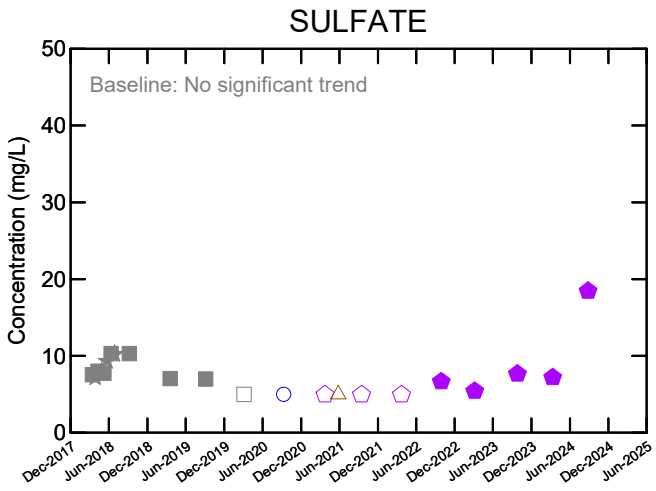
Notes:
1) Non-detects (plotted at detection limit) are represented by empty symbols.
2) Non-detects with detection limits above target and/or detected values were excluded from trends.
3) Trend analysis results are reported at a 95 percent confidence level.

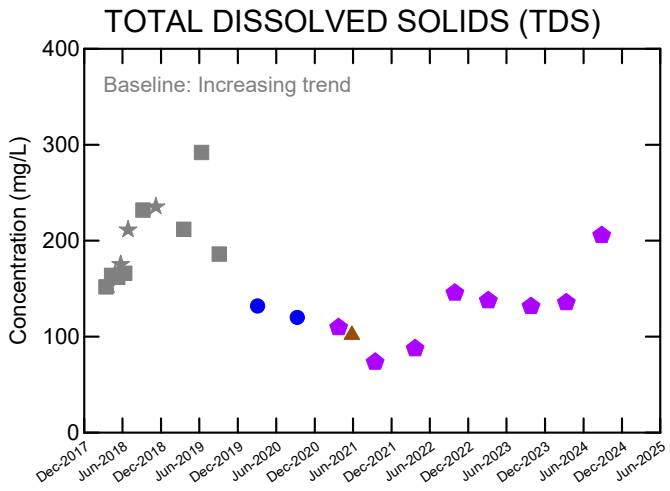
MidAmerican Energy Company
Louisa Generating Station
Muscatine, Iowa

MW-213A -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
Date: **Oct 29, 2024**

figure 1.a





Legend:

- Baseline Result
- Historical Result (not used in baseline calculations)
- Detection Monitoring Result
- Assessment Monitoring Result
- Verification or Supplemental Result

Notes:

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2) Non-detects with detection limits above target and/or detected values were excluded from trends.
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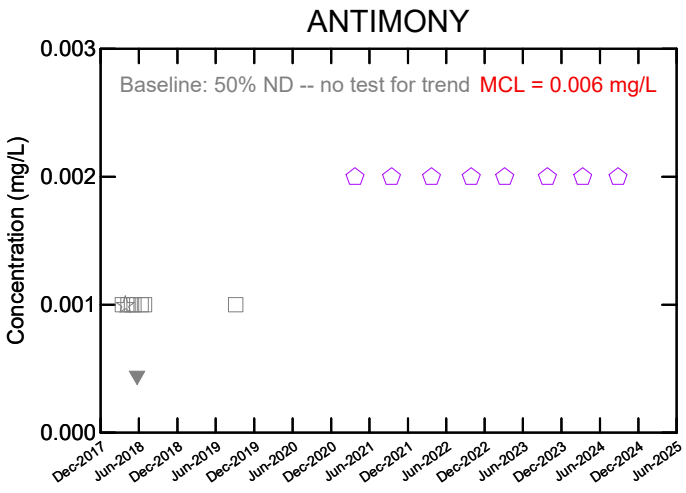
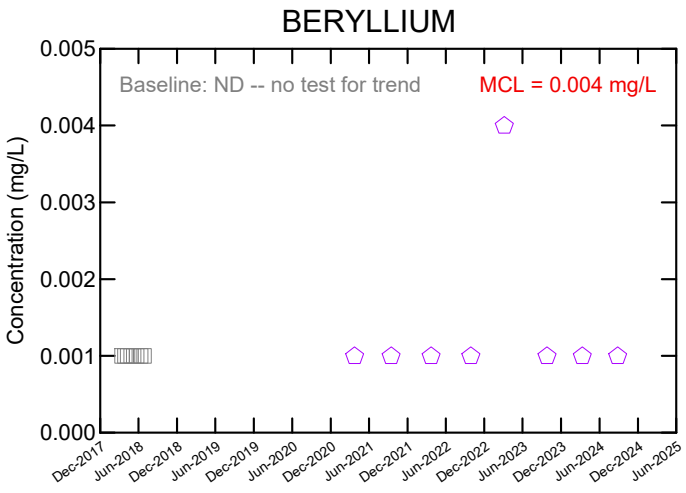
MidAmerican Energy Company
Louisa Generating Station
Muscatine, Iowa

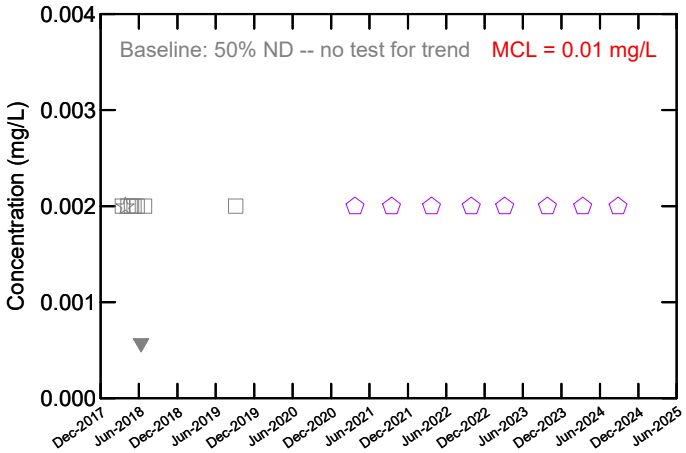
MW-213A -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME

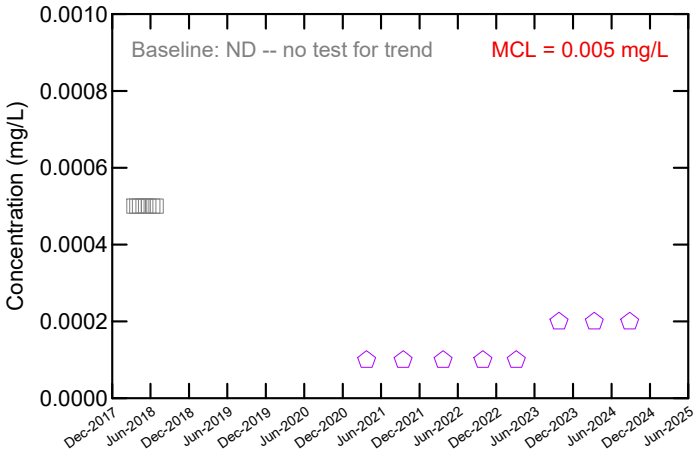
Project No. **12575233**
Date: **Oct 29, 2024**

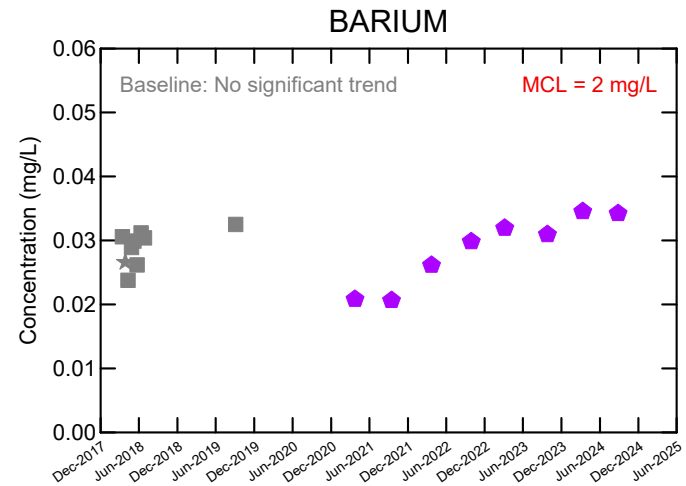
figure 1.b











Legend:

- Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental Result

MCL (Maximum Contaminant Level)

Notes:

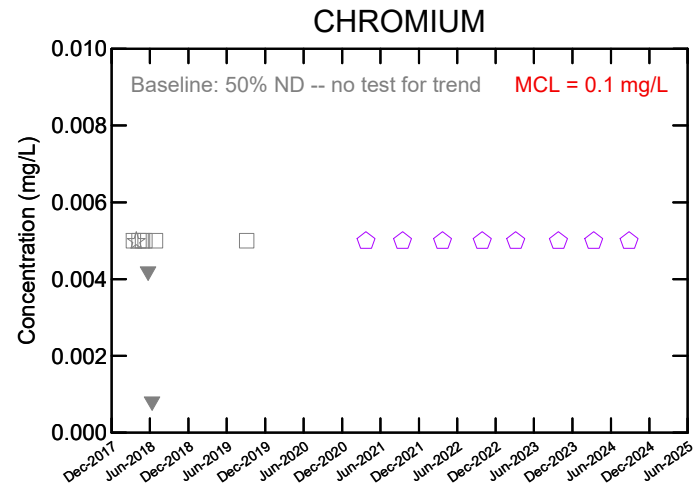
1) Non-detects (plotted at detection limit) are represented by empty symbols.
2) Non-detects with detection limits above target and/or detected values were excluded from trends.
3) Trend analysis results are reported at a 95 percent confidence level.

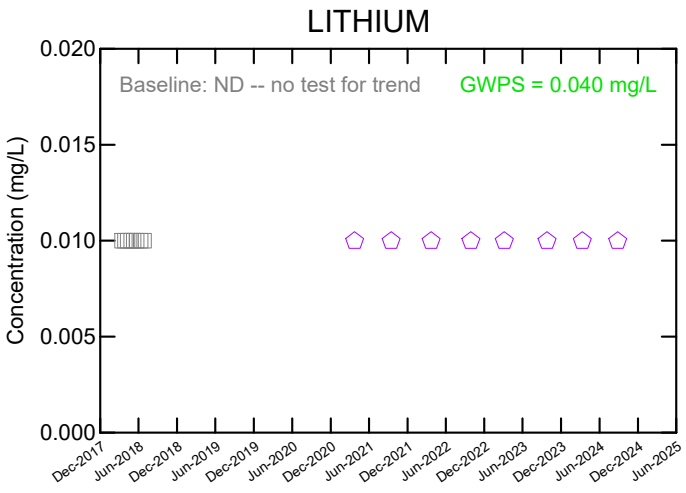
MidAmerican Energy Company
Louisa Generating Station
Muscatine, Iowa

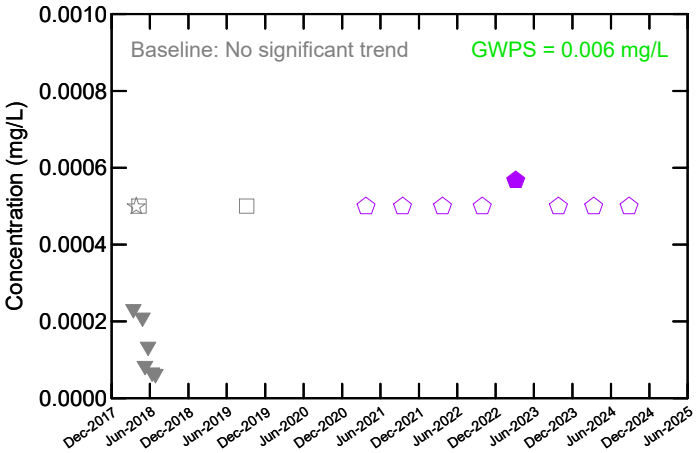
MW-213A -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

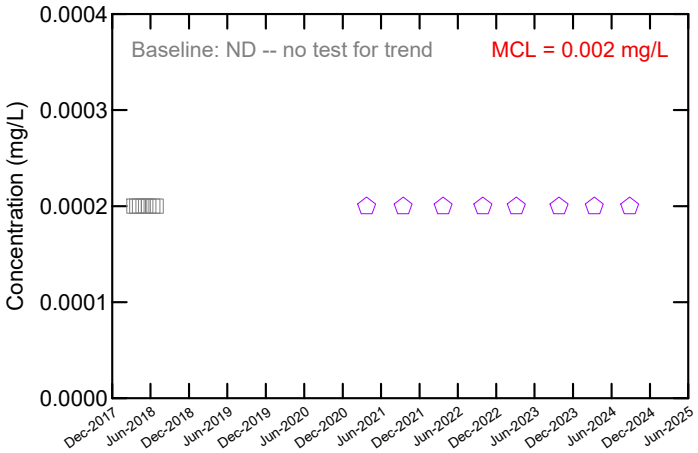
Project No. **12575233**
Date: **Oct 29, 2024**

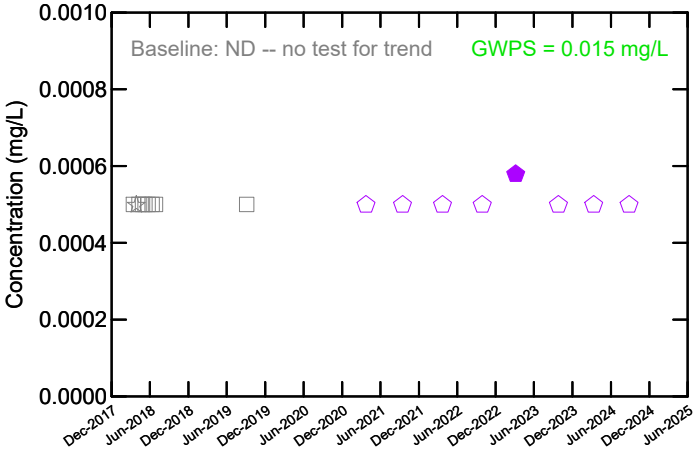
figure 1.c











Legend:

- ■ Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental Result

MCL (Maximum Contaminant Level)

GWPS (Groundwater Protection Standard)

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.
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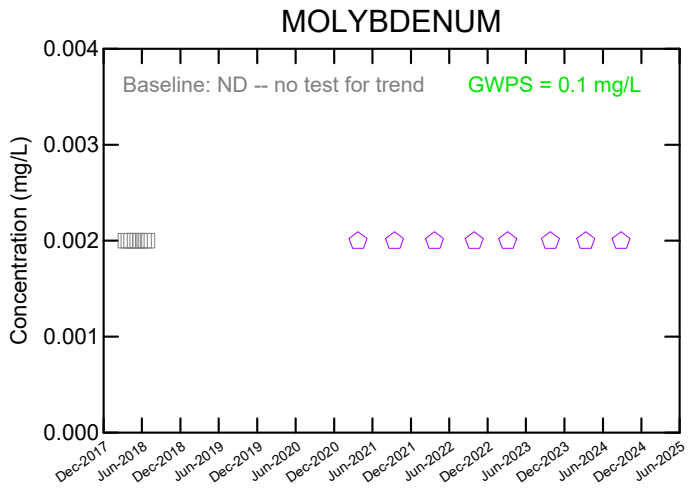
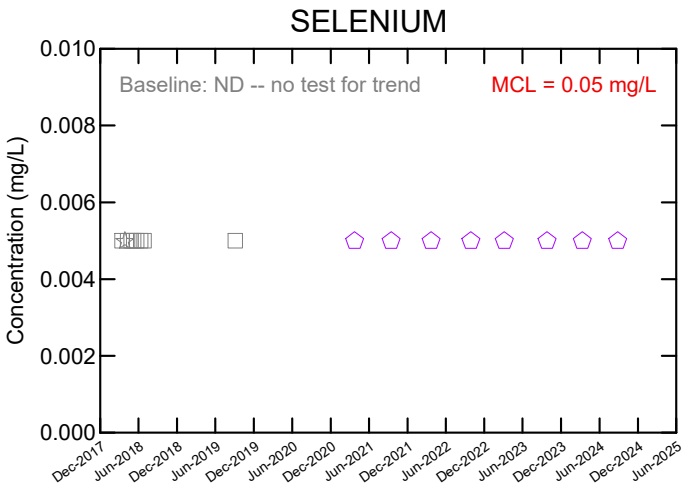
MidAmerican Energy Company
Louisa Generating Station
Muscatine, Iowa

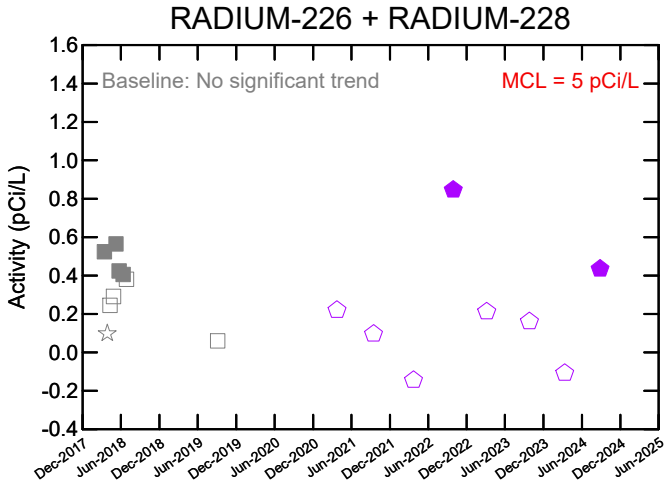
MW-213A -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME

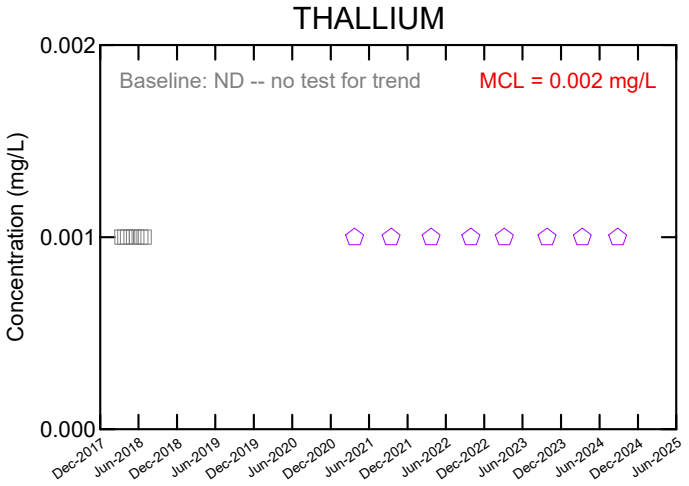
Project No. **12575233**
Date: **Oct 29, 2024**

figure 1.d









Legend:

- ■ Baseline Result
- ★ Historical Result (not used in baseline calculations)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result

MCL (Maximum Contaminant Level)

GWPS (Groundwater Protection Standard)

Notes:

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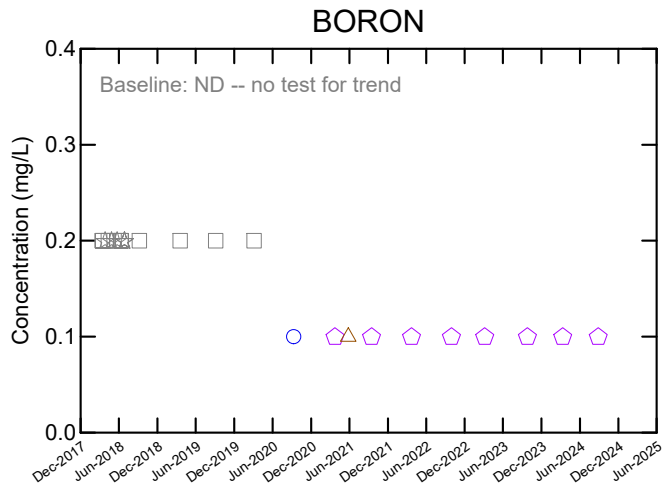
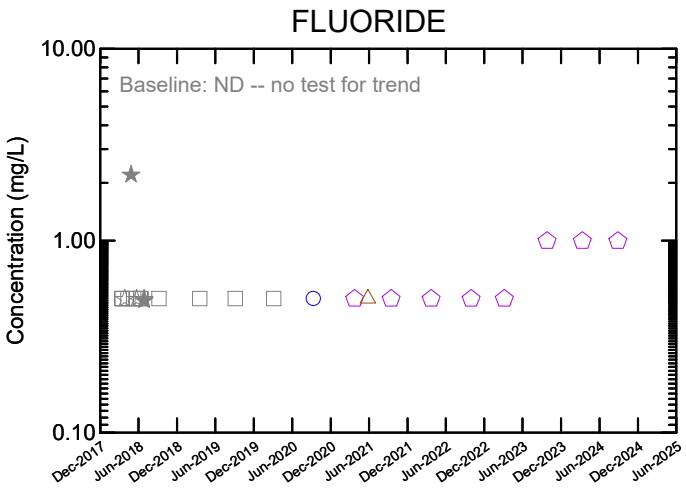
MidAmerican Energy Company
Louisa Generating Station
Muscatine, Iowa

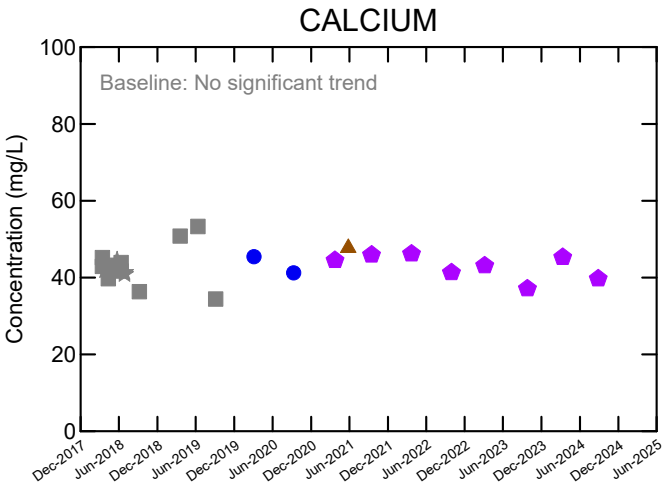
MW-213A -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME

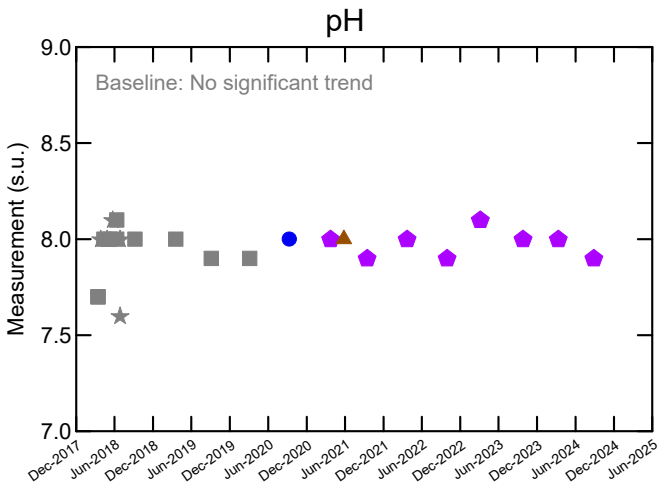
Project No. **12575233**
Date: **Oct 29, 2024**

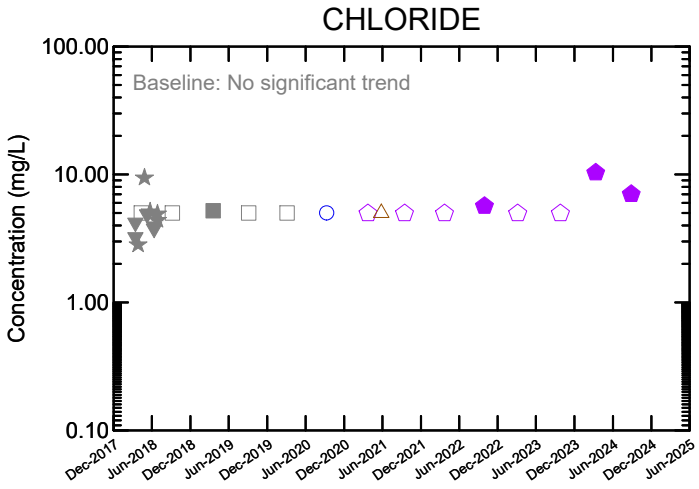
figure 1.e











Legend:

- Baseline Result
- Historical Result (not used in baseline calcs)
- Baseline J-qualified value
- Detection Monitoring Result
- Assessment Monitoring Result
- Verification or Supplemental Result

Notes:

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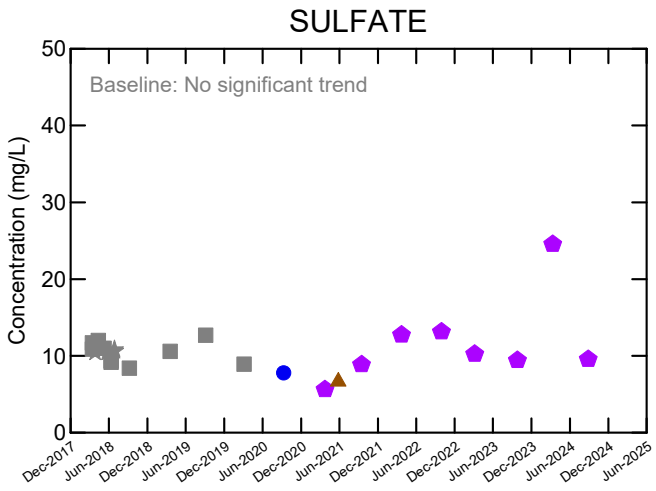
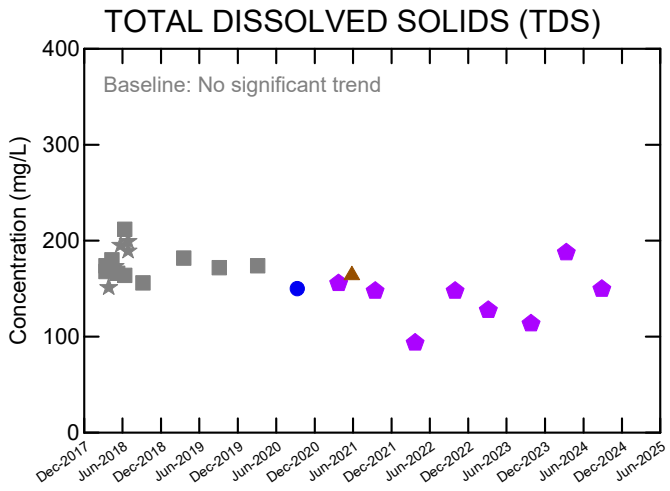
MidAmerican Energy Company
Louisa Generating Station
Muscatine, Iowa

MW-221A -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
Date: **Oct 29, 2024**

figure 2.a





Legend:

- Baseline Result
- Historical Result (not used in baseline calculations)
- Detection Monitoring Result
- Assessment Monitoring Result
- Verification or Supplemental Result

Notes:

1) Non-detects (plotted at detection limit) are represented by empty symbols.
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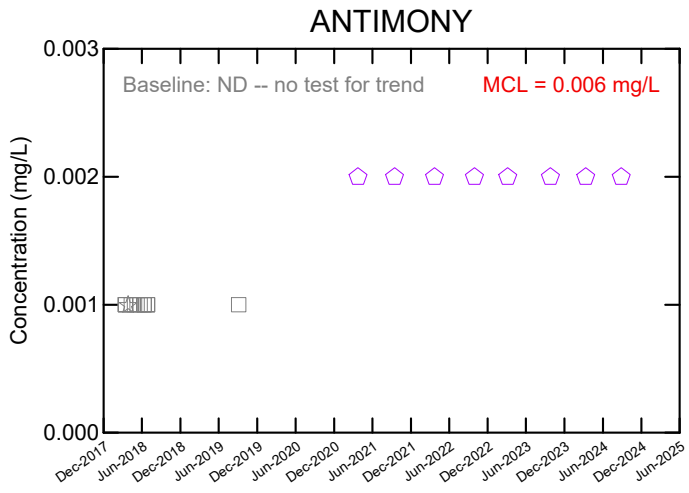
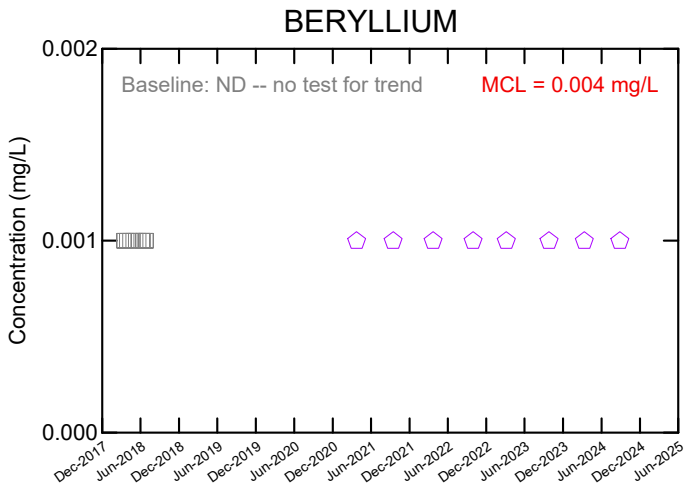
MidAmerican Energy Company
Louisa Generating Station
Muscatine, Iowa

