



2023 Annual Groundwater Monitoring and Correction Action Report

**Coal Combustion Residue (CCR) Landfill
Permit No. #70-SDP-06-82P**

Muscatine Power and Water

January 26, 2024

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Certification

Annual Groundwater Monitoring and Corrective Action Report for the MPW CCR Landfill

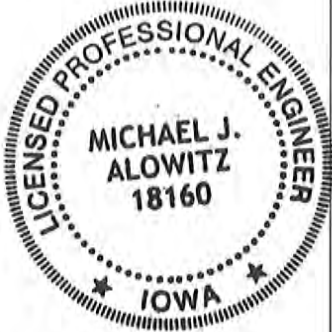


Permit No. 70-SDP-06-82P

CCR Landfill

Muscatine, Iowa

Muscatine Power and Water

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
	License Number:	18160
	My license renewal date is:	December 31, 2024
	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 Muscatine Power and Water (MPW) coal combustion residue (CCR) Landfill in 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):	
(A) Identify those constituents listed in appendix III to this part and the names of the monitoring wells associated with such an increase; and	<p>During the calendar year 2023 annual reporting period, statistically significant increases over background were detected for the following Appendix III constituents:</p> <ul style="list-style-type: none"> — Boron at MW-14A, MW-15A, and MW-21 — Calcium at MW-14A — Chloride at MW-5B — pH (SSD) at MW-5B, MW-14A, and MW-21 — Sulfate at MW-14A — TDS at MW-14A and MW-15A
(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	The assessment monitoring program for this CCR unit was initiated in March 2018.
(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:	No results were identified at a statistically significantly level above groundwater protection standards for appendix IV parameters during the 2023 monitoring period.
(A) Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an increase;	

Item	Current Status
(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;	
(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and	
(D) Provide the date when the assessment of corrective measures was completed for the 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	No corrective measures are required.
(e)(6)(vi) Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.	No remedial activities are required.

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1. Introduction

This Annual Groundwater Monitoring and Correction Action Report (AGWMCAR) was prepared by GHD Services, Inc. on behalf of Muscatine Power and Water (MPW) in compliance with the Federal Coal Combustion Residual (CCR) Rule (40 CFR Part 257) for the MPW CCR Landfill. The approximate 80-acre landfill site is located in the SW¼ of Section 16, Township 76 North, Range 3 West in Muscatine County (Figure 1). A site overview is provided on Figure 2.

MPW initiated baseline groundwater monitoring in accordance with the Federal CCR rule in June 2015. The initial eight rounds of baseline sampling and analysis were completed prior to the October 17, 2017 deadline established in the Federal CCR Rule (40 CFR § 257.94).

Two semiannual assessment monitoring events were conducted during 2023. The first event was conducted April 11-12, 2023, and the second event September 18-20, 2023. The 2023 semiannual assessment monitoring events were completed in accordance with 40 CFR §257.

The uppermost aquifer in the vicinity of the CCR Landfill consists of a glacial till and clayey silt. No perched water zones have been observed. The water table elevation fluctuates with regional changes and varies with topography and native stream flow patterns on the CCR Landfill site. A clay-rich glacial till functions as a lower confining limit and overlies a carbonate bedrock. The depth to bedrock is 335 feet based on a water well drilled at the Site maintenance shop. Additional geologic details are included in the Groundwater Monitoring System and Sampling and Analysis Program (HR Green, 2017a).

2. Groundwater Monitoring Activities

2.1 Groundwater Monitoring Network

The routine groundwater monitoring network (Table 1) consists of 16 monitoring wells (denoted by MW-X) and one piezometer (PZ-1). Monitoring well MW-12 is screened in the lower confining unit glacial till; all other monitoring wells are screened in the Uppermost Aquifer. The piezometer is screened in CCR. Monitoring wells MW-8, MW-10, MW-22, and MW-23 are classified as background locations while monitoring wells MW-4A/4B, MW-5B, MW-6A, MW-14A, MW-15A, and MW-21 are downgradient monitoring locations. Monitoring wells MW-11, MW-12, MW-24, MW-26, and MW-27 are typically only used as water level gaging locations. The monitoring locations are shown in Figure 3.

There were no changes in the monitoring system program during the 2023 reporting period.

Monitoring well MW-22 was installed in 2018 to provide an additional background quality monitoring point. MW-23 was added as a background well in 2020.

Monitoring well MW-13 was determined to be an ineffective monitoring point and was abandoned in April 2019 following Iowa Department of Natural Resources (IDNR) approval. In March 2019, bentonite was observed in the casing of MW-18A, indicating damage to the point where it could no longer be used, and was subsequently abandoned in August 2019. Monitoring well MW-4A was damaged, abandoned, and replaced with MW-4B in 2020. No other monitoring wells under the federal monitoring program have been decommissioned or abandoned since 2020.

There are facility monitoring wells which are not part of the current Federal CCR groundwater monitoring system because under §257.95(f-g) there has been no statistical trigger to further characterize the nature of a release. These other wells were installed to comply with separate monitoring requirements established under State of Iowa CCR rule [567] IAC Chapter 103 and per IDNR request and include: MW-24 installed in 2018, and MW-26 and MW-27 installed in 2020.

Downgradient monitoring wells MW-4A/4B, MW-5B and MW-6A are closely clustered within approximately 250 feet of each other; other downgradient locations are approximately 300-400 feet apart. Groundwater samples are used to assess the potential impacts of the MPW CCR Landfill on surrounding groundwater. Groundwater elevation data are used to identify upgradient and downgradient monitoring points. Well construction details are provided in Table 1.

2.2 Monitoring Well Inspection

During each sampling event, the monitoring wells are inspected, and conditions of concern documented. Monitoring wells are maintained with a cap and lockable protective casing. Observations include the condition of the protective casing/vault and surrounding ground surface. Monitoring wells in the groundwater monitoring system consist of 2-inch nominal inner-diameter polyvinyl chloride (PVC) casing and screen.

2.3 Sample Collection

Low-flow sampling was conducted using dedicated tubing and a peristaltic pump to purge water and collect samples. 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. The readings were recorded on well sampling records. Upon stabilization, unfiltered samples were collected in laboratory-supplied containers. Copies of the groundwater sampling records for the 2023 events are included in Appendix A. Field duplicate samples were collected for quality assurance/quality control purposes from MW-4B and MW-22 during the April 2023 event, and from MW-10 and MW-26 during the September 2023 event.

2.4 Analytical Parameters

A summary of groundwater sampling events is provided in Table 2. Groundwater samples were analyzed for the parameters specified in 40 CFR Part 257 Appendix III and Appendix IV (Table 3 and 4, respectively) for the two semiannual assessment monitoring events.

The laboratory analyses were conducted by Eurofins Environment Testing North Central, LLC(Eurofins) in Cedar Falls, Iowa with the exception of the Radium 226 and 228 (combined) analyses which were conducted by Eurofins in St. Louis, Missouri. Analyses were conducted by the laboratory in accordance with the procedures and methods described in the United States Environmental Protection Agency (USEPA) Manual SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (September 1986)," as updated and/or in accordance with other approved testing procedures. Eurofins provided prepared sample containers for each monitoring event. Analytical reports from each sampling event report total (i.e., unfiltered) sample results in accordance with the Federal CCR rule.

Table 2 summarizes the 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.

3. Groundwater Flow Conditions

Groundwater levels were measured during each monitoring event. Piezometer PZ-5 was dry during each monitoring event in 2023. Groundwater elevations are presented in Table 1. Field depth to water measurements are included in Appendix A on sample collection records for those wells where samples are collected.

3.1 Horizontal Groundwater Flow

Groundwater flow maps were prepared using water level measurements from each monitoring event (Figures 4 and 5). The overall groundwater flow direction is generally southward, mimicking topography and surface water flow patterns. Groundwater flows from the west and east toward the center of the Site before flowing southward toward the Farm Pond (the northern extent of this pond is shown on Figures 4 and 5).

3.2 Horizontal Hydraulic Gradient and Groundwater Flow Velocity

Hydraulic conductivity data for the alluvial aquifer are estimated at 1.0E-5 to 1.0E-4 centimeters per second (cm/s) or 0.008 to 0.08 meters per day (m/d) (HR Green, 2017a). For calculation purposes, a hydraulic conductivity of 0.04 m/d is assumed.

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

$$V = Ki/n$$

Where V equals the average linear velocity; K equals the hydraulic conductivity (0.04 m/day); i equals the average horizontal hydraulic gradient; and n equals the effective porosity (estimated at 0.3). During the 2023 monitoring events at the MPW CCR landfill, the average linear groundwater velocity at the shallow alluvial aquifer was estimated to range between 0.002 m/day (approximately 2 feet per year) for both 2023 monitoring events. The estimated horizontal gradients and average linear groundwater flow velocities for each of the monitoring events is summarized in Table 5.

3.3 Vertical Hydraulic Gradient

A vertical gradient was not calculated for 2023 due to lack of data from well pairs. Data collection for well pairs will resume in 2024.

3.4 Monitoring Well Network Assessment

The MPW CCR Landfill 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 §257.91. Monitoring wells MW-8, MW-10, MW-22, and MW-23 have been identified as upgradient sampling locations.

4. Groundwater Monitoring

Groundwater sample collection records for the 2023 monitoring events are provided in Appendix A. The associated laboratory reports are provided in Appendix B. Statistical analysis of the analytical data was performed by Groundwater Stats Consulting (GW Stats). Statistical analysis, historic and current data, graphs, and supporting information are provided in GW Stats' report in Appendix C.

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 vs. time)
- Inter-well comparisons (downgradient vs. upgradient)

- Intra-well comparisons (vs. baseline conditions at a given well)

The statistical methods used in these evaluation steps for the MPW CCR Landfill are presented in the Groundwater Monitoring System and Sampling and Analysis Program (MSSAP) document (HR Green, 2017a). The procedures in the MSSAP were selected in accordance with the Federal CCR rule, utilizing methodology presented in the USEPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance (Unified Guidance) (USEPA, 2009). The present evaluation utilizes the statistical methods presented therein to evaluate monitoring data from groundwater samples collected during the 2023 assessment monitoring events.

Originally, baseline monitoring under the Federal CCR rule occurred at the MPW CCR Landfill during eight monitoring events conducted between June 2016 and August 2017. For background monitoring well MW-22, the baseline period was March 2018 to April 2021 and for background well MW-23, the baseline period was June 2018 to September 2020. Baseline and other sampling event history are summarized in Table 2.

4.1 Statistical Analysis Approach

Groundwater monitoring at MPW CCR Landfill is currently conducted under assessment monitoring status per the Federal CCR rule. The 2023 assessment monitoring data are presented in Appendix C and Appendix D. During both 2023 semiannual assessment monitoring events all Appendix III and Appendix IV parameters were analyzed in accordance with 40 CFR §257.95(d)(1).

No single method of statistical analysis is appropriate for each groundwater constituent dataset; instead, the statistical methods selected for use are dependent upon the data and distributions and should consider the specific constituents and the nature of local hydrogeologic conditions. Depending on characteristics of the site and the groundwater monitoring data, a mix of inter-well (comparison vs. upgradient conditions) and intra-well (comparison vs. baseline) tests may be warranted. The statistical methods used for the inter-well and intra-well approaches are selected based on these factors as well as consideration of natural temporal or spatial variability of the concentrations of the groundwater constituents.

The analyzed data were used to calculate statistical limits for each well/constituent pair where there are a significant quantity of results above the reporting limit. Statistical calculations were performed by Groundwater Stats using industry standard SANITAS™ Statistical Software, an EPA-compliant package (EPA, 2009). The full procedure is as detailed in the GWMSSAP (HR Green, 2017a).

The statistical report dated November 10, 2023, incorporates data collected through 2023 and the corresponding statistical analyses, including narratives, background limits, prediction limits, statistically significant increases (SSI), trend tests, confidence intervals, statistically significant levels (SSL), and groundwater protection standards (GWPS), and time-series plots is provided in Appendix C and discussed below.

4.2 Discussion of Findings

Groundwater at the MPW CCR Landfill has been analyzed under the Federal CCR rule since 2016. The first two years of data were to collect baseline samples. The summary of data and events from 2017-2022 is updated from the 2022 Annual Groundwater Monitoring and Corrective Action Report (HR Green, 2023).

Appendix III constituents include boron, calcium, chloride, fluoride, pH, sulfate, and total dissolved solids (TDS).

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

4.2.1 2017 Groundwater Monitoring

Establishment of background water quality occurred by testing all wells for Appendix III and IV constituents during the period of June 2016 through August 2017 (8 sampling events, spaced to capture seasonality), following which the detection monitoring program was initiated.

The first detection monitoring event was on October 16, 2017, where Appendix III constituents were tested. An initial 22 well/constituent pairs were determined to exceed their respective statistical limits (Groundwater Stats Consulting, November 15, 2017), which are called initial SSIs, above background concentration.

A resampling event for the 22 well/constituent pairs was conducted on November 28, 2017, to confirm that each is in fact an SSI and not a false positive. Based on re-sampling and statistical analysis there were 3 false positives (calcium, sulfate, and TDS at MW-13) and 19 confirmed SSIs (Groundwater Stats Consulting, December 19, 2017).

Under §257.95(a), the confirmed SSI directed the facility transition into assessment monitoring beginning in 2018.

4.2.2 2018-2022 Groundwater Monitoring

Assessment monitoring commenced in 2018 with the analysis of Appendix III and IV constituents. The events were conducted in the spring and fall of each year. These events satisfy the requirement of semiannual and assessment monitoring. Specifically, assessment monitoring was initiated at the March 6, 2018, event, where the full Appendix III and Appendix IV constituent lists were tested.

4.2.3 2023 Groundwater Monitoring

Assessment monitoring was completed in 2023 for Appendix III and IV constituents. The events were conducted in April and September of 2023. These events satisfy the requirement of semiannual and assessment monitoring requirements. Detected Appendix IV parameters are identified in Table 6.

Table 7 provides a current groundwater monitoring program summary including:

1. The current monitoring program status,
2. Planned change in monitoring program status for the next sampling event,
3. Confirmed statistically significant increases (SSI) over background,
4. Statistically significant trends,
5. Statistically significant level (SSL) over a groundwater protection standard (GWPS), and
6. Upcoming sampling dates and constituents (as best as can be determined at this point in time).

The information shown in Table 7 shows that the concentrations of several constituents remain at a statistically significant increase above background (i.e., SSI), but that all confidence interval concentrations are below the GWPS, that is, there were no SSLs determined. GWPSs are shown in Table 8 along with background concentrations.

The facility is required to continue assessment monitoring in 2024, as shown in Table 3, due to detections above background concentrations at multiple well locations.

In summary, the current-year review indicates:

1. Monitoring wells remain viable sampling points as they are physically intact, void of excessive sediment, and provide the anticipated recharge during sampling, with the exception of MW-13 and MW-18A which were abandoned in 2019, and MW-4A which was abandoned and replaced with MW-4B in 2020.
2. The primary groundwater flow path is from the west and east toward the center of the Site before flowing southward toward the Farm Pond. (Figures 4 and 5).
3. Analytical results indicate the landfill's primary impact on groundwater quality is from Appendix III constituents, including boron, calcium, chloride, sulfate, and TDS in the immediate area downgradient of the active landfill (MW-14A and MW-15A) and vicinity of the sediment runoff control pond (MW-5B and MW-21).

4.3 Comparison to Groundwater Protection Standards

During the April and September 2023 semiannual assessment monitoring events, Appendix III and Appendix IV parameters were analyzed. The 2023 sample results are compared to the Groundwater Protection Standards (GWPSs), as described in 40 CFR §257.95(h):

(h) The owner or operator of the CCR unit must establish a groundwater protection standard for each constituent in appendix IV to this part detected in the groundwater. The groundwater protection standard shall be:

(1) For constituents for which a maximum contaminant level (MCL) has been established under §§141.62 and 141.66 of this title, the MCL for that constituent;

(2) For the following constituents:

(i) Cobalt 6 micrograms per liter ($\mu\text{g/l}$)

(ii) Lead 15 $\mu\text{g/l}$;

(iii) Lithium 40 $\mu\text{g/l}$; and

(iv) Molybdenum 100 $\mu\text{g/l}$.

(3) For constituents for which the background level is higher than the levels identified under paragraphs (h)(1) and (h)(2) of this section, the background concentration.

The resulting site-specific GWPS values for Appendix IV parameters at the Site are summarized in Table 8. Comparisons of the 2023 monitoring data to the GWPS values are presented below for Appendix III and Appendix IV parameters.

4.3.1 Appendix III Analytes

- Boron: No MCL has been established for boron. The maximum boron concentration detected during 2023 was 18.1 milligrams per liter (mg/L) at MW-14A.
- Calcium: No MCL has been established for calcium. The maximum calcium concentration detected during 2023 was 291 mg/L at MW-14A.
- Chloride: No MCL has been established for chloride. The maximum chloride concentration detected during 2023 was 41.8 mg/L at MW-5B.
- Fluoride: Fluoride has an MCL of 4 mg/L and is included on both the Appendix III and Appendix IV analyte lists. All fluoride levels were non-detect during any sampling event in 2023.
- pH: No MCL has been established for pH. The highest and lowest pH recorded during the 2023 monitoring events were 7.24 (at MW-8) and 6.42 (at MW-5B).
- Sulfate: No MCL has been established for sulfate. The maximum sulfate concentration detected during 2023 was 1440 mg/L at monitoring well MW-14A.
- TDS: No MCL has been established for TDS. The maximum TDS concentration detected during 2023 was 1,800 mg/L at monitoring well MW-14A.

4.3.2 Appendix IV Analytes

- Antimony: No detectable concentrations of antimony were reported in any of the samples collected during the 2023 monitoring events. The statistical background limit calculated for antimony is 0.002 mg/L which is below the established MCL of 0.006 mg/L.
- Arsenic: Arsenic has an MCL of 0.01 mg/L. The maximum arsenic concentration detected during 2023 was 0.00501 mg/L at MW-10
- Barium: Barium was detected in all monitored wells during the 2023 monitoring events; however, the detected levels were below the MCL for barium (2.0 mg/L) with a maximum concentration of 0.274 mg/L at MW-5B.

- Beryllium: No detectable concentrations of beryllium were reported in any of the samples collected during 2023. The beryllium reporting limit is 0.001 mg/L, which is below the established MCL (0.004 mg/L).
- Cadmium: Cadmium was not detected in any of the samples collected in the 2023 monitoring events. The statistical background limit calculated for cadmium is 0.0001 mg/L, which is below the established MCL (0.005).
- Chromium: Chromium was detected only in MW-21 with a concentration of 0.00752, which is above the background limit of 0.005, but below the established MCL of 0.1 mg/L.
- Cobalt: The GWPS for cobalt in groundwater at the Site is 0.006, the maximum cobalt concentration detected during the 2023 event was 0.00374 mg/L at MW-4B.
- Lead: The established CCR rule GWPS for lead is 0.015 mg/L with the background limit for Site calculated at 0.002 mg/L. MW-4B and MW-5B were the only wells with detectable levels of lead, both under the background limit at 0.000576 mg/L and 0.000627 mg/L respectively.
- Lithium: No MCL has been established for lithium; the CCR rule GWPS is 0.04 mg/L. Lithium was only detected in one well, MW-21, at a concentration of 0.0205, which is below the GWPS.
- Mercury: Mercury has an MCL of 0.002, and a background limit set at 0.0002 mg/L. There were no detections of mercury in any of the samples collected during the 2023 monitoring period.
- Molybdenum: There is no MCL established for molybdenum, the GWPS is 0.1 mg/L and there is a background limit set at 0.0082 mg/L. Upgradient monitoring well MW-22 was the only well with a reported concentration of molybdenum, with a concentration of 0.00661 mg/L, which is below all limits.
- Radium 226 and 228 (combined): Combined radium levels were detected in many of the wells; however, detected concentrations were below the MCL of 5 picocuries per liter (pCi/L) and most were below the background limit of 1.15 pCi/L. MW-5B and MW-10 did have levels at or above the background limit, at 1.15 pCi/L and 1.48 pCi/L respectively.
- Selenium: Selenium has an established MCL of 0.05 mg/L. The background limit for selenium is 0.005 mg/L. Selenium was only detected in MW-21, at a concentration of 0.00530 mg/L.
- Thallium: Thallium has an established MCL of 0.002 mg/L and a background limit of 0.001 mg/L. There was no thallium detected in any sample taken during the 2023 monitoring period.

5. Conclusions and Recommendations

This AGWMCAR documents groundwater monitoring conducted at the Site during the 2023 reporting period. During the reporting period, two assessment monitoring events were completed at the site.

5.1 Groundwater Flow and Evaluation of the Monitoring Network

The groundwater flow was consistent through the spring and fall 2023 monitoring events, with flow direction generally towards the runoff pond west of the landfill area and then south off site. The groundwater contour maps (Figures 4 and 5) indicate the monitoring network is sufficient and has appropriately located background and downgradient well locations.

5.2 Groundwater Quality

Monitoring data from samples collected during the past year (April and September 2023 assessment monitoring events) were evaluated. The key findings of the evaluation are:

- Inter-well comparisons – below is a summary of well/constituent pairs that had at least one observation outside of upgradient background conditions during the 2023 monitoring period. Confirmed SSIs were identified for:

- **Boron** at MW-14A, MW-15A, and MW-21
- **Calcium** at MW-14A
- **Chloride** at MW-5B
- **pH** at MW-5B, MW-14A, and MW-21
 - pH at the above wells fell below the lower limit, making them statistically significant decreases (SSDs)
- **Sulfate** at MW-14A
- **TDS** at MW-14A and MW-15A

Statistical analysis indicates that the concentrations of multiple constituents remain above background limits (see SSI on Table 7), however, during 2023 there were no Appendix IV constituents that exhibited a statistically significant level (SSL) above a GWPS. As such, under Assessment Monitoring Program §257.95(f) this site will continue in assessment monitoring.

5.3 Recommendations

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

6. References

- Green Environmental Services (GES), November 21, 1991. Coal Combustion Residue Landfill Development Plans and Supporting Documentation, Muscatine Power and Water; and Supplemental Plan Sheets 16 and 18 dated January 29, 1993.
- Green Environmental Services (GES), October 25, 1991. Hydrogeologic Evaluation of the Muscatine Power and Water Coal Combustion Residue Landfill.
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- HR Green, June 2017b. Procedure for Groundwater and Surface Water Sampling. (Updated November 2018.)
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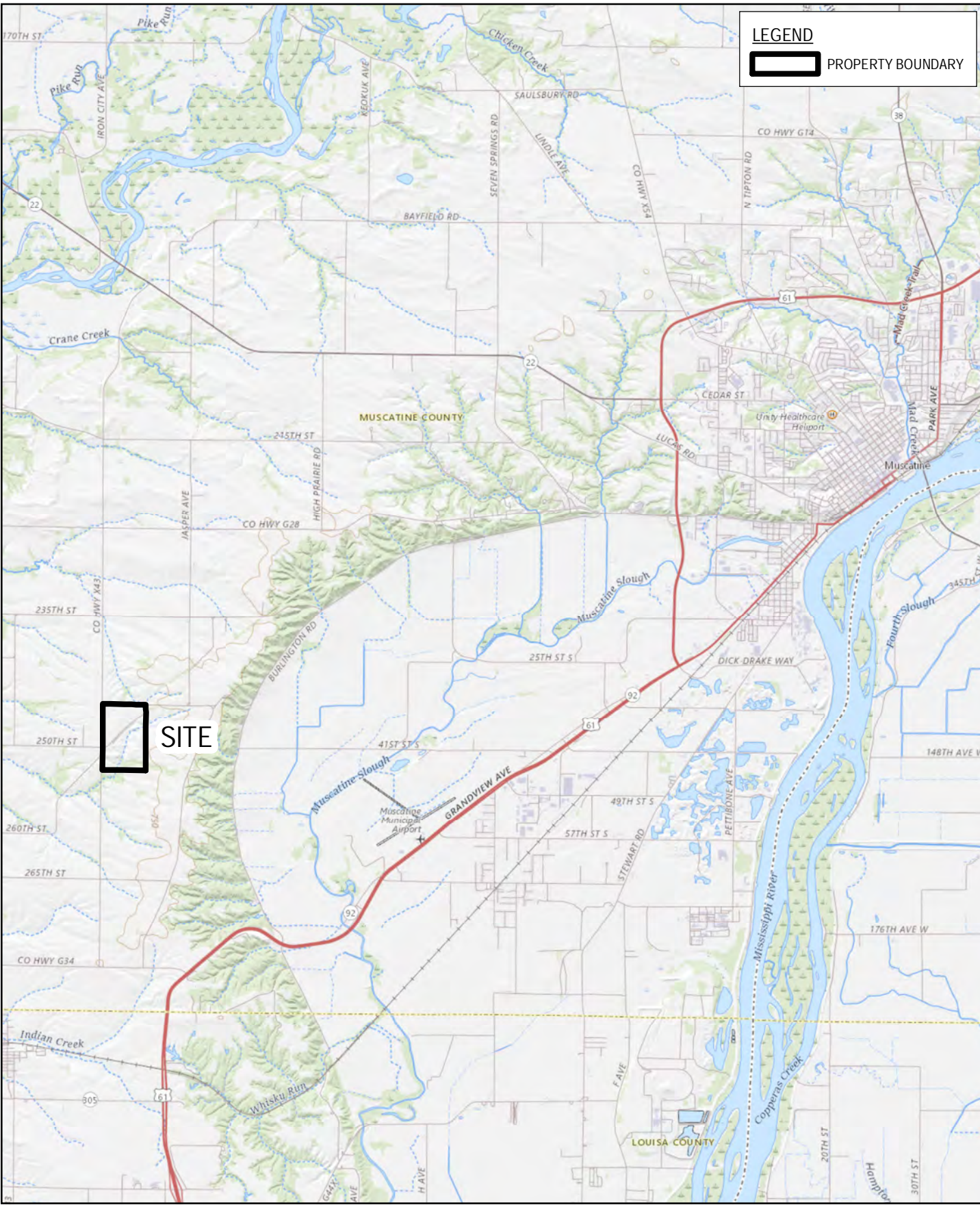
Muscatine Power and Water. Federal *CCR Rule Compliance Data and Information*, publicly accessible Internet site at <https://www.mpw.org/utilities/electric/ccr-rule>.

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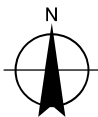
U.S. Environmental Protection Agency (EPA), March 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance. Office of Resource Conservation and Recovery Program Implementation and Information Division, U.S. EPA, Washington, DC. EPA 530/R-09-007.