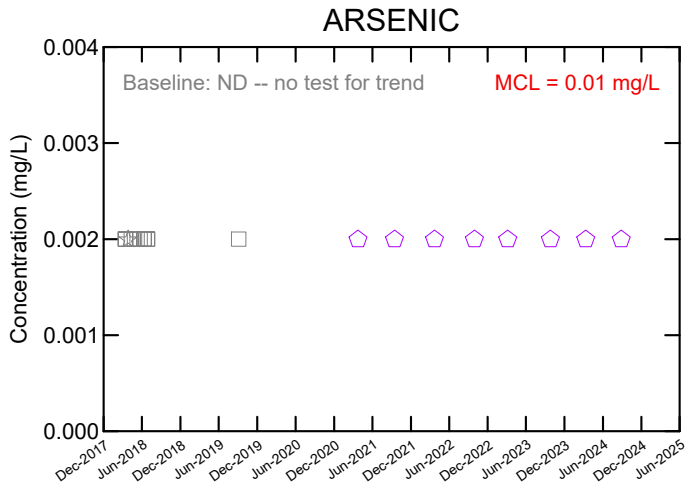
MW-221A -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME

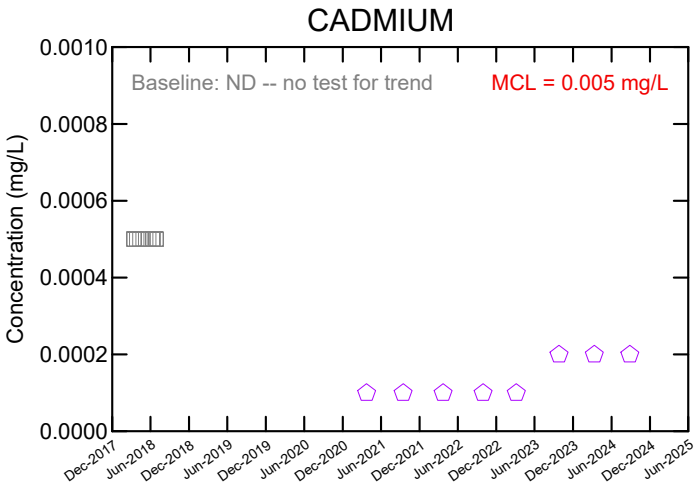
Project No. **12575233**
Date: **Oct 29, 2024**

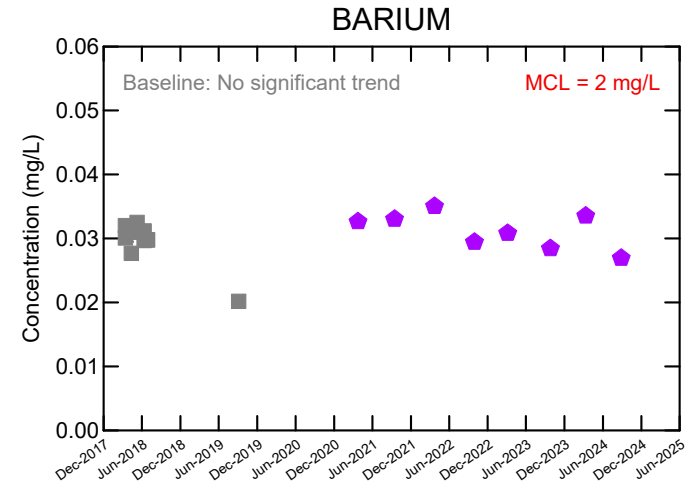
figure 2.b











Legend:
- ■ Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result

MCL (Maximum Contaminant Level)

Notes:
1) Non-detects (plotted at detection limit) are represented by empty symbols.
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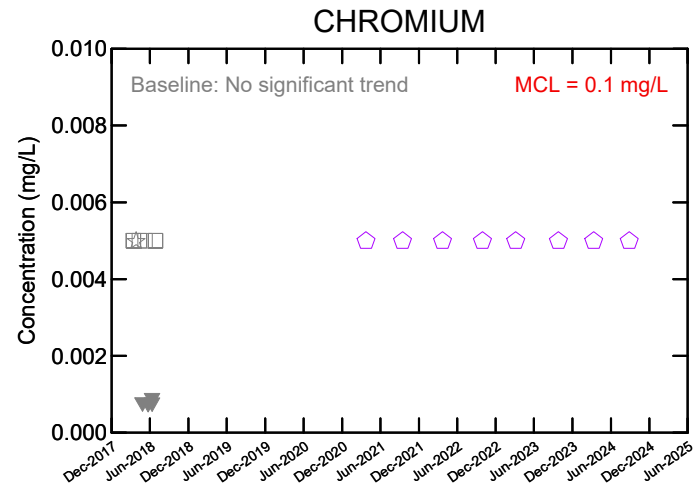
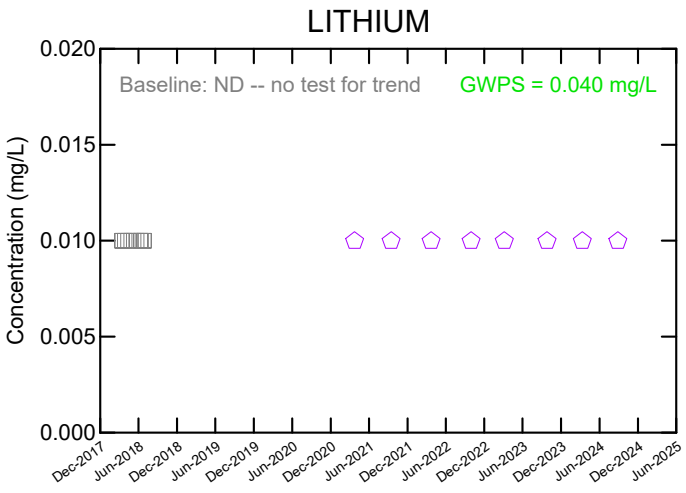
MidAmerican Energy Company
Louisa Generating Station
Muscatine, Iowa

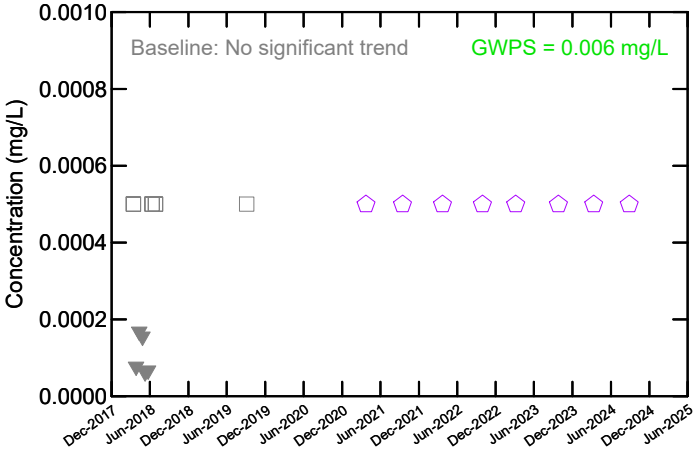
MW-221A -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME

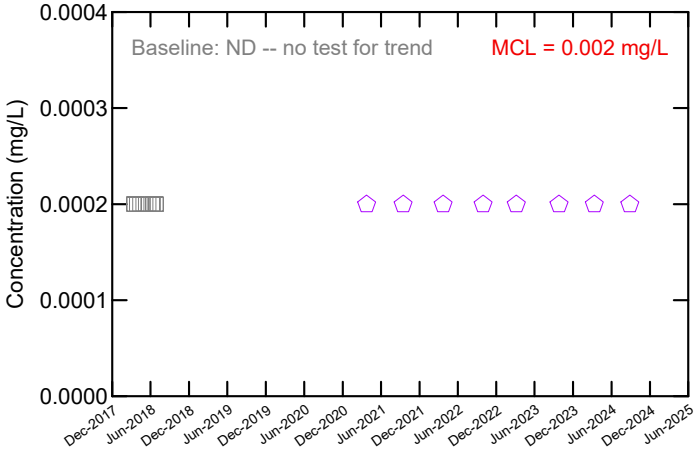
Project No. **12575233**
Date: **Oct 29, 2024**

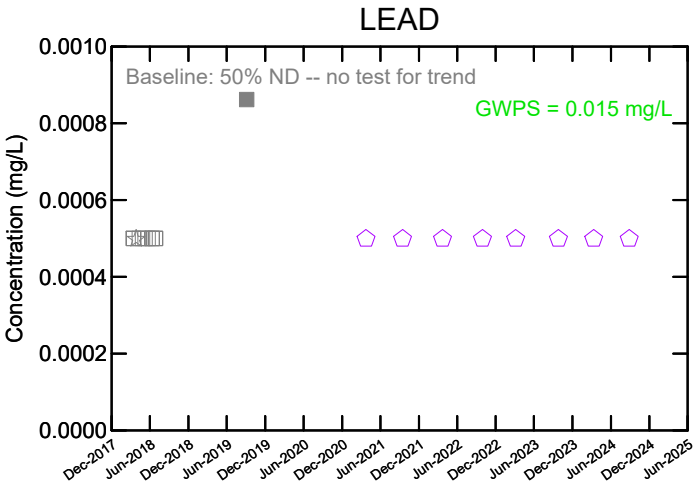
figure 2.c











Legend:

- Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental Result

MCL (Maximum Contaminant Level)

GWPS (Groundwater Protection Standard)

Notes:

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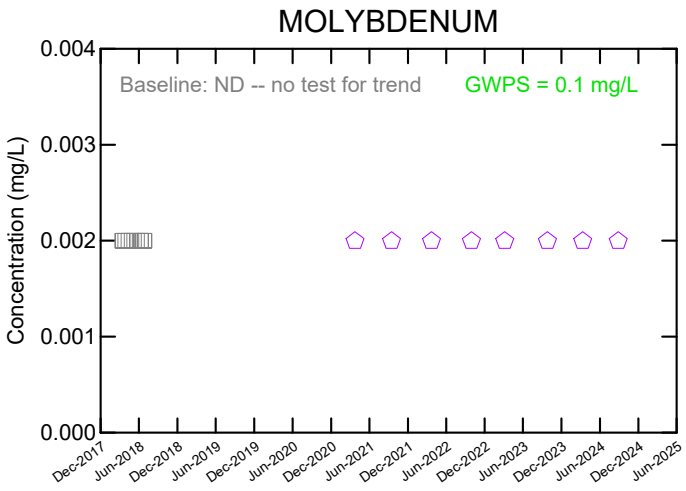
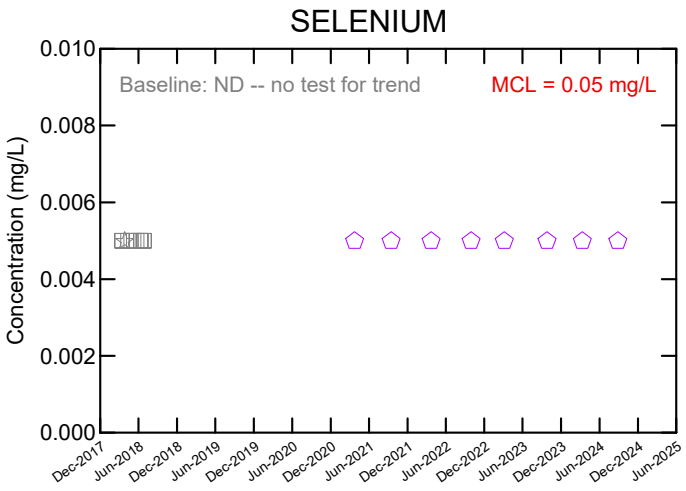
MidAmerican Energy Company
Louisa Generating Station
Muscatine, Iowa

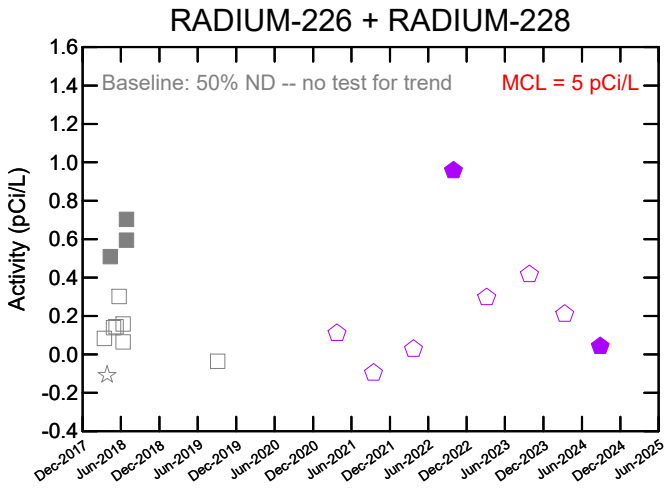
MW-221A -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

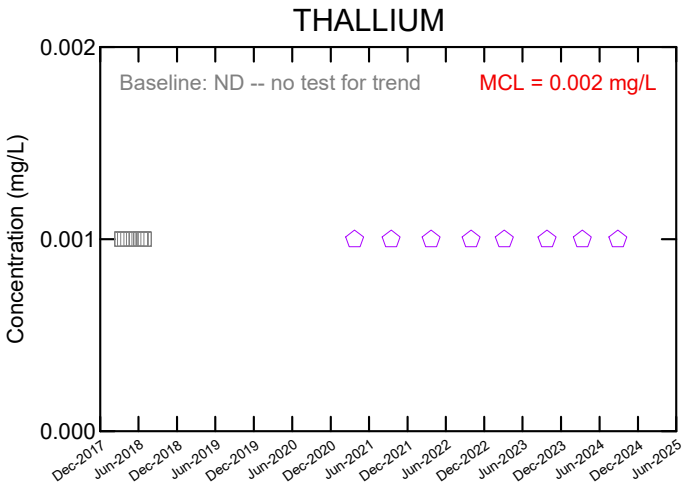
Project No. **12575233**
Date: **Oct 29, 2024**

figure 2.d









Legend:

- ■ Baseline Result
- ★ Historical Result (not used in baseline calculations)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result

MCL (Maximum Contaminant Level)

GWPS (Groundwater Protection Standard)

Notes:

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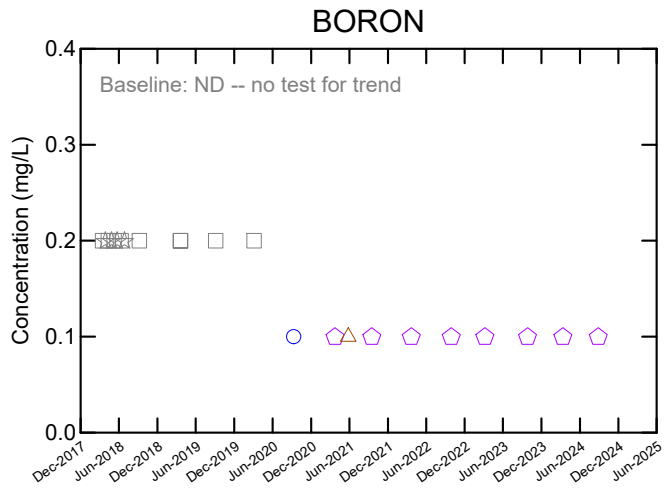
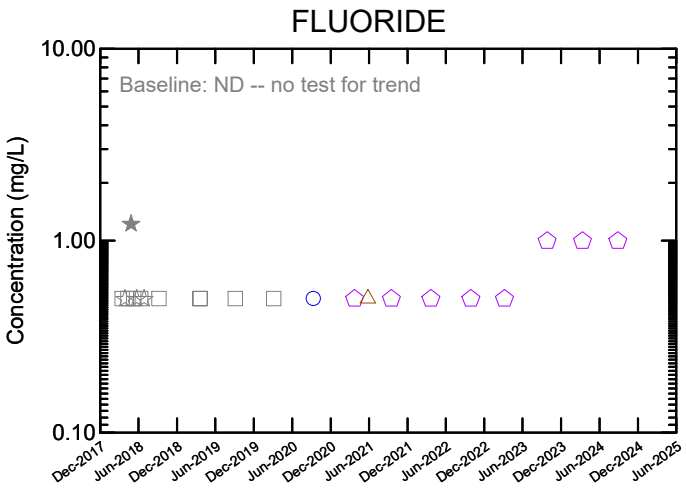
MidAmerican Energy Company
Louisa Generating Station
Muscatine, Iowa

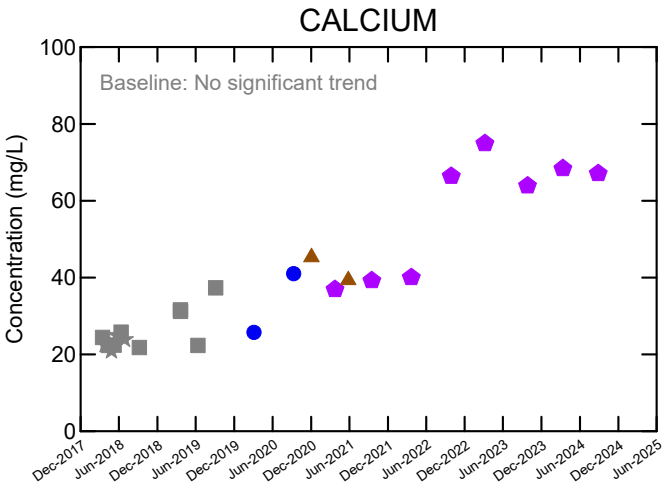
MW-221A -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME

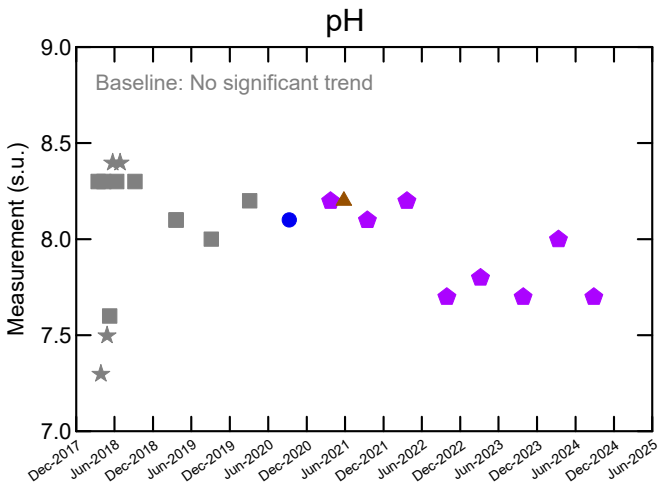
Project No. **12575233**
Date: **Oct 29, 2024**

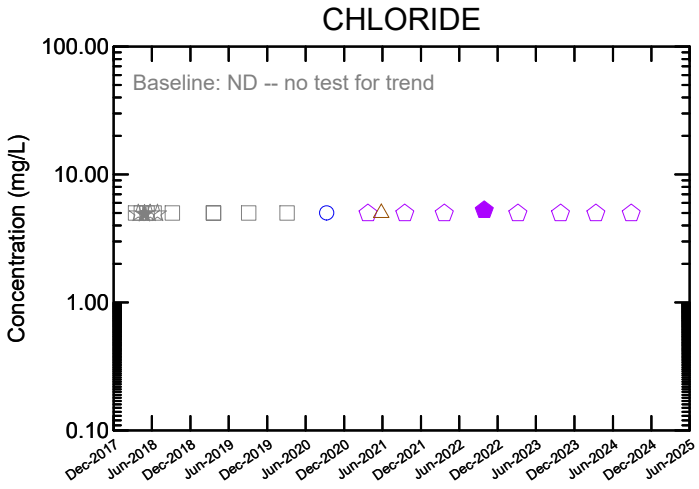
figure 2.e











Legend:

- Baseline Result
- Historical Result (not used in baseline calcs)
- Baseline J-qualified value
- Detection Monitoring Result
- Assessment Monitoring Result
- Verification or Supplemental Result

Notes:

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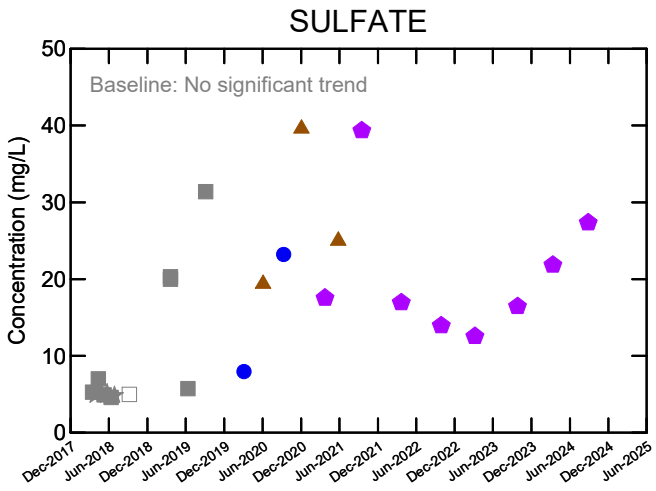
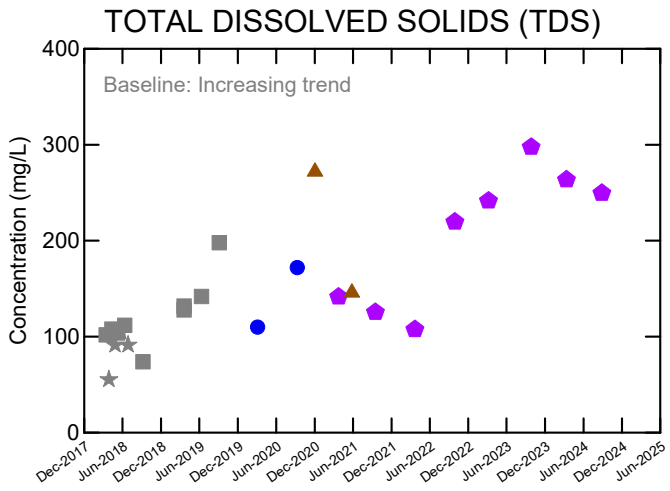
MidAmerican Energy Company
Louisa Generating Station
Muscatine, Iowa

MW-230 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
Date: **Oct 29, 2024**

figure 3.a





Legend:

- Baseline Result
- Historical Result (not used in baseline calculations)
- Detection Monitoring Result
- Assessment Monitoring Result
- Verification or Supplemental Result

Notes:

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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.

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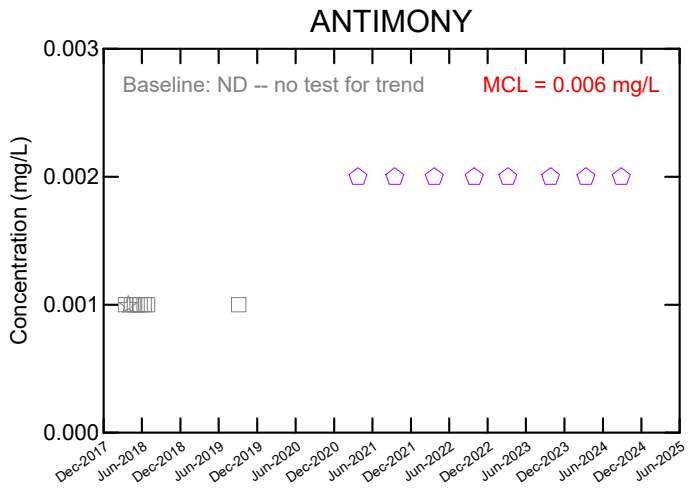
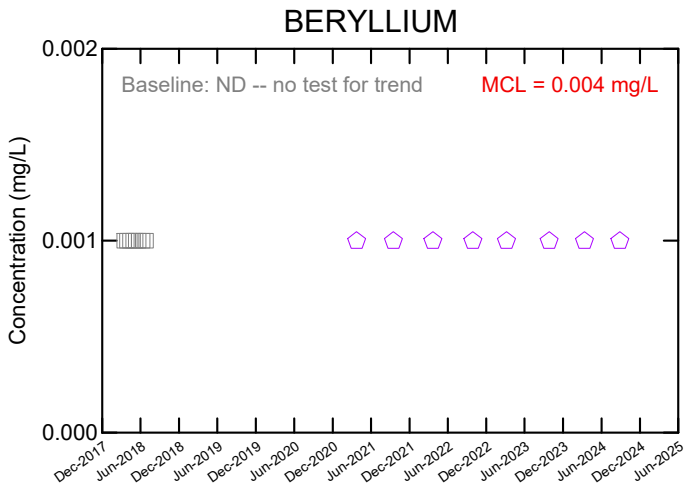
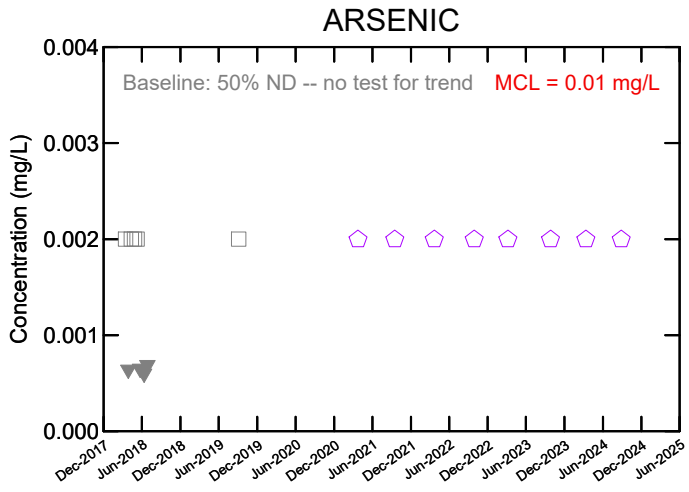
MW-230 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME

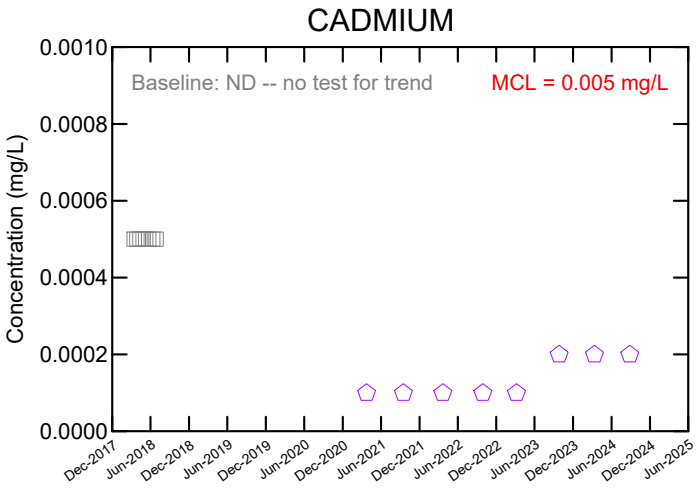
Project No. **12575233**
Date: **Oct 29, 2024**

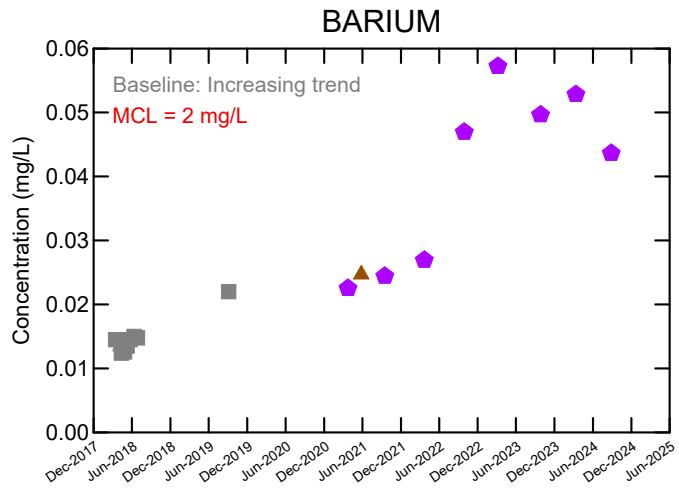
figure 3.b











Legend:

- Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental Result

MCL (Maximum Contaminant Level)

Notes:

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2) Non-detects with detection limits above target and/or detected values were excluded from trends.
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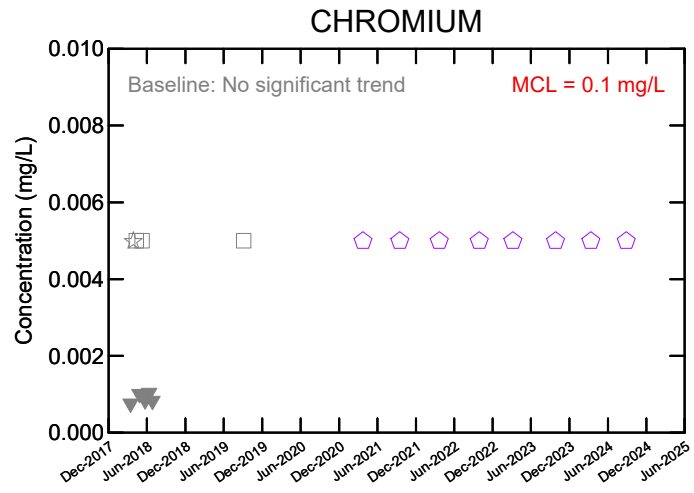
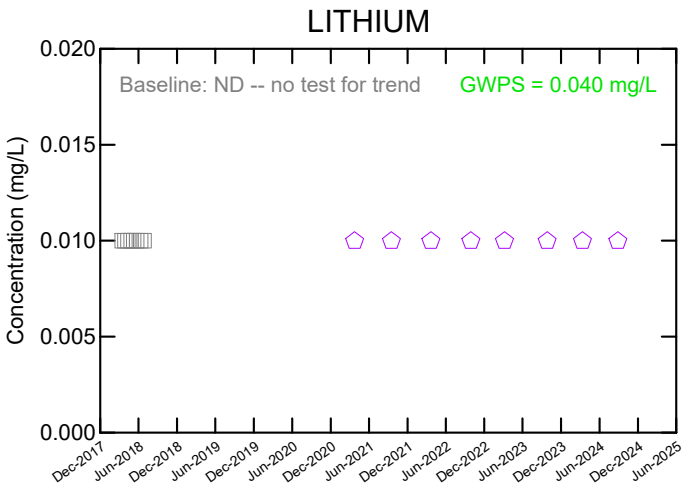
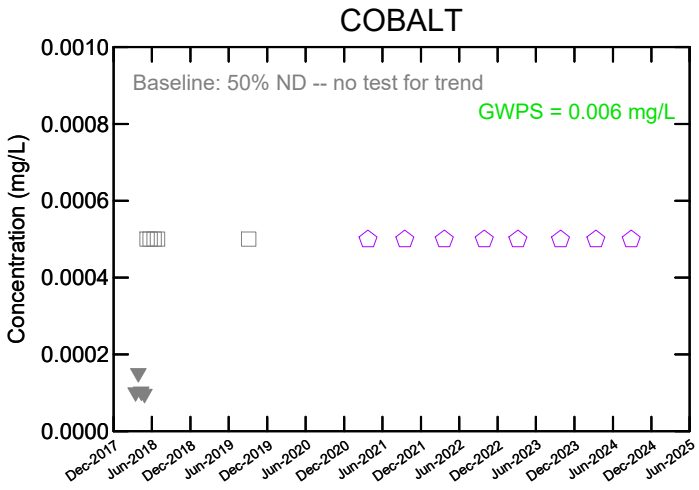
MW-230 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME

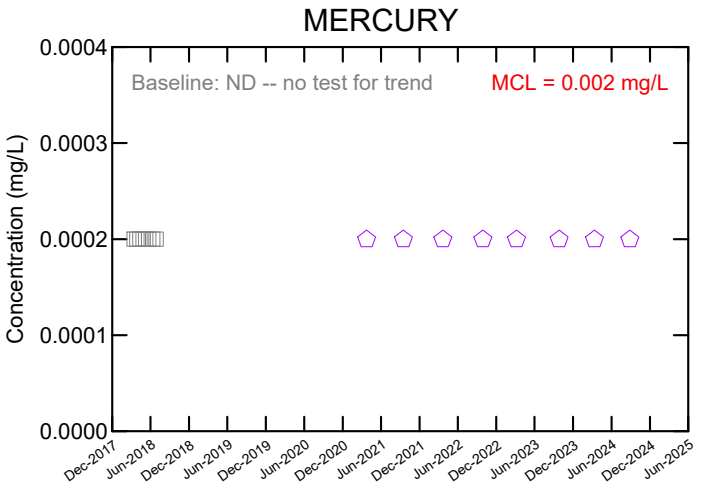
Project No. **12575233**
Date: **Oct 29, 2024**

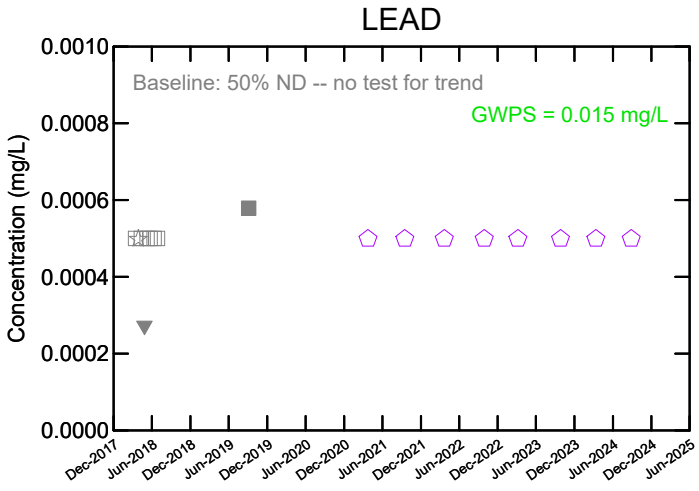
figure 3.c











Legend:

- ■ Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental Result

MCL (Maximum Contaminant Level)

GWPS (Groundwater Protection Standard)

Notes:

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2) Non-detects with detection limits above target and/or detected values were excluded from trends.
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MW-230 -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
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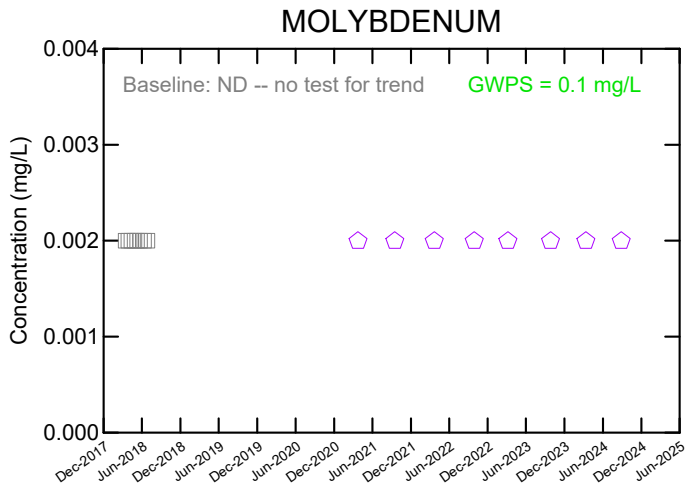
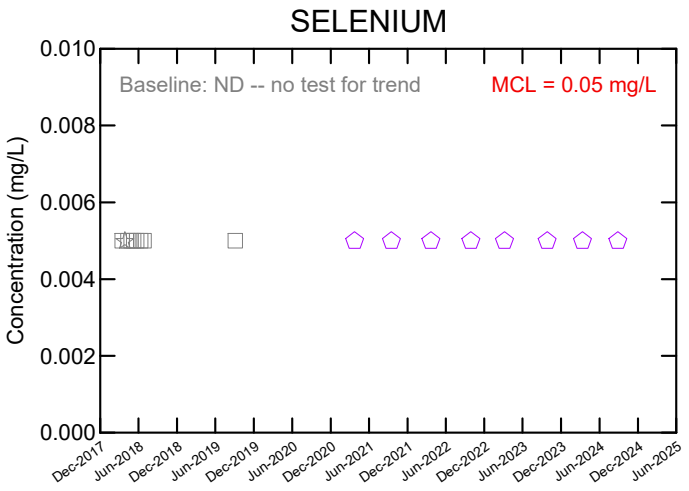
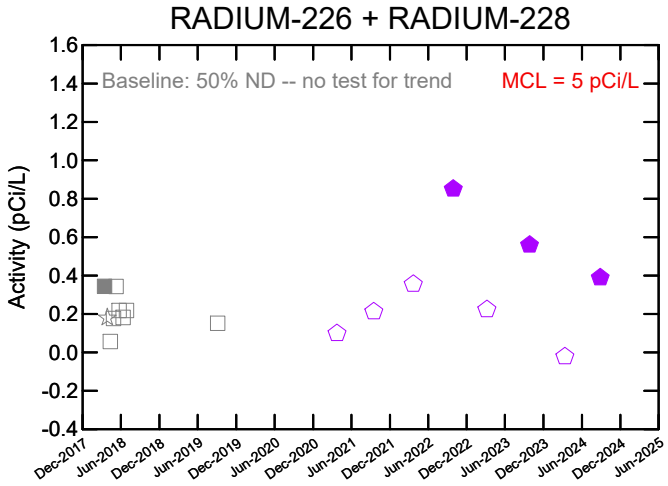
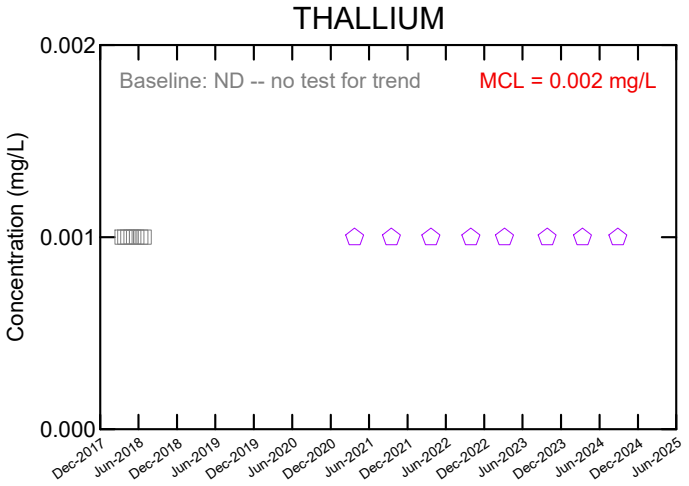
figure 3.d









Legend:

- Baseline Result
- ★ Historical Result (not used in baseline calculations)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result

MCL (Maximum Contaminant Level)

GWPS (Groundwater Protection Standard)

Notes:

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MW-230 -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
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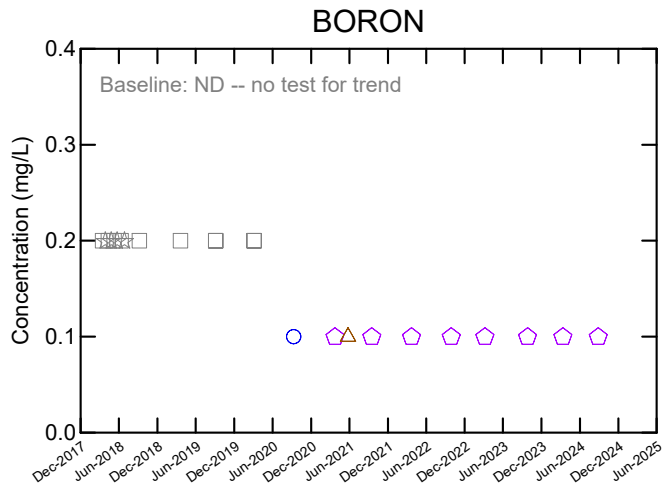
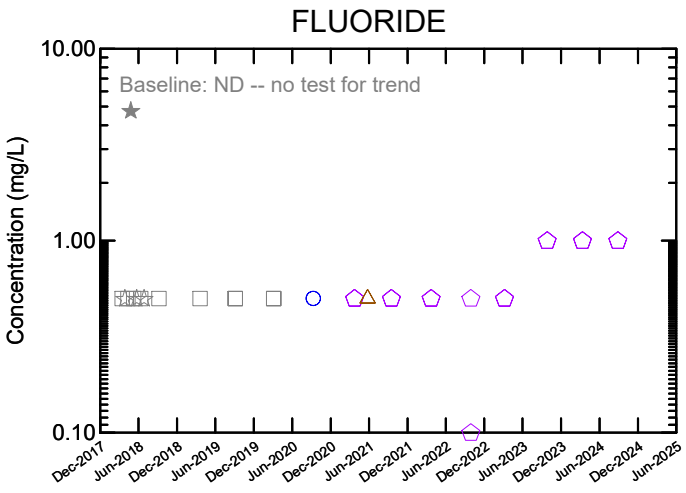
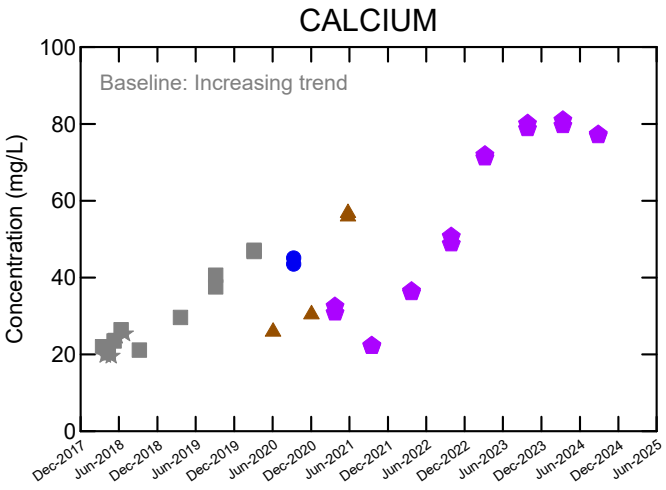
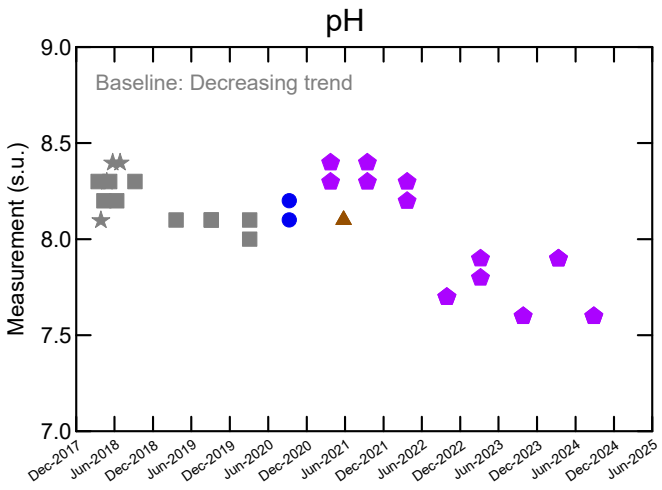
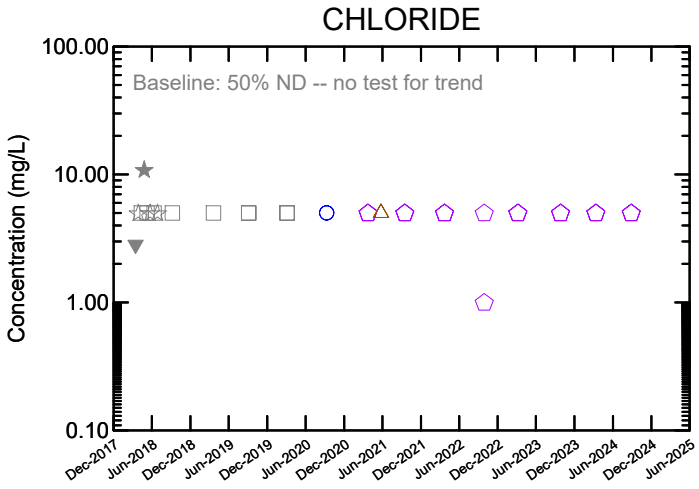
figure 3.e











Legend:

- Baseline Result
- Historical Result (not used in baseline calcs)
- Baseline J-qualified value
- Detection Monitoring Result
- Assessment Monitoring Result
- Verification or Supplemental Result

Notes:

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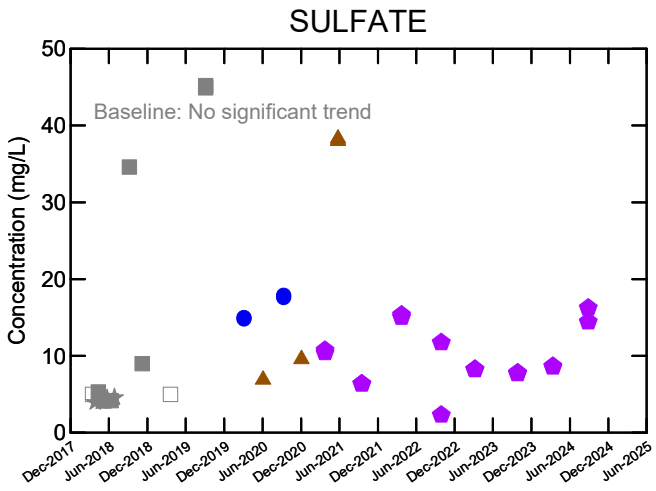
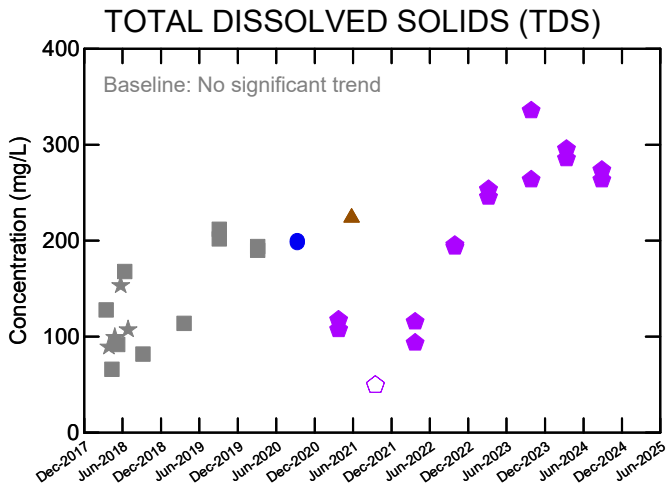
MW-231 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
Date: **Oct 29, 2024**

figure 4.a





Legend:

- Baseline Result
- Historical Result (not used in baseline calculations)
- Detection Monitoring Result
- Assessment Monitoring Result
- Verification or Supplemental Result

Notes:

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MW-231 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
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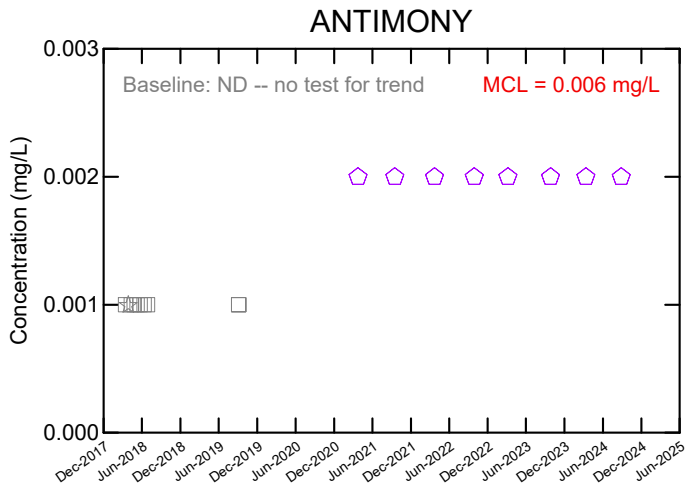
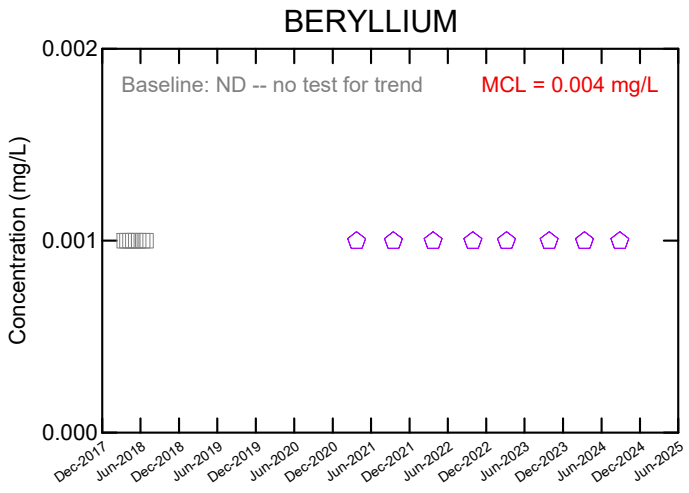
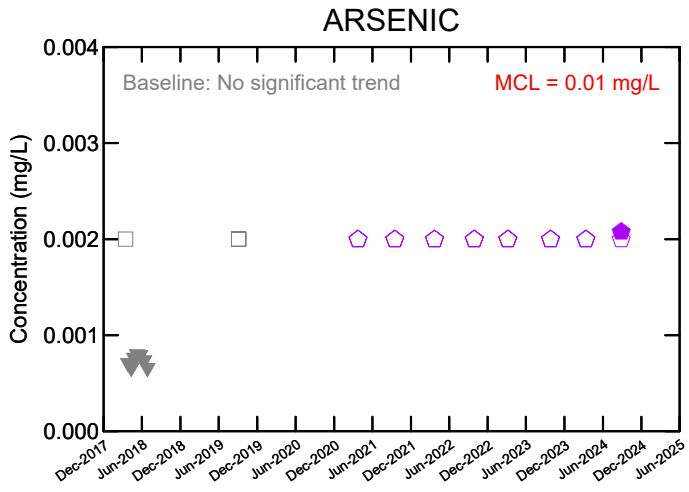
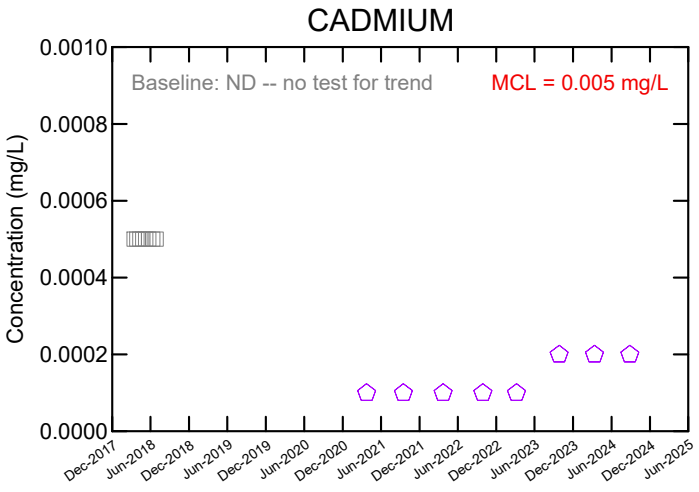
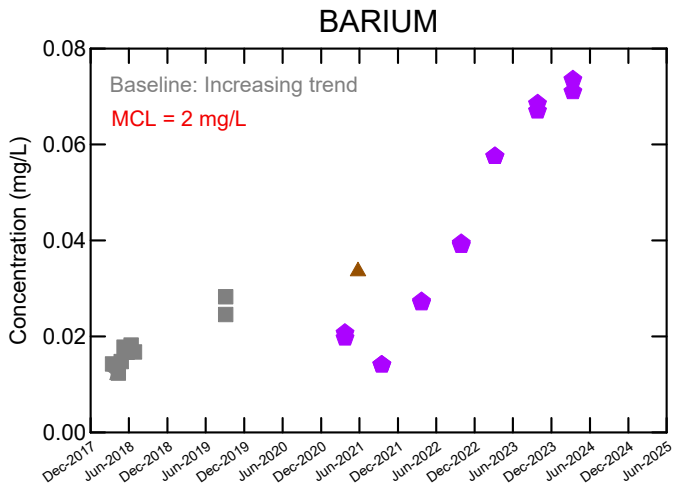
figure 4.b











Legend:

- Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental Result

MCL (Maximum Contaminant Level)

Notes:

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MW-231 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
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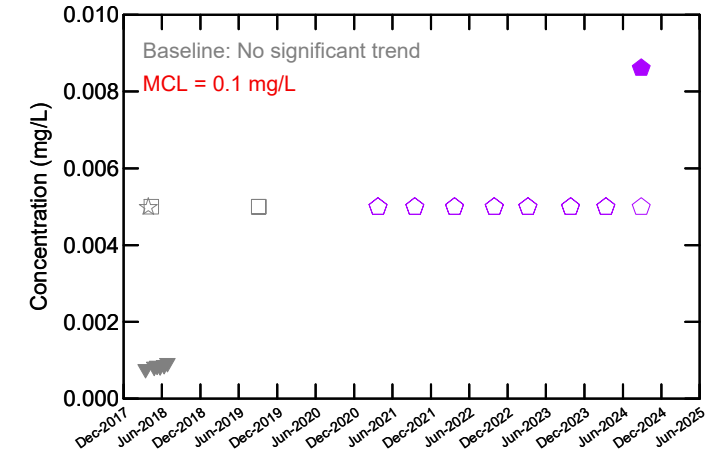
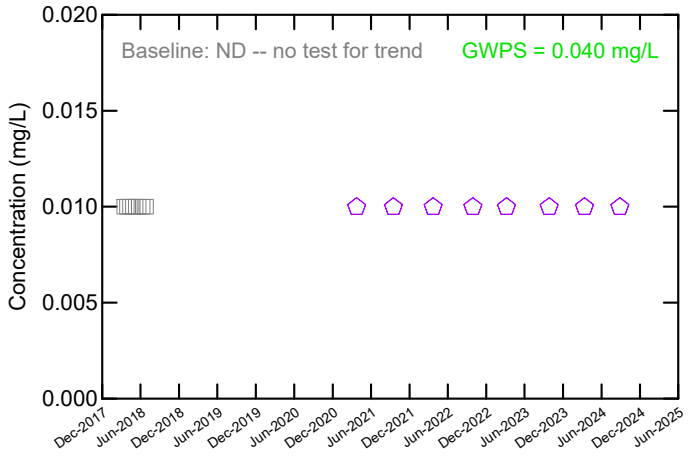
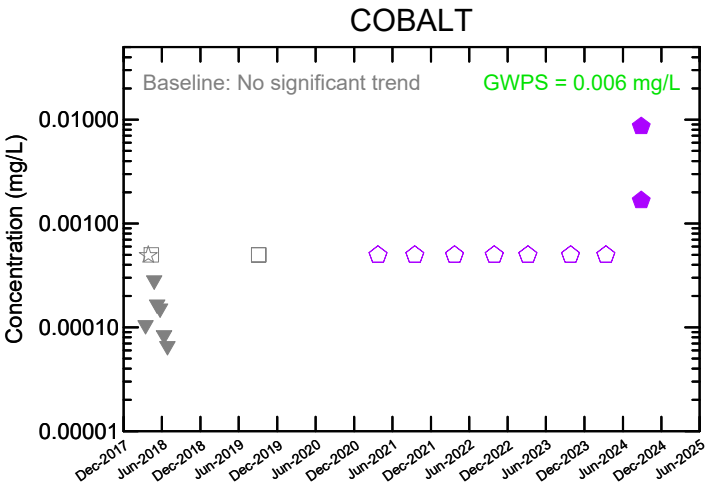
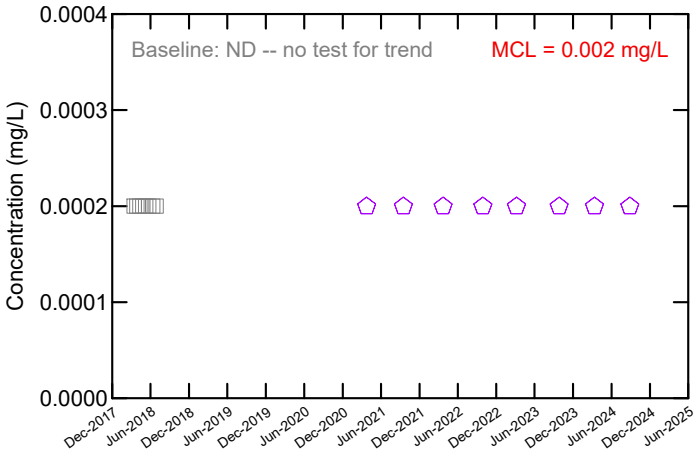
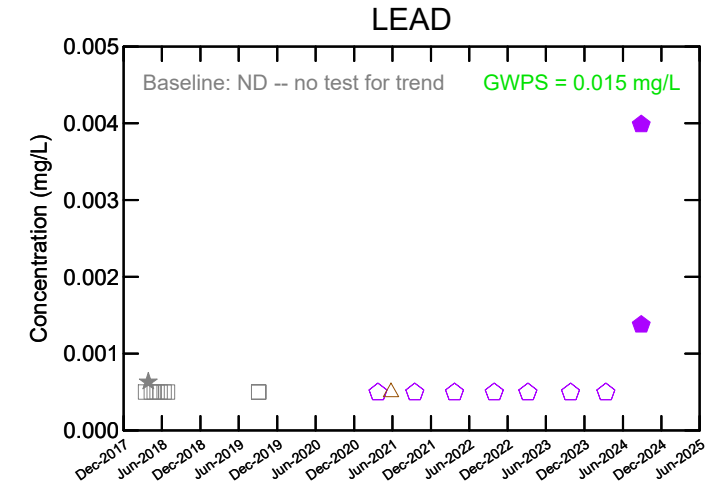
figure 4.c