Figures



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Map Projection: Transverse Mercator
 Horizontal Datum: NAD 1983 2011
 Grid: NAD 1983 (2011) 1aRCS zone 14

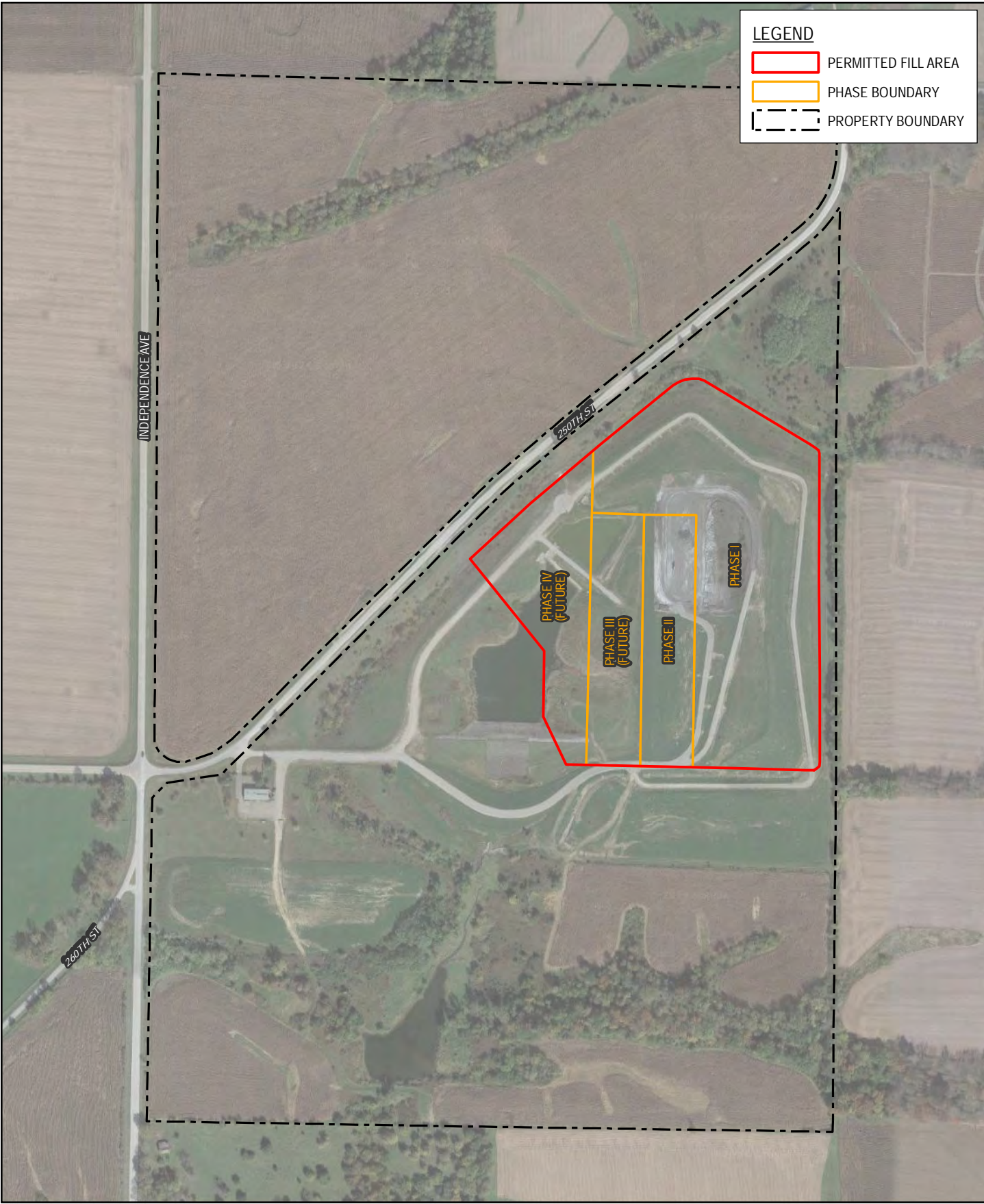


MUSCATINE POWER AND WATER
 CCR LANDFILL
 MUSCATINE, IOWA

Project No. 12606359
 Revision No. -
 Date 01/16/2024

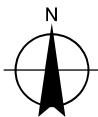
SITE LOCATION

FIGURE 1



Paper Size ANSI A
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 Feet

Map Projection: Transverse Mercator
 Horizontal Datum: NAD 1983 2011
 Grid: NAD 1983 (2011) IARCS zone 14

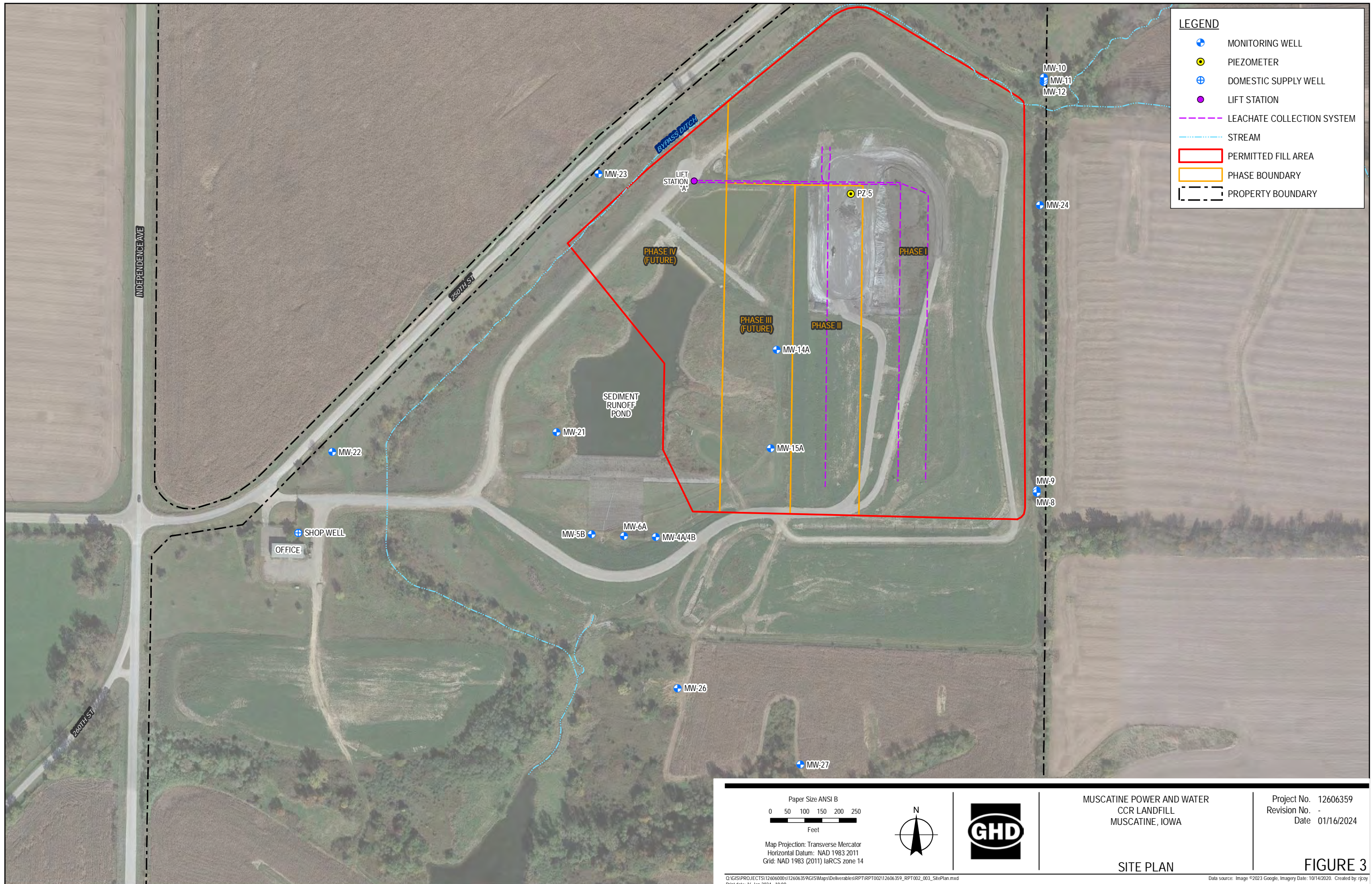


MUSCATINE POWER AND WATER
 CCR LANDFILL
 MUSCATINE, IOWA

Project No. 12606359
 Revision No. -
 Date 01/16/2024

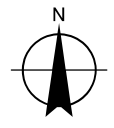
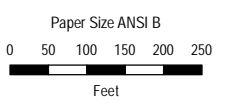
SITE OVERVIEW

FIGURE 2



LEGEND

- + MONITORING WELL
- PIEZOMETER
- ⊕ DOMESTIC SUPPLY WELL
- LIFT STATION
- LEACHATE COLLECTION SYSTEM
- STREAM
- PERMITTED FILL AREA
- PHASE BOUNDARY
- PROPERTY BOUNDARY



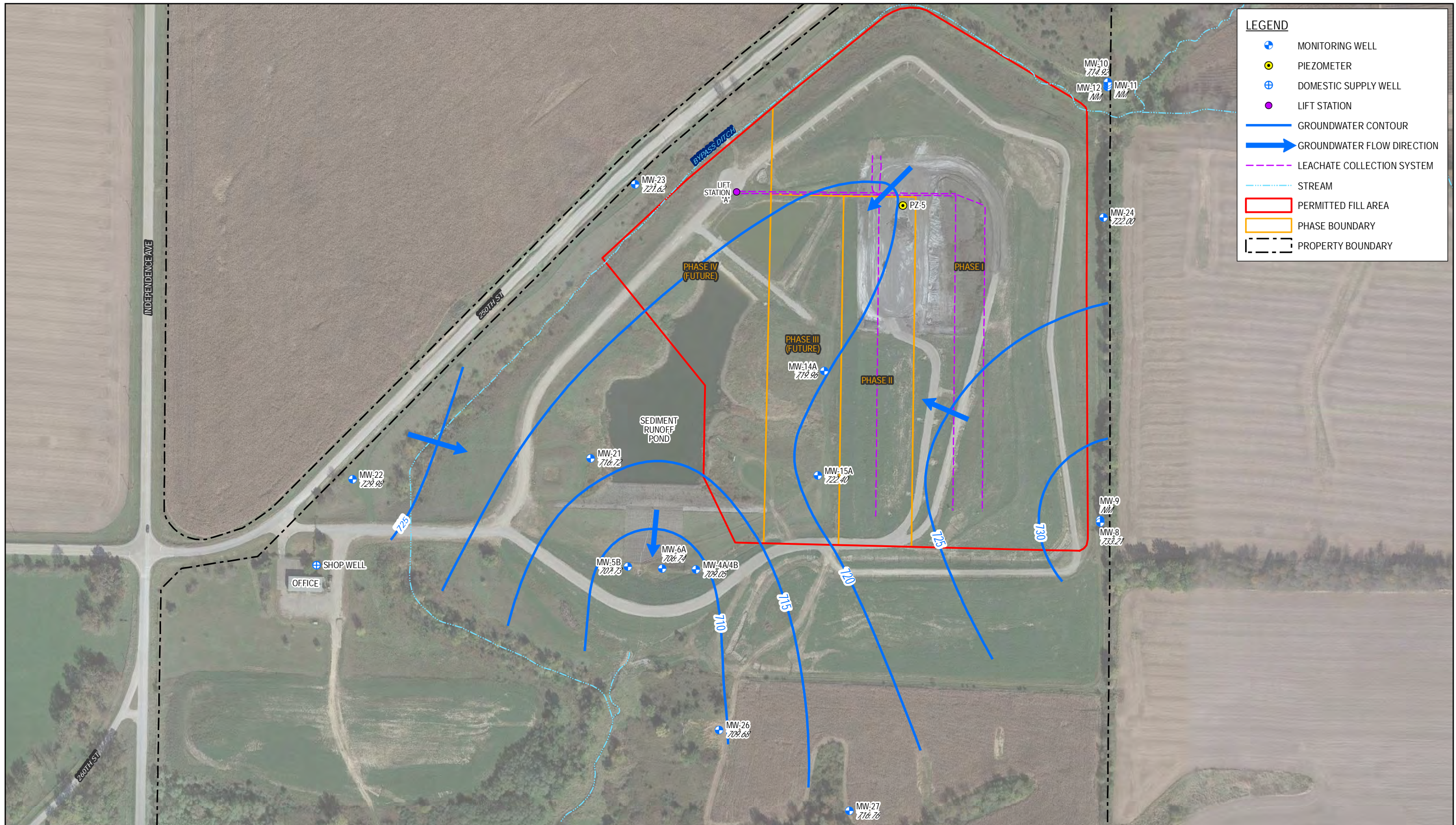
MUSCATINE POWER AND WATER
CCR LANDFILL
MUSCATINE, IOWA

Project No. 12606359
Revision No. -
Date 01/16/2024

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 2011
Grid: NAD 1983 (2011) IARCS zone 14

SITE PLAN

FIGURE 3



LEGEND

- + MONITORING WELL
- PIEZOMETER
- ⊕ DOMESTIC SUPPLY WELL
- LIFT STATION
- GROUNDWATER CONTOUR
- ➔ GROUNDWATER FLOW DIRECTION
- - - LEACHATE COLLECTION SYSTEM
- - - STREAM
- PERMITTED FILL AREA
- PHASE BOUNDARY
- PROPERTY BOUNDARY

NOTES

729.95 GROUNDWATER ELEVATION (FT AMSL)

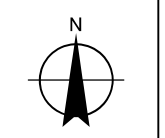
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709.54* NOT USED FOR CONTOUR INTERPRETATION

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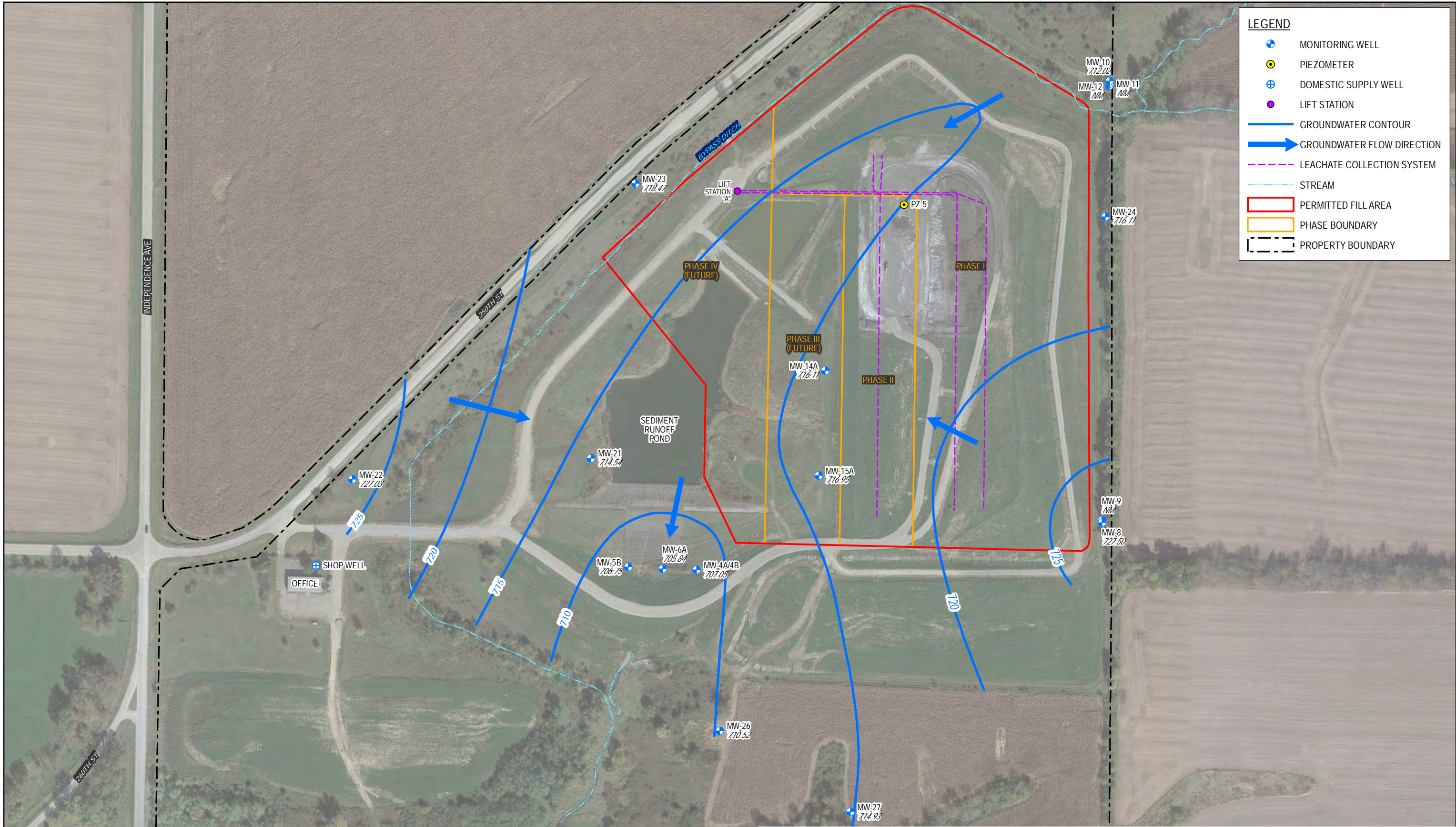


MUSCATINE POWER AND WATER
CCR LANDFILL
MUSCATINE, IOWA

GROUNDWATER CONTOURS
APRIL 12, 2023

Project No. 12606359
Revision No. -
Date 01/16/2024

FIGURE 4



LEGEND

- ⊕ MONITORING WELL
- PIEZOMETER
- ⊕ DOMESTIC SUPPLY WELL
- LIFT STATION
- GROUNDWATER CONTOUR
- ➔ GROUNDWATER FLOW DIRECTION
- - - LEACHATE COLLECTION SYSTEM
- - - STREAM
- PERMITTED FILL AREA
- PHASE BOUNDARY
- PROPERTY BOUNDARY

NOTES

729.95 GROUNDWATER ELEVATION (FT AMSL)

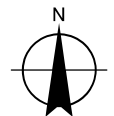
MM NOT MEASURED

709.54* NOT USED FOR CONTOUR INTERPRETATION

Paper Size ANSI B

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Feet

Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 2011
Grid: NAD 1983 (2011) 14RCS zone 14



MUSCATINE POWER AND WATER
CCR LANDFILL
MUSCATINE, IOWA

GROUNDWATER CONTOURS
SEPTEMBER 20, 2023

Project No. 12606359
Revision No. -
Date 01/16/2024

FIGURE 5

Q:\GIS\PROJECTS\12606359\GIS\Maps\Deliverables\RPT\12606359_RPT002_005_GWContSep23.mxd
Print date: 16 Jan 2024 - 10:10
Data source: Image ©2023 Google, Imagery Date: 10/14/2020. Created by: rjczy

Tables

Table 1
Summary of Monitoring Wells and Piezometers
2023 Groundwater Monitoring and Corrective Action Report
Muscatine Power and Water CCR Landfill
Permit No. #70-SDP-06-82P

Well ID	State Plane ⁽¹⁾		WELL CONSTRUCTION ⁽²⁾					Function	Hydrogeologic Unit	WATER LEVELS (Feet, amsl) ⁽³⁾				
			Elevation		Well Depth	Screen Length	Screened Lithology			Low	High	Vertical Gradient ⁽⁴⁾	4/12/2023	9/20/2023
	Northing	Easting	Top of Well Casing	Ground										
PZ-5	511,495	2,269,505	729.63	727	10.00	1	CCR	Piezometer	CCR	DRY	DRY	NA	DRY	DRY
MW-4B ⁽⁵⁾	510,484	2,268,975	715.87	712.04	24.70	10	Clay, Silt	Monitoring	Uppermost Aquifer	705.73	710.01	NA	709.05	707.05
MW-5B	510,485	2,268,777	709.10	706.73	25.30	10	Silt, Clay	Monitoring	Uppermost Aquifer	704.07	708.31	NA	707.73	706.75
MW-6A	510,482	2,268,871	708.92	706.49	25.35	10	Silt, Sand	Monitoring	Uppermost Aquifer	704.47	706.82	NA	706.74	705.84
MW-8	510,639	2,270,068	747.36	744.37	42.95	10	Till	Monitoring	Uppermost Aquifer	727.50	737.74	NA	733.21	727.50
MW-9	510,646	2,270,068	747.12	744.40	58.74	10	Till	Piezometer	Uppermost Aquifer	721.96	729.75	NA	-	-
MW-10	511,846	2,270,058	718.51	716.32	20.32	10	Silt, Till	Monitoring	Uppermost Aquifer	710.89	715.10	NA	714.92	712.02
MW-11	511,840	2,270,058	718.34	716.00	55.97	10	Till, Sand	Piezometer	Uppermost Aquifer	712.87	718.34	NA	-	-
MW-12	511,833	2,270,057	717.75	715.40	86.42	5	Till	Piezometer	Lower Confining Unit	713.13	717.75	NA	-	-
MW-14A	511,035	2,269,301	729.00	726.19	20.50	10	Silt, Till, Clay	Monitoring	Uppermost Aquifer	712.59	719.96	NA	719.96	716.11
MW-15A	510,748	2,269,291	729.99	727.12	20.50	10	Silt, Clay	Monitoring	Uppermost Aquifer	713.83	722.40	NA	722.40	716.95
MW-21	510,779	2,268,668	725.75	722.81	22.20	10	Silt, Clay	Monitoring	Uppermost Aquifer	713.16	721.01	NA	716.72	714.54
MW-22	510,704	2,268,017	744.27	741.13	41	10	Clay Till	Monitoring	Uppermost Aquifer	726.9	731.18	NA	729.98	727.03
MW-23	511,532	2,268,770	726.90	723.73	25	10	Clay Till	Assessment	Uppermost Aquifer	718.47	723.02	NA	721.62	718.47
MW-24	511,476	2,270,056	735.32	732.10	20	10	Clay Till	Assessment	Uppermost Aquifer	716.11	725.83	NA	722.00	716.11
MW-26	510,044	2,269,037	731.08	727.35	38.27	10	Clay Till	Assessment	Uppermost Aquifer	709.68	712.91	NA	709.68	710.52
MW-27	509,830	2,269,401	730.26	726.26	19.44	10	Sand Clay	Assessment	Uppermost Aquifer	714.47	718.43	NA	716.76	714.93

(1) State Plane coordinates from MP&W in email dated 1/20/16 and 6/28/18. MPW has transitioned away from Site System coordinates-see 2017 AWQR Table I-1.

(2) DNR original well construction forms. Top of casings at piezometers re-surveyed May 2018.

(3) Period of record: 2002-2023 (for wells installed during a portion or the entire duration)

(4) Well clusters are MW-8/MW-9 and MW-10/11/12. Insufficient data to calculate for 2023.

(5) MW-4A was damaged and replaced by MW-4B in 2020

(6) MW-13 and MW-18A abandoned in 2019 and MW-25 abandoned in 2020.

NA not applicable; **bold** low or high recorded during 2023.

Table 2

**Summary of Groundwater Monitoring Events
2023 Groundwater Monitoring and Corrective Action Report
Muscatine Power and Water CCR Landfill
Permit No. #70-SDP-06-82P**

Sampling Dates	MW-4A/MW-4B	MW-5B	MW-6A	MW-8	MW-10	MW-13	MW-14A	MW-15A	MW-18A
Well Function	Downgradient	Downgradient	Downgradient	Upgradient	Upgradient	Downgradient	Downgradient	Downgradient	Downgradient
June 6, 2016	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
August 15, 2016	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
October 10, 2016	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
December 12, 2016	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
February 17, 2017	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
April 17, 2017	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
June 19, 2017	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
August 7, 2017	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
October 16, 2017	Detection	Detection	Detection	Detection	Detection	Detection	Detection	Detection	Detection
November 28, 2017	-	Supplemental	-	-	-	Supplemental	Supplemental	Supplemental	Supplemental
March 6, 2018	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
June 19, 2018	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
June 30, 2018	-	-	-	-	-	-	-	-	-
August 29-30, 2018	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
March 18, 2019	Assessment	Assessment	Assessment	Assessment	Assessment	-	Assessment	Assessment	-
August 6, 2019	Assessment	Assessment	Assessment	Assessment	Assessment	-	Assessment	Assessment	-
April 7, 2020	Assessment	Assessment	Assessment	Assessment	Assessment	-	Assessment	Assessment	-
September 18, 2020	-	-	-	-	-	-	-	-	-
September 24, 2020	Assessment	Assessment	Assessment	Assessment	Assessment	-	Assessment	Assessment	-
April 6, 2021	Assessment	Assessment	Assessment	Assessment	Assessment	-	Assessment	Assessment	-
September 1, 2021	Assessment	Assessment	Assessment	Assessment	Assessment	-	Assessment	Assessment	-
April 20, 2022	Assessment	Assessment	Assessment	Assessment	Assessment	-	Assessment	Assessment	-
September 14, 2022	Assessment	Assessment	Assessment	Assessment	Assessment	-	Assessment	Assessment	-
April 11-12, 2023	Assessment	Assessment	Assessment	Assessment	Assessment	-	Assessment	Assessment	-
September 18-20, 2023	Assessment	Assessment	Assessment	Assessment	Assessment	-	Assessment	Assessment	-
Number of Samples									
Appendix III Analytes	22	22	22	22	22	22	22	22	22
Appendix IV Analytes	21	21	21	21	21	21	21	21	21

Table 2

Summary of Groundwater Monitoring Events
2023 Groundwater Monitoring and Corrective Action Report
Muscatine Power and Water CCR Landfill
Permit No. #70-SDP-06-82P

Sampling Dates	MW-21	MW-22 ⁽²⁾	MW-23 ⁽²⁾
Well Function	Downgradient	Upgradient	Upgradient
June 6, 2016	Baseline	-	-
August 15, 2016	Baseline	-	-
October 10, 2016	Baseline	-	-
December 12, 2016	Baseline	-	-
February 17, 2017	Baseline	-	-
April 17, 2017	Baseline	-	-
June 19, 2017	Baseline	-	-
August 7, 2017	Baseline	-	-
October 16, 2017	Detection	-	-
November 28, 2017	Supplemental	-	-
March 6, 2018	Assessment	Baseline	-
June 19, 2018	Assessment	Baseline	-
June 30, 2018	-	-	Baseline
August 29-30, 2018	Assessment	Baseline	Baseline
March 18, 2019	Assessment	Baseline	Baseline
August 6, 2019	Assessment	Baseline	Baseline
April 7, 2020	Assessment	Baseline	Baseline
September 18, 2020	-	Baseline	Baseline
September 24, 2020	Assessment	-	-
April 6, 2021	Assessment	Baseline	Baseline
September 1, 2021	Assessment	Detection	Baseline
April 20, 2022	Assessment	Assessment	Assessment
September 14, 2022	Assessment	Assessment	Assessment
April 11-12, 2023	Assessment	Assessment	Assessment
September 18-20, 2023	Assessment	Assessment	Assessment
Number of Samples			
Appendix III Analytes	22	13	12
Appendix IV Analytes	21	12	11

Notes:

1. Baseline monitoring events include 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 both Appendix III (Detection Monitoring) and Appendix IV (Assessment Monitoring) analytes.
4. MW-22 installed in February 2018 as an additional background well.
5. MW-13 and MW-18A were decommissioned in 2019 due to damage and site construction following IDNR approval.

Table 3

Appendix III Parameters (Detection Monitoring)
2023 Groundwater Monitoring and Corrective Action Report
Muscatine Power and Water CCR Landfill
Permit No. #70-SDP-06-82P

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 4

Appendix IV Parameters (Assessment Monitoring)
2023 Groundwater Monitoring and Corrective Action Report
Muscatine Power and Water CCR Landfill
Permit No. #70-SDP-06-82P

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 5

Horizontal Velocity
2023 Groundwater Monitoring and Corrective Action Report
Muscatine Power and Water CCR Landfill
Permit No. #70-SDP-06-82P

Date	Monitoring Wells	Horizontal Hydraulic Gradient (unitless)	Average Linear Groundwater Flow Velocity (meters/day)	Average Linear Groundwater Flow Velocity (feet/year)
4/12/2023	MW-8, MW-14A	0.015	0.002	2.4
9/20/2023	MW-8, MW-14A	0.013	0.002	2.1

Notes:

Velocity calculated for given well pair assuming effective porosity of 0.3 and mean hydraulic conductivity of 0.04 meters per day.

Table 6

**Overview of Detected Appendix IV Analytes in 2023
2023 Groundwater Monitoring and Corrective Action Report
Muscatine Power and Water CCR Landfill
Permit No. #70-SDP-06-82P**

MW-	4A/4B	5B	6A	8	10	14A	15A	21	22	23
Arsenic					X				X	
Barium	X	X	X	X	X	X	X	X	X	X
Chromium								X		
Cobalt	X			X	X					
Fluoride										
Lead	X	X								
Lithium								X		
Mercury										
Molybdenum									X	
Selenium								X		
Combined Radium 226+226		X	X	X	X	X			X	

Table 7

Groundwater Monitoring Program Summary
2023 Groundwater Monitoring and Corrective Action Report
Muscatine Power and Water CCR Landfill
Permit No. #70-SDP-06-82P

Monitoring Well	Current Monitoring Program Status	Planned Change in Monitoring Program Status For The Next Sampling Event	Confirmed Statistically Significant Increase (SSI) Over Background	Statistically Significant Trends	Statistically Significant Level (SSL) Over GWPS	Upcoming Sampling Dates And Constituents			
						Resample	Semiannual Assessment Monitoring: March 2024	Semiannual Assessment Monitoring: September 2024	Others TBD, if needed
PZ-4	Water level	None	NA	NA	NA	NA	NA	NA	
MW-4A / MW-5B	Assessment	None	None	None	None	NA	Appendix III & IV	Appendix III & IV	
MW-5B	Assessment	None	Chloride, pH*	Downward: Chloride	None	NA	Appendix III & IV	Appendix III & IV	
MW-6A	Assessment	None	None	None	None	NA	Appendix III & IV	Appendix III & IV	
MW-8	Background	None	None	Downward: Calcium, Sulfate, TDS	None	NA	Appendix III & IV	Appendix III & IV	
MW-9	Water level	None	NA	NA	NA	NA	NA	NA	
MW-10	Background	None	None	Downward: TDS	None	NA	Appendix III & IV	Appendix III & IV	
MW-11	Water level	None	NA	NA	NA	NA	NA	NA	
MW-12	Water level	None	NA	NA	NA	NA	NA	NA	
MW-13	Abandoned ⁽¹⁾	None	NA	NA	NA	NA	NA	NA	
MW-14A	Assessment	None	Boron, calcium, sulfate, TDS, pH*	None	None	NA	Appendix III & IV	Appendix III & IV	
MW-15A	Assessment	None	Boron, TDS	Downward: Boron, TDS	None	NA	Appendix III & IV	Appendix III & IV	
MW-18A	Abandoned ⁽¹⁾	None	NA	NA	NA	NA	NA	NA	
MW-21	Assessment	None	Boron, pH*	None	None	NA	Appendix III & IV	Appendix III & IV	
MW-22	Background	None	None	Upward: Sulfate; Downward: Chloride	None	NA	Appendix III & IV	Appendix III & IV	
MW-23	Background	None	None	None	None	NA	Appendix III & IV	Appendix III & IV	
MW-24	Water level	None	NA	NA	NA	NA	NA	NA	
MW-26	Water level	None	NA	NA	NA	NA	NA	NA	
MW-27	Water level	None	NA	NA	NA	NA	NA	NA	

Notes:

Assessment monitoring program triggered upon receipt of confirmed (by resample) SSI on December 19, 2017 and continuing SSI in 2018.

SSI = Statistically Significant Increase above background.

SSL = Statistically Significant Level above a groundwater protection standard (GWPS).

*pH is a Statistically Significant Decrease (SSD).

NA = Not Applicable.

(1) MW-13 and MW-18A were plugged and abandoned in 2019 due to damage and site construction following IDNR approval.

Table 8

Groundwater Protection Standards
2023 Groundwater Monitoring and Corrective Action Report
Muscatine Power and Water CCR Landfill
Permit No. #70-SDP-06-82P

Constituent	Unit	MCL	40 CFR 247.95(h)(2)	Statistical Background Limit	GWPS
Antimony	(mg/L)	0.006	-	0.002	0.006
Arsenic	(mg/L)	0.01	-	0.0078	0.01
Barium	(mg/L)	2	-	0.25	2
Beryllium	(mg/L)	0.004	-	0.001	0.004
Cadmium	(mg/L)	0.005	-	0.0001	0.005
Chromium	(mg/L)	0.1	-	0.005	0.1
Cobalt	(mg/L)	N/A	0.006	0.0056	0.006
Combined Radium	(pCi/L)	5	-	1.15	5
Fluoride	(mg/L)	4	-	0.86	4
Lead	(mg/L)	0.015	-	0.002	0.015
Lithium	(mg/L)	N/A	0.04	0.01	0.04
Mercury	(mg/L)	0.002	-	0.0002	0.002
Molybdenum	(mg/L)	N/A	0.1	0.0082	0.1
Selenium	(mg/L)	0.05	-	0.005	0.05
Thallium	(mg/L)	0.002	-	0.001	0.002

Notes:

All metals as total recoverable.

MCL: Maximum Contaminant Level.

CFR: Code of Federal Regulations.

Statistical Background Limit: Groundwater Stats Consulting, 11/10/2023.

GWPS: Ground Water Protection Standard.

Appendices

Appendix A

Groundwater Sample Collection Records

2023 Spring Sampling

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water	Permit No. 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-4B	
Upgradient	Downgradient <input checked="" type="checkbox"/>
Name of person sampling Neil Hoskins	

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If no, explain	
Standing Water or Litter? (please check)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
If yes, explain	

B. GROUNDWATER ELEVATION MEASUREMENT (± 0.01 foot, MSL)

Elevation:

Top of inner well casing 715.87	Ground Elevation 712.04
Depth of Well 24.70	Inside Casing Diameter (in inches) 2"
Equipment Used Slope Indicator Co. Water level indicator Model 51453	

Groundwater Level (± 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/12/23 12:50	6.82	709.05
*After Purging	4/12/23 13:40	9.16	706.71
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 1.45
No. of Well Volumes (based on current water level) 0.50
Was well pumped/bailed dry? No

Equipment used:

Bailer type	Dedicated Bailer?
Pump type Peristaltic	Dedicated Pump? Yes
If not dedicated, method of cleaning	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
 Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

*D. FIELD MEASUREMENT	
Weather Conditions 83dF, Clear 18 mph SW wind	
Field Measurements (after stabilization):	
Temperature 20.41	Units °C
Equipment Used Horiba U-50	
pH 7.23	
Equipment Used Horiba U-50	
Specific Conductance 0.640	Units mS/m
Equipment Used Horiba U-50	

Comments

CERTIFICATION		
I certify under penalty of law I believe the information reported above is true, accurate and complete.		
Signature <i>Neil Hoskins</i>	Date 1-11-25	
Telephone 563-262-3582	Fax	Email neil.hoskins@mpw.org
NOTE: Attach Laboratory Report and 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.		

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water	Permit No. 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-5B	
Upgradient	Downgradient <input checked="" type="checkbox"/>
Name of person sampling Neil Hoskins	

A. MONITORING WELL/PIEZOMETER CONDITIONS	
Well/Piezometer Properly Capped? (please check)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If no, explain	
Standing Water or Litter? (please check)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
If yes, explain	

B. GROUNDWATER ELEVATION MEASUREMENT (\pm 0.01 foot, MSL)			
Elevation:			
Top of inner well casing 709.10	Ground Elevation 706.73		
Depth of Well 25.30	Inside Casing Diameter (in inches) 2"		
Equipment Used Slope Indicator Co. Water level indicator Model 51453			
Groundwater Level (\pm 0.01 foot below top of inner casing, MSL):			
	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/12/23 15:35	1.37	707.73
*After Purging	4/12/23 16:15	2.58	706.52
*Before Purging			

*C. WELL PURGING	
Quantity of Water Removed from Well (gallons) 1.06	
No. of Well Volumes (based on current water level) 0.27	
Was well pumped/bailed dry? No	
Equipment used:	
Bailer type	Dedicated Bailer?
Pump type Peristaltic	Dedicated Pump? Yes
If not dedicated, method of cleaning	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
 Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

*D. FIELD MEASUREMENT	
Weather Conditions 85dF. Clear, 18 mph SW wind	
Field Measurements (after stabilization):	
Temperature 19.17	Units C
Equipment Used Horiba U-50	
pH 6.96	
Equipment Used Horiba U-50	
Specific Conductance 0.759	Units mS/m
Equipment Used Horiba U-50	

Comments

CERTIFICATION		
I certify under penalty of law I believe the information reported above is true, accurate and complete.		
Signature <i>Neil Hoskins</i>	Date 1-11-25	
Telephone 563-262-3582	Fax	Email neil.hoskins@mpw.org
NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.		

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water	Permit No. 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-6A	
Upgradient	Downgradient ^X
Name of person sampling Neil Hoskins	

A. MONITORING WELL/PIEZOMETER CONDITIONS	
Well/Piezometer Properly Capped? (please check)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If no, explain	
Standing Water or Litter? (please check)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
If yes, explain	

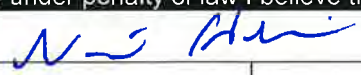
B. GROUNDWATER ELEVATION MEASUREMENT (\pm 0.01 foot, MSL)			
Elevation:			
Top of inner well casing 708.92	Ground Elevation 706.49		
Depth of Well 25.35	Inside Casing Diameter (in inches) 2"		
Equipment Used Slope Indicator Co. Water level indicator Model 51453			
Groundwater Level (\pm 0.01 foot below top of inner casing, MSL):			
	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/12/23 14:25	2.18	706.74
*After Purging	4/12/23 15:00	2.84	706.08
*Before Purging			

*C. WELL PURGING	
Quantity of Water Removed from Well (gallons) 0.92	
No. of Well Volumes (based on current water level) 0.24	
Was well pumped/bailed dry? No	
Equipment used:	
Bailer type	Dedicated Bailer?
Pump type Peristaltic	Dedicated Pump? Yes
If not dedicated, method of cleaning	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
 Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

*D. FIELD MEASUREMENT	
Weather Conditions Sunny 80dF, 10-15 mph W wind	
Field Measurements (after stabilization):	
Temperature 16.75	Units C
Equipment Used Horiba U-50	
pH 7.08	
Equipment Used Horiba U-50	
Specific Conductance 0.678	Units mS/m
Equipment Used Horiba U-50	

Comments

CERTIFICATION		
I certify under penalty of law I believe the information reported above is true, accurate and complete.		
Signature 	Date 1-11-25	
Telephone 563-262-3583	Fax	Email sbennett@mpw.org
NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.		

*Omit if only measuring groundwater elevations.

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
 Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water	Permit No. 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-08	
Upgradient ^X	Downgradient
Name of person sampling Neil Hoskins	

A. MONITORING WELL/PIEZOMETER CONDITIONS	
Well/Piezometer Properly Capped? (please check)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If no, explain	
Standing Water or Litter? (please check)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
If yes, explain	

B. GROUNDWATER ELEVATION MEASUREMENT (\pm 0.01 foot, MSL)			
Elevation:			
Top of inner well casing 747.36	Ground Elevation 744.37		
Depth of Well 42.95	Inside Casing Diameter (in inches) 2"		
Equipment Used Slope Indicator Co. Water level indicator Model 51453			
Groundwater Level (\pm 0.01 foot below top of inner casing, MSL):			
	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/11/23 15:15	14.15	733.21
*After Purging	4/11/23 15:50	20.29	727.07
*Before Purging			

*C. WELL PURGING	
Quantity of Water Removed from Well (gallons) 0.92	
No. of Well Volumes (based on current water level) 0.20	
Was well pumped/bailed dry? No	
Equipment used:	
Bailer type	Dedicated Bailer?
Pump type Peristaltic	Dedicated Pump? Yes
If not dedicated, method of cleaning	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
 Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

***D. FIELD MEASUREMENT**

Weather Conditions 82dF, Clear, 10-15 mph SW wind

Field Measurements (after stabilization):

Temperature 16.51 **Units** °C

Equipment Used Horiba U-50

pH 7.24

Equipment Used Horiba U-50

Specific Conductance 0.620 **Units** mS/m

Equipment Used Horiba U-50

Comments

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature *N. Bennett*

Date 1-11-25

Telephone 563-262-3583

Fax

Email sbennett@mpw.org

NOTE: Attach Laboratory Report and 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water	Permit No. 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-10	
Upgradient <input checked="" type="checkbox"/>	Downgradient <input type="checkbox"/>
Name of person sampling Neil Hoskins	

A. MONITORING WELL/PIEZOMETER CONDITIONS	
Well/Piezometer Properly Capped? (please check)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If no, explain	
Standing Water or Litter? (please check)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
If yes, explain	

B. GROUNDWATER ELEVATION MEASUREMENT (\pm 0.01 foot, MSL)			
Elevation:			
Top of inner well casing 718.51	Ground Elevation 716.32		
Depth of Well 20.32	Inside Casing Diameter (in inches) 2"		
Equipment Used Slope Indicator Co. Water level indicator Model 51453			
Groundwater Level (\pm 0.01 foot below top of inner casing, MSL):			
	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/12/23 8:15	3.59	714.92
*After Purging	4/12/23 8:45	3.82	714.69
*Before Purging			

*C. WELL PURGING	
Quantity of Water Removed from Well (gallons) 0.79	
No. of Well Volumes (based on current water level) .29	
Was well pumped/bailed dry? No	
Equipment used:	
Bailer type	Dedicated Bailer?
Pump type Peristaltic	Dedicated Pump? Yes
If not dedicated, method of cleaning	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
 Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

*D. FIELD MEASUREMENT	
Weather Conditions 67dF, Clear, 15 mph SW wind	
Field Measurements (after stabilization):	
Temperature 13.12	Units C
Equipment Used Horiba U-50	
pH 6.96	
Equipment Used Horiba U-50	
Specific Conductance 0.636	Units mS/m
Equipment Used Horiba U-50	

Comments	

CERTIFICATION		
I certify under penalty of law I believe the information reported above is true, accurate and complete.		
Signature 		Date 1-11-25
Telephone 563-262-3583	Fax	Email sbennett@mpw.org
NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.		

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water	Permit No. 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-14A	
Upgradient	Downgradient <input checked="" type="checkbox"/>
Name of person sampling Neil Hoskins	

A. MONITORING WELL/PIEZOMETER CONDITIONS	
Well/Piezometer Properly Capped? (please check)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If no, explain	
Standing Water or Litter? (please check)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
If yes, explain	

B. GROUNDWATER ELEVATION MEASUREMENT (\pm 0.01 foot, MSL)			
Elevation:			
Top of inner well casing 729.00	Ground Elevation 726.19		
Depth of Well 20.50	Inside Casing Diameter (in inches) 2"		
Equipment Used Slope Indicator Co. Water level indicator Model 51453			
Groundwater Level (+ 0.01 foot below top of inner casing, MSL):			
	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/11/23 10:00	9.04	719.96
*After Purging	4/11/23 10:45	12.78	716.22
*Before Purging			

*C. WELL PURGING	
Quantity of Water Removed from Well (gallons) 1.19	
No. of Well Volumes (based on current water level) 0.64	
Was well pumped/bailed dry? No	
Equipment used:	
Bailer type	Dedicated Bailer?
Pump type Peristaltic	Dedicated Pump? Yes
If not dedicated, method of cleaning	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
 Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

*D. FIELD MEASUREMENT	
Weather Conditions 76dF, Clear, 15 mph SW wind	
Field Measurements (after stabilization):	
Temperature 11.29	Units C
Equipment Used Horiba U-50	
pH 6.97	
Equipment Used Horiba U-50	
Specific Conductance 2.10	Units mS/m
Equipment Used Horiba U-50	

Comments

CERTIFICATION	
I certify under penalty of law I believe the information reported above is true, accurate and complete.	
Signature <i>N. Hoskins</i>	Date 1-11-25
Telephone 563-262-3582	Fax Email neil.hoskins@mpw.org
NOTE: Attach Laboratory Report and 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.	

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water	Permit No. 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-15A	
Upgradient	Downgradient ^X
Name of person sampling Neil Hoskins	

A. MONITORING WELL/PIEZOMETER CONDITIONS	
Well/Piezometer Properly Capped? (please check)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If no, explain	
Standing Water or Litter? (please check)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
If yes, explain	


B. GROUNDWATER ELEVATION MEASUREMENT (\pm 0.01 foot, MSL)			
Elevation:			
Top of inner well casing 729.99	Ground Elevation 727.12		
Depth of Well 20.50	Inside Casing Diameter (in inches) 2"		
Equipment Used Slope Indicator Co. Water level indicator Model 51453			
Groundwater Level (\pm 0.01 foot below top of inner casing, MSL):			
	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/11/23 12:30	7.59	722.4
*After Purging	4/11/23 13:35	12.68	717.31
*Before Purging			

*C. WELL PURGING	
Quantity of Water Removed from Well (gallons) 1.72	
No. of Well Volumes (based on current water level) 0.82	
Was well pumped/bailed dry? No	
Equipment used:	
Bailer type	Dedicated Bailer?
Pump type Peristaltic	Dedicated Pump? Yes
If not dedicated, method of cleaning	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
 Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

*D. FIELD MEASUREMENT	
Weather Conditions 81dF, Clear, 18-20 mph W wind	
Field Measurements (after stabilization):	
Temperature 14.07	Units C
Equipment Used Horiba U-50	
pH 7.24	
Equipment Used Horiba U-50	
Specific Conductance 0.858	Units mS/m
Equipment Used Horiba U-50	

Comments

CERTIFICATION		
I certify under penalty of law I believe the information reported above is true, accurate and complete.		
Signature 	Date 1-11-25	
Telephone 563-262-3582	Fax	Email neil.hoskins@mpw.org
NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.		

*Omit if only measuring groundwater elevations.

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319. Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water **Permit No.** 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-21
Upgradient _____ **Downgradient** _____
Name of person sampling Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO

If no, explain _____

Standing Water or Litter? (please check) YES NO

If yes, explain _____

B. GROUNDWATER ELEVATION MEASUREMENT (± 0.01 foot, MSL)

Elevation:

Top of inner well casing 725.75 **Ground Elevation** 722.81

Depth of Well 22.20 **Inside Casing Diameter (in inches)** 2"

Equipment Used Slope Indicator Co. Water level indicator Model 51453

Groundwater Level (± 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/11/23 11:20	9.03	716.72
*After Purging	4/11/23 11:50	9.43	716.32
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.79

No. of Well Volumes (based on current water level) 0.37

Was well pumped/bailed dry? No

Equipment used:

Bailer type _____ **Dedicated Bailer?** _____

Pump type Peristaltic **Dedicated Pump?** Yes

If not dedicated, method of cleaning _____

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

***D. FIELD MEASUREMENT**

Weather Conditions 75dF, Clear, 15 mph SW wind

Field Measurements (after stabilization):

Temperature 14.29 **Units** C

Equipment Used Horiba U-50

pH 6.62

Equipment Used Horiba U-50

Specific Conductance 0.767 **Units** mS/m

Equipment Used Horiba U-50

Comments

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature *Nina Booker* **Date** 1-11-25

Telephone 563-262-3583 **Fax** _____ **Email** sbennett@mpw.org

NOTE: Attach Laboratory Report and 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water **Permit No.** 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-22
Upgradient _____ **Downgradient** X
Name of person sampling Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO

If no, explain _____

Standing Water or Litter? (please check) YES NO

If yes, explain _____

B. GROUNDWATER ELEVATION MEASUREMENT (± 0.01 foot, MSL)

Elevation:

Top of inner well casing 744.27 Ground Elevation 741.00

Depth of Well 44.27 Inside Casing Diameter (in inches) 2"

Equipment Used Slope Indicator Co. Water level indicator Model 51453

Groundwater Level (± 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/10/23 12:00	14.29	729.98
*After Purging	4/10/23 12:55	26.12	718.15
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 1.32

No. of Well Volumes (based on current water level) 0.27

Was well pumped/bailed dry? No

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type Peristaltic Dedicated Pump? Yes

If not dedicated, method of cleaning _____

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

***D. FIELD MEASUREMENT**

Weather Conditions 74dF, Clear, 15-20 mph SW wind

Field Measurements (after stabilization):

Temperature 15.05 Units C

Equipment Used Horiba U-50

pH 7.14

Equipment Used Horiba U-50

Specific Conductance 0.645 Units mS/m

Equipment Used Horiba U-50

Comments

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature  Date 1-11-25

Telephone 563-262-3583 Fax _____ Email sbennett@mpw.org

NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water Permit No. 70-SDP-6_82P
 Monitoring Well/Piezometer No. MW-23
 Upgradient Downgradient _____
 Name of person sampling Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO

If no, explain _____

Standing Water or Litter? (please check) YES NO

If yes, explain _____

B. GROUNDWATER ELEVATION MEASUREMENT (± 0.01 foot, MSL)

Elevation:

Top of inner well casing 726.90 Ground Elevation 723.73

Depth of Well 27.17 Inside Casing Diameter (in inches) 2"

Equipment Used Slope Indicator Co. Water level indicator Model 51453

Groundwater Level (± 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/12/23 09:45	5.28	721.62
*After Purging	4/12/23 10:15	8.50	718.40
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.79

No. of Well Volumes (based on current water level) 0.22

Was well pumped/bailed dry? No

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type Peristaltic Dedicated Pump? Yes

If not dedicated, method of cleaning _____

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

***D. FIELD MEASUREMENT**

Weather Conditions 73dF, Clear. 15 mph W wind

Field Measurements (after stabilization):

Temperature 15.18 **Units** C

Equipment Used Horiba U-50

pH 7.24

Equipment Used Horiba U-50

Specific Conductance 0.495 **Units** mS/m

Equipment Used Horiba U-50

Comments

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature  **Date** 1-11-25

Telephone 563-262-3583 **Fax** _____ **Email** sbennett@mpw.org

NOTE: Attach Laboratory Report and 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water Permit No. 70-SDP-6_82P
 Monitoring Well/Piezometer No. MW-24
 Upgradient Downgradient _____
 Name of person sampling Neil Hoskins

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO

If no, explain _____

Standing Water or Litter? (please check) YES NO

If yes, explain _____

B. GROUNDWATER ELEVATION MEASUREMENT (± 0.01 foot, MSL)

Elevation:

Top of inner well casing 735.32 Ground Elevation 732.10

Depth of Well 22.22 Inside Casing Diameter (in inches) 2"

Equipment Used Slope Indicator Co. Water level indicator Model 51453

Groundwater Level (± 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/11/23 14:15	13.32	722.0
*After Purging	4/11/23 14:55	13.68	721.64
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 1.06

No. of Well Volumes (based on current water level) 0.73

Was well pumped/bailed dry? No

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type Peristaltic Dedicated Pump? Yes

If not dedicated, method of cleaning _____

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

***D. FIELD MEASUREMENT**

Weather Conditions 81dF, Clear, 15 mph SW wind

Field Measurements (after stabilization):

Temperature 17.57 Units C

Equipment Used Horiba U-50

pH 7.27

Equipment Used Horiba U-50

Specific Conductance 0.688 Units mS/m

Equipment Used Horiba U-50

Comments

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature  Date 1-11-25

Telephone 563-262-3583 Fax _____ Email sbennett@mpw.org

NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water Permit No. 70-SDP-6_82P
 Monitoring Well/Piezometer No. MW-26
 Upgradient Downgradient _____
 Name of person sampling Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO

If no, explain _____

Standing Water or Litter? (please check) YES NO

If yes, explain _____

B. GROUNDWATER ELEVATION MEASUREMENT (± 0.01 foot, MSL)

Elevation:

Top of inner well casing 731.08 Ground Elevation 727.35

Depth of Well 38.27 Inside Casing Diameter (in inches) 2"

Equipment Used Slope Indicator Co. Water level indicator Model 51453

Groundwater Level (± 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/12/23 11:30	21.40	709.68
*After Purging	4/12/23 11:55	23.63	707.45
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.66

No. of Well Volumes (based on current water level) 0.24

Was well pumped/bailed dry? No

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type Peristaltic Dedicated Pump? Yes

If not dedicated, method of cleaning _____

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

***D. FIELD MEASUREMENT**

Weather Conditions 81dF, Clear, 15-20 mph WSW wind

Field Measurements (after stabilization):

Temperature 19.09 **Units** C

Equipment Used Horiba U-50

pH 7.27

Equipment Used Horiba U-50

Specific Conductance 1.000 **Units** mS/m

Equipment Used Horiba U-50

Comments

CERTIFICATION
I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature  **Date** 1-11-25

Telephone 563-262-3583 **Fax** _____ **Email** sbennett@mpw.org

NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water **Permit No.** 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-27
Upgradient **Downgradient**
Name of person sampling Neil Hoskins

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO

If no, explain _____

Standing Water or Litter? (please check) YES NO

If yes, explain _____

B. GROUNDWATER ELEVATION MEASUREMENT (± 0.01 foot, MSL)

Elevation:

Top of inner well casing 730.26 **Ground Elevation** 726.26

Depth of Well 19.44 **Inside Casing Diameter (in inches)** 2"

Equipment Used Slope Indicator Co. Water level indicator Model 51453

Groundwater Level (± 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/12/23 10:40	13.50	716.76
*After Purging	4/12/23 11:10	15.75	714.51
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.79

No. of Well Volumes (based on current water level) 0.82

Was well pumped/bailed dry? No

Equipment used:

Bailer type _____ **Dedicated Bailer?** _____

Pump type Peristaltic **Dedicated Pump?** Yes

If not dedicated, method of cleaning _____

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

***D. FIELD MEASUREMENT**

Weather Conditions 77dF, Clear, 15-20 mph WSW wind

Field Measurements (after stabilization):

Temperature 13.68 **Units** C

Equipment Used Horiba U-50

pH 6.37

Equipment Used Horiba U-50

Specific Conductance 0.236 **Units** mS/m

Equipment Used Horiba U-50

Comments

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature  **Date** 1-11-25

Telephone 563-262-3583 **Fax** _____ **Email** sbennett@mpw.org

NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

LOW FLOW SAMPLING FORM

DATE 4/12/2023 WELL ID MW-4B SAMPLE DATE / TIME 4/12/23 1340
 SITE Muscatine Power & Water DTW 6.82 NOTE Dup-2 marked 4/12/23 1200
 PROJECT # Spring 2023 WELL DEPTH 24.55
 WEATHER 83dF, Clear, 18 mpw SW wind PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 19.5'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES			
1250	100		6.82										
1255	100	500	7.90	25.74	7.44	270	0.586	0.0	0.51				
1300	100	1000	8.50	23.90	7.37	261	0.596	0.6	0.35				
1305	100	1500	8.71	22.25	7.30	252	0.617	1.0	0.34				
1310	100	2000	8.80	21.78	7.23	219	0.628	1.2	0.31				
1315	100	2500	8.90	21.37	7.20	174	0.632	1.7	0.28				
1320	100	3000	9.00	21.00	7.19	159	0.636	1.8	0.28				
1325	100	3500	9.10	20.69	7.19	150	0.639	1.9	0.31				
1330	100	4000	9.04	20.67	7.20	139	0.639	2.1	0.27				
1335	100	4500	9.13	20.35	7.22	133	0.643	2.2	0.27				
1340	100	5000	9.16	20.41	7.23	129	0.640	2.3	0.26			Sample Start	
1400			9.50									Sample End	
1415												Dup-2 Start	
			9.40									Dup-2 End	
											Preservative	# of Containers	
											HCl		
											HNO ₃	3	
											None	1	
<i>0.5-5.0 min</i>	<i>200-500 ml</i>	<i>---</i>	<i>minimize</i>	<i>---</i>	<i>+/- 0.1</i>	<i>+/-10 mV</i>	<i>+/- 3%</i>	<i>+/- 10%</i>	<i>+/- 10%</i>	<i>Limits</i>	<i>or +/-0.2 mg/L</i>		

LOW FLOW SAMPLING FORM

DATE 4/12/2023 WELL ID MW-5B SAMPLE DATE / TIME 4/12/23 1615
 SITE Muscatine Power & Water DTW 1.37 NOTE _____
 PROJECT # Spring 2023 WELL DEPTH 25.30
 WEATHER 85dF, Clear, 18 mph SW wind PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 25'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES	
1535	100		1.37								
1540	100	500	1.99	26.17	7.31	66	0.699	52.0	0.45		
1545	100	1000	2.18	22.13	7.28	64	0.725	9.7	0.23		
1550	100	1500	2.36	21.36	7.26	66	0.732	6.9	0.22		
1555	100	2000	2.48	20.26	7.18	67	0.743	3.4	0.22		
1600	100	2500	2.50	19.89	7.11	69	0.747	1.3	0.27		
1605	100	3000	2.55	19.18	7.05	72	0.755	0.0	0.31		
1610	100	3500	2.55	19.18	6.98	74	0.758	0.1	0.37		
1615	100	4000	2.58	19.17	6.96	75	0.759	0.0	0.30	Sample Start	
1635			2.70							Sample End	
										Preservative	# of Containers
										HCl	
										HNO ₃	3
										NaOH	
										None	1

0.5-5.0 min 200-500 ml --- minimize --- +/- 0.1 +/-10 mV +/- 3% +/- 10% +/- 10% Limits
 or +/-0.2 mg/L

LOW FLOW SAMPLING FORM

DATE 4/12/2023 WELL ID MW-6A SAMPLE DATE / TIME 4/12/23 1500
 SITE Muscatine Power & Water DTW 2.18 NOTE _____
 PROJECT # Spring 2023 WELL DEPTH 25.35
 WEATHER Sunny 80 dF, 10-15 mph W wind PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 20'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES
1425	100		2.18							
1430	100	500	2.72	25.78	7.32	38	0.578	1.5	0.30	
1435	100	1000	2.74	25.44	7.26	34	0.568	1.3	2.80	
1440	100	1500	2.95	18.75	7.22	33	0.659	0.0	0.40	
1445	100	2000	2.82	17.50	7.18	32	0.674	0.0	0.57	
1450	100	2500	2.83	17.08	7.13	32	0.676	0.0	0.69	
1455	100	3000	2.83	16.89	7.10	32	0.678	0.0	0.79	
1500	100	3500	2.84	16.75	7.08	33	0.678	0.0	0.73	Sample Start
1518			2.93							Sample End
										Preservative
										HCl
										HNO ₃
										NaOH
										None
										# of Containers
										3
										1

0.5-5.0 min 200-500 ml --- minimize --- +/- 0.1 +/-10 mV +/- 3% +/- 10% +/- 10% Limits
 or +/-0.2 mg/L

LOW FLOW SAMPLING FORM

DATE 4/11/2023 WELL ID MW-24 SAMPLE DATE / TIME 4/11/23 1455
 SITE Muscatine Power & Water DTW 13.32 NOTE _____
 PROJECT # Spring 2023 WELL DEPTH 43.33
 WEATHER 81dF, Clear, 15 mpw SW wind PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 38'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES			
1415	100		13.32										
1420	100	500	13.63	18.65	7.64	288	0.590	20.5	6.69				
1425	100	1000	13.81	14.79	7.47	294	0.626	5.7	8.59				
1430	100	1500	13.86	14.41	7.34	295	0.638	8.9	8.39				
1435	100	2000	13.74	15.17	7.24	293	0.671	11.4	8.23				
1440	100	2500	13.72	16.55	7.24	288	0.681	9.3	7.46				
1445	100	3000	13.68	17.59	7.24	288	0.687	8.8	7.39				
1450	100	3500	13.68	17.55	7.25	288	0.688	8.4	7.30				
1455	100	4000	13.68	17.57	7.27	288	0.688	8.3	7.33	Sample Start			
1505			13.68							Sample End			
											Preservative	# of	
											HCl		
											HNO ₃	1	
											NaOH		
											None	1	
0.5-5.0 min	200-500 ml	---	minimize	---	+/- 0.1	+/-10 mV	+/- 3%	+/- 10%	+/- 10%	Limits			
										or +/-0.2 mg/L			

LOW FLOW SAMPLING FORM

DATE 4/12/2023 WELL ID MW-26 SAMPLE DATE / TIME 4/12/23 1155
 SITE Muscataine Power & Water DTW 21.40 NOTE _____
 PROJECT # Spring 2023 WELL DEPTH 38.27 _____
 WEATHER 81dF, Clear, 15-20 mph WSW wind PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 35'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES	
1130	100		21.40								
1135	100	500	21.56	18.91	6.95	260	0.989	11.4	1.15		
1140	100	1000	22.31	19.19	7.15	251	0.996	9.5	0.93		
1145	100	1500	22.65	18.69	7.22	248	1.010	8.6	0.87		
1150	100	2000	23.17	18.89	7.29	245	1.010	7.9	0.86		
1155	100	2500	23.63	19.09	7.27	241	1.000	8.2	0.88	Sample Start	
1205			24.04							Sample End	
										Preservative	# of Containers
										HCl	
										HNO ₃	1
										NaOH	
										None	1

0.5-5.0 min 200-500 ml --- minimize --- +/- 0.1 +/-10 mV +/- 3% +/- 10% +/- 10% Limits or +/-0.2 mg/L

LOW FLOW SAMPLING FORM

DATE	<u>4/12/2023</u>	WELL ID	<u>MW-27</u>			SAMPLE DATE / TIME	<u>4/12/23 1110</u>			
SITE	<u>Muscatine Power & Water</u>	DTW	<u>13.50</u>			NOTE				
PROJECT #	<u>Spring 2023</u>	WELL DEPTH	<u>19.44</u>							
WEATHER	<u>77dF, Clear, 15-20 mph WSW wind</u>	PUMP TYPE	<u>GeoTech Peristaltic</u>			DEPTH TO INTAKE	<u>18'</u>			

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES
1040	100		13.50							
1045	100	500	13.86	19.09	7.10	269	0.220	13.4	5.22	
1050	100	1000	14.44	16.14	6.75	293	0.210	54.3	4.09	
1055	100	1500	15.15	15.91	6.68	295	0.211	57.8	3.89	
1100	100	2000	15.15	14.51	6.48	302	0.231	149.0	4.06	
1105	100	2500	15.46	15.06	6.38	308	0.230	145.0	3.65	
1110	100	3000	15.75	13.68	6.37	312	0.236	142.0	3.92	Sample Start
1120			16.17							Sample End

										Preservative	# of Containers	
										HCl		
										HNO ₃	1	
										NaOH		
										None	1	
<i>0.5-5.0 min</i>	<i>200-500 ml</i>	<i>---</i>	<i>minimize</i>	<i>---</i>	<i>+/- 0.1</i>	<i>+/-10 mV</i>	<i>+/- 3%</i>	<i>+/- 10%</i>	<i>+/- 10%</i>	<i>Limits</i>		
										<i>or +/-0.2 mg/L</i>		

2023 Fall Sampling

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water	Permit No. 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-4B	
Upgradient	Downgradient <input checked="" type="checkbox"/>
Name of person sampling Neil Hoskins	

A. MONITORING WELL/PIEZOMETER CONDITIONS	
Well/Piezometer Properly Capped? (please check)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If no, explain	
Standing Water or Litter? (please check)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
If yes, explain	

B. GROUNDWATER ELEVATION MEASUREMENT (\pm 0.01 foot, MSL)			
Elevation:			
Top of inner well casing 715.87	Ground Elevation 712.04		
Depth of Well 24.70	Inside Casing Diameter (in inches) 2"		
Equipment Used Slope Indicator Co. Water level indicator Model 51453			
Groundwater Level (\pm 0.01 foot below top of inner casing, MSL):			
	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/20/23 7:25	8.82	707.05
*After Purging	9/20/23 8:00	10.15	705.72
*Before Purging			

*C. WELL PURGING	
Quantity of Water Removed from Well (gallons) 0.92	
No. of Well Volumes (based on current water level) 0.36	
Was well pumped/bailed dry? No	
Equipment used:	
Bailer type	Dedicated Bailer?
Pump type Peristaltic	Dedicated Pump? Yes
If not dedicated, method of cleaning	


Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
 Questions? Call or Email: Nina Koger Environmental Engineer Sr, 515-725-8309, nina.koger@dnr.iowa.gov

*D. FIELD MEASUREMENT	
Weather Conditions 62dF, Cloudy, Calm	
Field Measurements (after stabilization):	
Temperature 15.16	Units C
Equipment Used Horiba U-50	
pH 7.03	
Equipment Used Horiba U-50	
Specific Conductance 0.715	Units mS/m
Equipment Used Horiba U-50	

Comments

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature 	Date 1-11-25
Telephone 563-262-3582	Fax
Email neil.hoskins@mpw.org	

NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
 Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water	Permit No. 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-5B	
Upgradient	Downgradient <input checked="" type="checkbox"/>
Name of person sampling Neil Hoskins	

A. MONITORING WELL/PIEZOMETER CONDITIONS	
Well/Piezometer Properly Capped? (please check)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If no, explain	
Standing Water or Litter? (please check)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
If yes, explain	

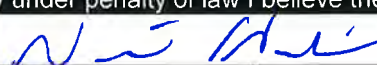
B. GROUNDWATER ELEVATION MEASUREMENT (\pm 0.01 foot, MSL)			
Elevation:			
Top of inner well casing 709.10	Ground Elevation 706.73		
Depth of Well 25.30	Inside Casing Diameter (in inches) 2"		
Equipment Used Slope Indicator Co. Water level indicator Model 51453			
Groundwater Level (\pm 0.01 foot below top of inner casing, MSL):			
	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/20/23 10:20	2.35	706.75
*After Purging	9/20/23 10:55	3.26	705.84
*Before Purging			

*C. WELL PURGING	
Quantity of Water Removed from Well (gallons) 0.92	
No. of Well Volumes (based on current water level) 0.25	
Was well pumped/bailed dry? No	
Equipment used:	
Bailer type	Dedicated Bailer?
Pump type Peristaltic	Dedicated Pump? Yes
If not dedicated, method of cleaning	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
 Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

*D. FIELD MEASUREMENT	
Weather Conditions 72dF, Cloudy, Calm	
Field Measurements (after stabilization):	
Temperature 15.69	Units C
Equipment Used Horiba U-50	
pH 6.42	
Equipment Used Horiba U-50	
Specific Conductance 0.883	Units mS/m
Equipment Used Horiba U-50	

Comments

CERTIFICATION		
I certify under penalty of law I believe the information reported above is true, accurate and complete.		
Signature 	Date 1-11-25	
Telephone 563-262-3582	Fax	Email neil.hoskins@mpw.org
NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.		