Legend:

- ■ Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental Result

MCL (Maximum Contaminant Level)

GWPS (Groundwater Protection Standard)

Notes:

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MW-231 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
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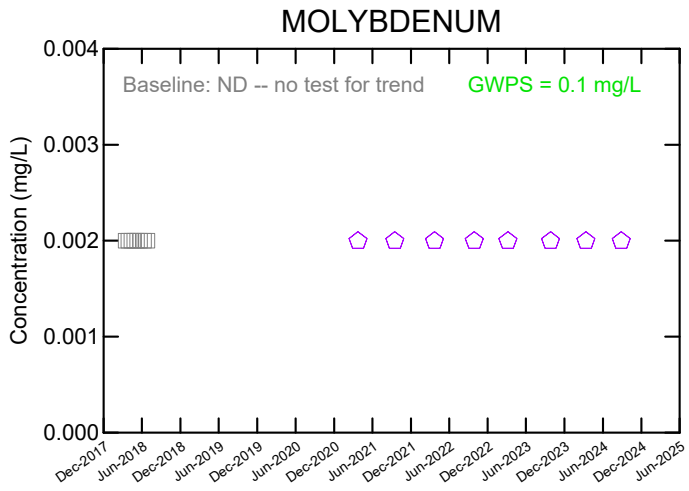
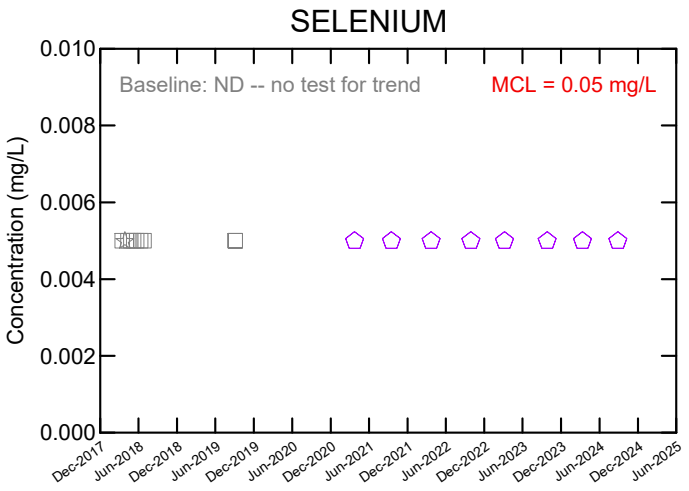
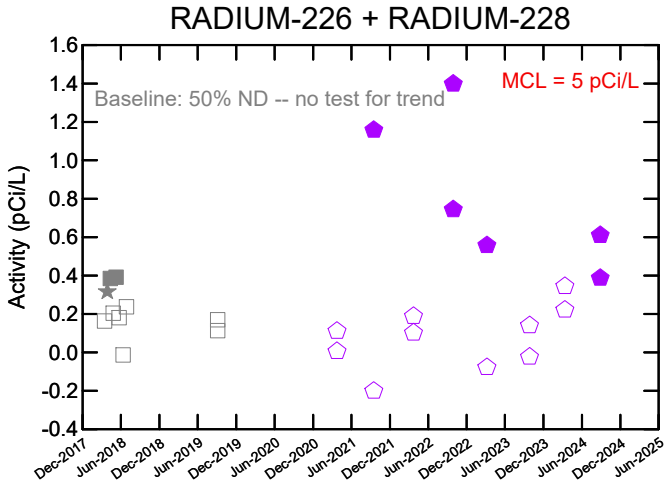
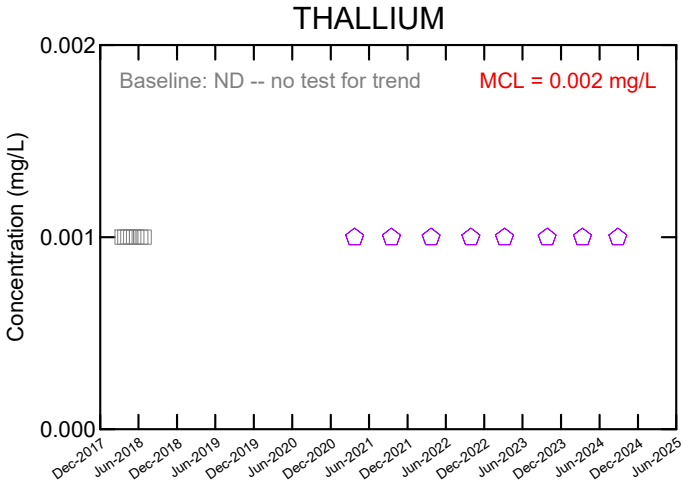
figure 4.d









Legend:

- Baseline Result
- Historical Result (not used in baseline calculations)
- Baseline J-qualified value
- Assessment Monitoring Result
- MCL (Maximum Contaminant Level)
- GWPS (Groundwater Protection Standard)

Notes:

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MW-231 -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
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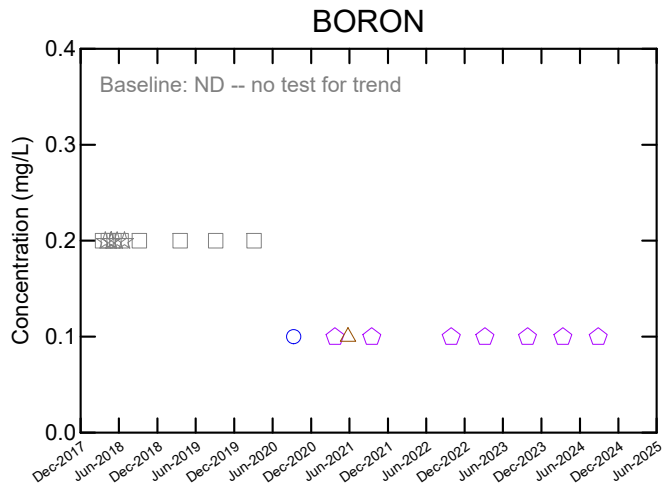
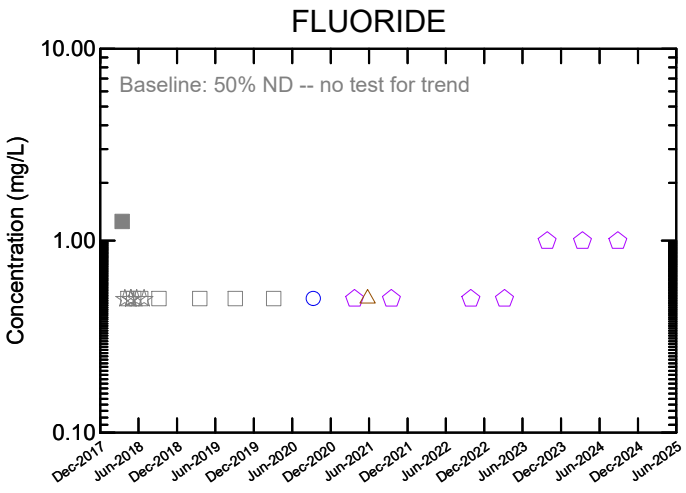
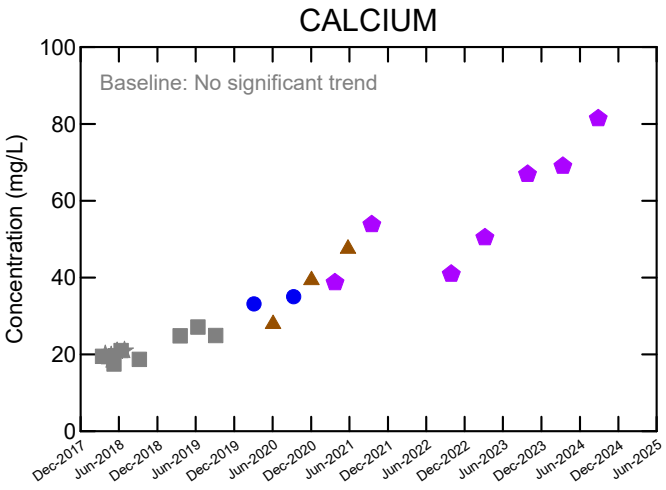
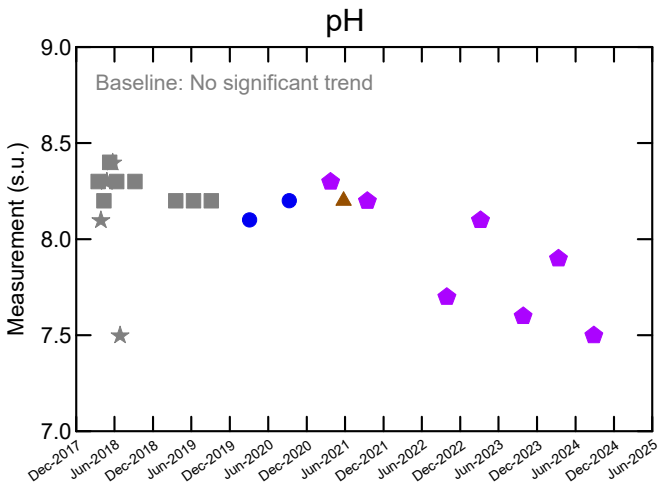
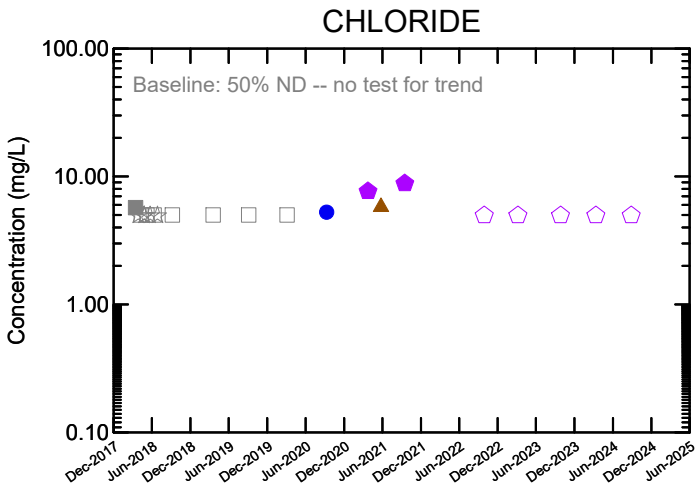
figure 4.e











Legend:

- Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ● Detection Monitoring Result
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental Result

Notes:

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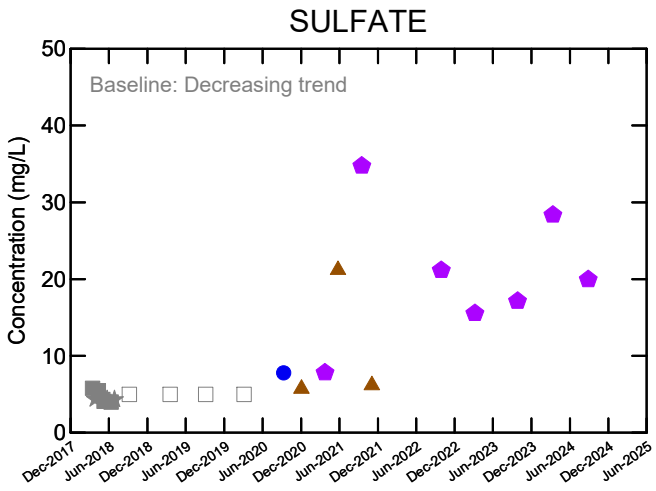
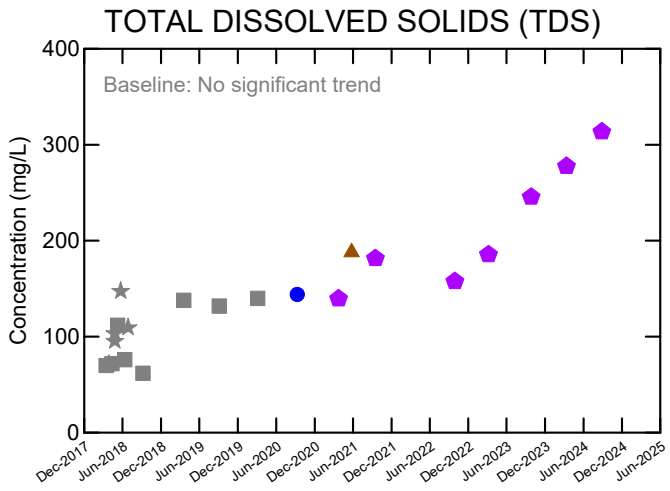
MW-232 -- APPENDIX III PARAMETERS ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
Date: **Oct 29, 2024**

figure 5.a





Legend:

- Baseline Result
- Historical Result (not used in baseline calculations)
- Detection Monitoring Result
- Assessment Monitoring Result
- Verification or Supplemental Result

Notes:

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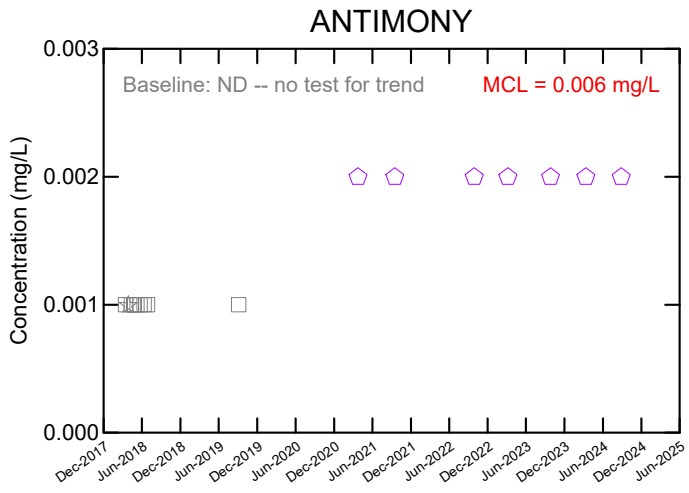
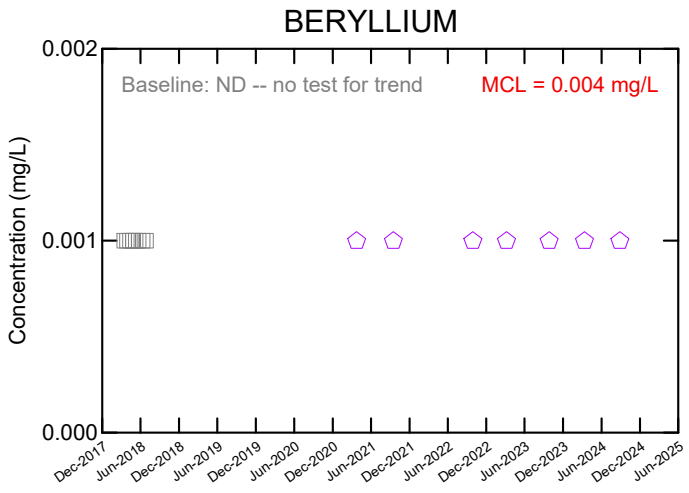
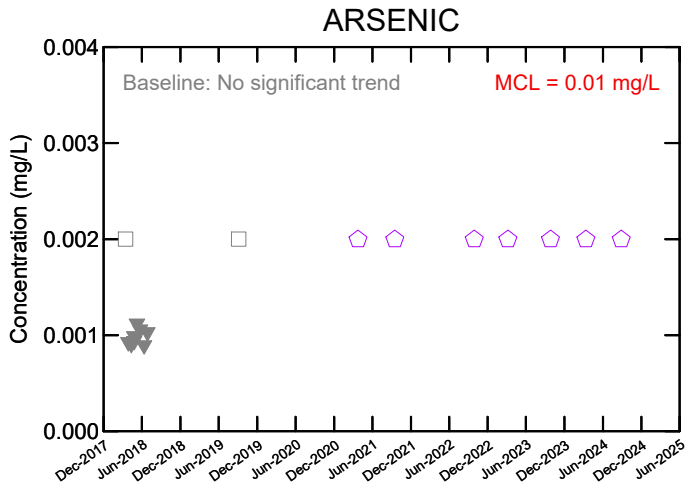
MW-232 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME

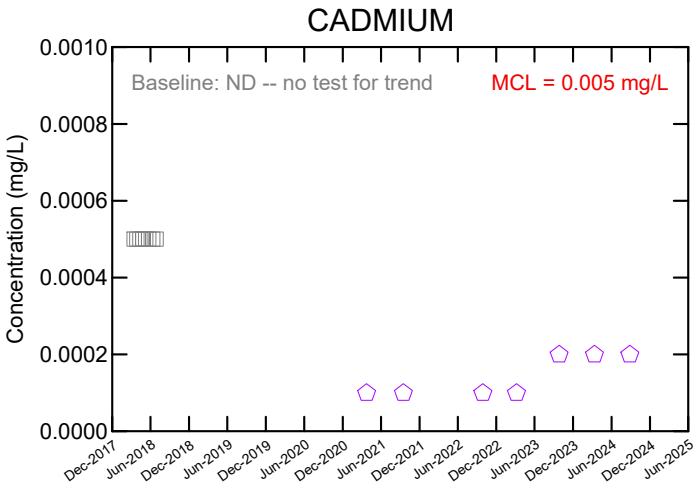
Project No. **12575233**
Date: **Oct 29, 2024**

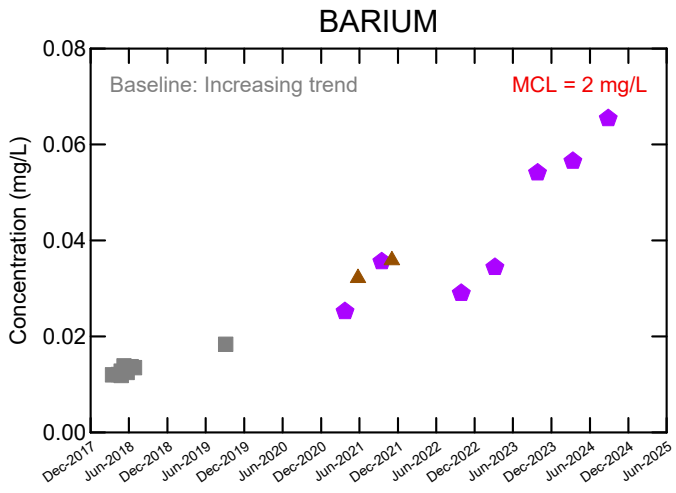
figure 5.b











Legend:

- Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental Result

MCL (Maximum Contaminant Level)

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
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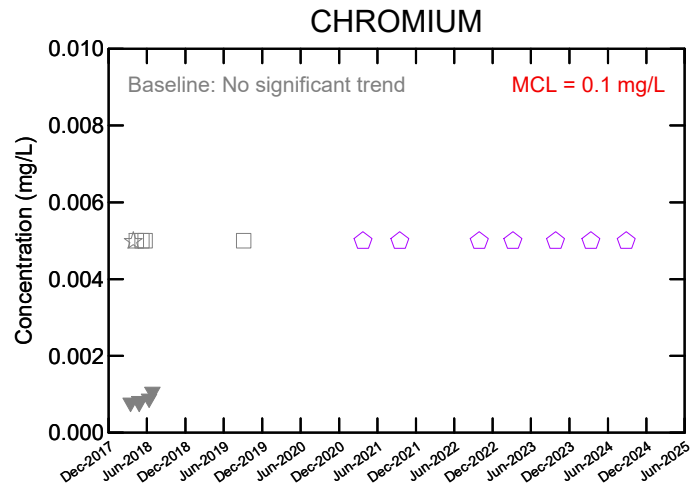
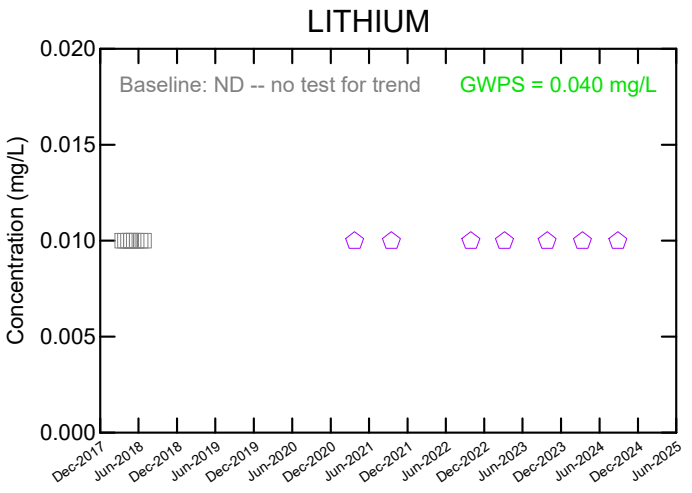
Muscatine, Iowa

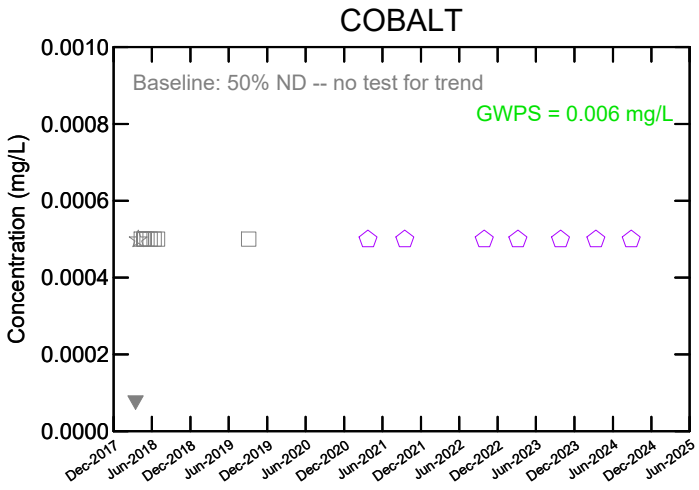
MW-232 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME

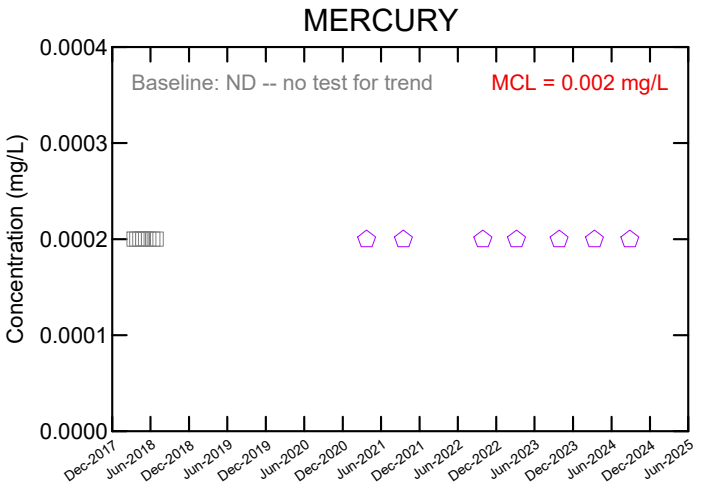
Project No. **12575233**
Date: **Oct 29, 2024**

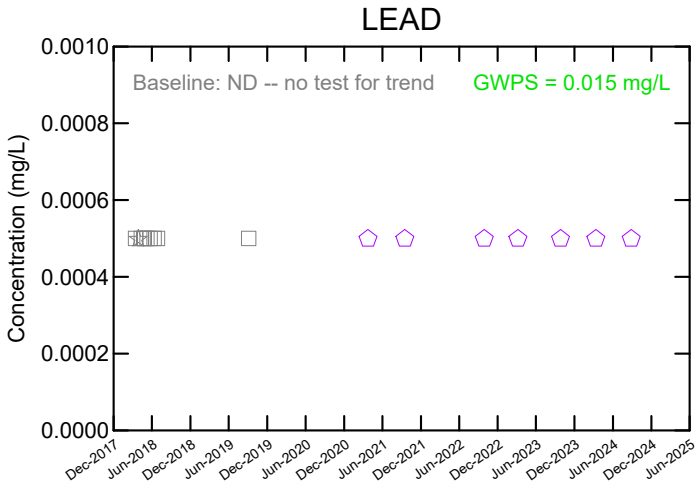
figure 5.c











Legend:

- ■ Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental Result

MCL (Maximum Contaminant Level)

GWPS (Groundwater Protection Standard)

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.

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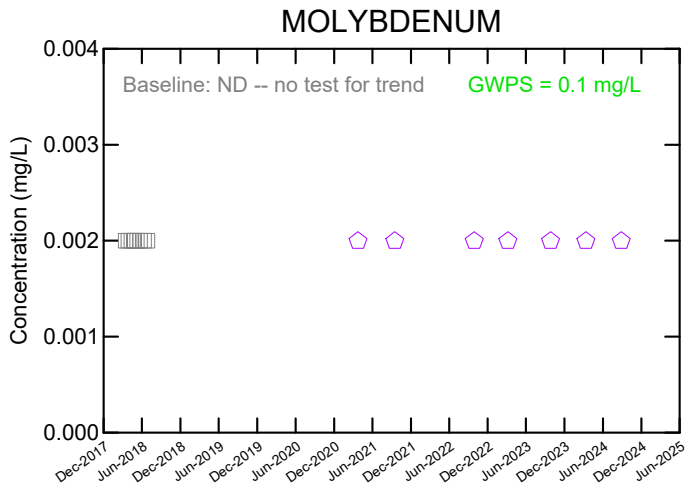
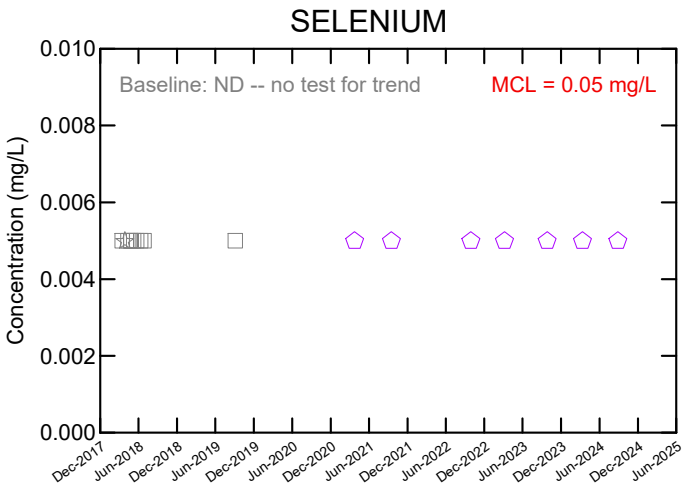
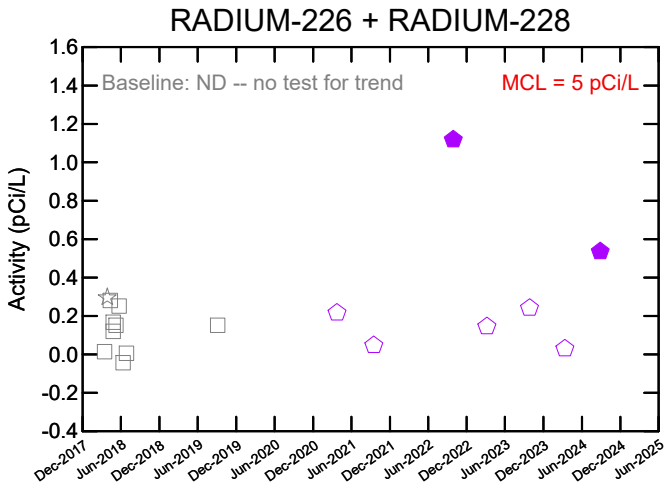
MW-232 -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

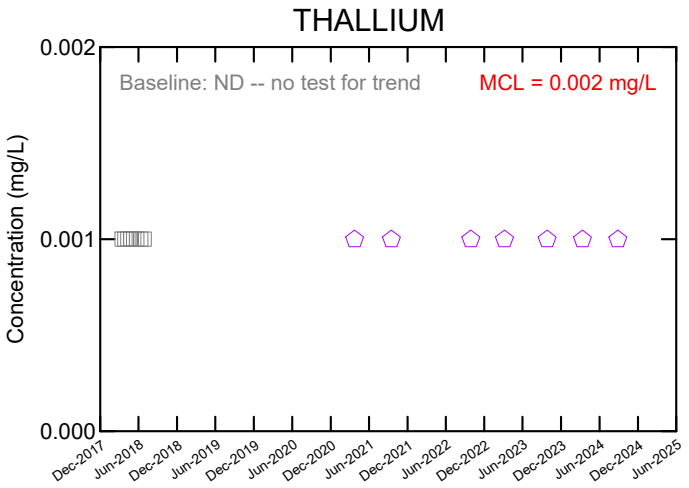
Project No. **12575233**
Date: **Oct 29, 2024**

figure 5.d









Legend:

- ■ Baseline Result
- ★ Historical Result (not used in baseline calculations)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result

MCL (Maximum Contaminant Level)

GWPS (Groundwater Protection Standard)

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.