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water	Permit No. 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-6A	
Upgradient	Downgradient <input checked="" type="checkbox"/>
Name of person sampling Neil Hoskins	

A. MONITORING WELL/PIEZOMETER CONDITIONS	
Well/Piezometer Properly Capped? (please check)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If no, explain	
Standing Water or Litter? (please check)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
If yes, explain	

B. GROUNDWATER ELEVATION MEASUREMENT (± 0.01 foot, MSL)			
Elevation:			
Top of inner well casing 708.92	Ground Elevation 706.49		
Depth of Well 25.35	Inside Casing Diameter (in inches) 2"		
Equipment Used Slope Indicator Co. Water level indicator Model 51453			
Groundwater Level (± 0.01 foot below top of inner casing, MSL):			
	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/20/23 8:45	3.08	705.84
*After Purging	9/20/23 9:15	3.57	705.35
*Before Purging			

*C. WELL PURGING	
Quantity of Water Removed from Well (gallons) 0.79	
No. of Well Volumes (based on current water level) 0.22	
Was well pumped/bailed dry? No	
Equipment used:	
Bailer type	Dedicated Bailer?
Pump type Peristaltic	Dedicated Pump? Yes
If not dedicated, method of cleaning	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
 Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

*D. FIELD MEASUREMENT	
Weather Conditions 68dF, Cloudy and Calm	
Field Measurements (after stabilization):	
Temperature 15.08	Units C
Equipment Used Horiba U-50	
pH 6.88	
Equipment Used Horiba U-50	
Specific Conductance 0.650	Units mS/m
Equipment Used Horiba U-50	

Comments

CERTIFICATION	
I certify under penalty of law I believe the information reported above is true, accurate and complete.	
Signature <i>Nina Koger</i>	Date 1-11-25
Telephone 563-262-3583	Fax
	Email sbennett@mpw.org
NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.	

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water	Permit No. 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-08	
Upgradient ^X	Downgradient
Name of person sampling Neil Hoskins	

A. MONITORING WELL/PIEZOMETER CONDITIONS	
Well/Piezometer Properly Capped? (please check)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If no, explain	
Standing Water or Litter? (please check)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
If yes, explain	

B. GROUNDWATER ELEVATION MEASUREMENT (\pm 0.01 foot, MSL)			
Elevation:			
Top of inner well casing 747.36	Ground Elevation 744.37		
Depth of Well 42.95	Inside Casing Diameter (in inches) 2"		
Equipment Used Slope Indicator Co. Water level indicator Model 51453			
Groundwater Level (\pm 0.01 foot below top of inner casing, MSL):			
	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/19/23 9:15	19.86	727.5
*After Purging	9/19/23 9:50	24.14	723.22
*Before Purging			

*C. WELL PURGING	
Quantity of Water Removed from Well (gallons) 0.92	
No. of Well Volumes (based on current water level) 0.25	
Was well pumped/bailed dry? No	
Equipment used:	
Bailer type	Dedicated Bailer?
Pump type Peristaltic	Dedicated Pump? Yes
If not dedicated, method of cleaning	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
 Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

*D. FIELD MEASUREMENT	
Weather Conditions 68dF, Cloudy and Calm	
Field Measurements (after stabilization):	
Temperature 14.02	Units °C
Equipment Used Horiba U-50	
pH 6.81	
Equipment Used Horiba U-50	
Specific Conductance 0.643	Units mS/m
Equipment Used Horiba U-50	

Comments

CERTIFICATION	
I certify under penalty of law I believe the information reported above is true, accurate and complete.	
Signature <i>N. Koger</i>	Date 1-11-25
Telephone 563-262-3583	Fax
Email sbennett@mpw.org	
NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.	

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water	Permit No. 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-10	
Upgradient ^X	Downgradient
Name of person sampling Neil Hoskins	

A. MONITORING WELL/PIEZOMETER CONDITIONS	
Well/Piezometer Properly Capped? (please check)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If no, explain	
Standing Water or Litter? (please check)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
If yes, explain	

B. GROUNDWATER ELEVATION MEASUREMENT (\pm 0.01 foot, MSL)			
Elevation:			
Top of inner well casing 718.51	Ground Elevation 716.32		
Depth of Well 20.32	Inside Casing Diameter (in inches) 2"		
Equipment Used Slope Indicator Co. Water level indicator Model 51453			
Groundwater Level (\pm 0.01 foot below top of inner casing, MSL):			
	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/18/23 10:55	6.49	712.02
*After Purging	9/18/23 11:45	6.65	711.86
*Before Purging			

*C. WELL PURGING	
Quantity of Water Removed from Well (gallons) 1.32	
No. of Well Volumes (based on current water level) 0.59	
Was well pumped/bailed dry? No	
Equipment used:	
Bailer type	Dedicated Bailer?
Pump type Peristaltic	Dedicated Pump? Yes
If not dedicated, method of cleaning	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319
 Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water	Permit No. 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-14A	
Upgradient	Downgradient <input checked="" type="checkbox"/>
Name of person sampling Neil Hoskins	

A. MONITORING WELL/PIEZOMETER CONDITIONS	
Well/Piezometer Properly Capped? (please check)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If no, explain	
Standing Water or Litter? (please check)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
If yes, explain	

B. GROUNDWATER ELEVATION MEASUREMENT (\pm 0.01 foot, MSL)			
Elevation:			
Top of inner well casing 729.00	Ground Elevation 726.19		
Depth of Well 20.50	Inside Casing Diameter (in inches) 2"		
Equipment Used Slope Indicator Co. Water level indicator Model 51453			
Groundwater Level (\pm 0.01 foot below top of inner casing, MSL):			
	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/19/23 11:30	12.89	716.11
*After Purging	9/19/23 11:50	13.62	715.38
*Before Purging			

*C. WELL PURGING	
Quantity of Water Removed from Well (gallons) 0.53	
No. of Well Volumes (based on current water level) 0.43	
Was well pumped/bailed dry? No	
Equipment used:	
Bailer type	Dedicated Bailer?
Pump type Peristaltic	Dedicated Pump? Yes
If not dedicated, method of cleaning	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.
 Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

*D. FIELD MEASUREMENT	
Weather Conditions 69dF, Cloudy, Calm	
Field Measurements (after stabilization):	
Temperature 18.32	Units C
Equipment Used Horiba U-50	
pH 6.78	
Equipment Used Horiba U-50	
Specific Conductance 2.00	Units mS/m
Equipment Used Horiba U-50	

Comments

CERTIFICATION	
I certify under penalty of law I believe the information reported above is true, accurate and complete.	
Signature <i>Neil Hoskins</i>	Date 1-11-25
Telephone 563-262-3582	Fax
Email neil.hoskins@mpw.org	
NOTE: Attach Laboratory Report and 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.	

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water	Permit No. 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-15A	
Upgradient	Downgradient <input checked="" type="checkbox"/>
Name of person sampling Neil Hoskins	

A. MONITORING WELL/PIEZOMETER CONDITIONS	
Well/Piezometer Properly Capped? (please check)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
If no, explain	
Standing Water or Litter? (please check)	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
If yes, explain	

B. GROUNDWATER ELEVATION MEASUREMENT (\pm 0.01 foot, MSL)			
Elevation:			
Top of inner well casing 729.99	Ground Elevation 727.12		
Depth of Well 20.50	Inside Casing Diameter (in inches) 2"		
Equipment Used Slope Indicator Co. Water level indicator Model 51453			
Groundwater Level (\pm 0.01 foot below top of inner casing, MSL):			
	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/19/23 12:25	13.04	716.95
*After Purging	9/19/23 13:00	14.08	715.91
*Before Purging			

*C. WELL PURGING	
Quantity of Water Removed from Well (gallons) 0.92	
No. of Well Volumes (based on current water level) .076	
Was well pumped/bailed dry? No	
Equipment used:	
Bailer type	Dedicated Bailer?
Pump type Peristaltic	Dedicated Pump? Yes
If not dedicated, method of cleaning	

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319
 Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-725-8309, nina.koger@dnr.iowa.gov

*D. FIELD MEASUREMENT	
Weather Conditions 70dF, Cloudy and Calm	
Field Measurements (after stabilization):	
Temperature 16.53	Units C
Equipment Used Horiba U-50	
pH 6.97	
Equipment Used Horiba U-50	
Specific Conductance 1.01	Units mS/m
Equipment Used Horiba U-50	

Comments	

CERTIFICATION		
I certify under penalty of law I believe the information reported above is true, accurate and complete.		
Signature 	Date 1-11-25	
Telephone 563-262-3582	Fax	Email neil.hoskins@mpw.org
NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.		

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water **Permit No.** 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-21
Upgradient _____ **Downgradient** X
Name of person sampling Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO

If no, explain _____

Standing Water or Litter? (please check) YES NO

If yes, explain _____

B. GROUNDWATER ELEVATION MEASUREMENT (± 0.01 foot, MSL)

Elevation:

Top of inner well casing 725.75 Ground Elevation 722.81

Depth of Well 22.20 Inside Casing Diameter (in inches) 2"

Equipment Used Slope Indicator Co. Water level indicator Model 51453

Groundwater Level (± 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/19/23 10:30	11.21	714.54
*After Purging	9/19/23 10:50	11.47	714.28
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.53

No. of Well Volumes (based on current water level) 0.29

Was well pumped/bailed dry? No

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type Peristaltic Dedicated Pump? Yes

If not dedicated, method of cleaning _____

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

***D. FIELD MEASUREMENT**

Weather Conditions 69dF, Cloudy and Calm

Field Measurements (after stabilization):

Temperature 15.93 Units C

Equipment Used Horiba U-50

pH 6.55

Equipment Used Horiba U-50

Specific Conductance 0.952 Units mS/m

Equipment Used Horiba U-50

Comments

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature *Nina Booker* Date 1-11-25

Telephone 563-262-3583 Fax _____ Email sbennett@mpw.org

NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water **Permit No.** 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-22
Upgradient _____ **Downgradient** X
Name of person sampling Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO

If no, explain _____

Standing Water or Litter? (please check) YES NO

If yes, explain _____

B. GROUNDWATER ELEVATION MEASUREMENT (± 0.01 foot, MSL)

Elevation:

Top of inner well casing 744.27 Ground Elevation 741.00

Depth of Well 44.27 Inside Casing Diameter (in inches) 2"

Equipment Used Slope Indicator Co. Water level indicator Model 51453

Groundwater Level (± 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/18/23 14:00	17.24	727.03
*After Purging	9/18/23 14:30	23.00	721.27
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.79

No. of Well Volumes (based on current water level) 0.18

Was well pumped/bailed dry? No

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type Peristaltic Dedicated Pump? Yes

If not dedicated, method of cleaning _____

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

***D. FIELD MEASUREMENT**

Weather Conditions 75dF, Calm and Sunny

Field Measurements (after stabilization):

Temperature 19.00 Units C

Equipment Used Horiba U-50

pH 7.14

Equipment Used Horiba U-50

Specific Conductance 0.660 Units mS/m

Equipment Used Horiba U-50

Comments

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature *N E Bennett* Date 1-11-25

Telephone 563-262-3583 Fax _____ Email sbennett@mpw.org

NOTE: Attach Laboratory Report and 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water **Permit No.** 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-23
Upgradient **Downgradient** _____
Name of person sampling Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO

If no, explain _____

Standing Water or Litter? (please check) YES NO

If yes, explain _____

B. GROUNDWATER ELEVATION MEASUREMENT (± 0.01 foot, MSL)

Elevation:

Top of inner well casing 726.90 Ground Elevation 723.73

Depth of Well 27.17 Inside Casing Diameter (in inches) 2"

Equipment Used Slope Indicator Co. Water level indicator Model 51453

Groundwater Level (± 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/18/23 12:50	8.43	718.47
*After Purging	9/18/23 13:05	10.33	716.57
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.40

No. of Well Volumes (based on current water level) 0.13

Was well pumped/bailed dry? No

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type Peristaltic Dedicated Pump? Yes

If not dedicated, method of cleaning _____

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

***D. FIELD MEASUREMENT**

Weather Conditions 72dF, Calm and Sunny

Field Measurements (after stabilization):

Temperature 20.99 **Units** C

Equipment Used Horiba U-50

pH 7.05

Equipment Used Horiba U-50

Specific Conductance 0.468 **Units** mS/m

Equipment Used Horiba U-50

Comments

Multiple horizontal lines for entering comments.

CERTIFICATION
I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature [Handwritten Signature] **Date** 1-11-25

Telephone 563-262-3583 **Fax** _____ **Email** sbennett@mpw.org

NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water **Permit No.** 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-24
Upgradient **Downgradient** _____
Name of person sampling Neil Hoskins

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO

If no, explain _____

Standing Water or Litter? (please check) YES NO

If yes, explain _____

B. GROUNDWATER ELEVATION MEASUREMENT (± 0.01 foot, MSL)

Elevation:

Top of inner well casing 735.32 **Ground Elevation** 732.10

Depth of Well 22.22 **Inside Casing Diameter (in inches)** 2"

Equipment Used Slope Indicator Co. Water level indicator Model 51453

Groundwater Level (± 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/19/23 8:00	19.21	716.11
*After Purging	9/19/23 9:00	20.66	714.66
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 1.59

No. of Well Volumes (based on current water level) 3.23

Was well pumped/bailed dry? No

Equipment used:

Bailer type _____ **Dedicated Bailer?** _____

Pump type Peristaltic **Dedicated Pump?** Yes

If not dedicated, method of cleaning _____

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

***D. FIELD MEASUREMENT**

Weather Conditions 65dF, Cloudy and Calm

Field Measurements (after stabilization):

Temperature 13.34 Units C

Equipment Used Horiba U-50

pH 6.96

Equipment Used Horiba U-50

Specific Conductance 0.619 Units mS/m

Equipment Used Horiba U-50

Comments

Paused sampling from 8:05 - 8:15 to flush excess silt from sampling cell.

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature  Date 1-11-25

Telephone 563-262-3583 Fax _____ Email sbennett@mpw.org

NOTE: Attach Laboratory Report and 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water **Permit No.** 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-26
Upgradient **Downgradient** _____
Name of person sampling Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO

If no, explain _____

Standing Water or Litter? (please check) YES NO

If yes, explain _____

B. GROUNDWATER ELEVATION MEASUREMENT (± 0.01 foot, MSL)

Elevation:

Top of inner well casing 731.08 **Ground Elevation** 727.35

Depth of Well 38.27 **Inside Casing Diameter (in inches)** 2"

Equipment Used Slope Indicator Co. Water level indicator Model 51453

Groundwater Level (± 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/20/23 12:10	20.56	710.52
*After Purging	9/20/23 12:35	22.63	708.45
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.66

No. of Well Volumes (based on current water level) 0.23

Was well pumped/bailed dry? No

Equipment used:

Bailer type _____ **Dedicated Bailer?** _____

Pump type Peristaltic **Dedicated Pump?** Yes

If not dedicated, method of cleaning _____

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

***D. FIELD MEASUREMENT**

Weather Conditions 75dF, Cloudy and Calm

Field Measurements (after stabilization):

Temperature 18.65 **Units** C

Equipment Used Horiba U-50

pH 7.35

Equipment Used Horiba U-50

Specific Conductance 1.000 **Units** mS/m

Equipment Used Horiba U-50

Comments

(This section contains multiple horizontal lines for handwritten comments, which are currently blank.)

CERTIFICATION
I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature *N. S. Bennett* **Date** 1-11-25

Telephone 563-262-3583 **Fax** _____ **Email** sbennett@mpw.org

NOTE: Attach Laboratory Report and 8 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water **Permit No.** 70-SDP-6_82P
Monitoring Well/Piezometer No. MW-27
Upgradient **Downgradient** _____
Name of person sampling Neil Hoskins

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO

If no, explain _____

Standing Water or Litter? (please check) YES NO

If yes, explain _____

B. GROUNDWATER ELEVATION MEASUREMENT (± 0.01 foot, MSL)

Elevation:

Top of inner well casing 730.26 **Ground Elevation** 726.26

Depth of Well 19.44 **Inside Casing Diameter (in inches)** 2"

Equipment Used Slope Indicator Co. Water level indicator Model 51453

Groundwater Level (± 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/20/23 13:15	15.33	714.93
*After Purging	9/20/23 13:35	17.32	712.94
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.53

No. of Well Volumes (based on current water level) 0.79

Was well pumped/bailed dry? No

Equipment used:

Bailer type _____ **Dedicated Bailer?** _____

Pump type Peristaltic **Dedicated Pump?** Yes

If not dedicated, method of cleaning _____

Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319.

Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, nina.booker@dnr.iowa.gov

***D. FIELD MEASUREMENT**

Weather Conditions 74dF, Clear and calm

Field Measurements (after stabilization):

Temperature 24.43 Units C

Equipment Used Horiba U-50

pH 6.24

Equipment Used Horiba U-50

Specific Conductance 0.345 Units mS/m

Equipment Used Horiba U-50

Comments

CERTIFICATION

I certify under penalty of law I believe the information reported above is true, accurate and complete.

Signature  Date 1-11-25

Telephone 563-262-3583 Fax _____ Email sbennett@mpw.org

NOTE: Attach Laboratory Report and 8 1/2" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.

*Omit if only measuring groundwater elevations.

LOW FLOW SAMPLING FORM

DATE 9/20/2023 WELL ID MW-5B SAMPLE DATE / TIME 9/20/23 1055
 SITE Muscatine Power & Water DTW 2.35 NOTE _____
 PROJECT # Fall 2023 WELL DEPTH 25.10 _____
 WEATHER 72dF, Cloudy and Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 25'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
1020	100		2.35									
1025	100	500	2.90	16.82	6.92	-55	0.856	1.6	1.70			
1030	100	1000	3.01	16.30	6.94	-59	0.873	2.5	92.00			
1035	100	1500	3.12	16.06	6.95	-60	0.887	4.6	0.76			
1040	100	2000	3.18	15.87	6.94	-61	0.889	6.2	0.67			
1045	100	2500	3.20	15.82	6.94	-63	0.885	6.0	0.57			
1050	100	3000	3.22	15.68	6.43	-63	0.883	4.9	0.51			
1055	100	3500	3.26	15.69	6.42	-64	0.883	5.9	0.49	Sample Start		
1120			3.30							Sample End		
										# of		
										Preservative	Containers	
										HCl		
										HNO ₃	3	
										NaOH		
										None	1	

0.5-5.0 min 200-500 ml --- minimize --- +/- 0.1 +/-10 mV +/- 3% +/- 10% +/- 10% Limits
 or +/-0.2 mg/L

LOW FLOW SAMPLING FORM

DATE	9/20/2023	WELL ID	MW-6A	SAMPLE DATE / TIME	9/20/23 915
SITE	Muscatine Power & Water	DTW	3.08	NOTE	
PROJECT #	Fall 2023	WELL DEPTH	25.32		
WEATHER	68dF, Cloudy and Calm	PUMP TYPE	GeoTech Peristaltic	DEPTH TO INTAKE	20'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
845	100		3.08									
850	100	500	3.38	16.38	6.93	-82	0.666	0.0	4.17			
855	100	1000	3.42	15.83	6.80	-97	0.658	0.0	1.20			
900	100	1500	3.45	15.36	6.83	-97	0.653	0.0	0.92			
905	100	2000	3.45	15.26	6.84	-95	0.653	0.0	0.75			
910	100	2500	3.45	15.16	6.86	-99	0.659	0.0	0.73			
915	100	3000	3.57	15.08	6.88	-90	0.650	0.1	0.68	Sample Start		
945			3.63							Sample End		
										Preservative	# of Containers	
										HCl	3	
										HNO ₃	3	
										NaOH	1	
										None	1	

0.5-5.0 min	200-500 ml	---	minimize	---	+/- 0.1	+/-10 mV	+/- 3%	+/- 10%	+/- 10%	Limits or +/-0.2 mg/L
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LOW FLOW SAMPLING FORM

DATE 9/19/2023 WELL ID MW-08 SAMPLE DATE / TIME 9/19/23 950
 SITE Muscatine Power & Water DTW 19.86 NOTE _____
 PROJECT # Fall 2023 WELL DEPTH 43.03 _____
 WEATHER 68dF, Cloudy and Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 38'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES	
915	100		19.86								
920	100	500	20.73	14.21	6.38	-48	0.695	2.7	9.36		
925	100	1000	21.17	13.7	6.48	-141	0.656	2	8.62		
930	100	1500	21.99	13.59	6.61	-155	0.69	1.6	8.46		
935	100	2000	23.10	13.64	6.74	-158	0.645	1.5	8.28		
940	100	2500	23.61	13.71	6.73	-156	0.641	1.2	7.78		
945	100	3000	23.93	13.86	6.75	-151	0.643	1.2	7.44		
950	100	3500	24.14	14.02	6.81	-152	0.647	1.5	7.52	Sample Start	
1020			24.97							Sample End	
										Preservative	# of Containers
										HCl	
										HNO ₃	3
										NaOH	
										None	1

0.5-5.0 min 200-500 ml --- minimize --- +/- 0.1 +/-10 mV +/- 3% +/- 10% +/- 10% Limits
 or +/-0.2 mg/L

LOW FLOW SAMPLING FORM

DATE 9/18/2023 WELL ID MW-10 SAMPLE DATE / TIME 9/18/23 1145
 SITE Muscatine Power & Water DTW 6.49 NOTE DUP-1 marked 1200
 PROJECT # Fall 2023 WELL DEPTH 20.03
 WEATHER 65dF, Clear and Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 15.5'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
1055	100		6.49									
1100	100	500	6.62	17.75	6.43	-39	0.649	101.0	1.21			
1105	100	1000	6.62	16.92	6.58	-40	0.651	82.1	1.12			
1110	100	1500	6.62	16.58	6.89	-44	0.653	57.8	1.01			
1115	100	2000	6.63	16.54	6.91	-40	0.655	36.2	0.97			
1120	100	2500	6.63	16.36	6.90	-36	0.660	17.9	0.90			
1125	100	3000	6.63	16.04	6.90	-34	0.663	15.9	0.89			
1130	100	3500	6.63	15.99	6.89	-32	0.666	15.5	0.87			
1135	100	4000	6.63	16.08	6.89	-32	0.667	10.5	0.83			
1140	100	4500	6.64	16.17	6.88	-31	0.672	11.3	0.87			
1145	100	5000	6.65	16.30	6.86	-30	0.677	10.4	0.84	Sample Start		
1205			6.68							Sample End/Dup-1 Start		
1225			6.70							Dup-1 End		
										Preservative	# of Containers	
										HCl		
										HNO ₃	3	
										NaOH		
										None	1	

0.5-5.0 min 200-500 ml --- minimize --- +/- 0.1 +/-10 mV +/- 3% +/- 10% +/- 10% Limits
 or +/-0.2 mg/L

LOW FLOW SAMPLING FORM

DATE 9/19/2023 WELL ID MW-15A SAMPLE DATE / TIME 9/19/23 1300
 SITE Muscatine Power & Water DTW 13.04 NOTE _____
 PROJECT # Fall 2023 WELL DEPTH _____
 WEATHER 70dF, Cloudy, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 15'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES
1225	100		13.04							
1230	100	500	13.21	17.08	7.03	137	1.100	7.7	3.22	
1235	100	1000	13.41	16.74	7.01	144	1.050	7.4	3.44	
1240	100	1500	13.54	16.55	6.99	149	1.040	6.0	3.35	
1245	100	2000	13.69	16.41	6.97	160	1.020	4.5	3.61	
1250	100	2500	13.79	16.44	6.96	163	1.020	3.0	3.61	
1255	100	3000	13.95	16.50	6.96	166	1.010	2.9	3.70	
1300	100	3500	14.08	16.53	6.97	166	1.010	2.6	3.66	Sample Start
1320			14.49							Sample End

0.5-5.0 min 200-500 ml --- minimize --- +/- 0.1 +/-10 mV +/- 3% +/- 10% +/- 10%
or +/-0.2 mg/L

Preservative	# of Containers	
HCl		
HNO ₃	3	
NaOH		
None	1	

Limits

LOW FLOW SAMPLING FORM

DATE 9/19/2023 WELL ID MW-21 SAMPLE DATE / TIME 9/19/23 1050
 SITE Muscatine Power & Water DTW 11.21 NOTE _____
 PROJECT # Fall 2023 WELL DEPTH 22.20 _____
 WEATHER 69dF, Cloudy, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 17'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
1030	100		11.21									
1035	100	500	11.32	16.09	6.69	38	0.897	1.7	8.74			
1040	100	1000	11.39	15.89	6.55	142	0.950	1.3	8.04			
1045	100	1500	11.44	15.92	6.54	145	0.951	1.1	8.02			
1050	100	2000	11.47	15.93	6.55	147	0.952	1.1	7.94	Sample Start		
1115			12.22							Sample End		
										Preservative	# of Containers	
										HCl		
										HNO ₃	3	
										NaOH		
										None	1	

0.5-5.0 min 200-500 ml --- minimize --- +/- 0.1 +/-10 mV +/- 3% +/- 10% +/- 10% Limits
or +/-0.2 mg/L

LOW FLOW SAMPLING FORM

DATE 9/18/2023 WELL ID MW-22 SAMPLE DATE / TIME 9/18/23 1430
 SITE Muscatine Power & Water DTW 17.24 NOTE _____
 PROJECT # Fall 2023 WELL DEPTH 43.25 _____
 WEATHER 75dF, Calm, Sunny PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 38'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
1400	100		17.24									
1405	100	500	18.43	22.05	7.27	7	0.646	1.4	0.66			
1410	100	1000	19.03	20.64	7.22	11	0.660	0.9	0.54			
1415	100	1500	20.10	20.33	7.19	18	0.655	3.1	0.58			
1420	100	2000	21.04	19.55	7.17	28	0.659	4.0	0.55			
1425	100	2500	22.37	18.96	7.16	30	0.660	4.5	0.56			
1430	100	3000	23.00	19.00	7.14	32	0.660	3.8	0.57	Sample Start		
1500			26.06							Sample End		
										Preservative	# of Containers	
										HCl		
										HNO ₃	3	
										NaOH		
										None	1	

0.5-5.0 min 200-500 ml --- minimize --- +/- 0.1 +/-10 mV +/- 3% +/- 10% +/- 10% Limits
 or +/-0.2 mg/L

LOW FLOW SAMPLING FORM

DATE	9/18/2023	WELL ID	MW-23	SAMPLE DATE / TIME	9/18/23 1305
SITE	Muscatine Power & Water	DTW	8.43	NOTE	
PROJECT #	Fall 2023	WELL DEPTH	19.14		
WEATHER	72dF, Calm, Sunny	PUMP TYPE	GeoTech Peristaltic	DEPTH TO INTAKE	38'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES	
1250	100		8.43								
1255	100	500	9.27	20.91	7.09	154	0.469	1.9	2.58		
1300	100	1000	9.93	20.81	7.06	155	0.469	1.9	2.47		
1305	100	1500	10.33	20.99	7.05	156	0.468	1.1	2.42	Sample Start	
1330			12.85							Sample End	
										Preservative	# of Containers
										HCl	
										HNO ₃	1
										NaOH	
										None	1
0.5-5.0 min	200-500 ml	---	minimize	---	+/- 0.1	+/-10 mV	+/- 3%	+/- 10%	+/- 10%	Limits or +/-0.2 mg/L	

LOW FLOW SAMPLING FORM

DATE 9/19/2023 WELL ID MW-24 SAMPLE DATE / TIME 9/19/23 900
 SITE Muscatine Power & Water DTW 19.21 NOTE
 PROJECT # Fall 2023 WELL DEPTH 22.40
 WEATHER 65dF, Cloudy, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 38'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
800	100		19.21									
805	100	500	19.49							Paused to flush silt		
810	100	1000	19.63							Resumed		
815	100	1500	19.95	15.34	6.57	253	0.618	36.3	2.28			
820	100	2000	20.14	13.64	6.62	251	0.617	39.3	2.38			
825	100	2500	20.19	13.77	6.68	249	0.618	35.9	2.42			
830	100	3000	20.27	13.96	6.73	248	0.618	31.5	2.35			
835	100	3500	20.39	13.73	6.81	245	0.619	29.2	2.30			
840	100	4000	20.44	13.64	6.86	244	0.619	26.6	2.11			
845	100	4500	20.51	13.44	6.9	243	0.619	16.5	1.96			
850	100	5000	20.57	13.31	6.96	240	0.620	3.6	1.52			
855	100	5500	20.61	13.32	6.96	240	0.620	3.0	1.42			
900	100	6000	20.66	13.34	6.96	240	0.619	2.9	1.30	Sample Start		
910			21.02							Sample End		
										Preservative	# of Containers	
										HCl		
										HNO ₃	1	
										NaOH		
										None	1	
<i>0.5-5.0 min</i>	<i>200-500 ml</i>	<i>---</i>	<i>minimize</i>	<i>---</i>	<i>+/- 0.1</i>	<i>+/-10 mV</i>	<i>+/- 3%</i>	<i>+/- 10%</i>	<i>+/- 10%</i>	<i>Limits</i>		<i>or +/-0.2 mg/L</i>

LOW FLOW SAMPLING FORM

DATE 9/20/2023 WELL ID MW-26 SAMPLE DATE / TIME 9/20/23 1235
 SITE Muscatine Power & Water DTW 20.56 NOTE DUP-2 marked 1200
 PROJECT # Fall 2023 WELL DEPTH 38.13
 WEATHER _____ PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 35'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES	
1210	100		20.56								
1215	100	500	21.31	23.75	7.33	94	0.961	1.0	7.73		
1220	100	1000	21.90	21.21	7.37	98	0.991	0.2	7.83		
1225	100	1500	22.13	19.96	7.36	101	1.000	0.6	7.77		
1230	100	2000	22.52	18.91	7.35	104	1.021.02	0.0	7.88		
1235	100	2500	22.63	18.65	7.35	105	1.000	0.0	7.88	Sample Start	
1245			23.49							Sample End/Duplicate Start	
1255										Duplicate End	
										Preservative	# of Containers
										HCl	
										HNO ₃	1
										NaOH	
										None	1

0.5-5.0 min 200-500 ml --- minimize --- +/- 0.1 +/-10 mV +/- 3% +/- 10% +/- 10% Limits
 or +/-0.2 mg/L

LOW FLOW SAMPLING FORM

DATE	9/20/2023	WELL ID	MW-27			SAMPLE DATE / TIME	9/20/23 1335		
SITE	Muscatine Power & Water	DTW	15.33			NOTE			
PROJECT #	Fall 2023	WELL DEPTH	19.40						
WEATHER		PUMP TYPE	GeoTech Peristaltic			DEPTH TO INTAKE	18'		

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES
1315	100		15.33							
1320	100	500	16.16	25.44	7.41	153	0.388	2.2	3.33	
1325	100	1000	16.44	25.01	6.48	182	0.356	0.6	2.72	
1330	100	1500	16.93	24.64	6.36	189	0.350	0.3	2.69	
1335	100	2000	17.32	24.43	6.24	192	0.345	0.0	2.54	Sample Start
1345			18.18							Sample End
										# of
										Containers
										Preservative
										HCl
										HNO ₃
										NaOH
										None

0.5-5.0 min	200-500 ml	---	minimize	---	+/- 0.1	+/-10 mV	+/- 3%	+/- 10%	+/- 10%	Limits or +/-0.2 mg/L
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Appendix B

2023 Laboratory Analytical Data

ANALYTICAL REPORT

PREPARED FOR

Attn: Sam Bennett
Muscatine Power & Water
1700 Dick Drake Way
PO BOX 899
Muscatine, Iowa 52761

Generated 5/24/2023 2:15:37 PM

JOB DESCRIPTION

Muscatine Power & Water CCR Landfill

JOB NUMBER

310-253602-1

Eurofins Cedar Falls

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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

Authorization



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Authorized for release by
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Case Narrative

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Job ID: 310-253602-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-253602-1

Receipt

The samples were received on 4/14/2023 8:30 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 0.2°C, 1.4°C and 1.5°C

HPLC/IC

Method 9056A_ORGFM_28D: The following samples were diluted due to the nature of the sample matrix: MW-4B (310-253602-1), MW-5B (310-253602-2), MW-6A (310-253602-3), MW-8 (310-253602-4), MW-10 (310-253602-5), MW-14A (310-253602-6), MW-15A (310-253602-7), MW-21 (310-253602-8), MW-22 (310-253602-9), MW-23 (310-253602-10), MW-24 (310-253602-11), MW-26 (310-253602-12), MW-27 (310-253602-13), DUP-1 (310-253602-14) and DUP-2 (310-253602-15). Elevated reporting limits (RLs) are provided.

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

Metals

Method 6020B: The laboratory control sample (LCS) for preparation batch 310-384386 and analytical batch 310-385267 recovered outside control limits for the following analytes: Antimony. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

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.

Sample Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-253602-1	MW-4B	Ground Water	04/12/23 13:40	04/14/23 08:30
310-253602-2	MW-5B	Ground Water	04/12/23 16:15	04/14/23 08:30
310-253602-3	MW-6A	Ground Water	04/12/23 15:00	04/14/23 08:30
310-253602-4	MW-8	Ground Water	04/11/23 15:50	04/14/23 08:30
310-253602-5	MW-10	Ground Water	04/12/23 08:45	04/14/23 08:30
310-253602-6	MW-14A	Ground Water	04/11/23 10:45	04/14/23 08:30
310-253602-7	MW-15A	Ground Water	04/11/23 13:35	04/14/23 08:30
310-253602-8	MW-21	Ground Water	04/11/23 11:50	04/14/23 08:30
310-253602-9	MW-22	Ground Water	04/10/23 12:55	04/14/23 08:30
310-253602-10	MW-23	Ground Water	04/12/23 10:15	04/14/23 08:30
310-253602-14	DUP-1	Ground Water	04/10/23 13:30	04/14/23 08:30
310-253602-15	DUP-2	Ground Water	04/12/23 12:00	04/14/23 08:30

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

Detection Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-4B

Lab Sample ID: 310-253602-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	18.0		5.00		mg/L	5		9056A	Total/NA
Sulfate	54.0		5.00		mg/L	5		9056A	Total/NA
Barium	0.173	F1	0.00200		mg/L	1		6020B	Total/NA
Calcium	91.3		0.500		mg/L	1		6020B	Total/NA
Cobalt	0.00271		0.000500		mg/L	1		6020B	Total/NA
Thallium	0.00288		0.00100		mg/L	1		6020B	Total/NA
Total Dissolved Solids	396		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-5B

Lab Sample ID: 310-253602-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	38.7		5.00		mg/L	5		9056A	Total/NA
Sulfate	45.8		5.00		mg/L	5		9056A	Total/NA
Barium	0.237		0.00200		mg/L	1		6020B	Total/NA
Calcium	107		0.500		mg/L	1		6020B	Total/NA
Thallium	0.00393		0.00100		mg/L	1		6020B	Total/NA
Total Dissolved Solids	478		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-6A

Lab Sample ID: 310-253602-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	15.4		5.00		mg/L	5		9056A	Total/NA
Sulfate	20.5		5.00		mg/L	5		9056A	Total/NA
Barium	0.246		0.00200		mg/L	1		6020B	Total/NA
Calcium	95.4		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	428		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-8

Lab Sample ID: 310-253602-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	17.9		5.00		mg/L	5		9056A	Total/NA
Sulfate	72.2		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00247		0.00200		mg/L	1		6020B	Total/NA
Barium	0.0700		0.00200		mg/L	1		6020B	Total/NA
Calcium	78.2		0.500		mg/L	1		6020B	Total/NA
Cobalt	0.00140		0.000500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	2390		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.4	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-10

Lab Sample ID: 310-253602-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	5.86		5.00		mg/L	5		9056A	Total/NA
Sulfate	39.8		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00224		0.00200		mg/L	1		6020B	Total/NA
Barium	0.190		0.00200		mg/L	1		6020B	Total/NA
Calcium	83.7		0.500		mg/L	1		6020B	Total/NA
Cobalt	0.00142		0.000500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	410		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Detection Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-14A

Lab Sample ID: 310-253602-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	20.3		5.00		mg/L	5		9056A	Total/NA
Sulfate	1150		20.0		mg/L	20		9056A	Total/NA
Barium	0.0320		0.00200		mg/L	1		6020B	Total/NA
Boron	14.8		0.400		mg/L	4		6020B	Total/NA
Calcium	318		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	2140		250		mg/L	1		SM 2540C	Total/NA
pH	7.2	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-15A

Lab Sample ID: 310-253602-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	7.30		5.00		mg/L	5		9056A	Total/NA
Sulfate	254		5.00		mg/L	5		9056A	Total/NA
Barium	0.0299		0.00200		mg/L	1		6020B	Total/NA
Boron	5.80		0.400		mg/L	4		6020B	Total/NA
Calcium	110		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	646		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-21

Lab Sample ID: 310-253602-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	5.93		5.00		mg/L	5		9056A	Total/NA
Sulfate	215		5.00		mg/L	5		9056A	Total/NA
Barium	0.0310		0.00200		mg/L	1		6020B	Total/NA
Boron	3.35		0.100		mg/L	1		6020B	Total/NA
Calcium	76.0		0.500		mg/L	1		6020B	Total/NA
Chromium	0.00577		0.00500		mg/L	1		6020B	Total/NA
Lithium	0.0143		0.0100		mg/L	1		6020B	Total/NA
Total Dissolved Solids	646		50.0		mg/L	1		SM 2540C	Total/NA
pH	6.9	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-22

Lab Sample ID: 310-253602-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	18.2		5.00		mg/L	5		9056A	Total/NA
Sulfate	147		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00421		0.00200		mg/L	1		6020B	Total/NA
Barium	0.227		0.00200		mg/L	1		6020B	Total/NA
Boron	0.247		0.100		mg/L	1		6020B	Total/NA
Calcium	80.4		0.500		mg/L	1		6020B	Total/NA
Molybdenum	0.00364		0.00200		mg/L	1		6020B	Total/NA
Total Dissolved Solids	450		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-23

Lab Sample ID: 310-253602-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	17.7		5.00		mg/L	5		9056A	Total/NA
Sulfate	25.0		5.00		mg/L	5		9056A	Total/NA
Barium	0.0518		0.00200		mg/L	1		6020B	Total/NA
Boron	0.145		0.100		mg/L	1		6020B	Total/NA
Calcium	55.3		0.500		mg/L	1		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Detection Summary

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-23 (Continued)

Lab Sample ID: 310-253602-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	286		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.4	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: DUP-1

Lab Sample ID: 310-253602-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	3.49		1.00		mg/L	1		9056A	Total/NA
Sulfate	29.4		1.00		mg/L	1		9056A	Total/NA
Arsenic	0.00436		0.00200		mg/L	1		6020B	Total/NA
Barium	0.229		0.00200		mg/L	1		6020B	Total/NA
Calcium	80.4		0.500		mg/L	1		6020B	Total/NA
Molybdenum	0.00375		0.00200		mg/L	1		6020B	Total/NA
Total Dissolved Solids	442		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.6	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: DUP-2

Lab Sample ID: 310-253602-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	17.3		5.00		mg/L	5		9056A	Total/NA
Sulfate	53.7		5.00		mg/L	5		9056A	Total/NA
Barium	0.184		0.00200		mg/L	1		6020B	Total/NA
Calcium	98.0		0.500		mg/L	1		6020B	Total/NA
Cobalt	0.00286		0.000500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	404		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-4B
Date Collected: 04/12/23 13:40
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-1
Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	18.0		5.00		mg/L			04/22/23 10:32	5
Fluoride	<1.00		1.00		mg/L			04/22/23 10:32	5
Sulfate	54.0		5.00		mg/L			04/22/23 10:32	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	F1 *+	0.00200		mg/L		04/17/23 09:40	04/23/23 20:51	1
Arsenic	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 20:51	1
Barium	0.173	F1	0.00200		mg/L		04/17/23 09:40	04/23/23 20:51	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 20:51	1
Boron	<0.100		0.100		mg/L		04/17/23 09:40	04/23/23 20:51	1
Cadmium	<0.000200		0.000200		mg/L		04/17/23 09:40	04/23/23 20:51	1
Calcium	91.3		0.500		mg/L		04/17/23 09:40	04/23/23 20:51	1
Chromium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 20:51	1
Cobalt	0.00271		0.000500		mg/L		04/17/23 09:40	04/23/23 20:51	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 20:51	1
Lithium	<0.0100		0.0100		mg/L		04/17/23 09:40	04/23/23 20:51	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 20:51	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 20:51	1
Thallium	0.00288		0.00100		mg/L		04/17/23 09:40	04/23/23 20:51	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/19/23 12:34	04/20/23 12:16	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	396		50.0		mg/L			04/17/23 15:04	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.5	HF	0.1		SU			04/14/23 11:20	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-5B

Lab Sample ID: 310-253602-2

Date Collected: 04/12/23 16:15

Matrix: Ground Water

Date Received: 04/14/23 08:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	38.7		5.00		mg/L			04/22/23 11:19	5
Fluoride	<1.00		1.00		mg/L			04/22/23 11:19	5
Sulfate	45.8		5.00		mg/L			04/22/23 11:19	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		04/17/23 09:40	04/23/23 21:05	1
Arsenic	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:05	1
Barium	0.237		0.00200		mg/L		04/17/23 09:40	04/23/23 21:05	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:05	1
Boron	<0.100		0.100		mg/L		04/17/23 09:40	04/23/23 21:05	1
Cadmium	<0.000200		0.000200		mg/L		04/17/23 09:40	04/23/23 21:05	1
Calcium	107		0.500		mg/L		04/17/23 09:40	04/23/23 21:05	1
Chromium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:05	1
Cobalt	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:05	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:05	1
Lithium	<0.0100		0.0100		mg/L		04/17/23 09:40	04/23/23 21:05	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:05	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:05	1
Thallium	0.00393		0.00100		mg/L		04/17/23 09:40	04/23/23 21:05	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/19/23 12:34	04/20/23 12:20	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	478		50.0		mg/L			04/17/23 15:04	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.3	HF	0.1		SU			04/14/23 11:22	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-6A
 Date Collected: 04/12/23 15:00
 Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-3
 Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	15.4		5.00		mg/L			04/22/23 11:34	5
Fluoride	<1.00		1.00		mg/L			04/22/23 11:34	5
Sulfate	20.5		5.00		mg/L			04/22/23 11:34	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		04/17/23 09:40	04/23/23 21:08	1
Arsenic	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:08	1
Barium	0.246		0.00200		mg/L		04/17/23 09:40	04/23/23 21:08	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:08	1
Boron	<0.100		0.100		mg/L		04/17/23 09:40	04/23/23 21:08	1
Cadmium	<0.000200		0.000200		mg/L		04/17/23 09:40	04/23/23 21:08	1
Calcium	95.4		0.500		mg/L		04/17/23 09:40	04/23/23 21:08	1
Chromium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:08	1
Cobalt	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:08	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:08	1
Lithium	<0.0100		0.0100		mg/L		04/17/23 09:40	04/23/23 21:08	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:08	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:08	1
Thallium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:08	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/19/23 12:34	04/20/23 12:27	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	428		50.0		mg/L			04/17/23 15:04	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.3	HF	0.1		SU			04/14/23 11:23	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-8
 Date Collected: 04/11/23 15:50
 Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-4
 Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	17.9		5.00		mg/L			04/22/23 11:50	5
Fluoride	<1.00		1.00		mg/L			04/22/23 11:50	5
Sulfate	72.2		5.00		mg/L			04/22/23 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		04/17/23 09:40	04/23/23 21:10	1
Arsenic	0.00247		0.00200		mg/L		04/17/23 09:40	04/23/23 21:10	1
Barium	0.0700		0.00200		mg/L		04/17/23 09:40	04/23/23 21:10	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:10	1
Boron	<0.100		0.100		mg/L		04/17/23 09:40	04/23/23 21:10	1
Cadmium	<0.000200		0.000200		mg/L		04/17/23 09:40	04/23/23 21:10	1
Calcium	78.2		0.500		mg/L		04/17/23 09:40	04/23/23 21:10	1
Chromium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:10	1
Cobalt	0.00140		0.000500		mg/L		04/17/23 09:40	04/23/23 21:10	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:10	1
Lithium	<0.0100		0.0100		mg/L		04/17/23 09:40	04/23/23 21:10	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:10	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:10	1
Thallium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:10	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/19/23 12:34	04/20/23 12:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	2390		50.0		mg/L			04/15/23 10:50	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.4	HF	0.1		SU			04/14/23 11:24	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-10
 Date Collected: 04/12/23 08:45
 Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-5
 Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5.86		5.00		mg/L			04/22/23 12:06	5
Fluoride	<1.00		1.00		mg/L			04/22/23 12:06	5
Sulfate	39.8		5.00		mg/L			04/22/23 12:06	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		04/17/23 09:40	04/23/23 21:28	1
Arsenic	0.00224		0.00200		mg/L		04/17/23 09:40	04/23/23 21:28	1
Barium	0.190		0.00200		mg/L		04/17/23 09:40	04/23/23 21:28	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:28	1
Boron	<0.100		0.100		mg/L		04/17/23 09:40	04/24/23 18:12	1
Cadmium	<0.000200		0.000200		mg/L		04/17/23 09:40	04/23/23 21:28	1
Calcium	83.7		0.500		mg/L		04/17/23 09:40	04/23/23 21:28	1
Chromium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:28	1
Cobalt	0.00142		0.000500		mg/L		04/17/23 09:40	04/23/23 21:28	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:28	1
Lithium	<0.0100		0.0100		mg/L		04/17/23 09:40	04/23/23 21:28	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:28	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:28	1
Thallium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:28	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/19/23 12:34	04/20/23 12:35	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	410		50.0		mg/L			04/17/23 15:04	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.3	HF	0.1		SU			04/14/23 11:25	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-14A
 Date Collected: 04/11/23 10:45
 Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-6
 Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	20.3		5.00		mg/L			04/22/23 12:21	5
Fluoride	<1.00		1.00		mg/L			04/22/23 12:21	5
Sulfate	1150		20.0		mg/L			04/22/23 13:08	20

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		04/17/23 09:40	04/23/23 21:30	1
Arsenic	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:30	1
Barium	0.0320		0.00200		mg/L		04/17/23 09:40	04/23/23 21:30	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:30	1
Boron	14.8		0.400		mg/L		04/17/23 09:40	04/24/23 18:15	4
Cadmium	<0.000200		0.000200		mg/L		04/17/23 09:40	04/23/23 21:30	1
Calcium	318		0.500		mg/L		04/17/23 09:40	04/23/23 21:30	1
Chromium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:30	1
Cobalt	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:30	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:30	1
Lithium	<0.0100		0.0100		mg/L		04/17/23 09:40	04/23/23 21:30	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:30	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:30	1
Thallium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:30	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/19/23 12:34	04/20/23 12:37	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	2140		250		mg/L			04/15/23 10:50	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.2	HF	0.1		SU			04/14/23 11:26	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-15A

Lab Sample ID: 310-253602-7

Date Collected: 04/11/23 13:35

Matrix: Ground Water

Date Received: 04/14/23 08:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	7.30		5.00		mg/L			04/22/23 13:23	5
Fluoride	<1.00		1.00		mg/L			04/22/23 13:23	5
Sulfate	254		5.00		mg/L			04/22/23 13:23	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		04/17/23 09:40	04/23/23 21:33	1
Arsenic	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:33	1
Barium	0.0299		0.00200		mg/L		04/17/23 09:40	04/23/23 21:33	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:33	1
Boron	5.80		0.400		mg/L		04/17/23 09:40	04/27/23 03:15	4
Cadmium	<0.000200		0.000200		mg/L		04/17/23 09:40	04/23/23 21:33	1
Calcium	110		0.500		mg/L		04/17/23 09:40	04/23/23 21:33	1
Chromium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:33	1
Cobalt	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:33	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:33	1
Lithium	<0.0100		0.0100		mg/L		04/17/23 09:40	04/23/23 21:33	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:33	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:33	1
Thallium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:33	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/19/23 12:34	04/20/23 12:40	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	646		50.0		mg/L			04/15/23 10:50	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.5	HF	0.1		SU			04/14/23 11:27	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-21
Date Collected: 04/11/23 11:50
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-8
Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5.93		5.00		mg/L			04/22/23 13:39	5
Fluoride	<1.00		1.00		mg/L			04/22/23 13:39	5
Sulfate	215		5.00		mg/L			04/22/23 13:39	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		04/17/23 09:40	04/23/23 21:36	1
Arsenic	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:36	1
Barium	0.0310		0.00200		mg/L		04/17/23 09:40	04/23/23 21:36	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:36	1
Boron	3.35		0.100		mg/L		04/17/23 09:40	04/24/23 18:38	1
Cadmium	<0.000200		0.000200		mg/L		04/17/23 09:40	04/23/23 21:36	1
Calcium	76.0		0.500		mg/L		04/17/23 09:40	04/23/23 21:36	1
Chromium	0.00577		0.00500		mg/L		04/17/23 09:40	04/23/23 21:36	1
Cobalt	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:36	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:36	1
Lithium	0.0143		0.0100		mg/L		04/17/23 09:40	04/23/23 21:36	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:36	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:36	1
Thallium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:36	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/19/23 12:34	04/20/23 12:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	646		50.0		mg/L			04/15/23 10:50	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	6.9	HF	0.1		SU			04/14/23 11:28	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-22
 Date Collected: 04/10/23 12:55
 Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-9
 Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	18.2		5.00		mg/L			04/22/23 13:55	5
Fluoride	<1.00		1.00		mg/L			04/22/23 13:55	5
Sulfate	147		5.00		mg/L			04/22/23 13:55	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		04/17/23 09:40	04/23/23 21:39	1
Arsenic	0.00421		0.00200		mg/L		04/17/23 09:40	04/23/23 21:39	1
Barium	0.227		0.00200		mg/L		04/17/23 09:40	04/23/23 21:39	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:39	1
Boron	0.247		0.100		mg/L		04/17/23 09:40	04/24/23 18:41	1
Cadmium	<0.000200		0.000200		mg/L		04/17/23 09:40	04/23/23 21:39	1
Calcium	80.4		0.500		mg/L		04/17/23 09:40	04/23/23 21:39	1
Chromium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:39	1
Cobalt	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:39	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:39	1
Lithium	<0.0100		0.0100		mg/L		04/17/23 09:40	04/23/23 21:39	1
Molybdenum	0.00364		0.00200		mg/L		04/17/23 09:40	04/23/23 21:39	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:39	1
Thallium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:39	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/19/23 12:34	04/20/23 12:44	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	450		50.0		mg/L			04/15/23 10:50	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.5	HF	0.1		SU			04/14/23 11:29	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-23
 Date Collected: 04/12/23 10:15
 Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-10
 Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	17.7		5.00		mg/L			04/22/23 14:10	5
Fluoride	<1.00		1.00		mg/L			04/22/23 14:10	5
Sulfate	25.0		5.00		mg/L			04/22/23 14:10	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		04/17/23 09:40	04/23/23 21:42	1
Arsenic	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:42	1
Barium	0.0518		0.00200		mg/L		04/17/23 09:40	04/23/23 21:42	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:42	1
Boron	0.145		0.100		mg/L		04/17/23 09:40	04/24/23 18:44	1
Cadmium	<0.000200		0.000200		mg/L		04/17/23 09:40	04/23/23 21:42	1
Calcium	55.3		0.500		mg/L		04/17/23 09:40	04/23/23 21:42	1
Chromium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:42	1
Cobalt	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:42	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:42	1
Lithium	<0.0100		0.0100		mg/L		04/17/23 09:40	04/23/23 21:42	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:42	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:42	1
Thallium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:42	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/19/23 12:34	04/20/23 12:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	286		50.0		mg/L			04/17/23 15:04	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.4	HF	0.1		SU			04/14/23 11:30	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: DUP-1
 Date Collected: 04/10/23 13:30
 Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-14
 Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3.49		1.00		mg/L			04/22/23 15:28	1
Fluoride	<0.200		0.200		mg/L			04/22/23 15:28	1
Sulfate	29.4		1.00		mg/L			04/22/23 15:28	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		04/17/23 09:40	04/23/23 22:11	1
Arsenic	0.00436		0.00200		mg/L		04/17/23 09:40	04/23/23 22:11	1
Barium	0.229		0.00200		mg/L		04/17/23 09:40	04/23/23 22:11	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 22:11	1
Boron	<0.100		0.100		mg/L		04/17/23 09:40	04/24/23 18:59	1
Cadmium	<0.000200		0.000200		mg/L		04/17/23 09:40	04/23/23 22:11	1
Calcium	80.4		0.500		mg/L		04/17/23 09:40	04/23/23 22:11	1
Chromium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 22:11	1
Cobalt	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 22:11	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 22:11	1
Lithium	<0.0100		0.0100		mg/L		04/17/23 09:40	04/23/23 22:11	1
Molybdenum	0.00375		0.00200		mg/L		04/17/23 09:40	04/23/23 22:11	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 22:11	1
Thallium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 22:11	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/19/23 12:34	04/20/23 12:54	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	442		50.0		mg/L			04/15/23 10:50	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.6	HF	0.1		SU			04/14/23 11:38	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: DUP-2

Lab Sample ID: 310-253602-15

Date Collected: 04/12/23 12:00

Matrix: Ground Water

Date Received: 04/14/23 08:30

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	17.3		5.00		mg/L			04/22/23 16:15	5
Fluoride	<1.00		1.00		mg/L			04/22/23 16:15	5
Sulfate	53.7		5.00		mg/L			04/22/23 16:15	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		04/17/23 09:40	04/23/23 22:14	1
Arsenic	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 22:14	1
Barium	0.184		0.00200		mg/L		04/17/23 09:40	04/23/23 22:14	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 22:14	1
Boron	<0.100		0.100		mg/L		04/17/23 09:40	04/24/23 19:31	1
Cadmium	<0.000200		0.000200		mg/L		04/17/23 09:40	04/23/23 22:14	1
Calcium	98.0		0.500		mg/L		04/17/23 09:40	04/23/23 22:14	1
Chromium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 22:14	1
Cobalt	0.00286		0.000500		mg/L		04/17/23 09:40	04/23/23 22:14	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 22:14	1
Lithium	<0.0100		0.0100		mg/L		04/17/23 09:40	04/23/23 22:14	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 22:14	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 22:14	1
Thallium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 22:14	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/19/23 12:34	04/20/23 13:01	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	404		50.0		mg/L			04/17/23 15:04	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.5	HF	0.1		SU			04/14/23 11:39	1

Definitions/Glossary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Qualifiers

Metals

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
F1	MS and/or MSD recovery exceeds control limits.

General Chemistry

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

Glossary

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

QC Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-385567/3
Matrix: Water
Analysis Batch: 385567

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			04/22/23 10:01	1
Fluoride	<0.200		0.200		mg/L			04/22/23 10:01	1
Sulfate	<1.00		1.00		mg/L			04/22/23 10:01	1

Lab Sample ID: LCS 310-385567/4
Matrix: Water
Analysis Batch: 385567

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	10.27		mg/L		103	90 - 110
Fluoride	2.00	2.177		mg/L		109	90 - 110
Sulfate	10.0	10.66		mg/L		107	90 - 110

Lab Sample ID: 310-253602-1 MS
Matrix: Ground Water
Analysis Batch: 385567

Client Sample ID: MW-4B
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	18.0		25.0	41.65		mg/L		95	80 - 120
Fluoride	<1.00		5.00	5.115		mg/L		95	80 - 120
Sulfate	54.0		25.0	80.00		mg/L		104	80 - 120

Lab Sample ID: 310-253602-1 MSD
Matrix: Ground Water
Analysis Batch: 385567

Client Sample ID: MW-4B
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	18.0		25.0	41.89		mg/L		96	80 - 120	1	15
Fluoride	<1.00		5.00	5.106		mg/L		95	80 - 120	0	15
Sulfate	54.0		25.0	79.98		mg/L		104	80 - 120	0	15

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-384386/1-A
Matrix: Water
Analysis Batch: 385267

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 384386

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/17/23 09:40	04/23/23 20:45	1
Antimony	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 20:45	1
Arsenic	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 20:45	1
Barium	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 20:45	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 20:45	1
Boron	<0.100		0.100		mg/L		04/17/23 09:40	04/23/23 20:45	1
Cadmium	<0.000200		0.000200		mg/L		04/17/23 09:40	04/23/23 20:45	1
Calcium	<0.500		0.500		mg/L		04/17/23 09:40	04/23/23 20:45	1
Chromium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 20:45	1
Cobalt	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 20:45	1
Copper	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 20:45	1
Iron	<0.100		0.100		mg/L		04/17/23 09:40	04/23/23 20:45	1

Eurofins Cedar Falls

QC Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

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

Lab Sample ID: MB 310-384386/1-A
Matrix: Water
Analysis Batch: 385267

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 384386

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 20:45	1
Lithium	<0.0100		0.0100		mg/L		04/17/23 09:40	04/23/23 20:45	1
Magnesium	<0.500		0.500		mg/L		04/17/23 09:40	04/23/23 20:45	1
Manganese	<0.0100		0.0100		mg/L		04/17/23 09:40	04/23/23 20:45	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 20:45	1
Nickel	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 20:45	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 20:45	1
Strontium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 20:45	1
Thallium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 20:45	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 20:45	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 20:45	1

Lab Sample ID: LCS 310-384386/2-A
Matrix: Water
Analysis Batch: 385267

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 384386

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	0.200	0.2361		mg/L		118	80 - 120
Antimony	0.200	0.2577	*+	mg/L		129	80 - 120
Arsenic	0.200	0.2200		mg/L		110	80 - 120
Barium	0.100	0.1103		mg/L		110	80 - 120
Beryllium	0.100	0.1174		mg/L		117	80 - 120
Boron	0.200	0.2243		mg/L		112	80 - 120
Cadmium	0.100	0.1115		mg/L		112	80 - 120
Calcium	2.00	2.330		mg/L		117	80 - 120
Chromium	0.100	0.1055		mg/L		106	80 - 120
Cobalt	0.100	0.1177		mg/L		118	80 - 120
Copper	0.200	0.2405		mg/L		120	80 - 120
Lead	0.200	0.2265		mg/L		113	80 - 120
Lithium	0.200	0.2387		mg/L		119	80 - 120
Magnesium	2.00	2.342		mg/L		117	80 - 120
Manganese	0.100	0.1088		mg/L		109	80 - 120
Molybdenum	0.200	0.2258		mg/L		113	80 - 120
Nickel	0.200	0.2329		mg/L		116	80 - 120
Selenium	0.400	0.4378		mg/L		109	80 - 120
Strontium	0.200	0.2221		mg/L		111	80 - 120
Thallium	0.200	0.1760		mg/L		88	80 - 120
Vanadium	0.100	0.1058		mg/L		106	80 - 120
Zinc	0.200	0.2201		mg/L		110	80 - 120

Lab Sample ID: LCS 310-384386/2-A
Matrix: Water
Analysis Batch: 385390

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 384386

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	0.200	0.2259		mg/L		113	80 - 120

QC Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

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

Lab Sample ID: 310-253602-1 MS
Matrix: Ground Water
Analysis Batch: 385267

Client Sample ID: MW-4B
Prep Type: Total/NA
Prep Batch: 384386

Analyte	Sample	Sample Qualifier	Spike Added	MS	MS	Unit	D	%Rec	%Rec	Limits
	Result			Result	Qualifier					
Aluminum	<0.0500		0.200	0.2290		mg/L		114	75 - 125	
Antimony	<0.00200	F1 *+	0.200	0.2567	F1	mg/L		128	75 - 125	
Arsenic	<0.00200		0.200	0.2135		mg/L		106	75 - 125	
Barium	0.173	F1	0.100	0.2887		mg/L		116	75 - 125	
Beryllium	<0.00100		0.100	0.1144		mg/L		114	75 - 125	
Boron	<0.100		0.200	0.2354		mg/L		118	75 - 125	
Cadmium	<0.000200		0.100	0.1069		mg/L		107	75 - 125	
Calcium	91.3		2.00	96.65	4	mg/L		267	75 - 125	
Chromium	<0.00500		0.100	0.09964		mg/L		100	75 - 125	
Cobalt	0.00271		0.100	0.1133		mg/L		111	75 - 125	
Copper	<0.00500		0.200	0.2241		mg/L		112	75 - 125	
Lead	<0.000500		0.200	0.2119		mg/L		106	75 - 125	
Lithium	<0.0100		0.200	0.2321		mg/L		114	75 - 125	
Magnesium	33.9		2.00	37.25	4	mg/L		166	75 - 125	
Manganese	0.510		0.100	0.6378	4	mg/L		128	75 - 125	
Molybdenum	<0.00200		0.200	0.2166		mg/L		108	75 - 125	
Nickel	0.00510		0.200	0.2203		mg/L		108	75 - 125	
Selenium	<0.00500		0.400	0.4296		mg/L		107	75 - 125	
Strontium	0.0910		0.200	0.3155		mg/L		112	75 - 125	
Thallium	0.00288		0.200	0.1566		mg/L		77	75 - 125	
Vanadium	<0.00500		0.100	0.1010		mg/L		101	75 - 125	
Zinc	<0.0200		0.200	0.2147		mg/L		107	75 - 125	