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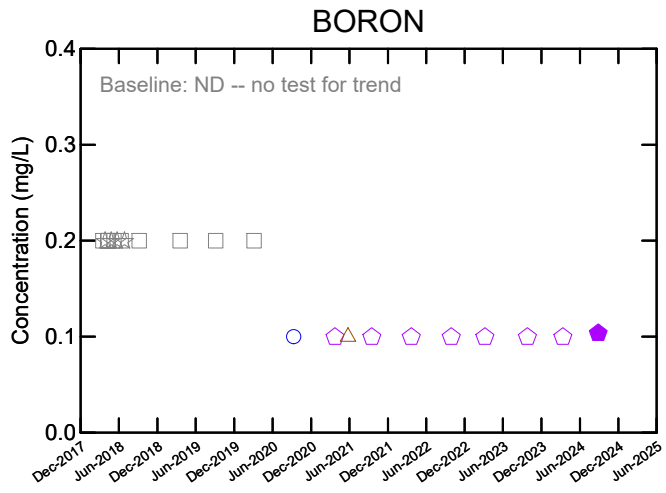
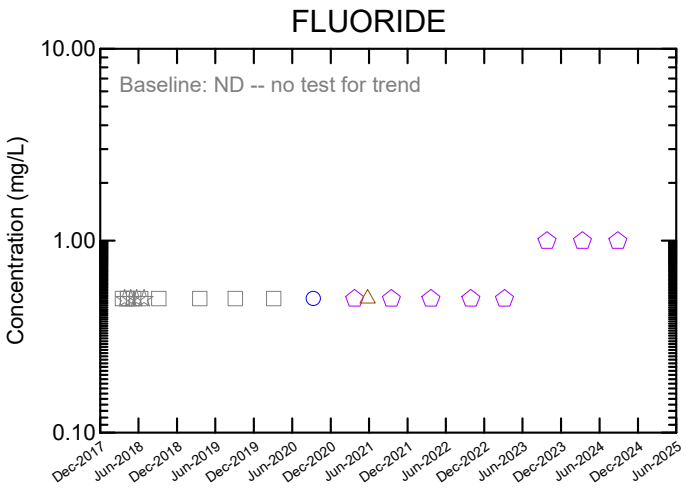
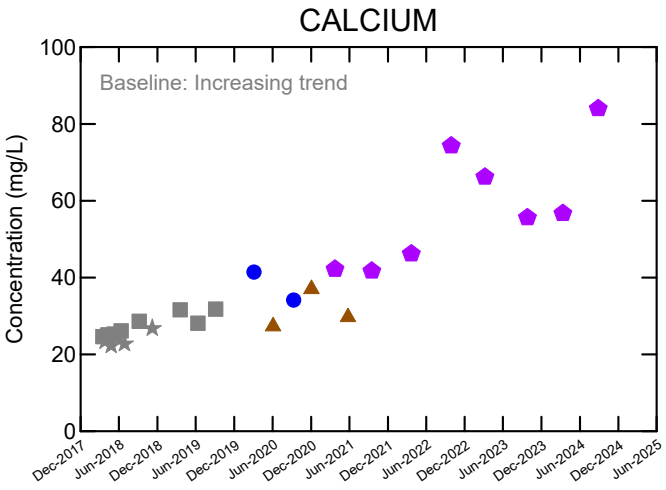
MW-232 -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

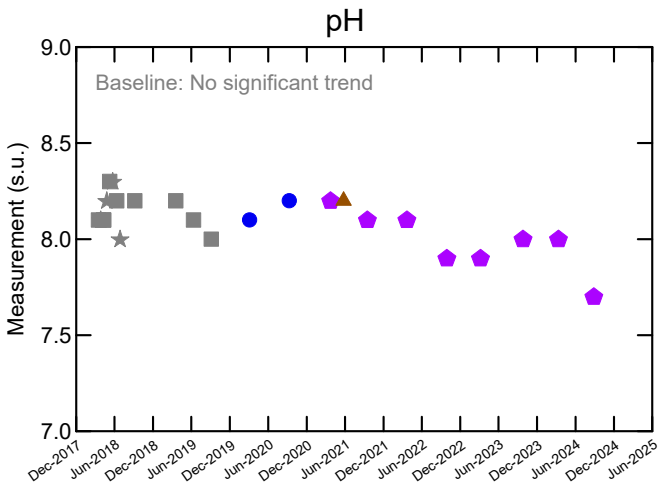
Project No. **12575233**
Date: **Oct 29, 2024**

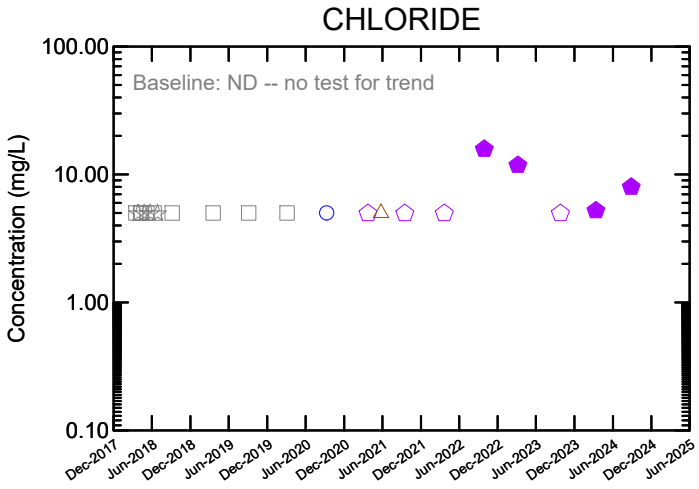
figure 5.e











Legend:

- Baseline Result
- Historical Result (not used in baseline calcs)
- Baseline J-qualified value
- Detection Monitoring Result
- Assessment Monitoring Result
- Verification or Supplemental Result

Notes:

1) Non-detects (plotted at detection limit) are represented by empty symbols.
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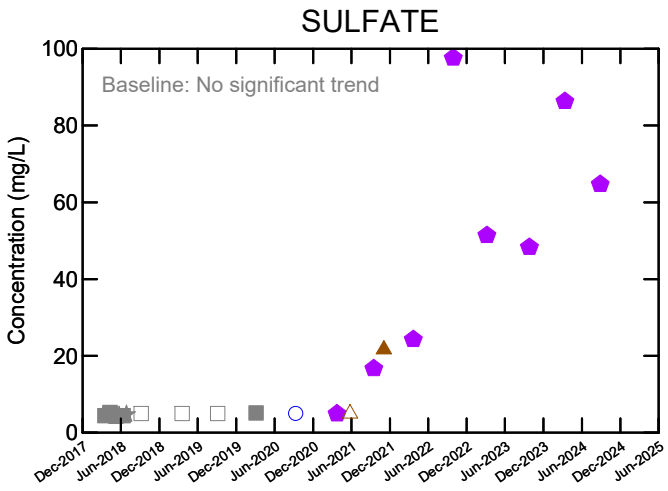
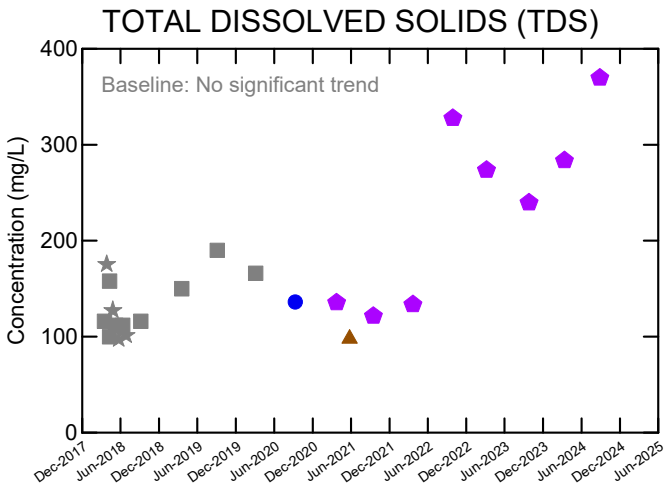
MW-233 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
Date: **Oct 29, 2024**

figure 6.a





Legend:

- ■ Baseline Result
- ★ Historical Result (not used in baseline calculations)
- ● Detection Monitoring Result
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental 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.
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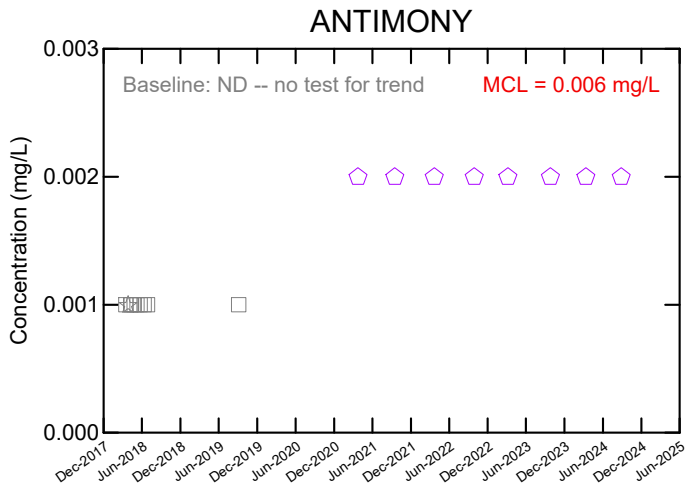
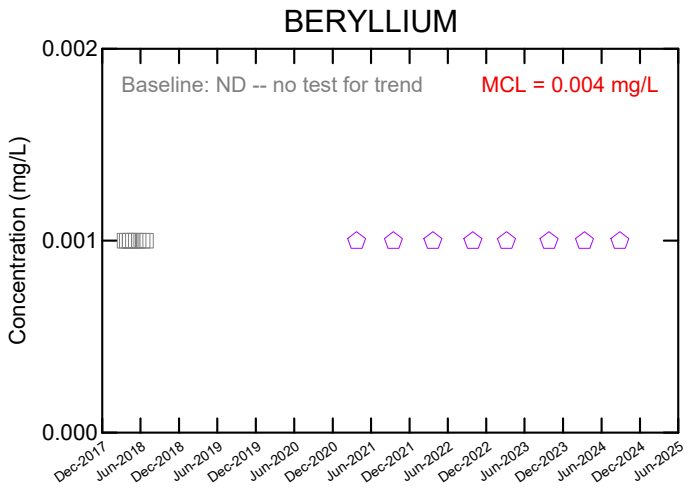
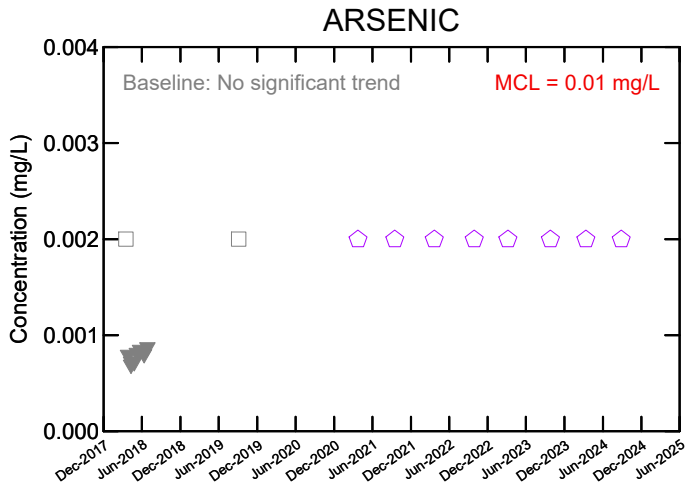
MW-233 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME

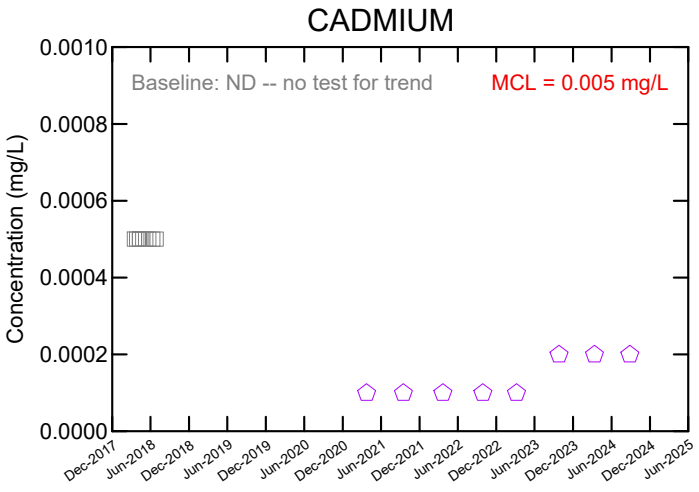
Project No. **12575233**
Date: **Oct 29, 2024**

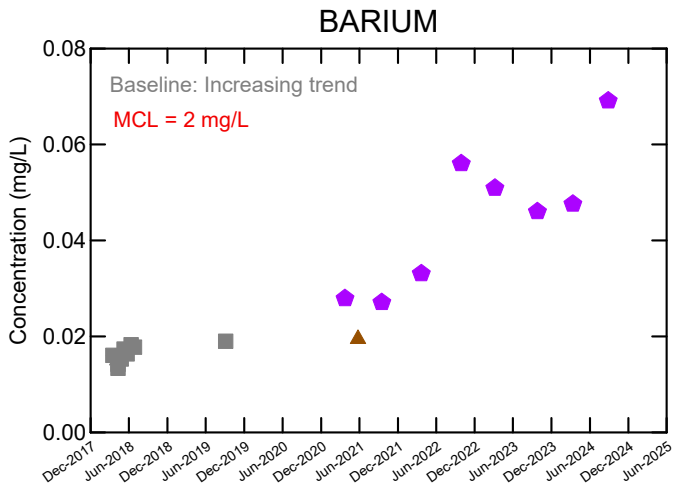
figure 6.b











Legend:

- Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental Result

MCL (Maximum Contaminant Level)

Notes:

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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.

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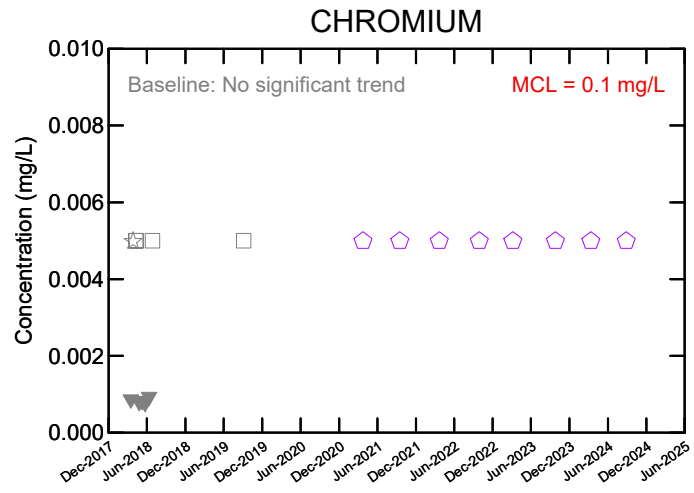
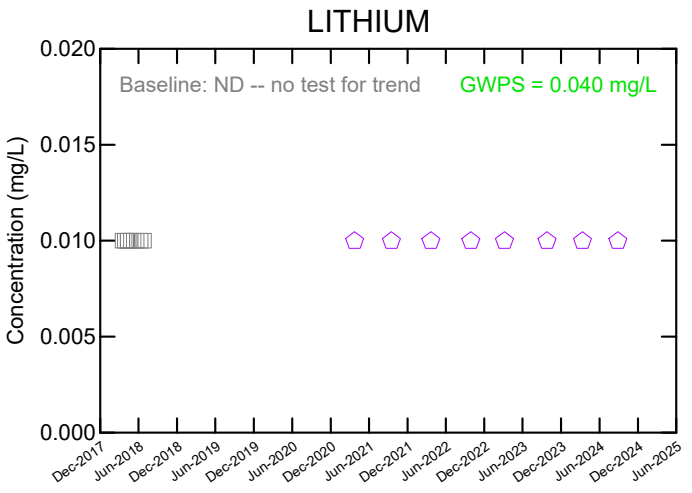
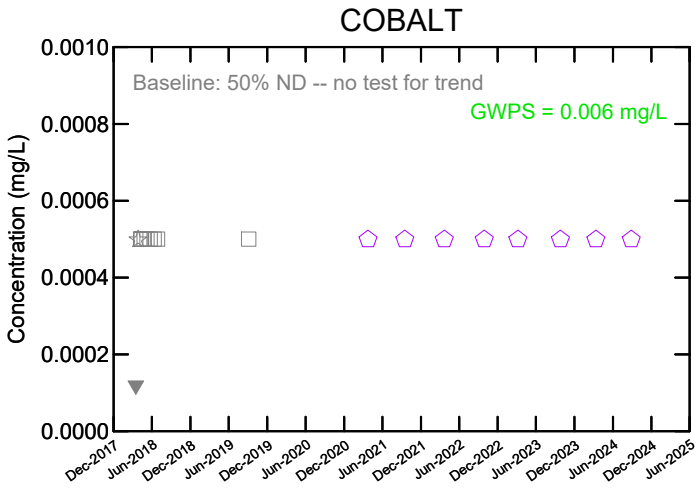
MW-233 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME

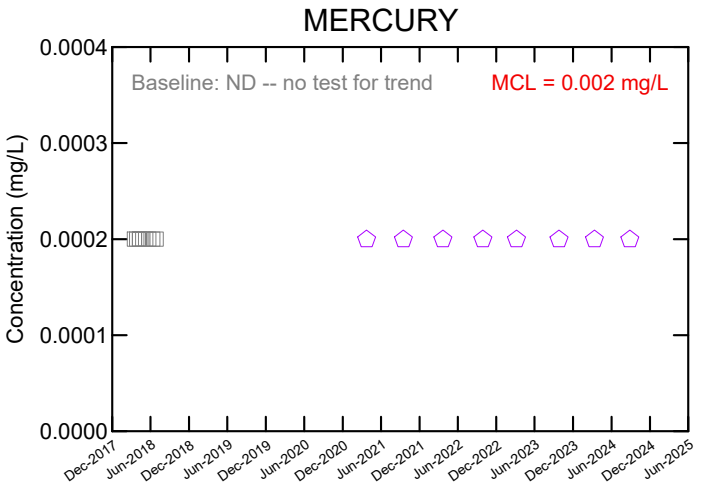
Project No. **12575233**
Date: **Oct 29, 2024**

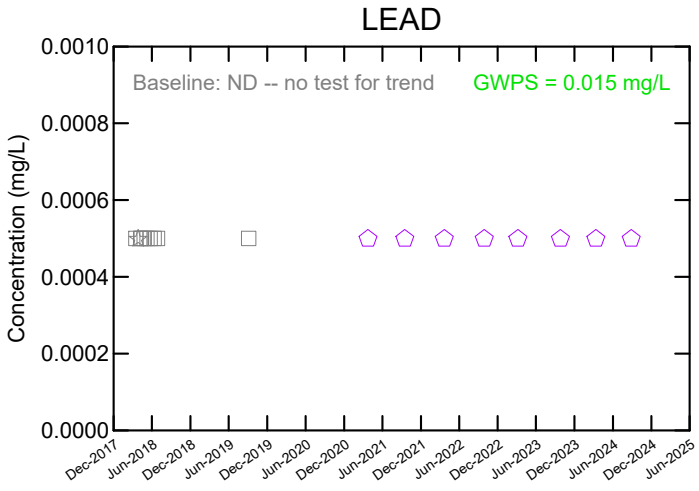
figure 6.c











Legend:

- ■ Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental Result

MCL (Maximum Contaminant Level)

GWPS (Groundwater Protection Standard)

Notes:

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2) Non-detects with detection limits above target and/or detected values were excluded from trends.
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MW-233 -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
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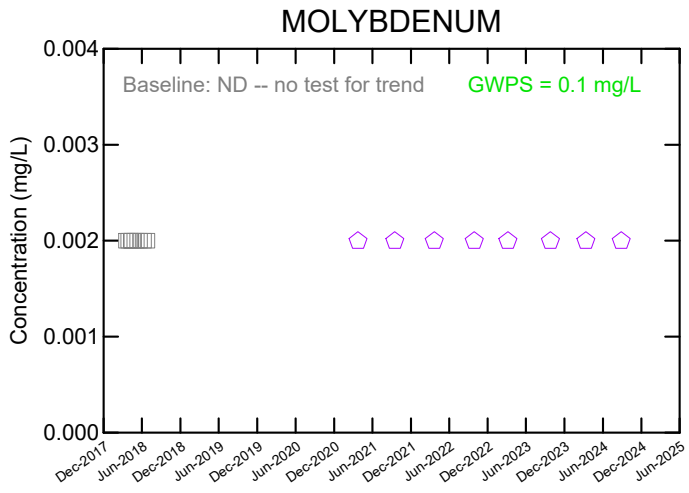
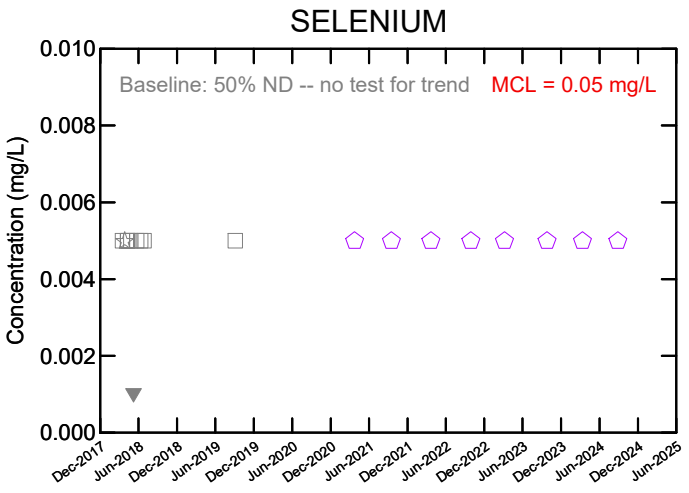
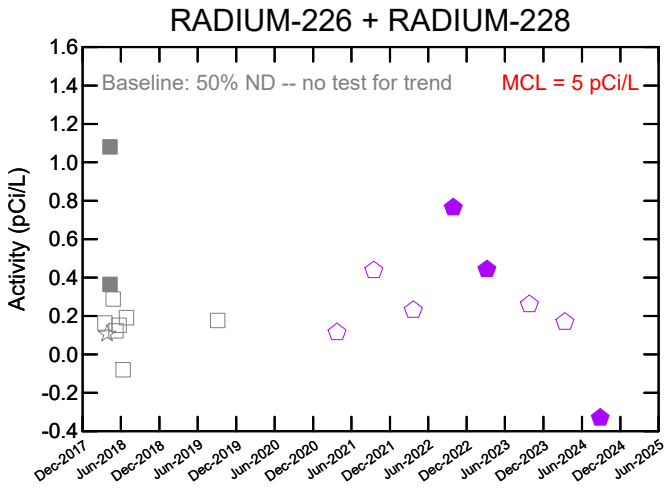
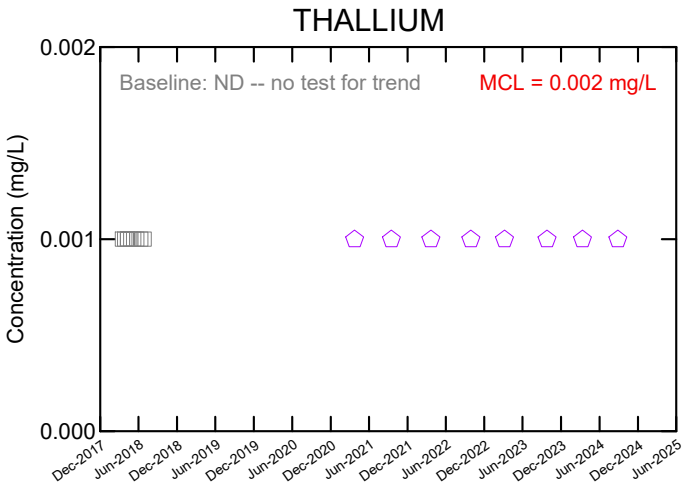
figure 6.d









Legend:

- ■ Baseline Result
- ★ Historical Result (not used in baseline calculations)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result
- MCL (Maximum Contaminant Level)
- GWPS (Groundwater Protection Standard)

Notes:

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MW-233 -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
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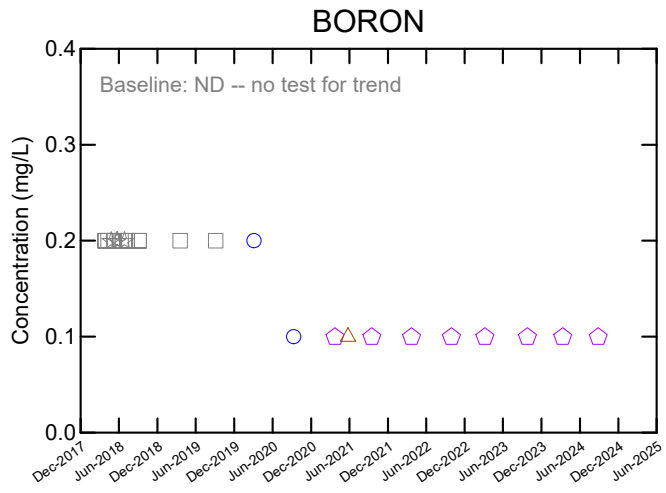
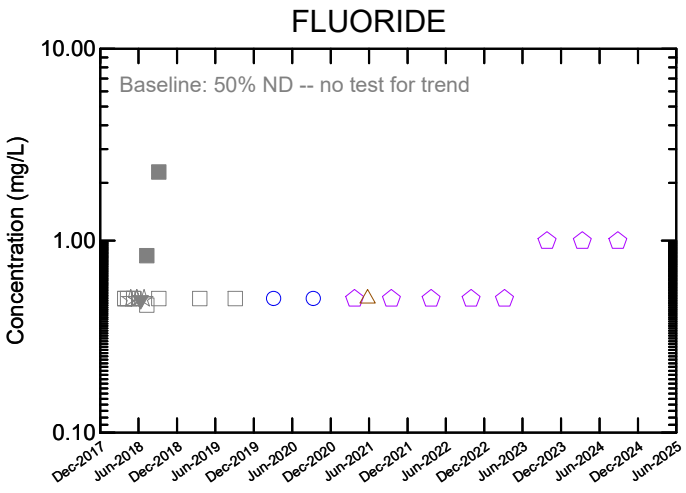
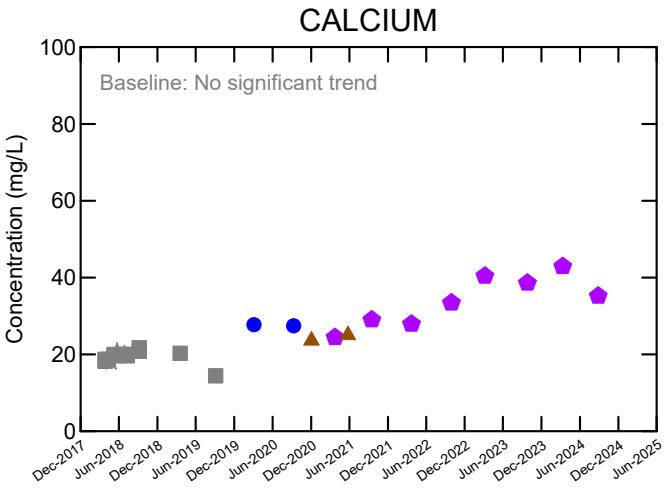
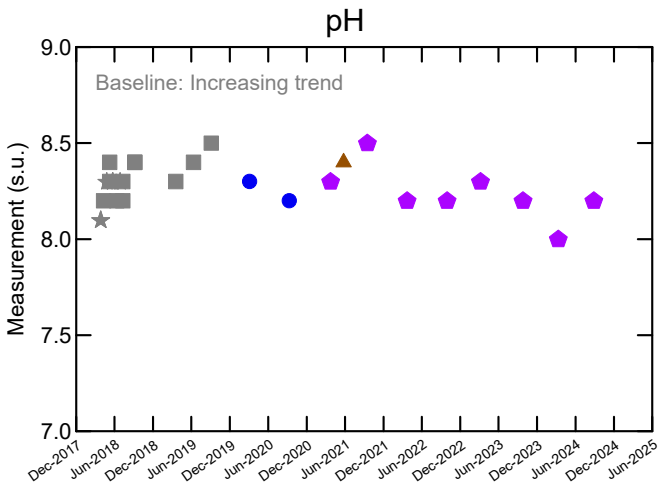
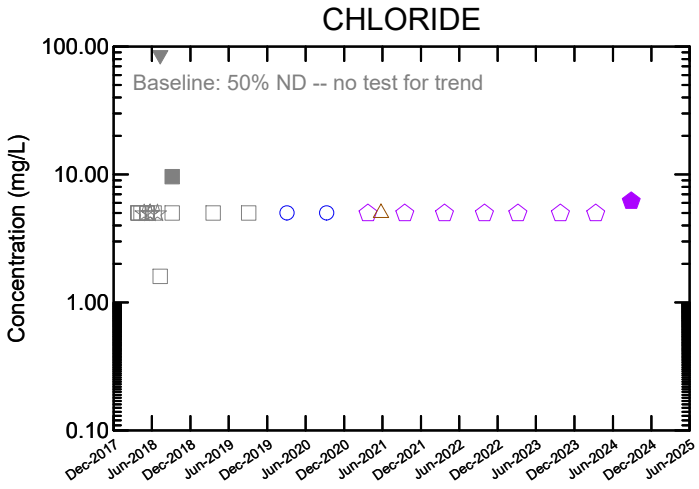
figure 6.e











Legend:

- Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ● Detection Monitoring Result
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental Result

Notes:

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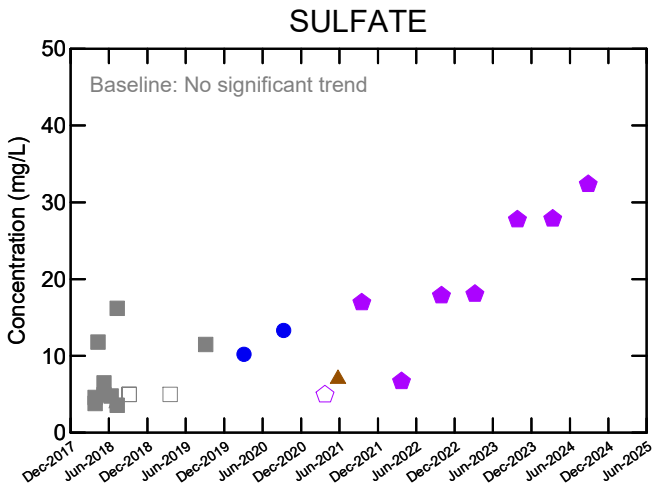
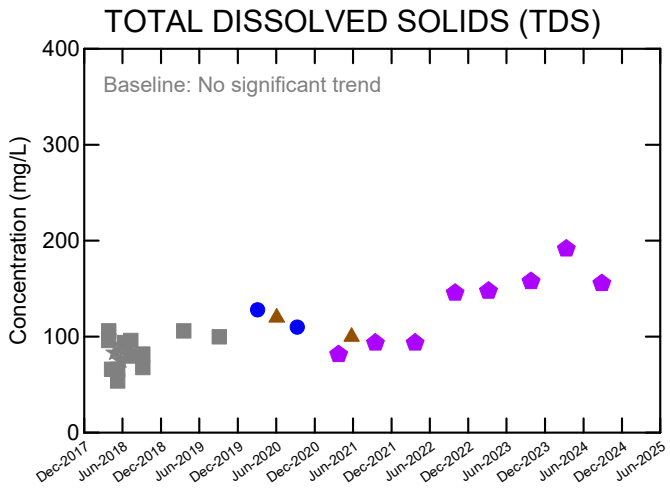
MW-234 -- APPENDIX III PARAMETERS ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
Date: **Oct 29, 2024**

figure 7.a





Legend:

- Baseline Result
- Historical Result (not used in baseline calculations)
- Detection Monitoring Result
- Assessment Monitoring Result
- Verification or Supplemental 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.