Lab Sample ID: 310-253602-1 MS
Matrix: Ground Water
Analysis Batch: 385390

Client Sample ID: MW-4B
Prep Type: Total/NA
Prep Batch: 384386

Analyte	Sample	Sample Qualifier	Spike Added	MS	MS	Unit	D	%Rec	%Rec	Limits
	Result			Result	Qualifier					
Iron	0.423		0.200	0.6457		mg/L		111	75 - 125	

Lab Sample ID: 310-253602-1 MSD
Matrix: Ground Water
Analysis Batch: 385267

Client Sample ID: MW-4B
Prep Type: Total/NA
Prep Batch: 384386

Analyte	Sample	Sample Qualifier	Spike Added	MSD	MSD	Unit	D	%Rec	%Rec	Limits	RPD	Limit
	Result			Result	Qualifier							
Aluminum	<0.0500		0.200	0.2437		mg/L		122	75 - 125	6	20	
Antimony	<0.00200	F1 *+	0.200	0.2704	F1	mg/L		135	75 - 125	5	20	
Arsenic	<0.00200		0.200	0.2286		mg/L		114	75 - 125	7	20	
Barium	0.173	F1	0.100	0.3028	F1	mg/L		130	75 - 125	5	20	
Beryllium	<0.00100		0.100	0.1208		mg/L		121	75 - 125	5	20	
Boron	<0.100		0.200	0.2496		mg/L		125	75 - 125	6	20	
Cadmium	<0.000200		0.100	0.1149		mg/L		115	75 - 125	7	20	
Calcium	91.3		2.00	101.2	4	mg/L		493	75 - 125	5	20	
Chromium	<0.00500		0.100	0.1065		mg/L		107	75 - 125	7	20	
Cobalt	0.00271		0.100	0.1212		mg/L		118	75 - 125	7	20	
Copper	<0.00500		0.200	0.2378		mg/L		119	75 - 125	6	20	
Lead	<0.000500		0.200	0.2288		mg/L		114	75 - 125	8	20	
Lithium	<0.0100		0.200	0.2472		mg/L		121	75 - 125	6	20	
Magnesium	33.9		2.00	40.23	4	mg/L		315	75 - 125	8	20	

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QC Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

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

Lab Sample ID: 310-253602-1 MSD
Matrix: Ground Water
Analysis Batch: 385267

Client Sample ID: MW-4B
Prep Type: Total/NA
Prep Batch: 384386

Analyte	Sample	Sample Qualifier	Spike Added	MSD	MSD	Unit	D	%Rec	%Rec	RPD	RPD
	Result			Result	Qualifier				Limits		Limit
Manganese	0.510		0.100	0.6821	4	mg/L		172	75 - 125	7	20
Molybdenum	<0.00200		0.200	0.2291		mg/L		114	75 - 125	6	20
Nickel	0.00510		0.200	0.2359		mg/L		115	75 - 125	7	20
Selenium	<0.00500		0.400	0.4565	E	mg/L		114	75 - 125	6	20
Strontium	0.0910		0.200	0.3375		mg/L		123	75 - 125	7	20
Thallium	0.00288		0.200	0.1744		mg/L		86	75 - 125	11	20
Vanadium	<0.00500		0.100	0.1085		mg/L		109	75 - 125	7	20
Zinc	<0.0200		0.200	0.2244		mg/L		112	75 - 125	4	20

Lab Sample ID: 310-253602-1 MSD
Matrix: Ground Water
Analysis Batch: 385390

Client Sample ID: MW-4B
Prep Type: Total/NA
Prep Batch: 384386

Analyte	Sample	Sample Qualifier	Spike Added	MSD	MSD	Unit	D	%Rec	%Rec	RPD	RPD
	Result			Result	Qualifier				Limits		Limit
Iron	0.423		0.200	0.6230		mg/L		100	75 - 125	4	20

Lab Sample ID: 310-253602-11 DU
Matrix: Ground Water
Analysis Batch: 385267

Client Sample ID: MW-24
Prep Type: Total/NA
Prep Batch: 384386

Analyte	Sample	Sample Qualifier	DU Result	DU	Unit	D	RPD	RPD
	Result			Qualifier				Limit
Aluminum	<0.0500		<0.0500		mg/L		NC	20
Antimony	<0.00200	*+	<0.00200	*+	mg/L		NC	20
Arsenic	<0.00200		<0.00200		mg/L		NC	20
Barium	0.0863		0.08706		mg/L		0.8	20
Beryllium	<0.00100		<0.00100		mg/L		NC	20
Cadmium	<0.000200		<0.000200		mg/L		NC	20
Calcium	78.6		77.80		mg/L		1	20
Chromium	<0.00500		<0.00500		mg/L		NC	20
Cobalt	<0.000500		<0.000500		mg/L		NC	20
Copper	<0.00500		<0.00500		mg/L		NC	20
Lead	<0.000500		<0.000500		mg/L		NC	20
Lithium	<0.0100		<0.0100		mg/L		NC	20
Magnesium	34.7		34.06		mg/L		2	20
Manganese	0.0144		0.01564		mg/L		8	20
Molybdenum	<0.00200		<0.00200		mg/L		NC	20
Nickel	<0.00500		<0.00500		mg/L		NC	20
Selenium	<0.00500		<0.00500		mg/L		NC	20
Strontium	0.0795		0.07962		mg/L		0.2	20
Thallium	<0.00100		<0.00100		mg/L		NC	20
Vanadium	<0.00500		<0.00500		mg/L		NC	20
Zinc	<0.0200		<0.0200		mg/L		NC	20

Lab Sample ID: 310-253602-11 DU
Matrix: Ground Water
Analysis Batch: 385390

Client Sample ID: MW-24
Prep Type: Total/NA
Prep Batch: 384386

Analyte	Sample	Sample Qualifier	DU	DU	Unit	D	RPD	RPD
	Result		Result	Qualifier				Limit
Boron	0.114		<0.100		mg/L		NC	20

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QC Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

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

Lab Sample ID: 310-253602-11 DU
 Matrix: Ground Water
 Analysis Batch: 385390

Client Sample ID: MW-24
 Prep Type: Total/NA
 Prep Batch: 384386

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Iron	<0.100		<0.100		mg/L		NC	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-384814/1-A
 Matrix: Water
 Analysis Batch: 385023

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 384814

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		04/19/23 12:34	04/20/23 12:12	1

Lab Sample ID: LCS 310-384814/2-A
 Matrix: Water
 Analysis Batch: 385023

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 384814

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001727		mg/L		104	80 - 120

Lab Sample ID: 310-253602-2 MS
 Matrix: Ground Water
 Analysis Batch: 385023

Client Sample ID: MW-5B
 Prep Type: Total/NA
 Prep Batch: 384814

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	<0.000200		0.00167	0.001480		mg/L		89	80 - 120

Lab Sample ID: 310-253602-2 MSD
 Matrix: Ground Water
 Analysis Batch: 385023

Client Sample ID: MW-5B
 Prep Type: Total/NA
 Prep Batch: 384814

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Mercury	<0.000200		0.00167	0.001489		mg/L		89	80 - 120	1	20

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

Lab Sample ID: MB 310-384415/1
 Matrix: Water
 Analysis Batch: 384415

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			04/15/23 10:50	1

Lab Sample ID: LCS 310-384415/2
 Matrix: Water
 Analysis Batch: 384415

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	1064		mg/L		106	90 - 110

QC Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

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

Lab Sample ID: MB 310-384551/1
Matrix: Water
Analysis Batch: 384551

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			04/17/23 15:04	1

Lab Sample ID: LCS 310-384551/2
Matrix: Water
Analysis Batch: 384551

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

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

Lab Sample ID: 310-253602-10 DU
Matrix: Ground Water
Analysis Batch: 384551

Client Sample ID: MW-23
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Total Dissolved Solids	286		290.0		mg/L		1	20

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-384288/1
Matrix: Water
Analysis Batch: 384288

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

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

Lab Sample ID: LCS 310-384288/24
Matrix: Water
Analysis Batch: 384288

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

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

Lab Sample ID: 310-253602-1 DU
Matrix: Ground Water
Analysis Batch: 384288

Client Sample ID: MW-4B
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
pH	7.5	HF	7.5		SU		0.1	20

Lab Sample ID: 310-253602-11 DU
Matrix: Ground Water
Analysis Batch: 384288

Client Sample ID: MW-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
pH	7.5	HF	7.5		SU		0.1	20

QC Association Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

HPLC/IC

Analysis Batch: 385567

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253602-1	MW-4B	Total/NA	Ground Water	9056A	
310-253602-2	MW-5B	Total/NA	Ground Water	9056A	
310-253602-3	MW-6A	Total/NA	Ground Water	9056A	
310-253602-4	MW-8	Total/NA	Ground Water	9056A	
310-253602-5	MW-10	Total/NA	Ground Water	9056A	
310-253602-6	MW-14A	Total/NA	Ground Water	9056A	
310-253602-6	MW-14A	Total/NA	Ground Water	9056A	
310-253602-7	MW-15A	Total/NA	Ground Water	9056A	
310-253602-8	MW-21	Total/NA	Ground Water	9056A	
310-253602-9	MW-22	Total/NA	Ground Water	9056A	
310-253602-10	MW-23	Total/NA	Ground Water	9056A	
310-253602-14	DUP-1	Total/NA	Ground Water	9056A	
310-253602-15	DUP-2	Total/NA	Ground Water	9056A	

Metals

Prep Batch: 384386

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253602-1	MW-4B	Total/NA	Ground Water	3005A	
310-253602-2	MW-5B	Total/NA	Ground Water	3005A	
310-253602-3	MW-6A	Total/NA	Ground Water	3005A	
310-253602-4	MW-8	Total/NA	Ground Water	3005A	
310-253602-5	MW-10	Total/NA	Ground Water	3005A	
310-253602-6	MW-14A	Total/NA	Ground Water	3005A	
310-253602-7	MW-15A	Total/NA	Ground Water	3005A	
310-253602-8	MW-21	Total/NA	Ground Water	3005A	
310-253602-9	MW-22	Total/NA	Ground Water	3005A	
310-253602-10	MW-23	Total/NA	Ground Water	3005A	
310-253602-14	DUP-1	Total/NA	Ground Water	3005A	
310-253602-15	DUP-2	Total/NA	Ground Water	3005A	

Prep Batch: 384814

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253602-1	MW-4B	Total/NA	Ground Water	7470A	
310-253602-2	MW-5B	Total/NA	Ground Water	7470A	
310-253602-3	MW-6A	Total/NA	Ground Water	7470A	
310-253602-4	MW-8	Total/NA	Ground Water	7470A	
310-253602-5	MW-10	Total/NA	Ground Water	7470A	
310-253602-6	MW-14A	Total/NA	Ground Water	7470A	
310-253602-7	MW-15A	Total/NA	Ground Water	7470A	
310-253602-8	MW-21	Total/NA	Ground Water	7470A	
310-253602-9	MW-22	Total/NA	Ground Water	7470A	
310-253602-10	MW-23	Total/NA	Ground Water	7470A	
310-253602-14	DUP-1	Total/NA	Ground Water	7470A	
310-253602-15	DUP-2	Total/NA	Ground Water	7470A	

Analysis Batch: 385023

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253602-1	MW-4B	Total/NA	Ground Water	7470A	384814
310-253602-2	MW-5B	Total/NA	Ground Water	7470A	384814
310-253602-3	MW-6A	Total/NA	Ground Water	7470A	384814

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QC Association Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Metals (Continued)

Analysis Batch: 385023 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253602-4	MW-8	Total/NA	Ground Water	7470A	384814
310-253602-5	MW-10	Total/NA	Ground Water	7470A	384814
310-253602-6	MW-14A	Total/NA	Ground Water	7470A	384814
310-253602-7	MW-15A	Total/NA	Ground Water	7470A	384814
310-253602-8	MW-21	Total/NA	Ground Water	7470A	384814
310-253602-9	MW-22	Total/NA	Ground Water	7470A	384814
310-253602-10	MW-23	Total/NA	Ground Water	7470A	384814
310-253602-14	DUP-1	Total/NA	Ground Water	7470A	384814
310-253602-15	DUP-2	Total/NA	Ground Water	7470A	384814

Analysis Batch: 385267

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253602-1	MW-4B	Total/NA	Ground Water	6020B	384386
310-253602-2	MW-5B	Total/NA	Ground Water	6020B	384386
310-253602-3	MW-6A	Total/NA	Ground Water	6020B	384386
310-253602-4	MW-8	Total/NA	Ground Water	6020B	384386
310-253602-5	MW-10	Total/NA	Ground Water	6020B	384386
310-253602-6	MW-14A	Total/NA	Ground Water	6020B	384386
310-253602-7	MW-15A	Total/NA	Ground Water	6020B	384386
310-253602-8	MW-21	Total/NA	Ground Water	6020B	384386
310-253602-9	MW-22	Total/NA	Ground Water	6020B	384386
310-253602-10	MW-23	Total/NA	Ground Water	6020B	384386
310-253602-14	DUP-1	Total/NA	Ground Water	6020B	384386
310-253602-15	DUP-2	Total/NA	Ground Water	6020B	384386

Analysis Batch: 385390

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253602-5	MW-10	Total/NA	Ground Water	6020B	384386
310-253602-6	MW-14A	Total/NA	Ground Water	6020B	384386
310-253602-8	MW-21	Total/NA	Ground Water	6020B	384386
310-253602-9	MW-22	Total/NA	Ground Water	6020B	384386
310-253602-10	MW-23	Total/NA	Ground Water	6020B	384386
310-253602-14	DUP-1	Total/NA	Ground Water	6020B	384386
310-253602-15	DUP-2	Total/NA	Ground Water	6020B	384386

Analysis Batch: 385692

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253602-7	MW-15A	Total/NA	Ground Water	6020B	384386

General Chemistry

Analysis Batch: 384288

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253602-1	MW-4B	Total/NA	Ground Water	SM 4500 H+ B	
310-253602-2	MW-5B	Total/NA	Ground Water	SM 4500 H+ B	
310-253602-3	MW-6A	Total/NA	Ground Water	SM 4500 H+ B	
310-253602-4	MW-8	Total/NA	Ground Water	SM 4500 H+ B	
310-253602-5	MW-10	Total/NA	Ground Water	SM 4500 H+ B	
310-253602-6	MW-14A	Total/NA	Ground Water	SM 4500 H+ B	
310-253602-7	MW-15A	Total/NA	Ground Water	SM 4500 H+ B	
310-253602-8	MW-21	Total/NA	Ground Water	SM 4500 H+ B	

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QC Association Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

General Chemistry (Continued)

Analysis Batch: 384288 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253602-9	MW-22	Total/NA	Ground Water	SM 4500 H+ B	
310-253602-10	MW-23	Total/NA	Ground Water	SM 4500 H+ B	
310-253602-14	DUP-1	Total/NA	Ground Water	SM 4500 H+ B	
310-253602-15	DUP-2	Total/NA	Ground Water	SM 4500 H+ B	

Analysis Batch: 384415

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253602-4	MW-8	Total/NA	Ground Water	SM 2540C	
310-253602-6	MW-14A	Total/NA	Ground Water	SM 2540C	
310-253602-7	MW-15A	Total/NA	Ground Water	SM 2540C	
310-253602-8	MW-21	Total/NA	Ground Water	SM 2540C	
310-253602-9	MW-22	Total/NA	Ground Water	SM 2540C	
310-253602-14	DUP-1	Total/NA	Ground Water	SM 2540C	

Analysis Batch: 384551

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253602-1	MW-4B	Total/NA	Ground Water	SM 2540C	
310-253602-2	MW-5B	Total/NA	Ground Water	SM 2540C	
310-253602-3	MW-6A	Total/NA	Ground Water	SM 2540C	
310-253602-5	MW-10	Total/NA	Ground Water	SM 2540C	
310-253602-10	MW-23	Total/NA	Ground Water	SM 2540C	
310-253602-15	DUP-2	Total/NA	Ground Water	SM 2540C	

Lab Chronicle

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-4B

Date Collected: 04/12/23 13:40

Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-1

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385567	QTZ5	EET CF	04/22/23 10:32
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385267	ZRI4	EET CF	04/23/23 20:51
Total/NA	Prep	7470A			384814	XXW3	EET CF	04/19/23 12:34
Total/NA	Analysis	7470A		1	385023	XXW3	EET CF	04/20/23 12:16
Total/NA	Analysis	SM 2540C		1	384551	ENB7	EET CF	04/17/23 15:04
Total/NA	Analysis	SM 4500 H+ B		1	384288	W9YR	EET CF	04/14/23 11:20

Client Sample ID: MW-5B

Date Collected: 04/12/23 16:15

Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-2

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385567	QTZ5	EET CF	04/22/23 11:19
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385267	ZRI4	EET CF	04/23/23 21:05
Total/NA	Prep	7470A			384814	XXW3	EET CF	04/19/23 12:34
Total/NA	Analysis	7470A		1	385023	XXW3	EET CF	04/20/23 12:20
Total/NA	Analysis	SM 2540C		1	384551	ENB7	EET CF	04/17/23 15:04
Total/NA	Analysis	SM 4500 H+ B		1	384288	W9YR	EET CF	04/14/23 11:22

Client Sample ID: MW-6A

Date Collected: 04/12/23 15:00

Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-3

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385567	QTZ5	EET CF	04/22/23 11:34
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385267	ZRI4	EET CF	04/23/23 21:08
Total/NA	Prep	7470A			384814	XXW3	EET CF	04/19/23 12:34
Total/NA	Analysis	7470A		1	385023	XXW3	EET CF	04/20/23 12:27
Total/NA	Analysis	SM 2540C		1	384551	ENB7	EET CF	04/17/23 15:04
Total/NA	Analysis	SM 4500 H+ B		1	384288	W9YR	EET CF	04/14/23 11:23

Client Sample ID: MW-8

Date Collected: 04/11/23 15:50

Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-4

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385567	QTZ5	EET CF	04/22/23 11:50
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385267	ZRI4	EET CF	04/23/23 21:10
Total/NA	Prep	7470A			384814	XXW3	EET CF	04/19/23 12:34
Total/NA	Analysis	7470A		1	385023	XXW3	EET CF	04/20/23 12:29

Eurofins Cedar Falls

Lab Chronicle

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-8
Date Collected: 04/11/23 15:50
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-4
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 2540C		1	384415	WZC8	EET CF	04/15/23 10:50
Total/NA	Analysis	SM 4500 H+ B		1	384288	W9YR	EET CF	04/14/23 11:24

Client Sample ID: MW-10
Date Collected: 04/12/23 08:45
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-5
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385567	QTZ5	EET CF	04/22/23 12:06
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385267	ZRI4	EET CF	04/23/23 21:28
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385390	ZRI4	EET CF	04/24/23 18:12
Total/NA	Prep	7470A			384814	XXW3	EET CF	04/19/23 12:34
Total/NA	Analysis	7470A		1	385023	XXW3	EET CF	04/20/23 12:35
Total/NA	Analysis	SM 2540C		1	384551	ENB7	EET CF	04/17/23 15:04
Total/NA	Analysis	SM 4500 H+ B		1	384288	W9YR	EET CF	04/14/23 11:25

Client Sample ID: MW-14A
Date Collected: 04/11/23 10:45
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-6
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385567	QTZ5	EET CF	04/22/23 12:21
Total/NA	Analysis	9056A		20	385567	QTZ5	EET CF	04/22/23 13:08
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385267	ZRI4	EET CF	04/23/23 21:30
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		4	385390	ZRI4	EET CF	04/24/23 18:15
Total/NA	Prep	7470A			384814	XXW3	EET CF	04/19/23 12:34
Total/NA	Analysis	7470A		1	385023	XXW3	EET CF	04/20/23 12:37
Total/NA	Analysis	SM 2540C		1	384415	WZC8	EET CF	04/15/23 10:50
Total/NA	Analysis	SM 4500 H+ B		1	384288	W9YR	EET CF	04/14/23 11:26

Client Sample ID: MW-15A
Date Collected: 04/11/23 13:35
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-7
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385567	QTZ5	EET CF	04/22/23 13:23
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385267	ZRI4	EET CF	04/23/23 21:33
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		4	385692	ZRI4	EET CF	04/27/23 03:15

Lab Chronicle

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-15A

Date Collected: 04/11/23 13:35

Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-7

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			384814	XXW3	EET CF	04/19/23 12:34
Total/NA	Analysis	7470A		1	385023	XXW3	EET CF	04/20/23 12:40
Total/NA	Analysis	SM 2540C		1	384415	WZC8	EET CF	04/15/23 10:50
Total/NA	Analysis	SM 4500 H+ B		1	384288	W9YR	EET CF	04/14/23 11:27

Client Sample ID: MW-21

Date Collected: 04/11/23 11:50

Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-8

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385567	QTZ5	EET CF	04/22/23 13:39
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385267	ZRI4	EET CF	04/23/23 21:36
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385390	ZRI4	EET CF	04/24/23 18:38
Total/NA	Prep	7470A			384814	XXW3	EET CF	04/19/23 12:34
Total/NA	Analysis	7470A		1	385023	XXW3	EET CF	04/20/23 12:42
Total/NA	Analysis	SM 2540C		1	384415	WZC8	EET CF	04/15/23 10:50
Total/NA	Analysis	SM 4500 H+ B		1	384288	W9YR	EET CF	04/14/23 11:28

Client Sample ID: MW-22

Date Collected: 04/10/23 12:55

Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-9

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385567	QTZ5	EET CF	04/22/23 13:55
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385267	ZRI4	EET CF	04/23/23 21:39
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385390	ZRI4	EET CF	04/24/23 18:41
Total/NA	Prep	7470A			384814	XXW3	EET CF	04/19/23 12:34
Total/NA	Analysis	7470A		1	385023	XXW3	EET CF	04/20/23 12:44
Total/NA	Analysis	SM 2540C		1	384415	WZC8	EET CF	04/15/23 10:50
Total/NA	Analysis	SM 4500 H+ B		1	384288	W9YR	EET CF	04/14/23 11:29

Client Sample ID: MW-23

Date Collected: 04/12/23 10:15

Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-10

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385567	QTZ5	EET CF	04/22/23 14:10
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385267	ZRI4	EET CF	04/23/23 21:42

Lab Chronicle

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Client Sample ID: MW-23
Date Collected: 04/12/23 10:15
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-10
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385390	ZRI4	EET CF	04/24/23 18:44
Total/NA	Prep	7470A			384814	XXW3	EET CF	04/19/23 12:34
Total/NA	Analysis	7470A		1	385023	XXW3	EET CF	04/20/23 12:46
Total/NA	Analysis	SM 2540C		1	384551	ENB7	EET CF	04/17/23 15:04
Total/NA	Analysis	SM 4500 H+ B		1	384288	W9YR	EET CF	04/14/23 11:30

Client Sample ID: DUP-1
Date Collected: 04/10/23 13:30
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-14
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	385567	QTZ5	EET CF	04/22/23 15:28
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385267	ZRI4	EET CF	04/23/23 22:11
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385390	ZRI4	EET CF	04/24/23 18:59
Total/NA	Prep	7470A			384814	XXW3	EET CF	04/19/23 12:34
Total/NA	Analysis	7470A		1	385023	XXW3	EET CF	04/20/23 12:54
Total/NA	Analysis	SM 2540C		1	384415	WZC8	EET CF	04/15/23 10:50
Total/NA	Analysis	SM 4500 H+ B		1	384288	W9YR	EET CF	04/14/23 11:38

Client Sample ID: DUP-2
Date Collected: 04/12/23 12:00
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-15
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385567	QTZ5	EET CF	04/22/23 16:15
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385267	ZRI4	EET CF	04/23/23 22:14
Total/NA	Prep	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385390	ZRI4	EET CF	04/24/23 19:31
Total/NA	Prep	7470A			384814	XXW3	EET CF	04/19/23 12:34
Total/NA	Analysis	7470A		1	385023	XXW3	EET CF	04/20/23 13:01
Total/NA	Analysis	SM 2540C		1	384551	ENB7	EET CF	04/17/23 15:04
Total/NA	Analysis	SM 4500 H+ B		1	384288	W9YR	EET CF	04/14/23 11:39

Laboratory References:

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

Accreditation/Certification Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

Laboratory: Eurofins Cedar Falls

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

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

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

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

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

Method Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-1

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

Protocol References:

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

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

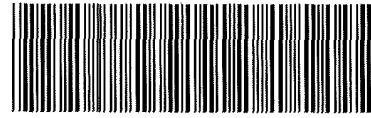
Laboratory References:

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

- 1
- 2
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- 10
- 11
- 12
- 13
- 14



Environment Testing
America



310-253602 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <i>Muscatine Power + Water</i>			
City/State:	CITY	STATE	Project:
		<i>IA</i>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<i>4/14/23</i>	<i>0830</i>	<i>n</i>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <i>1</i> of <i>3</i>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID:	<i>T</i>	Correction Factor (°C): <i>TD 1</i>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<i>1.3</i>	Corrected Temp (°C):	<i>1.4</i>
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> 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?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscatahuc Power & Water</u>			
City/State:	CITY	STATE	Project:
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>4/14/23</u>	<u>0830</u>	<u>RL</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee			
<input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>2</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>T</u>	Correction Factor (°C):	<u>+0.1</u>
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>1.4</u>	Corrected Temp (°C):	<u>1.5</u>
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> 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?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE. If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			





Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscatine Power + Water</u>			
City/State:	CITY	STATE	Project:
Receipt Information			
Date/Time Received:	DATE <u>4/14/23</u>	TIME <u>0830</u>	Received By: <u>R</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>3</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>+0.1</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>0.1</u>		Corrected Temp (°C): <u>0.2</u>	
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> 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?) <input type="checkbox"/> Yes <input type="checkbox"/> 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 Fax (319) 277-2425

Chain of Custody Record

Client Information		Lab PM Hayes Shawn M		Carrier Tracking No(s)		COC No	
Client Contact: Sam Bennett MP&W		Phone: 563-262-3583		E-Mail: shawn.hayes@testamericainc.com		Page:	
Company Muscatine Power & Water		Address 1700 Dick Drake Way		City Muscatine		State Zip IA, 52761	
Phone: 231623		PO #: 231623		WO #:		Email: sbennett@mpw.org and neil.hoskins@mpw.org	
Project Name: Muscatine Power & Water CCR Landfill		TestAmerica Project #:		Event: Spring 2023 Sampling		Site: Iowa	
Sample Identification		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)	
Sample ID		Preservation Code		Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)	
MW-4B		G	GW	X	X	X	X
MW-5B		G	GW	X	X	X	X
MW-6A		G	GW	X	X	X	X
MW-8		G	GW	X	X	X	X
MW-10		G	GW	X	X	X	X
MW-14A		G	GW	X	X	X	X
MW-15A		G	GW	X	X	X	X
MW-21		G	GW	X	X	X	X
MW-22		G	GW	X	X	X	X
MW-23		G	GW	X	X	X	X
MW-24		G	GW	X	X	X	X
Possible Hazard Identification		<input type="checkbox"/> Non-Hazard		<input type="checkbox"/> Flammable		<input type="checkbox"/> Skin Irritant	
Deliverable Requested		<input type="checkbox"/> I		<input type="checkbox"/> II		<input type="checkbox"/> III	
Empty Kit Relinquished by		Date		Time		Method of Shipment	
Relinquished by		Date/Time		Company		Date/Time	
Relinquished by		Date/Time		Company		Date/Time	
Relinquished by		Date/Time		Company		Date/Time	
Custody Seals Intact:		Custody Seal No		Cooler Temperature(s) °C and Other Remarks.		Company	
Δ Yes Δ No						4/14/23	

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Return To Client Disposal By Lab Archive For _____ Months

Special Instructions/QC Requirements

Received by	Date/Time	Company
MPW	4/13/23 9:15	Company
Received by	Date/Time	Company
Received by	Date/Time	Company



Eurofins Cedar Falls

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

Chain of Custody Record

Client Information		Lab PVI: Hayes, Shawn M		Carrier Tracking No(s):		COC No:	
Sampler: Sam Bennett Phone: 563-262-3583 E-Mail: shawn.hayes@testamericainc.com		Client Contact: Sam Bennett MP&W Company: Muscatine Power & Water		Project Name: Muscatine Power & Water CCR Landfill Site: Iowa		Page: Job #:	
Address: 1700 Dick Drake Way City: Muscatine State Zip: IA 52761 Phone: 231623 Email: sbennett@mpw.org and neil.hoskins@mpw.org		Due Date Requested: TAT Requested (days): PO #: 231623 WO #:		Analysis Requested 8020A CCR List, 7470A Mercury 2540C TDS, SM4500_H+ pH 9056A Chloride, Fluoride, Sulfate Radium-226 Radium-228		Preservation Codes: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - ph 4-5 L - EDTA Z - other (specify) Other:	
Event: Spring 2023 Sampling TestAmerica Project #:		Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/> Perform MS/MSD (Yes or No) <input checked="" type="checkbox"/> Total Number of Containers:		Special Instructions/Note:			
Sample Identification Sample Date: 4/12/23 Sample Time: 1155 Sample Type (C=Comp, G=grab): G Matrix (W=water, S=solid, O=soils, BT=Tissue, A=Air): GW		Preservation Code:		Special Instructions/Note:			
MW-26 MW-27 Dup-1 Dup-2		Sample Date: 4/12/23 Sample Time: 1110 Sample Type (C=Comp, G=grab): G Matrix (W=water, S=solid, O=soils, BT=Tissue, A=Air): GW		Preservation Code:			
Sample Date: 4/10/23 Sample Time: 1330 Sample Type (C=Comp, G=grab): G Matrix (W=water, S=solid, O=soils, BT=Tissue, A=Air): GW		Preservation Code:		Special Instructions/Note:			
Sample Date: 4/12/23 Sample Time: 1200 Sample Type (C=Comp, G=grab): G Matrix (W=water, S=solid, O=soils, BT=Tissue, A=Air): GW		Preservation Code:		Special Instructions/Note:			
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested I II III IV Other (specify)							
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months							
Special Instructions/QC Requirements							
Empty Kit Relinquished by:		Date:		Method of Shipment:		Time:	
Relinquished by: <i>Neil Hoskins</i>		Date: 4/13/23 9:15		Received by:		Company: MPW	
Relinquished by:		Date/Time:		Received by:		Company:	
Relinquished by:		Date/Time:		Received by:		Company:	
Custody Seals Intact: Δ Yes Δ No		Custody Seal No		Cooler Temperature(s) °C and Other Remarks:		Date/Time: 4/14/23 0830	



Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-253602-1

Login Number: 253602

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Homolar, Dana J

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





ANALYTICAL REPORT

PREPARED FOR

Attn: Sam Bennett
Muscatine Power & Water
1700 Dick Drake Way
PO BOX 899
Muscatine, Iowa 52761

Generated 6/7/2023 10:01:37 AM

JOB DESCRIPTION

Muscatine Power & Water CCR Landfill

JOB NUMBER

310-253602-2

Eurofins Cedar Falls

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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

Authorization



Generated
6/7/2023 10:01:37 AM

Authorized for release by
Matthew Hummel, Project Manager I
Matthew.Hummel@et.eurofinsus.com
(319)595-2010

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Case Narrative

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Job ID: 310-253602-2

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-253602-2

Receipt

The samples were received on 4/14/2023 8:30 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 0.2°C, 1.4°C and 1.5°C

Gas Flow Proportional Counter

Method 9315_Ra226: Radium-226 Prep Batch 160-609262The following sample was prepared at a reduced aliquot due to Matrix: MW-23 (310-253602-10). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precision.

Method 9315_Ra226: Radium-226 Prep Batch 160-609262Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-4B (310-253602-1), MW-5B (310-253602-2), MW-6A (310-253602-3), MW-8 (310-253602-4), MW-10 (310-253602-5), MW-14A (310-253602-6), MW-15A (310-253602-7), MW-21 (310-253602-8), MW-22 (310-253602-9), DUP-1 (310-253602-14) and DUP-2 (310-253602-15). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method 9315_Ra226: Radium-226 prep batch 160-609262:Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-4B (310-253602-1), MW-5B (310-253602-2), MW-6A (310-253602-3), MW-8 (310-253602-4), MW-10 (310-253602-5), MW-14A (310-253602-6), MW-15A (310-253602-7), MW-21 (310-253602-8), MW-22 (310-253602-9), MW-23 (310-253602-10), DUP-1 (310-253602-14), DUP-2 (310-253602-15), (LCS 160-609262/2-A), (LCSD 160-609262/3-A) and (MB 160-609262/1-A)

Method 9320_Ra228: Radium-228 Prep Batch 160-609265The following sample was prepared at a reduced aliquot due to Matrix: MW-23 (310-253602-10). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precision.

Method 9320_Ra228: Radium-228 Prep Batch 160-609265Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-4B (310-253602-1), MW-5B (310-253602-2), MW-6A (310-253602-3), MW-8 (310-253602-4), MW-10 (310-253602-5), MW-14A (310-253602-6), MW-15A (310-253602-7), MW-21 (310-253602-8), MW-22 (310-253602-9), DUP-1 (310-253602-14) and DUP-2 (310-253602-15). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method 9320_Ra228: Radium-228 batch 609265The detection goal was not met for the following sample(s). Sample was prepped a reduced volume due to the presence of matrix interferences: MW-23 (310-253602-10). Analytical results are reported with the detection limit achieved.

Method 9320_Ra228: Radium-228 batch 609265Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.MW-4B (310-253602-1), MW-5B (310-253602-2), MW-6A (310-253602-3), MW-8 (310-253602-4), MW-10 (310-253602-5), MW-14A (310-253602-6), MW-15A (310-253602-7), MW-21 (310-253602-8), MW-22 (310-253602-9), MW-23 (310-253602-10), DUP-1 (310-253602-14), DUP-2 (310-253602-15), (LCS 160-609265/2-A), (LCSD 160-609265/3-A) and (MB 160-609265/1-A)

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

Rad

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

Sample Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-253602-1	MW-4B	Ground Water	04/12/23 13:40	04/14/23 08:30
310-253602-2	MW-5B	Ground Water	04/12/23 16:15	04/14/23 08:30
310-253602-3	MW-6A	Ground Water	04/12/23 15:00	04/14/23 08:30
310-253602-4	MW-8	Ground Water	04/11/23 15:50	04/14/23 08:30
310-253602-5	MW-10	Ground Water	04/12/23 08:45	04/14/23 08:30
310-253602-6	MW-14A	Ground Water	04/11/23 10:45	04/14/23 08:30
310-253602-7	MW-15A	Ground Water	04/11/23 13:35	04/14/23 08:30
310-253602-8	MW-21	Ground Water	04/11/23 11:50	04/14/23 08:30
310-253602-9	MW-22	Ground Water	04/10/23 12:55	04/14/23 08:30
310-253602-10	MW-23	Ground Water	04/12/23 10:15	04/14/23 08:30
310-253602-14	DUP-1	Ground Water	04/10/23 13:30	04/14/23 08:30
310-253602-15	DUP-2	Ground Water	04/12/23 12:00	04/14/23 08:30

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Detection Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: MW-4B

Lab Sample ID: 310-253602-1

No Detections.

Client Sample ID: MW-5B

Lab Sample ID: 310-253602-2

No Detections.

Client Sample ID: MW-6A

Lab Sample ID: 310-253602-3

No Detections.

Client Sample ID: MW-8

Lab Sample ID: 310-253602-4

No Detections.

Client Sample ID: MW-10

Lab Sample ID: 310-253602-5

No Detections.

Client Sample ID: MW-14A

Lab Sample ID: 310-253602-6

No Detections.

Client Sample ID: MW-15A

Lab Sample ID: 310-253602-7

No Detections.

Client Sample ID: MW-21

Lab Sample ID: 310-253602-8

No Detections.

Client Sample ID: MW-22

Lab Sample ID: 310-253602-9

No Detections.

Client Sample ID: MW-23

Lab Sample ID: 310-253602-10

No Detections.

Client Sample ID: DUP-1

Lab Sample ID: 310-253602-14

No Detections.

Client Sample ID: DUP-2

Lab Sample ID: 310-253602-15

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: MW-4B
 Date Collected: 04/12/23 13:40
 Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-1
 Matrix: Ground Water

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.154	U	0.111	0.112	1.00	0.158	pCi/L	04/28/23 13:08	05/22/23 13:20	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.2		30 - 110					04/28/23 13:08	05/22/23 13:20	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	0.534	U	0.394	0.397	1.00	0.605	pCi/L	04/28/23 13:29	05/17/23 16:05	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.2		30 - 110					04/28/23 13:29	05/17/23 16:05	1
Y Carrier	80.7		30 - 110					04/28/23 13:29	05/17/23 16:05	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.687		0.409	0.412	5.00	0.605	pCi/L		05/23/23 22:08	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: MW-5B

Lab Sample ID: 310-253602-2

Date Collected: 04/12/23 16:15

Matrix: Ground Water

Date Received: 04/14/23 08:30

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.229		0.111	0.113	1.00	0.131	pCi/L	04/28/23 13:08	05/22/23 13:20	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.4		30 - 110					04/28/23 13:08	05/22/23 13:20	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	0.327	U	0.330	0.331	1.00	0.531	pCi/L	04/28/23 13:29	05/17/23 16:05	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.4		30 - 110					04/28/23 13:29	05/17/23 16:05	1
Y Carrier	80.7		30 - 110					04/28/23 13:29	05/17/23 16:05	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.556		0.348	0.350	5.00	0.531	pCi/L		05/23/23 22:08	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: MW-6A

Lab Sample ID: 310-253602-3

Date Collected: 04/12/23 15:00

Matrix: Ground Water

Date Received: 04/14/23 08:30

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.318		0.132	0.135	1.00	0.148	pCi/L	04/28/23 13:08	05/22/23 13:20	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.7		30 - 110					04/28/23 13:08	05/22/23 13:20	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	0.377	U	0.330	0.331	1.00	0.517	pCi/L	04/28/23 13:29	05/17/23 16:05	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.7		30 - 110					04/28/23 13:29	05/17/23 16:05	1
Y Carrier	83.0		30 - 110					04/28/23 13:29	05/17/23 16:05	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.695		0.355	0.357	5.00	0.517	pCi/L		05/23/23 22:08	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: MW-8

Lab Sample ID: 310-253602-4

Date Collected: 04/11/23 15:50

Matrix: Ground Water

Date Received: 04/14/23 08:30

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.169	U	0.121	0.121	1.00	0.178	pCi/L	04/28/23 13:08	05/22/23 13:20	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.8		30 - 110					04/28/23 13:08	05/22/23 13:20	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	0.301	U	0.329	0.330	1.00	0.537	pCi/L	04/28/23 13:29	05/17/23 16:06	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.8		30 - 110					04/28/23 13:29	05/17/23 16:06	1
Y Carrier	81.9		30 - 110					04/28/23 13:29	05/17/23 16:06	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.469	U	0.351	0.351	5.00	0.537	pCi/L		05/23/23 22:08	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: MW-10

Lab Sample ID: 310-253602-5

Date Collected: 04/12/23 08:45

Matrix: Ground Water

Date Received: 04/14/23 08:30

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.127	U	0.112	0.112	1.00	0.172	pCi/L	04/28/23 13:08	05/22/23 13:20	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.6		30 - 110					04/28/23 13:08	05/22/23 13:20	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		0.339	0.344	1.00	0.464	pCi/L	04/28/23 13:29	05/17/23 16:07	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.6		30 - 110					04/28/23 13:29	05/17/23 16:07	1
Y Carrier	82.2		30 - 110					04/28/23 13:29	05/17/23 16:07	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.775		0.357	0.362	5.00	0.464	pCi/L		05/23/23 22:08	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: MW-14A

Lab Sample ID: 310-253602-6

Date Collected: 04/11/23 10:45

Matrix: Ground Water

Date Received: 04/14/23 08:30

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.114	U	0.100	0.101	1.00	0.153	pCi/L	04/28/23 13:08	05/22/23 13:22	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	84.5		30 - 110					04/28/23 13:08	05/22/23 13:22	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	-0.0486	U	0.330	0.330	1.00	0.623	pCi/L	04/28/23 13:29	05/17/23 16:07	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	84.5		30 - 110					04/28/23 13:29	05/17/23 16:07	1
Y Carrier	83.4		30 - 110					04/28/23 13:29	05/17/23 16:07	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.0651	U	0.345	0.345	5.00	0.623	pCi/L		05/23/23 22:08	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: MW-15A

Lab Sample ID: 310-253602-7

Date Collected: 04/11/23 13:35

Matrix: Ground Water

Date Received: 04/14/23 08:30

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0906	U	0.0960	0.0964	1.00	0.154	pCi/L	04/28/23 13:08	05/22/23 13:22	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.6		30 - 110					04/28/23 13:08	05/22/23 13:22	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		0.359	0.364	1.00	0.517	pCi/L	04/28/23 13:29	05/17/23 16:07	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.6		30 - 110					04/28/23 13:29	05/17/23 16:07	1
Y Carrier	82.2		30 - 110					04/28/23 13:29	05/17/23 16:07	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.727		0.372	0.377	5.00	0.517	pCi/L		05/23/23 22:08	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: MW-21

Lab Sample ID: 310-253602-8

Date Collected: 04/11/23 11:50

Matrix: Ground Water

Date Received: 04/14/23 08:30

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0716	U	0.0730	0.0732	1.00	0.114	pCi/L	04/28/23 13:08	05/22/23 13:26	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.6		30 - 110					04/28/23 13:08	05/22/23 13:26	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	0.606		0.369	0.373	1.00	0.544	pCi/L	04/28/23 13:29	05/17/23 16:07	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.6		30 - 110					04/28/23 13:29	05/17/23 16:07	1
Y Carrier	82.6		30 - 110					04/28/23 13:29	05/17/23 16:07	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.678		0.376	0.380	5.00	0.544	pCi/L		05/23/23 22:08	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: MW-22

Lab Sample ID: 310-253602-9

Date Collected: 04/10/23 12:55

Matrix: Ground Water

Date Received: 04/14/23 08:30

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.117		0.0844	0.0850	1.00	0.116	pCi/L	04/28/23 13:08	05/22/23 15:11	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	92.1		30 - 110					04/28/23 13:08	05/22/23 15:11	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	0.324	U	0.300	0.302	1.00	0.474	pCi/L	04/28/23 13:29	05/17/23 16:08	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	92.1		30 - 110					04/28/23 13:29	05/17/23 16:08	1
Y Carrier	80.4		30 - 110					04/28/23 13:29	05/17/23 16:08	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.442	U	0.312	0.314	5.00	0.474	pCi/L		05/23/23 22:08	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: MW-23

Lab Sample ID: 310-253602-10

Date Collected: 04/12/23 10:15

Matrix: Ground Water

Date Received: 04/14/23 08:30

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.195	U	0.193	0.194	1.00	0.304	pCi/L	04/28/23 13:08	05/22/23 15:13	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	59.0		30 - 110					04/28/23 13:08	05/22/23 15:13	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.13	U G	0.764	0.771	1.00	1.15	pCi/L	04/28/23 13:29	05/17/23 16:08	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	59.0		30 - 110					04/28/23 13:29	05/17/23 16:08	1
Y Carrier	83.4		30 - 110					04/28/23 13:29	05/17/23 16:08	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.32		0.788	0.795	5.00	1.15	pCi/L		05/23/23 22:08	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: DUP-1

Lab Sample ID: 310-253602-14

Date Collected: 04/10/23 13:30

Matrix: Ground Water

Date Received: 04/14/23 08:30

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0976	U	0.0985	0.0989	1.00	0.156	pCi/L	04/28/23 13:08	05/22/23 15:13	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.6		30 - 110					04/28/23 13:08	05/22/23 15:13	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	-0.0323	U	0.279	0.279	1.00	0.536	pCi/L	04/28/23 13:29	05/17/23 16:08	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.6		30 - 110					04/28/23 13:29	05/17/23 16:08	1
Y Carrier	80.0		30 - 110					04/28/23 13:29	05/17/23 16:08	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.0653	U	0.296	0.296	5.00	0.536	pCi/L		05/23/23 22:08	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: DUP-2

Lab Sample ID: 310-253602-15

Date Collected: 04/12/23 12:00

Matrix: Ground Water

Date Received: 04/14/23 08:30

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0713	U	0.0969	0.0971	1.00	0.163	pCi/L	04/28/23 13:08	05/22/23 15:14	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.0		30 - 110					04/28/23 13:08	05/22/23 15:14	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	0.837		0.416	0.423	1.00	0.566	pCi/L	04/28/23 13:29	05/17/23 16:08	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.0		30 - 110					04/28/23 13:29	05/17/23 16:08	1
Y Carrier	77.0		30 - 110					04/28/23 13:29	05/17/23 16:08	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.908		0.427	0.434	5.00	0.566	pCi/L		05/23/23 22:08	1

Definitions/Glossary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Qualifiers

Rad

Qualifier	Qualifier Description
G	The Sample MDC is greater than the requested RL.
U	Result is less than the sample detection limit.

Glossary

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

QC Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-609262/1-A
Matrix: Water
Analysis Batch: 612651

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 609262

Analyte	MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.03732	U	0.0604	0.0605	1.00	0.105	pCi/L	04/28/23 13:08	05/22/23 13:19	1
Carrier	MB %Yield	MB Qualifier	Limits				Prepared		Analyzed	Dil Fac
Ba Carrier	108		30 - 110				04/28/23 13:08		05/22/23 13:19	1

Lab Sample ID: LCS 160-609262/2-A
Matrix: Water
Analysis Batch: 612651

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 609262

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	10.95		1.17	1.00	0.123	pCi/L	97	75 - 113
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	96.1		30 - 110						

Lab Sample ID: LCSD 160-609262/3-A
Matrix: Water
Analysis Batch: 612651

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 609262

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER
				Uncert. (2σ+/-)							Limit
Radium-226	11.3	11.67		1.26	1.00	0.173	pCi/L	103	75 - 113	0.30	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	92.4		30 - 110								

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-609265/1-A
Matrix: Water
Analysis Batch: 611880

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 609265

Analyte	MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.1718	U	0.269	0.270	1.00	0.458	pCi/L	04/28/23 13:29	05/17/23 16:04	1
Carrier	MB %Yield	MB Qualifier	Limits				Prepared		Analyzed	Dil Fac
Ba Carrier	108		30 - 110				04/28/23 13:29		05/17/23 16:04	1
Y Carrier	81.1		30 - 110				04/28/23 13:29		05/17/23 16:04	1

QC Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

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

Lab Sample ID: LCS 160-609265/2-A

Matrix: Water

Analysis Batch: 611880

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 609265

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits													
									75	125												
Radium-228	8.19	8.004		1.12	1.00	0.498	pCi/L	98	75	125												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Carrier</th> <th>LCS %Yield</th> <th>LCS Qualifier</th> <th>Limits</th> </tr> </thead> <tbody> <tr> <td>Ba Carrier</td> <td>96.1</td> <td></td> <td>30 - 110</td> </tr> <tr> <td>Y Carrier</td> <td>84.5</td> <td></td> <td>30 - 110</td> </tr> </tbody> </table>											Carrier	LCS %Yield	LCS Qualifier	Limits	Ba Carrier	96.1		30 - 110	Y Carrier	84.5		30 - 110
Carrier	LCS %Yield	LCS Qualifier	Limits																			
Ba Carrier	96.1		30 - 110																			
Y Carrier	84.5		30 - 110																			

Lab Sample ID: LCSD 160-609265/3-A

Matrix: Water

Analysis Batch: 611880

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 609265

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		RER	Limit												
									75	125	0.23	1												
Radium-228	8.19	8.533		1.18	1.00	0.480	pCi/L	104	75	125	0.23	1												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Carrier</th> <th>LCSD %Yield</th> <th>LCSD Qualifier</th> <th>Limits</th> </tr> </thead> <tbody> <tr> <td>Ba Carrier</td> <td>92.4</td> <td></td> <td>30 - 110</td> </tr> <tr> <td>Y Carrier</td> <td>84.1</td> <td></td> <td>30 - 110</td> </tr> </tbody> </table>													Carrier	LCSD %Yield	LCSD Qualifier	Limits	Ba Carrier	92.4		30 - 110	Y Carrier	84.1		30 - 110
Carrier	LCSD %Yield	LCSD Qualifier	Limits																					
Ba Carrier	92.4		30 - 110																					
Y Carrier	84.1		30 - 110																					

QC Association Summary

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Rad

Prep Batch: 609262

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253602-1	MW-4B	Total/NA	Ground Water	PrecSep-21	
310-253602-2	MW-5B	Total/NA	Ground Water	PrecSep-21	
310-253602-3	MW-6A	Total/NA	Ground Water	PrecSep-21	
310-253602-4	MW-8	Total/NA	Ground Water	PrecSep-21	
310-253602-5	MW-10	Total/NA	Ground Water	PrecSep-21	
310-253602-6	MW-14A	Total/NA	Ground Water	PrecSep-21	
310-253602-7	MW-15A	Total/NA	Ground Water	PrecSep-21	
310-253602-8	MW-21	Total/NA	Ground Water	PrecSep-21	
310-253602-9	MW-22	Total/NA	Ground Water	PrecSep-21	
310-253602-10	MW-23	Total/NA	Ground Water	PrecSep-21	
310-253602-14	DUP-1	Total/NA	Ground Water	PrecSep-21	
310-253602-15	DUP-2	Total/NA	Ground Water	PrecSep-21	
MB 160-609262/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-609262/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-609262/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 609265

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253602-1	MW-4B	Total/NA	Ground Water	PrecSep_0	
310-253602-2	MW-5B	Total/NA	Ground Water	PrecSep_0	
310-253602-3	MW-6A	Total/NA	Ground Water	PrecSep_0	
310-253602-4	MW-8	Total/NA	Ground Water	PrecSep_0	
310-253602-5	MW-10	Total/NA	Ground Water	PrecSep_0	
310-253602-6	MW-14A	Total/NA	Ground Water	PrecSep_0	
310-253602-7	MW-15A	Total/NA	Ground Water	PrecSep_0	
310-253602-8	MW-21	Total/NA	Ground Water	PrecSep_0	
310-253602-9	MW-22	Total/NA	Ground Water	PrecSep_0	
310-253602-10	MW-23	Total/NA	Ground Water	PrecSep_0	
310-253602-14	DUP-1	Total/NA	Ground Water	PrecSep_0	
310-253602-15	DUP-2	Total/NA	Ground Water	PrecSep_0	
MB 160-609265/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-609265/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-609265/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: MW-4B
 Date Collected: 04/12/23 13:40
 Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-1
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			609262	KAC	EET SL	04/28/23 13:08
Total/NA	Analysis	9315		1	612651	FLC	EET SL	05/22/23 13:20
Total/NA	Prep	PrecSep_0			609265	KAC	EET SL	04/28/23 13:29
Total/NA	Analysis	9320		1	611880	FLC	EET SL	05/17/23 16:05
Total/NA	Analysis	Ra226_Ra228		1	612861	EMH	EET SL	05/23/23 22:08

Client Sample ID: MW-5B
 Date Collected: 04/12/23 16:15
 Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-2
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			609262	KAC	EET SL	04/28/23 13:08
Total/NA	Analysis	9315		1	612651	FLC	EET SL	05/22/23 13:20
Total/NA	Prep	PrecSep_0			609265	KAC	EET SL	04/28/23 13:29
Total/NA	Analysis	9320		1	611880	FLC	EET SL	05/17/23 16:05
Total/NA	Analysis	Ra226_Ra228		1	612861	EMH	EET SL	05/23/23 22:08

Client Sample ID: MW-6A
 Date Collected: 04/12/23 15:00
 Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-3
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			609262	KAC	EET SL	04/28/23 13:08
Total/NA	Analysis	9315		1	612651	FLC	EET SL	05/22/23 13:20
Total/NA	Prep	PrecSep_0			609265	KAC	EET SL	04/28/23 13:29
Total/NA	Analysis	9320		1	611880	FLC	EET SL	05/17/23 16:05
Total/NA	Analysis	Ra226_Ra228		1	612861	EMH	EET SL	05/23/23 22:08

Client Sample ID: MW-8
 Date Collected: 04/11/23 15:50
 Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-4
 Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			609262	KAC	EET SL	04/28/23 13:08
Total/NA	Analysis	9315		1	612651	FLC	EET SL	05/22/23 13:20
Total/NA	Prep	PrecSep_0			609265	KAC	EET SL	04/28/23 13:29
Total/NA	Analysis	9320		1	611881	FLC	EET SL	05/17/23 16:06
Total/NA	Analysis	Ra226_Ra228		1	612861	EMH	EET SL	05/23/23 22:08

Lab Chronicle

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: MW-10

Lab Sample ID: 310-253602-5

Date Collected: 04/12/23 08:45

Matrix: Ground Water

Date Received: 04/14/23 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			609262	KAC	EET SL	04/28/23 13:08
Total/NA	Analysis	9315		1	612651	FLC	EET SL	05/22/23 13:20
Total/NA	Prep	PrecSep_0			609265	KAC	EET SL	04/28/23 13:29
Total/NA	Analysis	9320		1	611881	FLC	EET SL	05/17/23 16:07
Total/NA	Analysis	Ra226_Ra228		1	612861	EMH	EET SL	05/23/23 22:08

Client Sample ID: MW-14A

Lab Sample ID: 310-253602-6

Date Collected: 04/11/23 10:45

Matrix: Ground Water

Date Received: 04/14/23 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			609262	KAC	EET SL	04/28/23 13:08
Total/NA	Analysis	9315		1	612650	SCB	EET SL	05/22/23 13:22
Total/NA	Prep	PrecSep_0			609265	KAC	EET SL	04/28/23 13:29
Total/NA	Analysis	9320		1	611881	FLC	EET SL	05/17/23 16:07
Total/NA	Analysis	Ra226_Ra228		1	612861	EMH	EET SL	05/23/23 22:08

Client Sample ID: MW-15A

Lab Sample ID: 310-253602-7

Date Collected: 04/11/23 13:35

Matrix: Ground Water

Date Received: 04/14/23 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			609262	KAC	EET SL	04/28/23 13:08
Total/NA	Analysis	9315		1	612650	SCB	EET SL	05/22/23 13:22
Total/NA	Prep	PrecSep_0			609265	KAC	EET SL	04/28/23 13:29
Total/NA	Analysis	9320		1	611881	FLC	EET SL	05/17/23 16:07
Total/NA	Analysis	Ra226_Ra228		1	612861	EMH	EET SL	05/23/23 22:08

Client Sample ID: MW-21

Lab Sample ID: 310-253602-8

Date Collected: 04/11/23 11:50

Matrix: Ground Water

Date Received: 04/14/23 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			609262	KAC	EET SL	04/28/23 13:08
Total/NA	Analysis	9315		1	612492	FLC	EET SL	05/22/23 13:26
Total/NA	Prep	PrecSep_0			609265	KAC	EET SL	04/28/23 13:29
Total/NA	Analysis	9320		1	611881	FLC	EET SL	05/17/23 16:07
Total/NA	Analysis	Ra226_Ra228		1	612861	EMH	EET SL	05/23/23 22:08

Lab Chronicle

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Client Sample ID: MW-22

Lab Sample ID: 310-253602-9

Date Collected: 04/10/23 12:55

Matrix: Ground Water

Date Received: 04/14/23 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			609262	KAC	EET SL	04/28/23 13:08
Total/NA	Analysis	9315		1	612492	FLC	EET SL	05/22/23 15:11
Total/NA	Prep	PrecSep_0			609265	KAC	EET SL	04/28/23 13:29
Total/NA	Analysis	9320		1	611881	FLC	EET SL	05/17/23 16:08
Total/NA	Analysis	Ra226_Ra228		1	612861	EMH	EET SL	05/23/23 22:08

Client Sample ID: MW-23

Lab Sample ID: 310-253602-10

Date Collected: 04/12/23 10:15

Matrix: Ground Water

Date Received: 04/14/23 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			609262	KAC	EET SL	04/28/23 13:08
Total/NA	Analysis	9315		1	612651	FLC	EET SL	05/22/23 15:13
Total/NA	Prep	PrecSep_0			609265	KAC	EET SL	04/28/23 13:29
Total/NA	Analysis	9320		1	611881	FLC	EET SL	05/17/23 16:08
Total/NA	Analysis	Ra226_Ra228		1	612861	EMH	EET SL	05/23/23 22:08

Client Sample ID: DUP-1

Lab Sample ID: 310-253602-14

Date Collected: 04/10/23 13:30

Matrix: Ground Water

Date Received: 04/14/23 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			609262	KAC	EET SL	04/28/23 13:08
Total/NA	Analysis	9315		1	612651	FLC	EET SL	05/22/23 15:13
Total/NA	Prep	PrecSep_0			609265	KAC	EET SL	04/28/23 13:29
Total/NA	Analysis	9320		1	611881	FLC	EET SL	05/17/23 16:08
Total/NA	Analysis	Ra226_Ra228		1	612861	EMH	EET SL	05/23/23 22:08

Client Sample ID: DUP-2

Lab Sample ID: 310-253602-15

Date Collected: 04/12/23 12:00

Matrix: Ground Water

Date Received: 04/14/23 08:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			609262	KAC	EET SL	04/28/23 13:08
Total/NA	Analysis	9315		1	612651	FLC	EET SL	05/22/23 15:14
Total/NA	Prep	PrecSep_0			609265	KAC	EET SL	04/28/23 13:29
Total/NA	Analysis	9320		1	611881	FLC	EET SL	05/17/23 16:08
Total/NA	Analysis	Ra226_Ra228		1	612861	EMH	EET SL	05/23/23 22:08

Laboratory References:

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

Accreditation/Certification Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

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	Ground Water	Radium-226
9320	PrecSep_0	Ground Water	Radium-228
Ra226_Ra228		Ground Water	Combined Radium 226 + 228

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

Method Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Method	Method Description	Protocol	Laboratory
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
PrecSep_0	Preparation, Precipitate Separation	None	EET SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	EET SL

Protocol References:

None = None

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.