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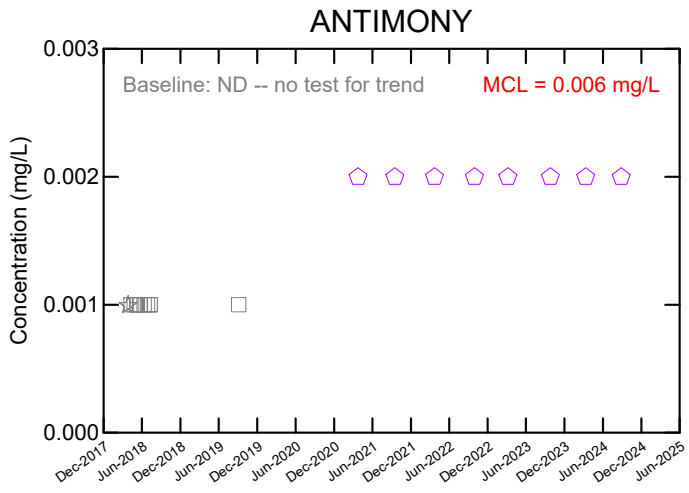
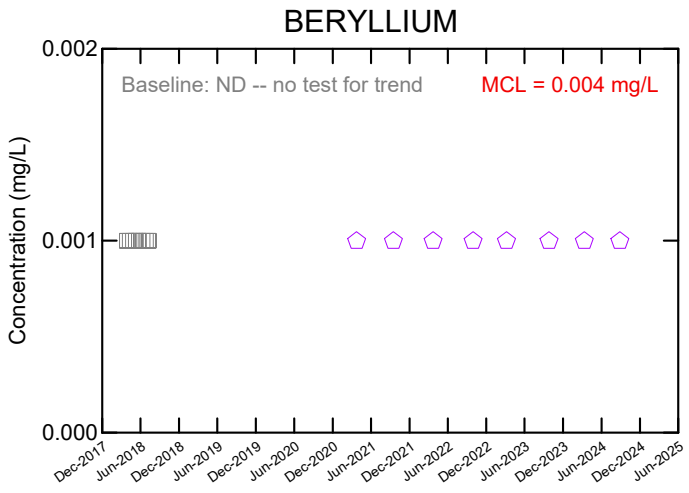
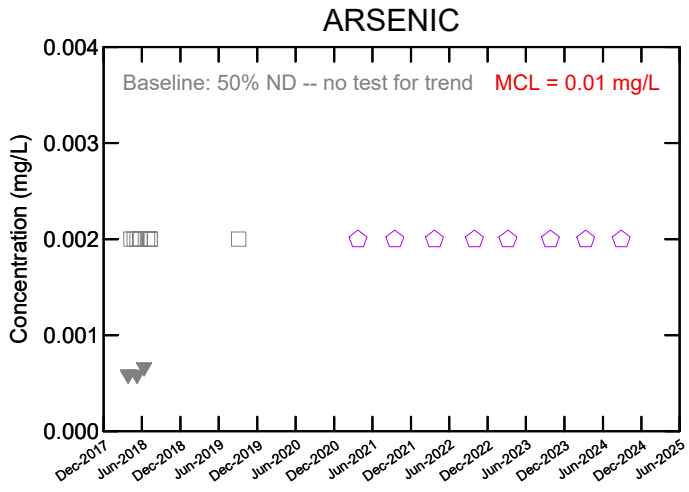
MW-234 -- APPENDIX III PARAMETERS
ANALYTE CONCENTRATION vs. TIME

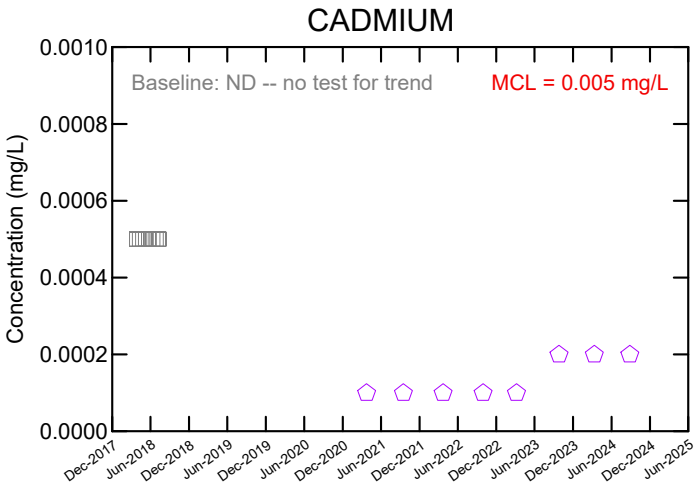
Project No. **12575233**
Date: **Oct 29, 2024**

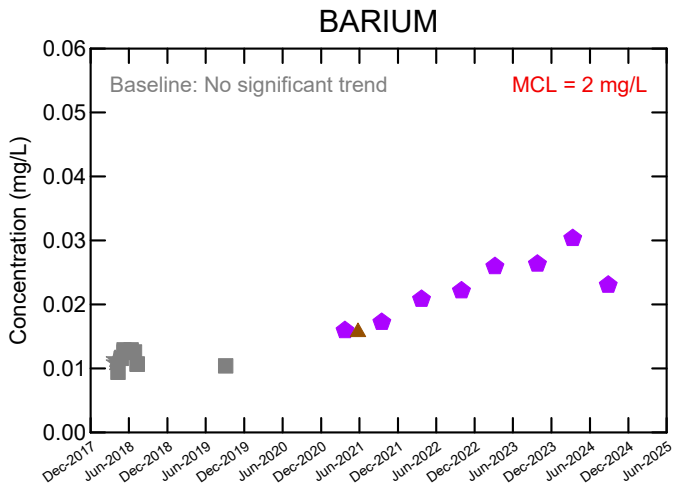
figure 7.b











Legend:

- Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental Result

MCL (Maximum Contaminant Level)

Notes:

1) Non-detects (plotted at detection limit) are represented by empty symbols.
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MidAmerican Energy Company
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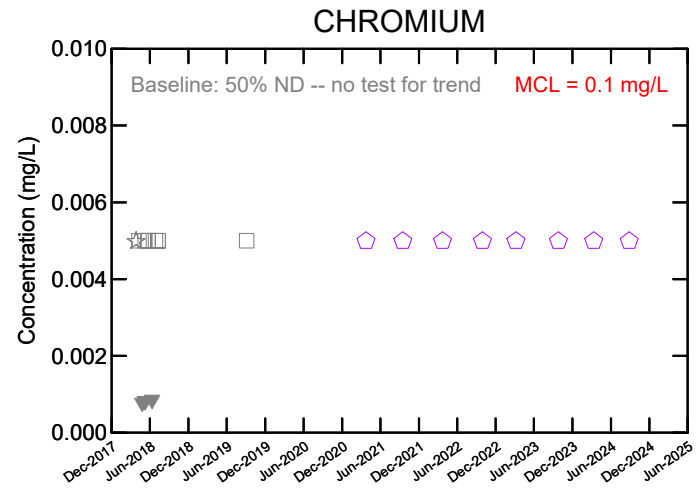
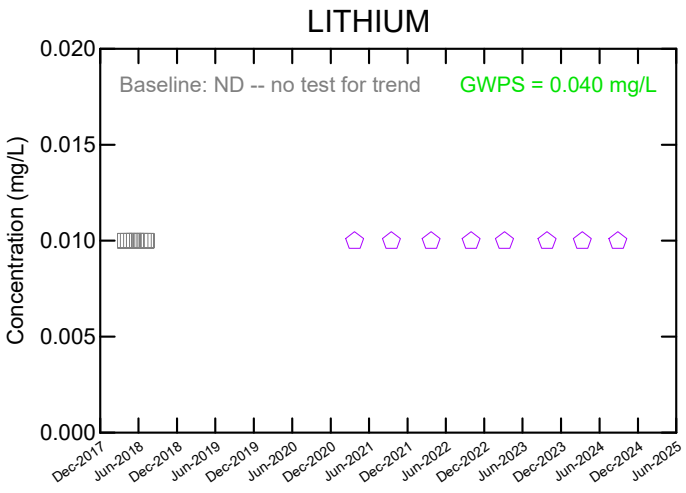
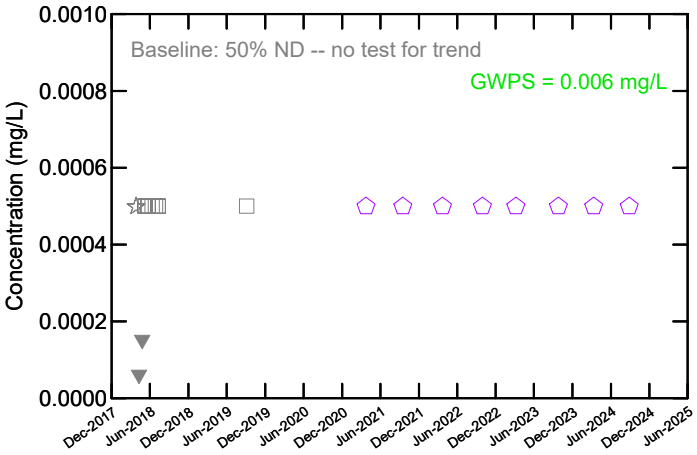
MW-234 -- APPENDIX IV PARAMETERS
ANALYTE CONCENTRATION vs. TIME

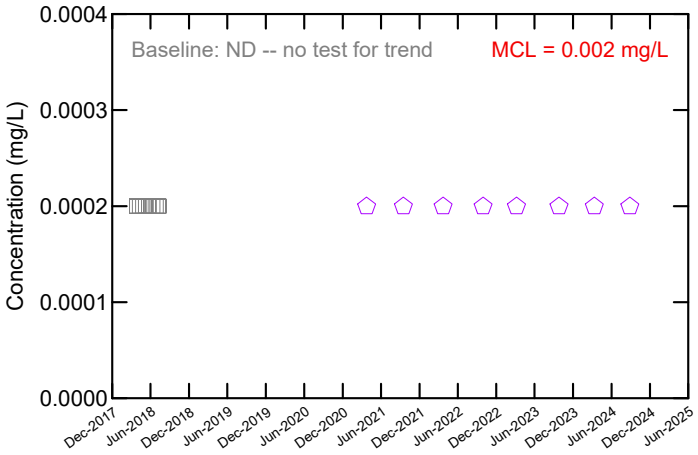
Project No. **12575233**
Date: **Oct 29, 2024**

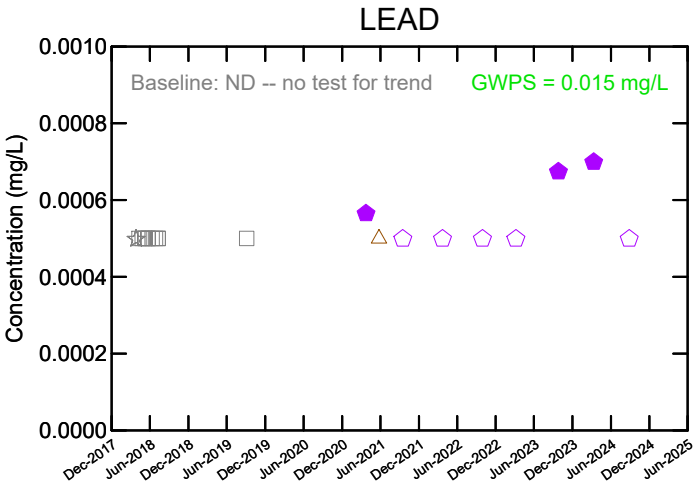
figure 7.c











Legend:

- ■ Baseline Result
- ★ Historical Result (not used in baseline calcs)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result
- ▲ Verification or Supplemental Result

MCL (Maximum Contaminant Level)

GWPS (Groundwater Protection Standard)

Notes:

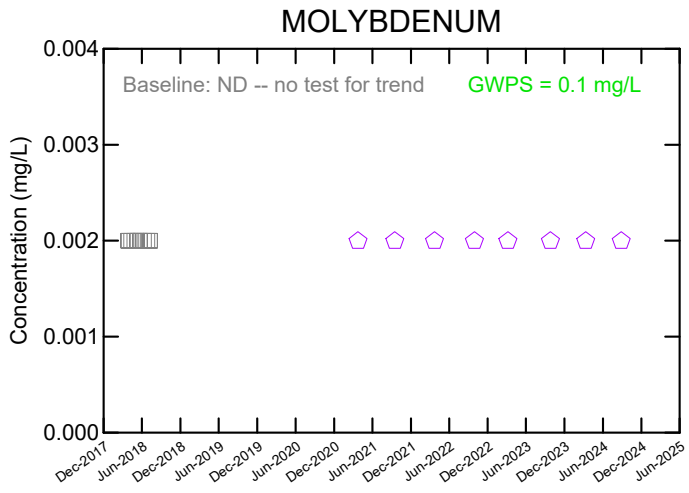
1) Non-detects (plotted at detection limit) are represented by empty symbols.
2) Non-detects with detection limits above target and/or detected values were excluded from trends.
3) Trend analysis results are reported at a 95 percent confidence level.

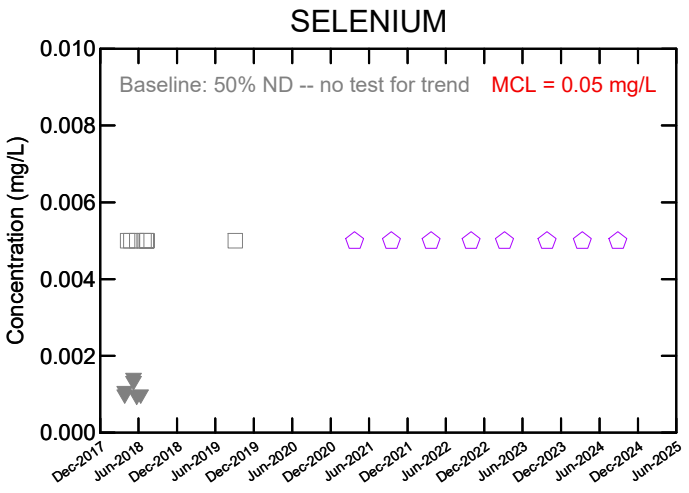
MidAmerican Energy Company
Louisa Generating Station
Muscatine, Iowa

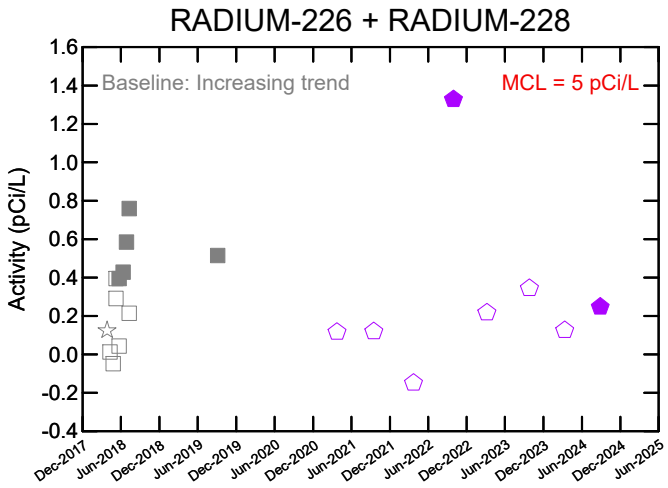
MW-234 -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

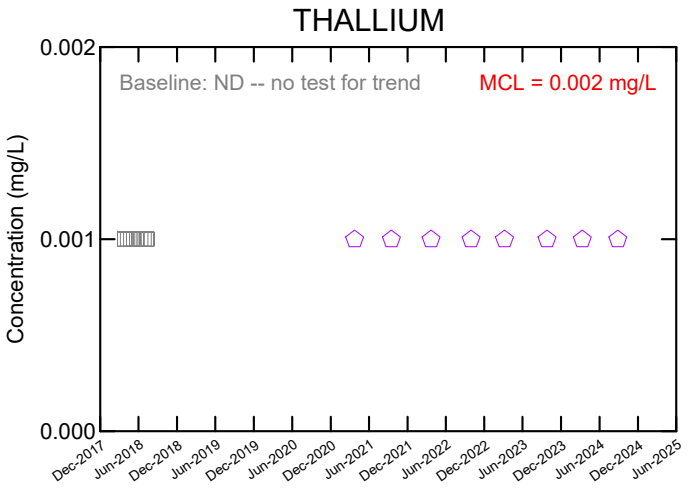
Project No. **12575233**
Date: **Oct 29, 2024**

figure 7.d









Legend:

- ■ Baseline Result
- ★ Historical Result (not used in baseline calculations)
- ▼ Baseline J-qualified value
- ⬟ Assessment Monitoring Result

MCL (Maximum Contaminant Level)

GWPS (Groundwater Protection Standard)

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
Louisa Generating Station
Muscatine, Iowa

MW-234 -- APPENDIX IV PARAMETERS ANALYTE CONCENTRATION vs. TIME

Project No. **12575233**
Date: **Oct 29, 2024**

figure 7.e

Appendix D

Groundwater Analytical Data
(March 2018 through 2024)

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:			MW-213A	MW-213A	MW-213A	MW-213A	MW-213A	MW-213A	MW-213A	MW-213A
Sample ID:			MW-213A_18_03_01	MW-213A_18_03_2	MW-213A_18_04_1	MW-213A_18_04_2	MW-213A_18_05_1	MW-213A_05_2	MW-213A_18_06_01	MW-213A_18_06_02
Sample Date:			3/14/2018	3/28/2018	4/10/2018	4/26/2018	5/8/2018	5/23/2018	6/11/2018	6/27/2018
Parameters	Units	Groundwater Protection Standard								
Appendix III										
Boron	mg/L	None	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Calcium	mg/L	None	38.9	35	35.4	35.2	38.1	37.8	44.2	42.4
Chloride	mg/L	None	5.22	3.23 J	5 U	3.32 J	3.4 J	4.88 J	5.58	5.6
Fluoride	mg/L	4	0.588	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
pH, lab	s.u.	None	7.7 J	7.9 J	7.8 J	7.9 J	8 J	8 J	8 J	7.9 J
Sulfate	mg/L	None	7.56	7.24	8.02	8.01	7.74	9.39	10.3	10.3
Total dissolved solids (TDS)	mg/L	None	152	154	164	166	162	176	166	212
Appendix IV										
Antimony	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.000446 J	0.001 U	0.001 U
Arsenic	mg/L	0.01	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.000574 J	0.002 U
Barium	mg/L	2	0.0306	0.0267	0.0238	0.0289	0.0299	0.0262	0.0312	0.0304
Beryllium	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	mg/L	0.005	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Chromium	mg/L	0.1	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.0042 J	0.000815 J	0.005 U
Cobalt	mg/L	0.006	0.000232 J	0.0005 U	0.0005 U	0.00021 J	0.000084 J	0.000134 J	0.000067 J	0.000063 J
Lead	mg/L	0.015	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Lithium	mg/L	0.04	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Mercury	mg/L	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L	0.1	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Radium-226 & 228	pCi/L	5	0.524	0.101 U	0.245 U	0.291 U	0.565	0.424	0.405	0.38 U
Selenium	mg/L	0.05	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Thallium	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Field										
Conductivity, field	mS/cm		0.31207	0.30543	0.28344	0.31001	0.29076	0.28454	0.43989	0.29785
Dissolved oxygen (DO), field	mg/L		7.61	8.00	8.19	8.24	8.29	7.53	6.94	6.34
Oxidation reduction potential (ORP), field	millivolts		46.1	198.9	203.0	186.3	159.0	193.3	173.7	185.2
pH, field	s.u.		7.82	7.77	7.46	7.57	7.84	7.82	7.40	7.52
Temperature, sample	Deg C		14.57	12.57	12.26	15.02	16.22	15.33	15.24	16.37
Turbidity, field	NTU		0.10	0.50	0	14.55	0.50	0.61	0.38	1.14

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-213A	MW-213A	MW-213A	MW-213A	MW-213A	MW-213A	MW-213A	MW-213A	MW-213A	MW-213A	MW-213A
Sample ID:		MW-213A_18_09	MW-213A_18_11	MW-213A_19_03	MW-213A_19_06	MW-213A_19_09	MW-213A_20_03	MW-213A_20_09	MW-213A_21_03	MW-213A_21_05	MW-213_21_09	MW213A_22_03
Sample Date:		9/6/2018	11/6/2018	3/19/2019	6/11/2019	9/4/2019	3/4/2020	9/9/2020	3/24/2021	5/26/2021	9/14/2021	3/23/2022
Parameters	**Units**											
Appendix III												
Boron	mg/L	0.200 U	--	0.200 U	--	0.200 U	0.200 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Calcium	mg/L	42.0	--	49.5	58.4	42.3	32.8	32.6	31.5	36.0	31.5	32.9
Chloride	mg/L	5.51	--	6.95	--	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Fluoride	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
pH, lab	s.u.	8.0 J	--	7.9 J	--	7.9 J	7.9 J	8.0 J	8.0 J	8.0 J	8.0 J	8.0 J
Sulfate	mg/L	10.3	--	7.05	--	6.99	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Total dissolved solids (TDS)	mg/L	232	236	212	292	186	132	120	110	102	74.0	88.0
Appendix IV												
Antimony	mg/L	--	--	--	--	0.00100 U	--	--	0.00200 U	--	0.00200 U	0.00200 U
Arsenic	mg/L	--	--	--	--	0.00200 U	--	--	0.00200 U	--	0.00200 U	0.00200 U
Barium	mg/L	--	--	--	--	0.0325	--	--	0.0209	--	0.0207	0.0262
Beryllium	mg/L	--	--	--	--	--	--	--	0.00100 U	--	0.00100 U	0.00100 U
Cadmium	mg/L	--	--	--	--	--	--	--	0.000100 U	--	0.000100 U	0.000100 U
Chromium	mg/L	--	--	--	--	0.00500 U	--	--	0.00500 U	--	0.00500 U	0.00500 U
Cobalt	mg/L	--	--	--	--	0.000500 U	--	--	0.000500 U	--	0.000500 U	0.000500 U
Lead	mg/L	--	--	--	--	0.000500 U	--	--	0.000500 U	--	0.000500 U	0.000500 U
Lithium	mg/L	--	--	--	--	--	--	--	0.0100 U	--	0.0100 U	0.0100 U
Mercury	mg/L	--	--	--	--	--	--	--	0.000200 U	--	0.000200 U	0.000200 U
Molybdenum	mg/L	--	--	--	--	--	--	--	0.00200 U	--	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	--	--	--	--	0.0604 U	--	--	0.222 U	--	0.0978 U	-0.143 U
Selenium	mg/L	--	--	--	--	0.00500 U	--	--	0.00500 U	--	0.00500 U	0.00500 U
Thallium	mg/L	--	--	--	--	--	--	--	0.00100 U	--	0.00100 U	0.00100 U
Field												
Conductivity, field	mS/cm	0.317	0.43687	0.3777	0.412	0.353	0.254	0.245	0.23	0.273	--	--
Dissolved oxygen (DO), field	mg/L	4.3	5.14	6.93	4.70	9.36	8.99	7.26	9.67	8.8	--	--
Oxidation reduction potential (ORP), field	millivolts	245	155.3	264	176	112	233	246	99.5	226	--	--
pH, field	s.u.	7.72	7.79	7.59	7.23	7.68	7.02	7.85	7.65	7.73	--	--
Temperature, sample	Deg C	14.16	12.84	13.15	14.35	14.04	11.49	13.15	12.62	14.69	--	--
Turbidity, field	NTU	0	0.4	1.7	0.0	0.0	0	1.9	0.97	0	--	--

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-213A	MW-213A	MW-213A	MW-213A	MW-213A	MW-213A	MW-213A	MW-221A	MW-221A	MW-221A
Sample ID:		MW-213A_22_09	MW-213A_23_03	MW-213A_23_03 Re1	MW-213A_23_03 Re2	MW-213A_23_09	MW-213A_24_03	MW-213A_24_08	MW-221A_18_03_01	FD-1_18_03_01	MW-221A_18_03_2
Sample Date:		9/28/2022	3/6/2023	3/6/2023	3/6/2023	9/25/2023	3/11/2024	8/26/2024	3/14/2018	3/14/2018 (Duplicate)	3/27/2018
Parameters	**Units**										
Appendix III											
Boron	mg/L	0.100 U	R	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.2 U	0.2 U	0.2 U
Calcium	mg/L	41.5	40.9	--	--	40.0	45.0	50.7	45.2	42.9	42
Chloride	mg/L	5.32	5.00 U	--	--	5.93	6.18	14.0	4.21 J	3.24 J	2.86 J
Fluoride	mg/L	0.500 U	0.500 U	--	--	1.00 U	1.00 U	1.00 U	0.5 U	0.500 U	0.5 U
pH, lab	s.u.	7.6 J	8.0 J	--	--	7.8 J	8.0 J	7.8 J	7.7 J	7.7 J	8 J
Sulfate	mg/L	6.70	5.47	--	--	7.71	7.24	18.5	11.7	10.9	10.5
Total dissolved solids (TDS)	mg/L	146	138	--	--	132	136	206	168	174	152
Appendix IV											
Antimony	mg/L	0.00200 U	0.00200 U	--	--	0.00200 U	0.00200 U	0.00200 U	0.001 U	0.00100 U	0.001 U
Arsenic	mg/L	0.00200 U	0.00200 U	--	--	0.00200 U	0.00200 U	0.00200 U	0.002 U	0.00200 U	0.002 U
Barium	mg/L	0.0299	0.0320	--	--	0.0310	0.0346	0.0343	0.032	0.0301	0.0306
Beryllium	mg/L	0.00100 U	0.00400 U	--	--	0.00100 U	0.00100 U	0.00100 U	0.001 U	0.00100 U	0.001 U
Cadmium	mg/L	0.000100 U	0.000100 U	--	--	0.000200 U	0.000200 U	0.000200 U	0.0005 U	0.0005 U	0.0005 U
Chromium	mg/L	0.00500 U	0.00500 U	--	--	0.00500 U	0.00500 U	0.00500 U	0.005 U	0.005 U	0.005 U
Cobalt	mg/L	0.000500 U	0.000568	--	--	0.000500 U	0.000500 U	0.000500 U	0.0005 U	0.0005 U	0.000077 J
Lead	mg/L	0.000500 U	0.000580	--	--	0.000500 U	0.000500 U	0.000500 U	0.0005 U	0.0005 U	0.0005 U
Lithium	mg/L	0.0100 U	0.0100 U	--	--	0.0100 U	0.0100 U	0.0100 U	0.01 U	0.01 U	0.01 U
Mercury	mg/L	0.000200 U	0.000200 U	--	--	0.000200 U	0.000200 U	0.000200 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L	0.00200 U	0.00200 U	--	--	0.00200 U	0.00200 U	0.00200 U	0.002 U	0.002 U	0.002 U
Radium-226 & 228	pCi/L	0.848	0.214 U	--	--	0.163 U	-0.106 U	0.437	0.0832 U	--	-0.105 U
Selenium	mg/L	0.00500 U	0.00500 U	--	--	0.00500 U	0.00500 U	0.00500 U	0.005 U	0.005 U	0.005 U
Thallium	mg/L	0.00100 U	0.00100 U	--	--	0.00100 U	0.00100 U	0.00100 U	0.001 U	0.001 U	0.001 U
Field											
Conductivity, field	mS/cm	0.28	0.27	--	--	0.29	0.32	0.36	0.28043	--	0.32926
Dissolved oxygen (DO), field	mg/L	6.14	7.72	--	--	5.96	7.01	5.59	9.10	--	9.44
Oxidation reduction potential (ORP), field	millivolts	93.7	17.6	--	--	155.6	131.2	134.9	92.4	--	202.4
pH, field	s.u.	8.65	7.79	--	--	7.31	7.62	7.54	8.01	--	7.80
Temperature, sample	Deg C	14.21	12.32	--	--	14.44	14.37	14.49	13.38	--	12.66
Turbidity, field	NTU	1.04	5.31	--	--	0	0	0.4	28.51	--	27.49

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-221A	MW-221A	MW-221A	MW-221A	MW-221A	MW-221A	MW-221A	MW-221A	MW-221A	MW-221A
Sample ID:		MW-221A_18_04_1	MW-221A_18_04_2	MW-221A_18_05_1	MW-221A_05_2	MW-221A_18_06_01	FD-1_18_06_01	MW-221A_18_06_02	FD-1_18_06_02	MW-221A_18_09	MW-221A_19_03
Sample Date:		4/11/2018	4/26/2018	5/9/2018	5/23/2018	6/11/2018	6/11/2018 (Duplicate)	6/27/2018	6/27/2018 (Duplicate)	9/6/2018	3/19/2019
Parameters	**Units**										
Appendix III											
Boron	mg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.200 U	0.200 U
Calcium	mg/L	39.7	42	42.6	44.5	43.9	41.7	41.5	41.0	36.3	50.8
Chloride	mg/L	5 U	9.51	4.89 J	5.17	3.77 J	3.93 J	4.45 J	4.98 J	5.00 U	5.21
Fluoride	mg/L	0.5 U	2.22	0.5 U	0.5 U	0.5 U	0.500 U	0.5 U	0.492 J	0.500 U	0.500 U
pH, lab	s.u.	8 J	8 J	8 J	8.1 J	8.1 J	8.0 J	8 J	7.6 J	8.0 J	8.0 J
Sulfate	mg/L	12	11.6	11	10.5	9.18	9.37	10.7	10.9	8.41	10.6
Total dissolved solids (TDS)	mg/L	180	174	166	196	164 J	212	190	200	156	182
Appendix IV											
Antimony	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	--	--
Arsenic	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	--	--
Barium	mg/L	0.0277	0.031	0.0325	0.031	0.0312	0.0297	0.0298	0.0298	--	--
Beryllium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	--	--
Cadmium	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--	--
Chromium	mg/L	0.005 U	0.000793 J	0.005 U	0.000774 J	0.000905 J	0.000790 J	0.005 U	0.005 U	--	--
Cobalt	mg/L	0.000168 J	0.000155 J	0.000062 J	0.000067 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--	--
Lead	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--	--
Lithium	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	--
Mercury	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	--	--
Molybdenum	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	--	--
Radium-226 & 228	pCi/L	0.509	0.139 U	0.144 U	0.301 U	0.158 U	0.0652 U	0.595	0.703	--	--
Selenium	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	--	--
Thallium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	--	--
Field											
Conductivity, field	mS/cm	0.32939	0.33072	0.32825	0.29772	0.42362	--	0.28279	--	0.268	0.352
Dissolved oxygen (DO), field	mg/L	8.93	8.91	7.56	6.76	7.79	--	7.19	--	5.75	7.01
Oxidation reduction potential (ORP), field	millivolts	239.1	180.4	156.5	173.1	138.5	--	162.6	--	248	317
pH, field	s.u.	7.51	7.69	7.78	8.15	7.61	--	7.85	--	7.87	7.85
Temperature, sample	Deg C	13.88	15.46	16.51	16.21	15.04	--	16.40	--	15.09	12.01
Turbidity, field	NTU	4.95	2.81	0.69	0.89	0.98	--	2.26	--	0	1.6

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-221A	MW-221A	MW-221A	MW-221A	MW-221A	MW-221A	MW-221A	MW-221A	MW-221A	MW-221A
Sample ID:		**MW-221A_19_06**	**MW-221A_19_09**	**MW-221A_20_03**	**MW-221A_20_09**	**MW-221A_21_03**	**MW-221A_21_05**	**MW-221A_21_09**	**MW221A_22_03**	**MW-221A_22_09**	**MW-221A_23_03**
Sample Date:		**6/11/2019**	**9/4/2019**	**3/4/2020**	**9/9/2020**	**3/24/2021**	**5/26/2021**	**9/14/2021**	**3/23/2022**	**9/29/2022**	**3/6/2023**
Parameters	**Units**										
Appendix III											
Boron	mg/L	--	0.200 U	0.200 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	R
Calcium	mg/L	53.3	34.4	45.4	41.2	44.6	47.7	46.0	46.3	41.4	43.2
Chloride	mg/L	--	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.71	5.00 U
Fluoride	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
pH, lab	s.u.	--	7.9 J	7.9 J	8.0 J	8.0 J	8.0 J	7.9 J	8.0 J	7.9 J	8.1 J
Sulfate	mg/L	--	12.7	8.93	7.78	5.68	6.66	8.93	12.8	13.2	10.3
Total dissolved solids (TDS)	mg/L	--	172	174	150	156	164	148	94.0	148	128
Appendix IV											
Antimony	mg/L	--	0.00100 U	--	--	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	--	0.00200 U	--	--	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	--	0.0202	--	--	0.0327	--	0.0331	0.0351	0.0295	0.0309
Beryllium	mg/L	--	--	--	--	0.00100 U	--	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	--	--	--	--	0.000100 U	--	0.000100 U	0.000100 U	0.000100 U	0.000100 U
Chromium	mg/L	--	0.0423	--	--	0.00500 U	--	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Cobalt	mg/L	--	0.000500 U	--	--	0.000500 U	--	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	--	0.000862	--	--	0.000500 U	--	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	--	--	--	--	0.0100 U	--	0.0100 U	0.0100 U	0.0100 U	0.0100 U
Mercury	mg/L	--	--	--	--	0.000200 U	--	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	--	--	--	--	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	--	-0.0360 U	--	--	0.112 U	--	-0.0947 U	0.0293 U	0.959	0.298 U
Selenium	mg/L	--	0.0238 U	--	--	0.00500 U	--	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	--	--	--	--	0.00100 U	--	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Field											
Conductivity, field	mS/cm	0.383	0.281	0.325	0.3	0.26	0.318	--	--	0.29	0.29
Dissolved oxygen (DO), field	mg/L	6.61	9.66	10.62	8.23	10.33	6.7	--	--	9.2	9.69
Oxidation reduction potential (ORP), field	millivolts	162	96	235	237	97.3	203	--	--	18	6.1
pH, field	s.u.	7.44	7.78	7.05	7.81	7.59	7.85	--	--	8.55	7.9
Temperature, sample	Deg C	14.69	14.29	11.64	13.31	12.03	21.26	--	--	14.9	10.68
Turbidity, field	NTU	0.0	3.2	0	0.3	0.65	4.1	--	--	1.43	5.08

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-221A	MW-221A	MW-221A	MW-221A	MW-221A	MW-230	MW-230	MW-230	MW-230	MW-230
Sample ID:		MW-221A_23_03 Re1	MW-221A_23_03 Re2	MW-221A_23_09	MW-221A_24_03	MW-221A_24_08	MW-230_18_03_01	MW-230_18_03_2	MW-230_18_04_1	MW-230_18_04_2	MW-230_18_05_1
Sample Date:		3/6/2023	3/6/2023	9/25/2023	3/11/2024	8/27/2024	3/15/2018	3/28/2018	4/11/2018	4/26/2018	5/9/2018
Parameters	**Units**										
Appendix III											
Boron	mg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Calcium	mg/L	--	--	37.2	45.4	39.8	24.4	22.6	22.3	21	22.4
Chloride	mg/L	--	--	5.00 U	10.4	7.07	5 U	5 U	5 U	4.97 J	5 U
Fluoride	mg/L	--	--	1.00 U	1.00 U	1.00 U	0.5 U	0.5 U	0.5 U	1.23	0.5 U
pH, lab	s.u.	--	--	8.0 J	8.0 J	7.9 J	8.3 J	7.3 J	8.3 J	7.5 J	7.6 J
Sulfate	mg/L	--	--	9.48	24.6	9.62	5.28	4.94 J	7.01	5.31	4.93 J
Total dissolved solids (TDS)	mg/L	--	--	114	188	150	102	56	108	92	104
Appendix IV											
Antimony	mg/L	--	--	0.00200 U	0.00200 U	0.00200 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic	mg/L	--	--	0.00200 U	0.00200 U	0.00200 U	0.002 U	0.000641 J	0.002 U	0.002 U	0.002 U
Barium	mg/L	--	--	0.0285	0.0336	0.0270	0.0145	0.0139	0.0124	0.0126	0.0135
Beryllium	mg/L	--	--	0.00100 U	0.00100 U	0.00100 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	mg/L	--	--	0.000200 U	0.000200 U	0.000200 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Chromium	mg/L	--	--	0.00500 U	0.00500 U	0.00500 U	0.000758 J	0.005 U	0.005 U	0.00101 J	0.005 U
Cobalt	mg/L	--	--	0.000500 U	0.000500 U	0.000500 U	0.000101 J	0.000151 J	0.000103 J	0.000097 J	0.0005 U
Lead	mg/L	--	--	0.000500 U	0.000500 U	0.000500 U	0.0005 U	0.0005 U	0.0005 U	0.000273 J	0.0005 U
Lithium	mg/L	--	--	0.0100 U	0.0100 U	0.0100 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Mercury	mg/L	--	--	0.000200 U	0.000200 U	0.000200 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L	--	--	0.00200 U	0.00200 U	0.00200 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Radium-226 & 228	pCi/L	--	--	0.418 U	0.212 U	0.0437	0.344	0.183 U	0.0563 U	0.177 U	0.343 U
Selenium	mg/L	--	--	0.00500 U	0.00500 U	0.00500 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Thallium	mg/L	--	--	0.00100 U	0.00100 U	0.00100 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Field											
Conductivity, field	mS/cm	--	--	0.27	0.34	0.3	0.16027	0.17006	0.16622	0.17195	0.1713
Dissolved oxygen (DO), field	mg/L	--	--	9.82	8.79	8.48	10.49	10.63	10.43	10.60	10.18
Oxidation reduction potential (ORP), field	millivolts	--	--	85.8	123.3	119.3	121.8	201.8	215.7	165.3	138.5
pH, field	s.u.	--	--	7.54	7.65	7.53	8.56	8.02	8.00	8.33	8.41
Temperature, sample	Deg C	--	--	15.09	14.53	14.95	13.79	13.28	14.16	14.83	15.64
Turbidity, field	NTU	--	--	0	0	0.32	3.25	3.41	3.60	0.18	0

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-230	MW-230	MW-230	MW-230	MW-230	MW-230	MW-230	MW-230	MW-230	MW-230	MW-230
Sample ID:		MW-230_05_2	MW-230_18_06_01	MW-230_18_06_02	MW-230_18_09	MW-230_19_03	FD-1_19_03	MW-230_19_06	MW-230_19_09	MW-230_20_03	MW-230_20_06	MW-230_20_09
Sample Date:		5/23/2018	6/11/2018	6/27/2018	9/6/2018	3/20/2019	3/20/2019 (Duplicate)	6/11/2019	9/4/2019	3/4/2020	6/3/2020	9/9/2020
Parameters	**Units**											
Appendix III												
Boron	mg/L	0.2 U	0.2 U	0.2 U	0.200 U	0.200 U	0.200 U	--	0.200 U	0.200 U	--	0.100 U
Calcium	mg/L	25.1	25.8	24	21.8	31.6	31.2	22.3	37.3	25.7	--	41.0
Chloride	mg/L	5 U	5 U	5 U	5.00 U	5.00 U	5.00 U	--	5.00 U	5.00 U	--	5.00 U
Fluoride	mg/L	0.5 U	0.5 U	0.5 U	0.500 U	0.500 U	0.500 U	--	0.500 U	0.500 U	--	0.500 U
pH, lab	s.u.	8.4 J	8.3 J	8.4 J	8.3 J	8.1 J	8.1 J	--	8.0 J	8.2 J	--	8.1 J
Sulfate	mg/L	5.24	4.6 J	4.94 J	5.00 U	20.0	20.3	5.74	31.4	7.96	19.4	23.2
Total dissolved solids (TDS)	mg/L	106	112	92	74.0	132	128	142	198	110	--	172
Appendix IV												
Antimony	mg/L	0.001 U	0.001 U	0.001 U	--	--	--	--	0.00100 U	--	--	--
Arsenic	mg/L	0.000651 J	0.0006 J	0.000688 J	--	--	--	--	0.00200 U	--	--	--
Barium	mg/L	0.0145	0.015	0.0148	--	--	--	--	0.0220	--	--	--
Beryllium	mg/L	0.001 U	0.001 U	0.001 U	--	--	--	--	--	--	--	--
Cadmium	mg/L	0.0005 U	0.0005 U	0.0005 U	--	--	--	--	--	--	--	--
Chromium	mg/L	0.000847 J	0.00104 J	0.000833 J	--	--	--	--	0.00500 U	--	--	--
Cobalt	mg/L	0.0005 U	0.0005 U	0.0005 U	--	--	--	--	0.000500 U	--	--	--
Lead	mg/L	0.0005 U	0.0005 U	0.0005 U	--	--	--	--	0.000579	--	--	--
Lithium	mg/L	0.01 U	0.01 U	0.01 U	--	--	--	--	--	--	--	--
Mercury	mg/L	0.0002 U	0.0002 U	0.0002 U	--	--	--	--	--	--	--	--
Molybdenum	mg/L	0.002 U	0.002 U	0.002 U	--	--	--	--	--	--	--	--
Radium-226 & 228	pCi/L	0.218 U	0.182 U	0.218 U	--	--	--	--	0.151 U	--	--	--
Selenium	mg/L	0.005 U	0.005 U	0.005 U	--	--	--	--	0.00500 U	--	--	--
Thallium	mg/L	0.001 U	0.001 U	0.001 U	--	--	--	--	--	--	--	--
Field												
Conductivity, field	mS/cm	0.1713	0.24004	0.16248	0.163	0.222	--	0.141	0.350	0.211	0.221	0.317
Dissolved oxygen (DO), field	mg/L	10.34	10.20	10.20	7.29	10.79	--	5.98	11.27	11.08	7.72	7.92
Oxidation reduction potential (ORP), field	millivolts	182.3	133.2	191.7	238	278	--	118	108	220	173	223
pH, field	s.u.	8.66	7.82	7.67	8.37	8.08	--	7.89	7.85	7.36	8.19	7.97
Temperature, sample	Deg C	16.52	15.73	16.01	14.12	12.74	--	22.34	13.69	12.71	14.86	14.15
Turbidity, field	NTU	0	0.82	1.07	0	1.4	--	0.0	0.0	0	2.8	0.7

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-230	MW-230	MW-230	MW-230	MW-230	MW-230	MW-230	MW-230	MW-230	MW-230	MW-231
Sample ID:		MW-230_20_12	MW-230_21_03	MW-230_21_05	MW-230_21_09	MW230_22_03	MW-230_22_09	MW-230_23_03	MW-230_23_09	MW-230_24_03	MW-230_24_08	MW-231_18_03_01
Sample Date:		12/2/2020	3/24/2021	5/26/2021	9/15/2021	3/22/2022	9/28/2022	3/7/2023	9/26/2023	3/12/2024	8/27/2024	3/15/2018
Parameters	**Units**											
Appendix III												
Boron	mg/L	--	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.2 U
Calcium	mg/L	45.3	37.0	39.3	39.3	40.1	66.5	75.0	64.0	68.5	67.2	22
Chloride	mg/L	--	5.00 U	5.00 U	5.00 U	5.00 U	5.30	5.00 U	5.00 U	5.00 U	5.00 U	2.83 J
Fluoride	mg/L	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U	1.00 U	1.00 U	0.5 U
pH, lab	s.u.	--	8.2 J	8.2 J	8.1 J	8.2 J	7.7 J	7.8 J	7.7 J	8.0 J	7.7 J	8.3 J
Sulfate	mg/L	39.6	17.6	25.0	39.4	17.0	14.0	12.6	16.5	21.9	27.4	5 U
Total dissolved solids (TDS)	mg/L	272	142	146	126	108	220	242	298	264	250	128
Appendix IV												
Antimony	mg/L	--	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.001 U
Arsenic	mg/L	--	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.002 U
Barium	mg/L	--	0.0226	0.0247	0.0245	0.0270	0.0470	0.0573	0.0497	0.0529	0.0437	0.0143
Beryllium	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	0.001 U
Cadmium	mg/L	--	0.000100 U	--	0.000100 U	0.000100 U	0.000100 U	0.000100 U	0.000200 U	0.000200 U	0.000200 U	0.0005 U
Chromium	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	0.000774 J
Cobalt	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	0.000105 J
Lead	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	0.0005 U
Lithium	mg/L	--	0.0100 U	--	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.01 U
Mercury	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	0.0002 U
Molybdenum	mg/L	--	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.002 U
Radium-226 & 228	pCi/L	--	0.101 U	--	0.214 U	0.357 U	0.853	0.225 U	0.561	-0.0200 U	0.391	0.163 U
Selenium	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	0.005 U
Thallium	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	0.001 U
Field												
Conductivity, field	mS/cm	0.313	0.27	0.282	--	--	0.43	0.52	0.45	0.49	0.48	0.15918
Dissolved oxygen (DO), field	mg/L	6.89	10.4	8.04	--	--	8.5	8.54	9.38	9.06	9.42	10.92
Oxidation reduction potential (ORP), field	millivolts	308	96.2	187	--	--	118.1	36.9	91.4	127.3	135.8	148.9
pH, field	s.u.	7.94	7.76	8.04	--	--	8.47	7.33	7.2	7.46	7.29	8.47
Temperature, sample	Deg C	13.87	13.39	19.64	--	--	15.58	14.09	15.11	15.35	17.02	14.13
Turbidity, field	NTU	3	0.34	2.9	--	--	0.32	4.16	0	1.27	6.58	1.65

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231
Sample ID:		MW-231_18_03_2	MW-231_18_04_1	MW-231_18_04_2	MW-231_18_05_1	MW-231_05_2	MW-231_18_06_01	MW-231_18_06_02	MW-231_18_09	MW-231_18_11	MW-231_19_03
Sample Date:		3/28/2018	4/11/2018	4/25/2018	5/9/2018	5/23/2018	6/11/2018	6/27/2018	9/6/2018	11/6/2018	3/20/2019
Parameters	**Units**										
Appendix III											
Boron	mg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.200 U	--	0.200 U
Calcium	mg/L	19.9	20.4	19.7	23.5	24.9	26.4	25.5	21.1	--	29.6
Chloride	mg/L	5 U	5 U	10.9	5 U	5 U	5 U	5 U	5.00 U	--	5.00 U
Fluoride	mg/L	0.5 U	0.5 U	4.76	0.5 U	0.5 U	0.5 U	0.5 U	0.500 U	--	0.500 U
pH, lab	s.u.	8.1 J	8.2 J	8.3 J	8.3 J	8.4 J	8.2 J	8.4 J	8.3 J	--	8.1 J
Sulfate	mg/L	4.03 J	5.3	4.14 J	4.15 J	4.52 J	4.17 J	4.66 J	34.6	9.00	5.00 U
Total dissolved solids (TDS)	mg/L	90	66	100	92	154	168	108	82.0	--	114
Appendix IV											
Antimony	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	--	--	--
Arsenic	mg/L	0.000709 J	0.000661 J	0.000763 J	0.000801 J	0.000793 J	0.000737 J	0.00066 J	--	--	--
Barium	mg/L	0.0126	0.0124	0.0148	0.0178	0.0167	0.0182	0.0168	--	--	--
Beryllium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	--	--	--
Cadmium	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--	--	--
Chromium	mg/L	0.005 U	0.005 U	0.000835 J	0.00086 J	0.000844 J	0.000877 J	0.000934 J	--	--	--
Cobalt	mg/L	0.0005 U	0.0005 U	0.000283 J	0.000166 J	0.000152 J	0.000084 J	0.000066 J	--	--	--
Lead	mg/L	0.000641	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--	--	--
Lithium	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	--	--
Mercury	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	--	--	--
Molybdenum	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	--	--	--
Radium-226 & 228	pCi/L	0.319	0.385	0.204 U	0.391	0.18 U	-0.0138 U	0.237 U	--	--	--
Selenium	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	--	--	--
Thallium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	--	--	--
Field											
Conductivity, field	mS/cm	0.16225	0.1714	0.14893	0.17385	0.16789	0.25852	0.1749	0.159	0.1838	0.190
Dissolved oxygen (DO), field	mg/L	11.07	10.57	10.60	10.62	10.45	10.50	10.43	7.2	11.31	10.18
Oxidation reduction potential (ORP), field	millivolts	197.7	235.0	208.9	144.9	216.4	129.4	229.7	240	70.2	281
pH, field	s.u.	8.19	7.78	8.28	8.30	7.96	7.90	7.93	8.32	8.34	8.32
Temperature, sample	Deg C	13.11	14.36	14.31	15.00	17.03	15.91	16.46	14.38	12.86	12.52
Turbidity, field	NTU	0.54	--	6.35	1.66	--	1.82	1.28	0	3.81	4.8

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231
Sample ID:		MW-231_19_09	FD-1_19_09	MW-231_20_03	FD-1_20_03	MW-231_20_06	MW-231_20_09	FD-1_20_09	MW-231_20_12	MW-231_21_03	FD-1_21_03	MW-231_21_05	FD-1_21_05	MW-231_21_09
Sample Date:		9/4/2019	9/4/2019 (Duplicate)	3/4/2020	3/4/2020 (Duplicate)	6/3/2020	9/9/2020	9/9/2020 (Duplicate)	12/2/2020	3/24/2021	3/24/2021 (Duplicate)	5/25/2021	5/25/2021 (Duplicate)	9/15/2021
Parameters	**Units**													
Appendix III														
Boron	mg/L	0.200 U	0.200 U	0.200 U	0.200 U	--	0.100 U	0.100 U	--	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Calcium	mg/L	37.6	40.6	47.1	46.8	25.9	43.5	45.1	30.4	30.9	32.6	55.9	56.8	22.2
Chloride	mg/L	5.00 U	5.00 U	5.00 U	5.00 U	--	5.00 U	5.00 U	--	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Fluoride	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	0.500 U
pH, lab	s.u.	8.1 J	8.1 J	8.0 J	8.1 J	--	8.1 J	8.2 J	--	8.3 J	8.4 J	8.1 J	8.1 J	8.4 J
Sulfate	mg/L	44.9	45.2	14.8	15.0	6.91	17.9	17.6	9.59	10.5	10.8	38.3	38.0	6.43
Total dissolved solids (TDS)	mg/L	212	202	190	194	--	198	200	--	118	108	224	224	50.0 U
Appendix IV														
Antimony	mg/L	0.00100 U	0.00100 U	--	--	--	--	--	--	0.00200 U	0.00200 U	--	--	0.00200 U
Arsenic	mg/L	0.00200 U	0.00200 U	--	--	--	--	--	--	0.00200 U	0.00200 U	--	--	0.00200 U
Barium	mg/L	0.0246	0.0283	--	--	--	--	--	--	0.0198	0.0208	--	0.0336	0.0142
Beryllium	mg/L	--	--	--	--	--	--	--	--	0.00100 U	0.00100 U	--	--	0.00100 U
Cadmium	mg/L	--	--	--	--	--	--	--	--	0.000100 U	0.000100 U	--	--	0.000100 U
Chromium	mg/L	0.00500 U	0.00500 U	--	--	--	--	--	--	0.00500 U	0.00500 U	--	--	0.00500 U
Cobalt	mg/L	0.000500 U	0.000500 U	--	--	--	--	--	--	0.000500 U	0.000500 U	--	--	0.000500 U
Lead	mg/L	0.000500 U	0.000500 U	--	--	--	--	--	--	0.000500 U	0.000500 U	--	0.000500 U	0.000500 U
Lithium	mg/L	--	--	--	--	--	--	--	--	0.0100 U	0.0100 U	--	--	0.0100 U
Mercury	mg/L	--	--	--	--	--	--	--	--	0.000200 U	0.000200 U	--	--	0.000200 U
Molybdenum	mg/L	--	--	--	--	--	--	--	--	0.00200 U	0.00200 U	--	--	0.00200 U
Radium-226 & 228	pCi/L	0.113 U	0.170 U	--	--	--	--	--	--	0.00731 U	0.113 U	--	--	1.16
Selenium	mg/L	0.00500 U	0.00500 U	--	--	--	--	--	--	0.00500 U	0.00500 U	--	--	0.00500 U
Thallium	mg/L	--	--	--	--	--	--	--	--	0.00100 U	0.00100 U	--	--	0.00100 U
Field														
Conductivity, field	mS/cm	0.358	--	0.353	--	0.174	0.338	--	0.223	0.24	--	0.431	--	--
Dissolved oxygen (DO), field	mg/L	10.23	--	10.8	--	8.01	8.05	--	7.87	10.94	--	9.73	--	--
Oxidation reduction potential (ORP), field	millivolts	89	--	218	--	191	227	--	296	91.3	--	216	--	--
pH, field	s.u.	8.01	--	7.25	--	7.94	7.97	--	8.18	7.93	--	8	--	--
Temperature, sample	Deg C	13.72	--	12.63	--	14.49	13.97	--	13.06	13.01	--	16.18	--	--
Turbidity, field	NTU	0.0	--	0	--	8.4	0.5	--	2.5	0.2	--	0	--	--

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231	MW-231
Sample ID:		**FD-1_21_09**	**MW231_22_03**	**FD-1_22_03**	**FD-1_22_09**	**FD-1_22_09**	**MW-231_22_09**	**MW-231_23_03**	**FD-1_23_03**	**MW-231_23_09**	**FD-1_23_09**	**MW-231_24_03**	**FD-1_24_03**	**MW-231_24_08**
Sample Date:		**9/15/2021**	**3/23/2022**	**3/23/2022**	**9/28/2022**	**9/28/2022**	**9/28/2022**	**3/7/2023**	**3/7/2023**	**9/26/2023**	**9/26/2023**	**3/12/2024**	**3/12/2024**	**8/27/2024**
		(Duplicate)		**(Duplicate)**		**(Duplicate)**			**(Duplicate)**		**(Duplicate)**		**(Duplicate)**	
Parameters	**Units**													
Appendix III														
Boron	mg/L	0.100 U	0.100 U	0.100 U	0.100 U	--	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Calcium	mg/L	22.4	36.2	36.6	48.9	--	50.8	71.3	72.0	80.2	78.9	81.1	79.7	77.4
Chloride	mg/L	5.00 U	5.00 U	5.00 U	1.00 U	--	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Fluoride	mg/L	0.500 U	0.500 U	0.500 U	0.100 U	--	0.500 U	0.500 U	0.500 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
pH, lab	s.u.	8.3 J	8.3 J	8.2 J	7.7 J	--	7.7 J	7.8 J	7.9 J	7.6 J	7.6 J	7.9 J	7.9 J	7.6 J
Sulfate	mg/L	6.41	15.4	15.1	2.36 J	--	11.8 J	8.26	8.33	7.87	7.74	8.63	8.72	14.5
Total dissolved solids (TDS)	mg/L	50.0 U	116	94.0	194	--	196	254	246	336	264	286	296	264
Appendix IV														
Antimony	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	0.0142	0.0271	0.0274	0.0391	--	0.0395	0.0576	0.0576	0.0686	0.0671	0.0736	0.0711	0.0935
Beryllium	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	0.00100 U	0.00100 U
Cadmium	mg/L	0.000100 U	0.000100 U	0.000100 U	0.000100 U	--	0.000100 U	0.000100 U	0.000100 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Chromium	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	0.00500 U	0.00500 U
Cobalt	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	0.000500 U	0.00168 J
Lead	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	0.000500 U	0.00138 J
Lithium	mg/L	0.0100 U	0.0100 U	0.0100 U	0.0100 U	--	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U
Mercury	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	0.000200 U	0.000200 U
Molybdenum	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	-0.199 U	0.190 U	0.104 U	--	1.40	0.746	-0.0761 U	0.559	0.142 U	-0.0218 U	0.223 U	0.346 U	0.389
Selenium	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	0.00500 U	0.00500 U
Thallium	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	0.00100 U	0.00100 U
Field														
Conductivity, field	mS/cm	--	--	--	--	--	0.33	0.47	--	0.54	--	0.56	--	0.51
Dissolved oxygen (DO), field	mg/L	--	--	--	--	--	8.31	8.96	--	8.42	--	7.16	--	6.82
Oxidation reduction potential (ORP), field	millivolts	--	--	--	--	--	123.3	48.9	--	92.4	--	116.9	--	130.2
pH, field	s.u.	--	--	--	--	--	8.45	7.43	--	7.15	--	7.41	--	7.27
Temperature, sample	Deg C	--	--	--	--	--	15.13	10.61	--	15.09	--	14.34	--	19.07
Turbidity, field	NTU	--	--	--	--	--	3.62	1.1	--	1.11	--	3.3	--	4.14

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-231	MW-232	MW-232	MW-232	MW-232	MW-232	MW-232	MW-232	MW-232	MW-232
Sample ID:		FD-1_24_08	MW-232_18_03_01	MW-232_18_03_02	MW-232_18_04_1	MW-232_18_04_2	FD-1_18_04_2	MW-232_18_05_1	MW-232_05_2	MW-232_18_06_01	MW-232_18_06_02
Sample Date:		8/27/2024 (Duplicate)	3/15/2018	3/28/2018	4/11/2018	4/25/2018	4/25/2018 (Duplicate)	5/8/2018	5/23/2018	6/11/2018	6/27/2018
Parameters	**Units**										
Appendix III											
Boron	mg/L	0.100 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Calcium	mg/L	77.1	19.5	20.1	19.4	19.8	18.6	17.5	20.9	21	21.1
Chloride	mg/L	5.00 U	5.71	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Fluoride	mg/L	1.00 U	1.26	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
pH, lab	s.u.	7.6 J	8.3 J	8.1 J	8.2 J	8.3 J	8.3 J	8.4 J	8.4 J	8.3 J	7.5 J
Sulfate	mg/L	16.3	5.8	4.44 J	5.48	4.78 J	4.98 J	4.1 J	4.39 J	3.99 J	4.4 J
Total dissolved solids (TDS)	mg/L	274	70	72	72	104	96.0	112	148	76	110
Appendix IV											
Antimony	mg/L	0.00200 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic	mg/L	0.00208	0.002 U	0.000927 J	0.000908 J	0.00094 J	0.000988 J	0.00112 J	0.00106 J	0.000894 J	0.00103 J
Barium	mg/L	0.111	0.012	0.0123	0.0121	0.0128	0.0119	0.0139	0.0125	0.0137	0.0135
Beryllium	mg/L	0.00100 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	mg/L	0.000200 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Chromium	mg/L	0.00862	0.000783 J	0.005 U	0.005 U	0.000829 J	0.000786 J	0.005 U	0.005 U	0.000891 J	0.00107 J
Cobalt	mg/L	0.00869 J	0.00008 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Lead	mg/L	0.00399 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Lithium	mg/L	0.0100 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Mercury	mg/L	0.000200 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L	0.00200 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Radium-226 & 228	pCi/L	0.612	0.0143 U	0.299 U	0.281 U	0.167 U	0.120 U	0.152 U	0.252 U	-0.0431 U	0.00512 U
Selenium	mg/L	0.00500 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Thallium	mg/L	0.00100 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Field											
Conductivity, field	mS/cm	--	0.14476	0.16257	0.16478	0.14747	--	0.14641	0.13824	0.20384	0.13441
Dissolved oxygen (DO), field	mg/L	--	10.40	10.68	10.08	10.23	--	10.12	10.23	10.31	10.41
Oxidation reduction potential (ORP), field	millivolts	--	148.6	188.0	212.1	200.4	--	169.9	172.9	125.2	175.0
pH, field	s.u.	--	8.59	8.23	7.99	8.25	--	8.11	8.61	8.09	8.36
Temperature, sample	Deg C	--	14.77	12.70	14.63	14.94	--	16.52	17.26	15.59	16.43
Turbidity, field	NTU	--	1.69	0.51	--	1.15	--	1.33	0	2.37	0.87

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-232	MW-232	MW-232	MW-232	MW-232	MW-232	MW-232	MW-232	MW-232	MW-232	MW-232
Sample ID:		MW-232_18_09	MW-232_19_03	MW-232_19_06	MW-232_19_09	MW-232_20_03	MW-232_20_06	MW-232_20_09	MW-232_20_12	MW-232_21_03	MW-232_21_05	MW-232_21_09
Sample Date:		9/6/2018	3/19/2019	6/11/2019	9/4/2019	3/4/2020	6/3/2020	9/9/2020	12/2/2020	3/24/2021	5/25/2021	9/15/2021
Parameters	**Units**											
Appendix III												
Boron	mg/L	0.200 U	0.200 U	--	0.200 U	0.200 U	--	0.100 U	--	0.100 U	0.100 U	0.100 U
Calcium	mg/L	18.7	24.8	27.1	24.9	33.1	27.9	35.0	39.3	38.8	47.5	53.9
Chloride	mg/L	5.00 U	5.00 U	--	5.00 U	5.00 U	--	5.25	--	7.72	5.79	8.90
Fluoride	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
pH, lab	s.u.	8.3 J	8.2 J	8.2 J	8.2 J	8.1 J	--	8.2 J	--	8.3 J	8.2 J	8.2 J
Sulfate	mg/L	5.00 U	5.00 U	--	5.00 U	5.00 U	--	7.78	5.74	7.87	21.2	34.8
Total dissolved solids (TDS)	mg/L	62.0	138	--	132	140	--	144	--	140	188	182
Appendix IV												
Antimony	mg/L	--	--	--	0.00100 U	--	--	--	--	0.00200 U	--	0.00200 U
Arsenic	mg/L	--	--	--	0.00200 U	--	--	--	--	0.00200 U	--	0.00200 U
Barium	mg/L	--	--	--	0.0184	--	--	--	--	0.0253	0.0322	0.0357
Beryllium	mg/L	--	--	--	--	--	--	--	--	0.00100 U	--	0.00100 U
Cadmium	mg/L	--	--	--	--	--	--	--	--	0.000100 U	--	0.000100 U
Chromium	mg/L	--	--	--	0.00500 U	--	--	--	--	0.00500 U	--	0.00500 U
Cobalt	mg/L	--	--	--	0.000500 U	--	--	--	--	0.000500 U	--	0.000500 U
Lead	mg/L	--	--	--	0.000500 U	--	--	--	--	0.000500 U	--	0.000500 U
Lithium	mg/L	--	--	--	--	--	--	--	--	0.0100 U	--	0.0100 U
Mercury	mg/L	--	--	--	--	--	--	--	--	0.000200 U	--	0.000200 U
Molybdenum	mg/L	--	--	--	--	--	--	--	--	0.00200 U	--	0.00200 U
Radium-226 & 228	pCi/L	--	--	--	0.151 U	--	--	--	--	0.218 U	--	0.0484 U
Selenium	mg/L	--	--	--	0.00500 U	--	--	--	--	0.00500 U	--	0.00500 U
Thallium	mg/L	--	--	--	--	--	--	--	--	0.00100 U	--	0.00100 U
Field												
Conductivity, field	mS/cm	0.146	0.164	0.170	0.221	0.258	0.188	0.273	0.296	0.29	0.365	--
Dissolved oxygen (DO), field	mg/L	7.15	10.75	5.81	10.68	11.18	8.14	8.34	7.65	11.2	9.4	--
Oxidation reduction potential (ORP), field	millivolts	240	272	163	86	207	206	220	299	95.3	200	--
pH, field	s.u.	8.28	8.35	7.75	8.10	7.28	7.69	8.11	8.07	7.86	8.14	--
Temperature, sample	Deg C	14.6	13.25	21.94	13.69	12.53	14.31	13.76	13.04	12.77	15.9	--
Turbidity, field	NTU	0	3.1	0.0	0.0	0	0	0.1	0.3	0.47	1.7	--

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-232	MW-232	MW-232	MW-232	MW-232	MW-232	MW-233	MW-233	MW-233	MW-233	MW-233
Sample ID:		MW232_21_11	MW-232_22_09	MW-232_23_03	MW-232_23_09	MW-232_24_03	MW-232_24_08	MW-233_18_03_01	MW-233_18_03_02	MW-233_18_04_1	FD_1_18_04_1	MW-233_18_04_2
Sample Date:		11/2/2021	9/28/2022	3/7/2023	9/26/2023	3/12/2024	8/27/2024	3/16/2018	3/27/2018	4/10/2018	4/10/2018 (Duplicate)	4/25/2018
Parameters	**Units**											
Appendix III												
Boron	mg/L	--	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Calcium	mg/L	--	41.0	50.5	67.0	69.1	81.5	24.6	23.5	25.1	24.8	22.4
Chloride	mg/L	--	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5 U	5 U	5 U	5 U	5 U
Fluoride	mg/L	--	0.500 U	0.500 U	1.00 U	1.00 U	1.00 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
pH, lab	s.u.	--	7.7 J	8.1 J	7.6 J	7.9 J	7.5 J	8.1 J	8.1 J	8.1 J	8.1 J	8.2 J
Sulfate	mg/L	6.19	21.2	15.6	17.2	28.4	20.0	4.43 J	4.76 J	5.26	5.12	4.56 J
Total dissolved solids (TDS)	mg/L	--	158	186	246	278	314	116	176	100 J	158	128
Appendix IV												
Antimony	mg/L	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic	mg/L	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.002 U	0.000796 J	0.000725 J	0.000693 J	0.00072 J
Barium	mg/L	0.0359	0.0291	0.0345	0.0542	0.0566	0.0655	0.0161	0.0156	0.0142	0.0134	0.0153
Beryllium	mg/L	--	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	mg/L	--	0.000100 U	0.000100 U	0.000200 U	0.000200 U	0.000200 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Chromium	mg/L	--	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.000871 J	0.005 U	0.005 U	0.005 U	0.000806 J
Cobalt	mg/L	--	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000119 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Lead	mg/L	--	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Lithium	mg/L	--	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Mercury	mg/L	--	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Radium-226 & 228	pCi/L	--	1.12	0.147 U	0.243 U	0.0312 U	0.538	0.163 U	0.109 U	0.365	1.08	0.288 U
Selenium	mg/L	--	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Thallium	mg/L	--	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Field												
Conductivity, field	mS/cm	--	0.3	0.35	0.45	0.49	0.59	0.20544	0.19264	0.17658	--	0.09177
Dissolved oxygen (DO), field	mg/L	--	10.2	8.81	8.59	9.55	7.72	10.85	10.95	10.72	--	10.01
Oxidation reduction potential (ORP), field	millivolts	--	122.5	41.4	151.1	134.4	128.6	65.0	186.7	197.8	--	217.0
pH, field	s.u.	--	8.71	7.77	7.06	7.7	7.36	8.41	8.20	8.22	--	7.84
Temperature, sample	Deg C	--	15.38	12.54	14.39	13.49	17.36	12.99	12.73	13.34	--	15.77
Turbidity, field	NTU	--	3.2	2.1	0	0	0.24	4.47	0.82	--	--	3.06

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-233	MW-233	MW-233	MW-233	MW-233	MW-233	MW-233	MW-233	MW-233	MW-233	MW-233
Sample ID:		MW-233_18_05_1	MW-233_05_2	MW-233_18_06_01	MW-233_18_06_02	MW-233_18_09	MW-233_18_11	MW-233_19_03	MW-233_19_06	MW-233_19_09	MW-233_20_03	MW-233_20_06
Sample Date:		5/8/2018	5/23/2018	6/11/2018	6/27/2018	9/5/2018	11/6/2018	3/19/2019	6/11/2019	9/4/2019	3/4/2020	6/3/2020
Parameters	**Units**											
Appendix III												
Boron	mg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.200 U	--	0.200 U	--	0.200 U	0.200 U	--
Calcium	mg/L	25.3	25.4	26.1	22.9	28.6	26.9	31.6	28.1	31.8	41.4	27.3
Chloride	mg/L	5 U	5 U	5 U	5 U	5.00 U	--	5.00 U	--	5.00 U	5.00 U	--
Fluoride	mg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.500 U	--	0.500 U	--	0.500 U	0.500 U	--
pH, lab	s.u.	8.3 J	8.3 J	8.2 J	8 J	8.2 J	--	8.2 J	8.1 J	8.0 J	8.1 J	--
Sulfate	mg/L	4.3 J	4.59 J	4.46 J	4.89 J	5.00 U	--	5.00 U	--	5.00 U	5.15	--
Total dissolved solids (TDS)	mg/L	112	98	112	102	116	--	150	--	190	166	--
Appendix IV												
Antimony	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	--	--	--	--	0.00100 U	--	--
Arsenic	mg/L	0.000817 J	0.000848 J	0.000803 J	0.000875 J	--	--	--	--	0.00200 U	--	--
Barium	mg/L	0.0174	0.0164	0.0183	0.0178	--	--	--	--	0.0190	--	--
Beryllium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	--	--	--	--	--	--	--
Cadmium	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--	--	--	--	--	--	--
Chromium	mg/L	0.000833 J	0.000777 J	0.000937 J	0.005 U	--	--	--	--	0.00500 U	--	--
Cobalt	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--	--	--	--	0.000500 U	--	--
Lead	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--	--	--	--	0.000500 U	--	--
Lithium	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	--	--	--	--	--	--	--
Mercury	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	--	--	--	--	--	--	--
Molybdenum	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	--	--	--	--	--	--	--
Radium-226 & 228	pCi/L	0.122 U	0.152 U	-0.0805 U	0.191 U	--	--	--	--	0.176 U	--	--
Selenium	mg/L	0.00103 J	0.005 U	0.005 U	0.005 U	--	--	--	--	0.00500 U	--	--
Thallium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	--	--	--	--	--	--	--
Field												
Conductivity, field	mS/cm	0.18021	0.17281	0.25659	0.16741	0.227	0.20123	0.201	0.207	0.280	0.308	0.194
Dissolved oxygen (DO), field	mg/L	10.08	10.08	10.47	10.33	7.12	11.64	10.77	8.38	10.65	10.85	7.98
Oxidation reduction potential (ORP), field	millivolts	165.9	170.5	133.4	168.7	237	51	272	138	115	210	211
pH, field	s.u.	7.98	8.45	7.85	7.61	8.07	8.32	8.19	7.66	7.84	7.23	7.57
Temperature, sample	Deg C	16.11	16.63	15.37	15.85	14.93	12.8	13.16	15.34	13.40	12.55	14.49
Turbidity, field	NTU	0.61	--	0.90	1.05	0	1.77	1.4	0.0	0.0	0	4.9

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-233	MW-233	MW-233	MW-233	MW-233	MW-233	MW-233	MW-233	MW-233	MW-233	MW-233	MW-233
Sample ID:		**MW-233_20_09**	**MW-233_20_12**	**MW233_21_03**	**MW-233_21_05**	**MW-233_21_09**	**MW233_21_11**	**MW233_22_03**	**MW-233_22_09**	**MW-233_23_03**	**MW-233_23_09**	**MW-233_24_03**	**MW-233_24_08**
Sample Date:		**9/9/2020**	**12/2/2020**	**3/24/2021**	**5/25/2021**	**9/15/2021**	**11/2/2021**	**3/22/2022**	**9/28/2022**	**3/7/2023**	**9/25/2023**	**3/12/2024**	**8/27/2024**
Parameters	**Units**												
Appendix III													
Boron	mg/L	0.100 U	--	0.100 U	0.100 U	0.100 U	--	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.104
Calcium	mg/L	34.1	37.0	42.3	29.7	41.8	--	46.3	74.4	66.3	55.7	56.8	84.1
Chloride	mg/L	5.00 U	--	5.00 U	5.00 U	5.00 U	--	5.00 U	15.9	11.9	5.00 U	5.26	8.04
Fluoride	mg/L	0.500 U	--	0.500 U	0.500 U	0.500 U	--	0.500 U	0.500 U	0.500 U	1.00 U	1.00 U	1.00 U
pH, lab	s.u.	8.2 J	--	8.2 J	8.2 J	8.1 J	--	8.1 J	7.9 J	7.9 J	8.0 J	8.0 J	7.7 J
Sulfate	mg/L	5.00 U	--	5.06	5.00 U	16.8	21.7	24.4	97.7	51.5	48.4	86.4	64.8
Total dissolved solids (TDS)	mg/L	136	--	136	98.0	122	--	134	328	274	240	284	370
Appendix IV													
Antimony	mg/L	--	--	0.00200 U	--	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	--	--	0.00200 U	--	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	--	--	0.0280	0.0195	0.0272	--	0.0332	0.0561	0.0510	0.0461	0.0477	0.0692
Beryllium	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
Cadmium	mg/L	--	--	0.000100 U	--	0.000100 U	--	0.000100 U	0.000100 U	0.000100 U	0.000200 U	0.000200 U	0.000200 U
Chromium	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
Cobalt	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
Lead	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
Lithium	mg/L	--	--	0.0100 U	--	0.0100 U	--	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U
Mercury	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
Molybdenum	mg/L	--	--	0.00200 U	--	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	--	--	0.116 U	--	0.439 U	--	0.232 U	0.766	0.444	0.262 U	0.170 U	-0.329
Selenium	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
Thallium	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
Field													
Conductivity, field	mS/cm	0.246	0.256	0.28	0.202	--	--	--	0.53	0.43	0.44	0.46	0.66
Dissolved oxygen (DO), field	mg/L	8.75	7.43	10.78	7.82	--	--	--	9.76	8.3	9.74	10.51	8.25
Oxidation reduction potential (ORP), field	millivolts	227	299	92.4	211	--	--	--	112.2	55.2	60.4	126.6	148.4
pH, field	s.u.	8.01	7.97	7.75	8.11	--	--	--	8.7	7.63	7.72	7.86	7.45
Temperature, sample	Deg C	13.75	13.29	12.77	20.09	--	--	--	15.57	13	15.09	13.04	16.51
Turbidity, field	NTU	0	2.2	0.42	2.4	--	--	--	1.61	5.17	0	1.68	4.13

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-234	MW-234	MW-234	MW-234	MW-234	MW-234	MW-234	MW-234	MW-234	MW-234	MW-234
Sample ID:		MW-234_18_03_02	FD-1_18_03_02	MW-234_18_04_1	MW-234_18_04_2	MW-234_18_05_1	FD-1_18_05_1	MW-234_05_2	FD-1_05_2	MW-234_18_06_01	MW-234_18_06_02	MW-234_18_07
Sample Date:		3/27/2018	3/27/2018 (Duplicate)	4/10/2018	4/25/2018	5/8/2018	5/8/2018 (Duplicate)	5/23/2018	5/23/2018 (Duplicate)	6/11/2018	6/27/2018	7/10/2018
Parameters	**Units**											
Appendix III												
Boron	mg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Calcium	mg/L	18.7	18.2	18.7	18.1	20	19.6	19.9	20.8	20	20.1	20
Chloride	mg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	85.8 J
Fluoride	mg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.491 J	0.5 U	0.836
pH, lab	s.u.	8.1 J	8.1 J	8.2 J	8.3 J	8.4 J	8.3 J	8.3 J	8.3 J	8.2 J	8.3 J	8.2 J
Sulfate	mg/L	4.6 J	3.82 J	11.8	4.98 J	4.96 J	6.51 J	4.88 J	5.12	4.78 J	4.21 J	16.2 J
Total dissolved solids (TDS)	mg/L	106	96.0	66	84	66	54.0	92	76.0	94	82	80
Appendix IV												
Antimony	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic	mg/L	0.000591 J	0.000590 J	0.002 U	0.002 U	0.002 U	0.000589 J	0.002 U	0.002 U	0.000667 J	0.002 U	0.002 U
Barium	mg/L	0.0115	0.0110	0.00942	0.0116	0.0129	0.0126	0.0125	0.0128	0.0129	0.0126	0.0107
Beryllium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Chromium	mg/L	0.005 U	0.005 U	0.005 U	0.000782 J	0.005 U	0.000826 J	0.005 U	0.005 U	0.000859 J	0.005 U	0.005 U
Cobalt	mg/L	0.0005 U	0.0005 U	0.000061 J	0.000152 J	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Lead	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Lithium	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Mercury	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Radium-226 & 228	pCi/L	0.127 U	--	0.0121 U	-0.0492 U	0.291 U	0.395 U	0.395	0.0430 U	0.428	0.585	0.214 U
Selenium	mg/L	0.00109 J	0.00100 J	0.005 U	0.005 U	0.00135 J	0.00143 J	0.005 U	0.000967 J	0.001 J	0.005 U	0.005 U
Thallium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Field												
Conductivity, field	mS/cm	0.15478	--	0.14082	0.14804	0.15347	--	0.14269	--	0.20768	0.13529	0.13822
Dissolved oxygen (DO), field	mg/L	10.74	--	10.59	9.88	10.01	--	10.11	--	10.20	10.06	10.93
Oxidation reduction potential (ORP), field	millivolts	186.6	--	189.0	262.7	162.4	--	175.9	--	135.9	154.5	186.1
pH, field	s.u.	8.31	--	8.36	8.07	8.14	--	8.41	--	7.96	8.30	7.41
Temperature, sample	Deg C	12.87	--	13.33	16.06	16.45	--	16.00	--	15.46	16.72	16.94
Turbidity, field	NTU	0.78	--	3.23	2.62	0	--	--	--	0.91	3.30	1.12

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-234	MW-234	MW-234	MW-234	MW-234	MW-234	MW-234	MW-234	MW-234	MW-234	MW-234	MW-234
Sample ID:		FD-1_18_07	MW-234_18_09	FD-1_18-09	MW-234_19_03	MW-234_19_06	MW-234_19_09	MW-234_20_03	MW-234_20_06	MW-234_20_09	MW-234_20_12	MW234_21_03	MW-234_21_05
Sample Date:		7/10/2018 (Duplicate)	9/5/2018	9/5/2018 (Duplicate)	3/19/2019	6/11/2019	9/4/2019	3/4/2020	6/3/2020	9/9/2020	12/2/2020	3/24/2021	5/25/2021
Parameters	**Units**												
Appendix III													
Boron	mg/L	0.2 U	0.200 U	0.200 U	0.200 U	--	0.200 U	0.200 U	--	0.100 U	--	0.100 U	0.100 U
Calcium	mg/L	19.6	21.7	20.8	20.3	--	14.4	27.7	--	27.4	23.6	24.5	25.0
Chloride	mg/L	1.60 U	9.60	5.00 U	5.00 U	--	5.00 U	5.00 U	--	5.00 U	--	5.00 U	5.00 U
Fluoride	mg/L	0.462 U	2.28	0.500 U	0.500 U	--	0.500 U	0.500 U	--	0.500 U	--	0.500 U	0.500 U
pH, lab	s.u.	8.3 J	8.4 J	8.4 J	8.3 J	8.4 J	8.5 J	8.3 J	--	8.2 J	--	8.3 J	8.4 J
Sulfate	mg/L	3.57 J	5.00 U	5.00 U	5.00 U	--	11.5	10.2	--	13.3	--	5.00 U	7.01
Total dissolved solids (TDS)	mg/L	96.0	82.0	68.0	106	--	100	128	120	110	--	82.0	100
Appendix IV													
Antimony	mg/L	0.001 U	--	--	--	--	0.00100 U	--	--	--	--	0.00200 U	--
Arsenic	mg/L	0.002 U	--	--	--	--	0.00200 U	--	--	--	--	0.00200 U	--
Barium	mg/L	0.0107	--	--	--	--	0.0104	--	--	--	--	0.0160	0.0157
Beryllium	mg/L	0.001 U	--	--	--	--	--	--	--	--	--	0.00100 U	--
Cadmium	mg/L	0.0005 U	--	--	--	--	--	--	--	--	--	0.000100 U	--
Chromium	mg/L	0.005 U	--	--	--	--	0.00500 U	--	--	--	--	0.00500 U	--
Cobalt	mg/L	0.0005 U	--	--	--	--	0.000500 U	--	--	--	--	0.000500 U	--
Lead	mg/L	0.0005 U	--	--	--	--	0.000500 U	--	--	--	--	0.000566	0.000500 U
Lithium	mg/L	0.01 U	--	--	--	--	--	--	--	--	--	0.0100 U	--
Mercury	mg/L	0.0002 U	--	--	--	--	--	--	--	--	--	0.000200 U	--
Molybdenum	mg/L	0.002 U	--	--	--	--	--	--	--	--	--	0.00200 U	--
Radium-226 & 228	pCi/L	0.759	--	--	--	--	0.515	--	--	--	--	0.118 U	--
Selenium	mg/L	0.005 U	--	--	--	--	0.00500 U	--	--	--	--	0.00500 U	--
Thallium	mg/L	0.001 U	--	--	--	--	--	--	--	--	--	0.00100 U	--
Field													
Conductivity, field	mS/cm	--	0.148	0.148	0.141	0.102	0.141	0.226	0.181	0.224	0.74	0.19	0.187
Dissolved oxygen (DO), field	mg/L	--	7.68	7.68	0.55	8.56	10.38	9.36	7.57	7.79	7.3	10.69	8.03
Oxidation reduction potential (ORP), field	millivolts	--	224	224	255	114	98	212	165	225	275	94.4	192
pH, field	s.u.	--	8.24	8.24	8.44	8.20	8.48	7.44	7.83	8.18	8.03	7.87	8.3
Temperature, sample	Deg C	--	15.1	15.1	13.20	15.36	13.44	12.27	14.97	13.68	13.27	12.65	20.66
Turbidity, field	NTU	--	0	0	2.3	4.5	0.0	0	1.4	0.9	0	1.74	3

Groundwater Analytical Data (March 2018 through 2024)
Louisa Generating Station - East Monofill
Muscatine, Iowa

Sample Location:		MW-234	MW-234	MW-234	MW-234	MW-234	MW-234	MW-234
Sample ID:		MW-234_21_09	MW234_22_03	MW-234_22_09	MW-234_23_03	MW-234_23_09	MW-234_24_03	MW-234_24_08
Sample Date:		9/15/2021	3/23/2022	9/29/2022	3/7/2023	9/25/2023	3/11/2024	8/27/2024
Parameters	**Units**							
Appendix III								
Boron	mg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Calcium	mg/L	29.1	28.0	33.5	40.5	38.7	43.0	35.3
Chloride	mg/L	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	6.24
Fluoride	mg/L	0.500 U	0.500 U	0.500 U	0.500 U	1.00 U	1.00 U	1.00 U
pH, lab	s.u.	8.5 J	8.2 J	8.2 J	8.3 J	8.2 J	8.0 J	8.2 J
Sulfate	mg/L	17.0	6.73	17.9	18.1	27.8	27.9	32.4
Total dissolved solids (TDS)	mg/L	94.0	94.0	146	148	158	192	156
Appendix IV								
Antimony	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	0.0173	0.0209	0.0222	0.0260	0.0264	0.0304	0.0231
Beryllium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.000100 U	0.000100 U	0.000100 U	0.000100 U	0.000200 U	0.000200 U	0.000200 U
Chromium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Cobalt	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000675	0.000700	0.000500 U
Lithium	mg/L	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U
Mercury	mg/L	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	0.121 U	-0.147 U	1.33	0.219 U	0.346 U	0.127 U	0.249
Selenium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Field								
Conductivity, field	mS/cm	--	--	0.27	0.29	0.3	0.34	0.28
Dissolved oxygen (DO), field	mg/L	--	--	9.94	10.41	10.49	10.44	10.25
Oxidation reduction potential (ORP), field	millivolts	--	--	11.7	78.8	80.1	118.7	165.5
pH, field	s.u.	--	--	8.65	7.84	7.92	7.87	7.89
Temperature, sample	Deg C	--	--	14.5	12.55	14.8	14.61	16.31
Turbidity, field	NTU	--	--	2.55	4.24	0	0.76	5.28

Notes:
U - Not detected at the associated reporting limit.
J - Estimated concentration.
R - Rejected.