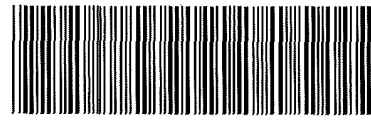
Laboratory References:

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





Environment Testing
America



310-253602 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscatine Power + Water</u>			
City/State:	CITY	STATE	Project:
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>4/14/23</u>	<u>0830</u>	<u>R</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID:	<u>T</u>	Correction Factor (°C):	<u>+0.1</u>
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>1.3</u>	Corrected Temp (°C):	<u>1.4</u>
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> 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?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscatahne Power & Water</u>			
City/State:	CITY	STATE	Project:
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>4/14/23</u>	<u>0830</u>	<u>RL</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>2</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>T</u>	Correction Factor (°C):	<u>+0.1</u>
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>1.4</u>	Corrected Temp (°C):	<u>1.5</u>
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> 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?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE. If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

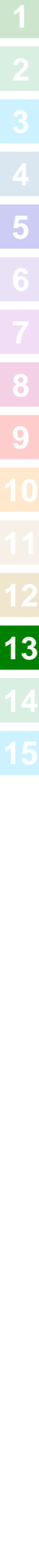
Client Information			
Client: <u>Muscataine Power + Water</u>			
City/State:	CITY	STATE	Project:
Receipt Information			
Date/Time Received:	DATE <u>4/14/23</u>	TIME <u>0830</u>	Received By: <u>R</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>3</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>+0.1</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>0.1</u>		Corrected Temp (°C): <u>0.2</u>	
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> 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?) <input type="checkbox"/> Yes <input type="checkbox"/> 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 Fax (319) 277-2425

Chain of Custody Record

<p>Client Information</p> <p>Client Contact: Sam Bennett Phone: 563-282-3583 E-Mail: shawn.hayes@testamericainc.com</p> <p>Company: Muscatine Power & Water</p>		<p>Lab PM: Hayes Shawn M</p> <p>Carrier Tracking No(s):</p> <p>COC No:</p> <p>Page:</p> <p>Job #:</p>	
<p>Address: 1700 Dick Drake Way</p> <p>City: Muscatine</p> <p>State: IA</p> <p>Zip: 52761</p> <p>Phone: 231623</p> <p>PO #: 231623</p> <p>WO #:</p> <p>Email: sbennett@mpw.org and neil.hoskins@mpw.org</p> <p>Project Name: Muscatine Power & Water CCR Landfill</p> <p>Site: Iowa</p>		<p>Analysis Requested</p> <p>Due Date Requested:</p> <p>TAT Requested (days):</p> <p>Perform MS/MSD (Yes or No):</p> <p>Field Filtered Sample (Yes or No):</p> <p>6020A CCR List, 7470A Mercury</p> <p>2540C TDS, SM4500, H+ pH</p> <p>9056A Chloride, Fluoride, Sulfate</p> <p>Radium-226</p> <p>Radium-228</p>	
<p>Sample Identification</p> <p>Sample ID: MW-4B, MW-5B, MW-6A, MW-8, MW-10, MW-14A, MW-15A, MW-21, MW-22, MW-23, MW-24</p> <p>Sample Date: 4/12/23, 4/12/23, 4/12/23, 4/11/23, 4/12/23, 4/11/23, 4/11/23, 4/10/23, 4/12/23, 4/11/23</p> <p>Sample Time: 1340, 1615, 1500, 1550, 0845, 1045, 1335, 1150, 1255, 1015, 1455</p> <p>Sample Type: G, G, G, G, G, G, G, G, G, G</p> <p>Matrix: GW, GW, GW, GW, GW, GW, GW, GW, GW, GW</p> <p>Preservation Code: N, N, N, N, N, N, N, N, N, N</p>		<p>Special Instructions/Note:</p> <p>Total Number of Containers: <input checked="" type="checkbox"/> X</p> <p>Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other</p> <p>M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - ph 4-5 Z - other (specify)</p>	
<p>Possible Hazard Identification</p> <p><input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological</p> <p>Deliverable Requested: <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV Other (specify)</p> <p>Empty Kit Relinquished by: <i>Neil Hoskins</i> Date: <i>4/13/23</i></p> <p>Relinquished by: <i>MPW</i> Date: <i>2.15</i></p> <p>Relinquished by: <i>MPW</i> Date: <i>2.15</i></p> <p>Relinquished by: <i>MPW</i> Date: <i>2.15</i></p> <p>Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Custody Seal No: <i>4/14/23</i></p>			



Eurofins Cedar Falls

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

Chain of Custody Record

Client Information		Lab PVI: Hayes, Shawn M		Carrier Tracking No(s):		COC No:	
Sampler: Sam Bennett Phone: 563-262-3583 E-Mail: shawn.hayes@testamericainc.com		Client Contact: Sam Bennett MP&W Company: Muscatine Power & Water		Project Name: Muscatine Power & Water CCR Landfill Site: Iowa		Page: Job #:	
Address: 1700 Dick Drake Way City: Muscatine State Zip: IA 52761 Phone: 231623 Email: sbennett@mpw.org and neil.hoskins@mpw.org		Due Date Requested: TAT Requested (days): PO #: 231623 WO #:		Analysis Requested Perform MS/MSD (Yes or No): Field Filtered Sample (Yes or No): 8020A CCR List, 7470A Mercury 2540C TDS, SM4500_H+ pH 9056A Chloride, Fluoride, Sulfate Radium-226 Radium-228		Preservation Codes: A - HCl B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Sample Identification MW-26 MW-27 Dup-1 Dup-2		Sample Date 4/12/23 4/12/23 4/10/23 4/12/23		Sample Time 1155 1110 1330 1200		Sample Type (C=Comp, G=grab) G G G G	
Matrix (W=water, S=solid, O=soils, BT=Tissue, A=Air) GW GW GW GW		Preservation Code: D N N N		Special Instructions/Note: Total Number of containers:		Special Instructions/Note: Total Number of containers:	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested I II III IV Other (specify)							
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months							
Special Instructions/QC Requirements							
Empty Kit Relinquished by:		Date:		Method of Shipment:		Time:	
Relinquished by: <i>Neil Hoskins</i>		Date: 4/13/23 9:15		Received by: <i>MZW</i>		Company:	
Relinquished by:		Date/Time:		Received by:		Company:	
Relinquished by:		Date/Time:		Received by:		Company:	
Custody Seals Intact: Δ Yes Δ No		Custody Seal No		Cooler Temperature(s) °C and Other Remarks:		Date/Time: 4/14/23 0830	



Chain of Custody Record



Client Information (Sub Contract Lab)		Sampler: Thompson, Shirley J		Lab PM: Thompson, Shirley J		Carrier Tracking No(s): 310-60419-1		COC No: 310-60419-1			
Client Contact: TestAmerica Laboratories, Inc.		Phone: 314-298-8566(Tel) 314-298-8757(Fax)		E-Mail: Shirley.Thompson@et.eurofins.com		State of Origin: Iowa		Page: Page 1 of 2			
Address: 13715 Rider Trail North, Earth City, MO, 63045		PO #:		Accreditations Required (See note): State - Iowa		Job #:		Job #: 310-253602-2			
Project Name: Muscatine Power & Water CCR Landfill		Project #: 31007856		Due Date Requested: 5/18/2023		Analysis Requested:		Preservation Codes:			
Site:		SSOW#:		TAT Requested (days):		Field Filtered Sample (Yes or No)		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Y - Trizma Z - other (specify)			
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=soil, BT=trace, A=air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9315_Ra226/PreSep_21 Radium-226	9320_Ra228/PreSep_0 Standard Target List	Ra226Ra228_GFP/ (MOD) Local Method	Total Number of Containers	Special Instructions/Note:
MW-4B (310-253602-1)	4/12/23	13:40 Central	Water	Water	X	X	X	X	X	2	
MW-5B (310-253602-2)	4/12/23	16:15 Central	Water	Water	X	X	X	X	X	2	
MW-6A (310-253602-3)	4/12/23	15:00 Central	Water	Water	X	X	X	X	X	2	
MW-8 (310-253602-4)	4/11/23	15:50 Central	Water	Water	X	X	X	X	X	2	
MW-10 (310-253602-5)	4/12/23	08:45 Central	Water	Water	X	X	X	X	X	2	
MW-14A (310-253602-6)	4/11/23	10:45 Central	Water	Water	X	X	X	X	X	2	
MW-15A (310-253602-7)	4/11/23	13:35 Central	Water	Water	X	X	X	X	X	2	
MW-21 (310-253602-8)	4/11/23	11:50 Central	Water	Water	X	X	X	X	X	2	
MW-22 (310-253602-9)	4/10/23	12:55 Central	Water	Water	X	X	X	X	X	2	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/rests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC.

Possible Hazard Identification
 Unconfirmed
 Return To Client
 Disposal By Lab
 Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

Empty Kit Relinquished by: _____ Date: _____ Method of Shipment: _____
 Relinquished by: _____ Date: 4/18/23 1:20 Company: _____
 Relinquished by: _____ Date: _____ Company: _____
 Relinquished by: _____ Date: _____ Company: _____

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

Received by: _____ Date: _____ Company: _____
 Received by: CONOR ASSIELLA Date: APR 20 2023 Company: _____
 Received by: _____ Date: _____ Company: _____

Client Information (Sub Contract Lab)
 Client Contact: Thompson, Shirley J
 Shipping/Receiving: Shirley.Thompson@et.eurofins.com
 Company: TestAmerica Laboratories, Inc.
 Address: 13715 Rider Trail North, Earth City, MO 63045
 Phone: 314-298-8566(Tel) 314-298-8757(Fax)
 Project Name: Muscatine Power & Water CCR Landfill
 Site:

Lab PM: Thompson, Shirley J
E-Mail: Shirley.Thompson@et.eurofins.com
Accreditations Required (See note): State - Iowa

Carrier Tracking No(s): 310-60419.2
Page: Page 2 of 2
Job #: 310-253602-2

Due Date Requested: 5/18/2023
TAT Requested (days):

PO #:
WO #:
Project #: 31007856
SSOW#:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=Water, S=solid, O=soil, T=tissue, A=air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9315_Ra226/Precep_21 Radium-226	9320_Ra226/Precep_0 Standard Target List	Ra226Ra228_GFPc/(MOD) Local Method	Total Number of Containers	Special Instructions/Note:
MW-23 (310-253602-10)	4/12/23	10:15 Central	Water	Water	X	X	X	X	X	2	
DUP-1 (310-253602-14)	4/10/23	13:30 Central	Water	Water	X	X	X	X	X	2	
DUP-2 (310-253602-15)	4/12/23	12:00 Central	Water	Water	X	X	X	X	X	2	

Preservation Codes:
 A - HCL
 B - NaOH
 C - Zn Acetate
 D - Nitric Acid
 E - NaHSO4
 F - MeOH
 G - Amchlor
 H - Ascorbic Acid
 I - Ice
 J - DI Water
 K - EDTA
 L - EDA
 Other:

Preservation Codes:
 M - Hexane
 N - None
 O - AsNaO2
 P - Na2O4S
 Q - Na2SO3
 R - Na2SO3
 S - H2SO4
 T - TSP Dodecahydrate
 U - Acetone
 V - MCAA
 W - pH 4-5
 Y - Trizma
 Z - other (specify)

Analysis Requested

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

Special Instructions/QC Requirements:

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

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

Relinquished by: **Date/Time:** **Company:**

Relinquished by: **Date/Time:** **Company:**

Relinquished by: **Date/Time:** **Company:**

Custody Seals Intact: **Custody Seal No.:**
 Δ Yes Δ No

Cooler Temperature(s) °C and Other Remarks:

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC.



Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-253602-2

Login Number: 253602

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Homolar, Dana J

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	



Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-253602-2

Login Number: 253602

List Number: 2

Creator: Worthington, Sierra M

List Source: Eurofins St. Louis

List Creation: 04/19/23 12:40 PM

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	Coc is in cooler that is not recieved yet
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	

Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-253602-2

Login Number: 253602

List Number: 3

Creator: Worthington, Sierra M

List Source: Eurofins St. Louis

List Creation: 04/20/23 12:45 PM

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
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: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Method: 9315 - Radium-226 (GFPC)

Matrix: Ground Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	
310-253602-1	MW-4B	90.2	
310-253602-2	MW-5B	91.4	
310-253602-3	MW-6A	88.7	
310-253602-4	MW-8	94.8	
310-253602-5	MW-10	93.6	
310-253602-6	MW-14A	84.5	
310-253602-7	MW-15A	94.6	
310-253602-8	MW-21	95.6	
310-253602-9	MW-22	92.1	
310-253602-10	MW-23	59.0	
310-253602-14	DUP-1	91.6	
310-253602-15	DUP-2	86.0	

Tracer/Carrier Legend
 Ba = Ba Carrier

Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	
LCS 160-609262/2-A	Lab Control Sample	96.1	
LCS D 160-609262/3-A	Lab Control Sample Dup	92.4	
MB 160-609262/1-A	Method Blank	108	

Tracer/Carrier Legend
 Ba = Ba Carrier

Method: 9320 - Radium-228 (GFPC)

Matrix: Ground Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)
310-253602-1	MW-4B	90.2	80.7
310-253602-2	MW-5B	91.4	80.7
310-253602-3	MW-6A	88.7	83.0
310-253602-4	MW-8	94.8	81.9
310-253602-5	MW-10	93.6	82.2
310-253602-6	MW-14A	84.5	83.4
310-253602-7	MW-15A	94.6	82.2
310-253602-8	MW-21	95.6	82.6
310-253602-9	MW-22	92.1	80.4
310-253602-10	MW-23	59.0	83.4
310-253602-14	DUP-1	91.6	80.0
310-253602-15	DUP-2	86.0	77.0

Tracer/Carrier Legend
 Ba = Ba Carrier
 Y = Y Carrier

Tracer/Carrier Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-253602-2

Method: 9320 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)
LCS 160-609265/2-A	Lab Control Sample	96.1	84.5
LCSD 160-609265/3-A	Lab Control Sample Dup	92.4	84.1
MB 160-609265/1-A	Method Blank	108	81.1

Tracer/Carrier Legend

Ba = Ba Carrier

Y = Y Carrier

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ANALYTICAL REPORT

PREPARED FOR

Attn: Sam Bennett
Muscatine Power & Water
1700 Dick Drake Way
PO BOX 899
Muscatine, Iowa 52761

Generated 10/11/2023 3:36:48 PM

JOB DESCRIPTION

Muscatine Power & Water CCR Landfill

JOB NUMBER

310-265406-1

Eurofins Cedar Falls

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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

Authorization



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Authorized for release by
Matthew Hummel, Project Manager I
Matthew.Hummel@et.eurofinsus.com
(319)595-2010



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Case Narrative

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Job ID: 310-265406-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-265406-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method. Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The samples were received on 9/22/2023 8:35 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 2.5°C, 3.3°C and 4.7°C

HPLC/IC

Method 9056A_ORGFM_28D: The following samples were diluted due to the nature of the sample matrix: MW-4A (310-265406-1) and MW-5B (310-265406-2). Elevated reporting limits (RLs) are provided.

Method 9056A_ORGFM_28D: The following samples were diluted due to the nature of the sample matrix: MW-6A (310-265406-3), MW-8 (310-265406-4), MW-10 (310-265406-5), MW-14A (310-265406-6), MW-15A (310-265406-7), MW-21 (310-265406-8), MW-22 (310-265406-9), MW-23 (310-265406-10), DUP-1 (310-265406-12), and DUP-2 (310-265406-15). Elevated reporting limits (RLs) are provided.

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

Metals

Method 6020B: The laboratory control sample (LCS) for preparation batch 310-400452 and analytical batch 310-402213 recovered outside control limits for the following analytes: Antimony. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

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.

Sample Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-265406-1	MW-4A	Ground Water	09/20/23 08:00	09/22/23 08:35
310-265406-2	MW-5B	Ground Water	09/20/23 10:55	09/22/23 08:35
310-265406-3	MW-6A	Ground Water	09/20/23 09:15	09/22/23 08:35
310-265406-4	MW-8	Ground Water	09/19/23 09:50	09/22/23 08:35
310-265406-5	MW-10	Ground Water	09/18/23 11:45	09/22/23 08:35
310-265406-6	MW-14A	Ground Water	09/19/23 11:50	09/22/23 08:35
310-265406-7	MW-15A	Ground Water	09/19/23 13:00	09/22/23 08:35
310-265406-8	MW-21	Ground Water	09/19/23 10:50	09/22/23 08:35
310-265406-9	MW-22	Ground Water	09/18/23 14:30	09/22/23 08:35
310-265406-10	MW-23	Ground Water	09/18/23 13:05	09/22/23 08:35
310-265406-12	DUP-1	Ground Water	09/18/23 12:00	09/22/23 08:35

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Detection Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-4A

Lab Sample ID: 310-265406-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	17.4		5.00		mg/L	5		9056A	Total/NA
Sulfate	53.1		5.00		mg/L	5		9056A	Total/NA
Barium	0.181		0.00200		mg/L	1		6020B	Total/NA
Cadmium	0.000285		0.000200		mg/L	1		6020B	Total/NA
Calcium	90.4		0.500		mg/L	1		6020B	Total/NA
Cobalt	0.00374		0.000500		mg/L	1		6020B	Total/NA
Lead	0.000576		0.000500		mg/L	1		6020B	Total/NA
Thallium	0.00300		0.00100		mg/L	1		6020B	Total/NA
Total Dissolved Solids	364		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-5B

Lab Sample ID: 310-265406-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	41.8		5.00		mg/L	5		9056A	Total/NA
Sulfate	53.4		5.00		mg/L	5		9056A	Total/NA
Barium	0.274		0.00200		mg/L	1		6020B	Total/NA
Cadmium	0.000255		0.000200		mg/L	1		6020B	Total/NA
Calcium	115		0.500		mg/L	1		6020B	Total/NA
Lead	0.000627		0.000500		mg/L	1		6020B	Total/NA
Thallium	0.00442		0.00100		mg/L	1		6020B	Total/NA
Total Dissolved Solids	476		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-6A

Lab Sample ID: 310-265406-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	12.2		5.00		mg/L	5		9056A	Total/NA
Sulfate	10.1		5.00		mg/L	5		9056A	Total/NA
Barium	0.222		0.00200		mg/L	1		6020B	Total/NA
Calcium	82.1		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	332		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.4	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-8

Lab Sample ID: 310-265406-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	19.9		5.00		mg/L	5		9056A	Total/NA
Sulfate	94.2		5.00		mg/L	5		9056A	Total/NA
Barium	0.0782		0.00200		mg/L	1		6020B	Total/NA
Calcium	79.4		0.500		mg/L	1		6020B	Total/NA
Cobalt	0.00126		0.000500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	260		250		mg/L	1		SM 2540C	Total/NA
pH	7.4	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-10

Lab Sample ID: 310-265406-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	57.4		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00501		0.00200		mg/L	1		6020B	Total/NA
Barium	0.233		0.00200		mg/L	1		6020B	Total/NA
Calcium	84.7		0.500		mg/L	1		6020B	Total/NA
Cobalt	0.000995		0.000500		mg/L	1		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Detection Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-10 (Continued)

Lab Sample ID: 310-265406-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	318		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-14A

Lab Sample ID: 310-265406-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	20.9		5.00		mg/L	5		9056A	Total/NA
Sulfate	1440		100		mg/L	100		9056A	Total/NA
Barium	0.0348		0.00200		mg/L	1		6020B	Total/NA
Boron	18.1		1.00		mg/L	10		6020B	Total/NA
Calcium	291		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	1800		250		mg/L	1		SM 2540C	Total/NA
pH	7.1	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-15A

Lab Sample ID: 310-265406-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	8.41		5.00		mg/L	5		9056A	Total/NA
Sulfate	365		5.00		mg/L	5		9056A	Total/NA
Barium	0.0338		0.00200		mg/L	1		6020B	Total/NA
Boron	9.28		1.00		mg/L	10		6020B	Total/NA
Calcium	126		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	720		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-21

Lab Sample ID: 310-265406-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	8.23		5.00		mg/L	5		9056A	Total/NA
Sulfate	303		5.00		mg/L	5		9056A	Total/NA
Barium	0.0559		0.00200		mg/L	1		6020B	Total/NA
Boron	4.42		0.100		mg/L	1		6020B	Total/NA
Calcium	96.0		0.500		mg/L	1		6020B	Total/NA
Chromium	0.00752		0.00500		mg/L	1		6020B	Total/NA
Lithium	0.0205		0.0100		mg/L	1		6020B	Total/NA
Selenium	0.00530		0.00500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	626		50.0		mg/L	1		SM 2540C	Total/NA
pH	6.9	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-22

Lab Sample ID: 310-265406-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	18.4		5.00		mg/L	5		9056A	Total/NA
Sulfate	208		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00421		0.00200		mg/L	1		6020B	Total/NA
Barium	0.256		0.00200		mg/L	1		6020B	Total/NA
Boron	0.207		0.100		mg/L	1		6020B	Total/NA
Calcium	79.0		0.500		mg/L	1		6020B	Total/NA
Molybdenum	0.00661		0.00200		mg/L	1		6020B	Total/NA
Total Dissolved Solids	404		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.6	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Detection Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-23

Lab Sample ID: 310-265406-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	19.2		5.00		mg/L	5		9056A	Total/NA
Sulfate	28.6		5.00		mg/L	5		9056A	Total/NA
Barium	0.0533		0.00200		mg/L	1		6020B	Total/NA
Boron	0.128		0.100		mg/L	1		6020B	Total/NA
Calcium	56.0		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	282		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: DUP-1

Lab Sample ID: 310-265406-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	60.4		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00466		0.00200		mg/L	1		6020B	Total/NA
Barium	0.236		0.00200		mg/L	1		6020B	Total/NA
Calcium	87.6		0.500		mg/L	1		6020B	Total/NA
Cobalt	0.00102		0.000500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	354		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.2	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-4A
 Date Collected: 09/20/23 08:00
 Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-1
 Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	17.4		5.00		mg/L			09/28/23 22:21	5
Fluoride	<1.00		1.00		mg/L			09/28/23 22:21	5
Sulfate	53.1		5.00		mg/L			09/28/23 22:21	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+ F1	0.00200		mg/L		09/25/23 09:35	10/11/23 11:57	1
Arsenic	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 11:57	1
Barium	0.181		0.00200		mg/L		09/25/23 09:35	10/11/23 11:57	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 11:57	1
Boron	<0.100		0.100		mg/L		09/25/23 09:35	10/11/23 11:57	1
Cadmium	0.000285		0.000200		mg/L		09/25/23 09:35	10/11/23 11:57	1
Calcium	90.4		0.500		mg/L		09/25/23 09:35	10/11/23 11:57	1
Chromium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 11:57	1
Cobalt	0.00374		0.000500		mg/L		09/25/23 09:35	10/11/23 11:57	1
Lead	0.000576		0.000500		mg/L		09/25/23 09:35	10/11/23 11:57	1
Lithium	<0.0100		0.0100		mg/L		09/25/23 09:35	10/11/23 11:57	1
Molybdenum	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 11:57	1
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 11:57	1
Thallium	0.00300		0.00100		mg/L		09/25/23 09:35	10/11/23 11:57	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/23 10:44	10/03/23 10:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	364		50.0		mg/L			09/22/23 15:07	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.5	HF	1.0		SU			09/22/23 10:06	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-5B

Lab Sample ID: 310-265406-2

Date Collected: 09/20/23 10:55

Matrix: Ground Water

Date Received: 09/22/23 08:35

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	41.8		5.00		mg/L			09/28/23 22:33	5
Fluoride	<1.00		1.00		mg/L			09/28/23 22:33	5
Sulfate	53.4		5.00		mg/L			09/28/23 22:33	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		09/25/23 09:35	10/11/23 12:09	1
Arsenic	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:09	1
Barium	0.274		0.00200		mg/L		09/25/23 09:35	10/11/23 12:09	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:09	1
Boron	<0.100		0.100		mg/L		09/25/23 09:35	10/11/23 12:09	1
Cadmium	0.000255		0.000200		mg/L		09/25/23 09:35	10/11/23 12:09	1
Calcium	115		0.500		mg/L		09/25/23 09:35	10/11/23 12:09	1
Chromium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:09	1
Cobalt	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:09	1
Lead	0.000627		0.000500		mg/L		09/25/23 09:35	10/11/23 12:09	1
Lithium	<0.0100		0.0100		mg/L		09/25/23 09:35	10/11/23 12:09	1
Molybdenum	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:09	1
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:09	1
Thallium	0.00442		0.00100		mg/L		09/25/23 09:35	10/11/23 12:09	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/23 10:44	10/03/23 11:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	476		50.0		mg/L			09/22/23 15:07	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.3	HF	1.0		SU			09/22/23 09:56	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-6A
 Date Collected: 09/20/23 09:15
 Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-3
 Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	12.2		5.00		mg/L			09/28/23 15:44	5
Fluoride	<1.00		1.00		mg/L			09/28/23 15:44	5
Sulfate	10.1		5.00		mg/L			09/28/23 15:44	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		09/25/23 09:35	10/11/23 12:12	1
Arsenic	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:12	1
Barium	0.222		0.00200		mg/L		09/25/23 09:35	10/11/23 12:12	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:12	1
Boron	<0.100		0.100		mg/L		09/25/23 09:35	10/11/23 12:12	1
Cadmium	<0.000200		0.000200		mg/L		09/25/23 09:35	10/11/23 12:12	1
Calcium	82.1		0.500		mg/L		09/25/23 09:35	10/11/23 12:12	1
Chromium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:12	1
Cobalt	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:12	1
Lead	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:12	1
Lithium	<0.0100		0.0100		mg/L		09/25/23 09:35	10/11/23 12:12	1
Molybdenum	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:12	1
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:12	1
Thallium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:12	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/23 10:44	10/03/23 11:07	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	332		50.0		mg/L			09/22/23 15:07	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.4	HF	1.0		SU			09/22/23 10:01	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-8

Lab Sample ID: 310-265406-4

Date Collected: 09/19/23 09:50

Matrix: Ground Water

Date Received: 09/22/23 08:35

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	19.9		5.00		mg/L			09/28/23 16:31	5
Fluoride	<1.00		1.00		mg/L			09/28/23 16:31	5
Sulfate	94.2		5.00		mg/L			09/28/23 16:31	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		09/25/23 09:35	10/11/23 12:14	1
Arsenic	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:14	1
Barium	0.0782		0.00200		mg/L		09/25/23 09:35	10/11/23 12:14	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:14	1
Boron	<0.100		0.100		mg/L		09/25/23 09:35	10/11/23 12:14	1
Cadmium	<0.000200		0.000200		mg/L		09/25/23 09:35	10/11/23 12:14	1
Calcium	79.4		0.500		mg/L		09/25/23 09:35	10/11/23 12:14	1
Chromium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:14	1
Cobalt	0.00126		0.000500		mg/L		09/25/23 09:35	10/11/23 12:14	1
Lead	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:14	1
Lithium	<0.0100		0.0100		mg/L		09/25/23 09:35	10/11/23 12:14	1
Molybdenum	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:14	1
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:14	1
Thallium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:14	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/23 10:44	10/03/23 11:10	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	260		250		mg/L			09/22/23 15:07	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.4	HF	1.0		SU			09/22/23 10:13	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-10
Date Collected: 09/18/23 11:45
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-5
Matrix: Ground 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			09/28/23 16:46	5
Fluoride	<1.00		1.00		mg/L			09/28/23 16:46	5
Sulfate	57.4		5.00		mg/L			09/28/23 16:46	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		09/25/23 09:35	10/11/23 12:36	1
Arsenic	0.00501		0.00200		mg/L		09/25/23 09:35	10/11/23 12:36	1
Barium	0.233		0.00200		mg/L		09/25/23 09:35	10/11/23 12:36	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:36	1
Boron	<0.100		0.100		mg/L		09/25/23 09:35	10/11/23 12:36	1
Cadmium	<0.000200		0.000200		mg/L		09/25/23 09:35	10/11/23 12:36	1
Calcium	84.7		0.500		mg/L		09/25/23 09:35	10/11/23 12:36	1
Chromium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:36	1
Cobalt	0.000995		0.000500		mg/L		09/25/23 09:35	10/11/23 12:36	1
Lead	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:36	1
Lithium	<0.0100		0.0100		mg/L		09/25/23 09:35	10/11/23 12:36	1
Molybdenum	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:36	1
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:36	1
Thallium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:36	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/23 10:44	10/03/23 11:12	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	318		50.0		mg/L			09/22/23 15:07	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.3	HF	1.0		SU			09/22/23 10:15	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-14A

Lab Sample ID: 310-265406-6

Date Collected: 09/19/23 11:50

Matrix: Ground Water

Date Received: 09/22/23 08:35

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	20.9		5.00		mg/L			09/28/23 17:02	5
Fluoride	<1.00		1.00		mg/L			09/28/23 17:02	5
Sulfate	1440		100		mg/L			09/29/23 12:55	100

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		09/25/23 09:35	10/11/23 12:38	1
Arsenic	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:38	1
Barium	0.0348		0.00200		mg/L		09/25/23 09:35	10/11/23 12:38	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:38	1
Boron	18.1		1.00		mg/L		09/25/23 09:35	10/11/23 13:19	10
Cadmium	<0.000200		0.000200		mg/L		09/25/23 09:35	10/11/23 12:38	1
Calcium	291		0.500		mg/L		09/25/23 09:35	10/11/23 12:38	1
Chromium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:38	1
Cobalt	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:38	1
Lead	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:38	1
Lithium	<0.0100		0.0100		mg/L		09/25/23 09:35	10/11/23 12:38	1
Molybdenum	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:38	1
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:38	1
Thallium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:38	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/23 10:44	10/03/23 11:14	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	1800		250		mg/L			09/22/23 15:07	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.1	HF	1.0		SU			09/22/23 10:08	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-15A

Lab Sample ID: 310-265406-7

Date Collected: 09/19/23 13:00

Matrix: Ground Water

Date Received: 09/22/23 08:35

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	8.41		5.00		mg/L			09/28/23 17:17	5
Fluoride	<1.00		1.00		mg/L			09/28/23 17:17	5
Sulfate	365		5.00		mg/L			09/28/23 17:17	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		09/25/23 09:35	10/11/23 12:40	1
Arsenic	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:40	1
Barium	0.0338		0.00200		mg/L		09/25/23 09:35	10/11/23 12:40	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:40	1
Boron	9.28		1.00		mg/L		09/25/23 09:35	10/11/23 13:21	10
Cadmium	<0.000200		0.000200		mg/L		09/25/23 09:35	10/11/23 12:40	1
Calcium	126		0.500		mg/L		09/25/23 09:35	10/11/23 12:40	1
Chromium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:40	1
Cobalt	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:40	1
Lead	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:40	1
Lithium	<0.0100		0.0100		mg/L		09/25/23 09:35	10/11/23 12:40	1
Molybdenum	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:40	1
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:40	1
Thallium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:40	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/23 10:44	10/03/23 11:16	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	720		50.0		mg/L			09/22/23 15:07	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.3	HF	1.0		SU			09/22/23 10:12	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-21

Lab Sample ID: 310-265406-8

Date Collected: 09/19/23 10:50

Matrix: Ground Water

Date Received: 09/22/23 08:35

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	8.23		5.00		mg/L			09/28/23 17:33	5
Fluoride	<1.00		1.00		mg/L			09/28/23 17:33	5
Sulfate	303		5.00		mg/L			09/28/23 17:33	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		09/25/23 09:35	10/11/23 12:43	1
Arsenic	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:43	1
Barium	0.0559		0.00200		mg/L		09/25/23 09:35	10/11/23 12:43	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:43	1
Boron	4.42		0.100		mg/L		09/25/23 09:35	10/11/23 12:43	1
Cadmium	<0.000200		0.000200		mg/L		09/25/23 09:35	10/11/23 12:43	1
Calcium	96.0		0.500		mg/L		09/25/23 09:35	10/11/23 12:43	1
Chromium	0.00752		0.00500		mg/L		09/25/23 09:35	10/11/23 12:43	1
Cobalt	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:43	1
Lead	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:43	1
Lithium	0.0205		0.0100		mg/L		09/25/23 09:35	10/11/23 12:43	1
Molybdenum	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:43	1
Selenium	0.00530		0.00500		mg/L		09/25/23 09:35	10/11/23 12:43	1
Thallium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:43	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/23 10:44	10/03/23 11:22	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	626		50.0		mg/L			09/22/23 15:07	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	6.9	HF	1.0		SU			09/22/23 09:57	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-22
 Date Collected: 09/18/23 14:30
 Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-9
 Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	18.4		5.00		mg/L			09/28/23 17:49	5
Fluoride	<1.00		1.00		mg/L			09/28/23 17:49	5
Sulfate	208		5.00		mg/L			09/28/23 17:49	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		09/25/23 09:35	10/11/23 12:45	1
Arsenic	0.00421		0.00200		mg/L		09/25/23 09:35	10/11/23 12:45	1
Barium	0.256		0.00200		mg/L		09/25/23 09:35	10/11/23 12:45	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:45	1
Boron	0.207		0.100		mg/L		09/25/23 09:35	10/11/23 12:45	1
Cadmium	<0.000200		0.000200		mg/L		09/25/23 09:35	10/11/23 12:45	1
Calcium	79.0		0.500		mg/L		09/25/23 09:35	10/11/23 12:45	1
Chromium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:45	1
Cobalt	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:45	1
Lead	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:45	1
Lithium	<0.0100		0.0100		mg/L		09/25/23 09:35	10/11/23 12:45	1
Molybdenum	0.00661		0.00200		mg/L		09/25/23 09:35	10/11/23 12:45	1
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:45	1
Thallium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:45	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/23 10:44	10/03/23 11:24	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	404		50.0		mg/L			09/22/23 15:07	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.6	HF	1.0		SU			09/22/23 10:14	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-23
Date Collected: 09/18/23 13:05
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-10
Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	19.2		5.00		mg/L			09/28/23 18:06	5
Fluoride	<1.00		1.00		mg/L			09/28/23 18:06	5
Sulfate	28.6		5.00		mg/L			09/28/23 18:06	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200	*+	0.00200		mg/L		09/25/23 09:35	10/11/23 12:47	1
Arsenic	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:47	1
Barium	0.0533		0.00200		mg/L		09/25/23 09:35	10/11/23 12:47	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:47	1
Boron	0.128		0.100		mg/L		09/25/23 09:35	10/11/23 12:47	1
Cadmium	<0.000200		0.000200		mg/L		09/25/23 09:35	10/11/23 12:47	1
Calcium	56.0		0.500		mg/L		09/25/23 09:35	10/11/23 12:47	1
Chromium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:47	1
Cobalt	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:47	1
Lead	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:47	1
Lithium	<0.0100		0.0100		mg/L		09/25/23 09:35	10/11/23 12:47	1
Molybdenum	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:47	1
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:47	1
Thallium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:47	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/23 10:44	10/03/23 11:27	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	282		50.0		mg/L			09/22/23 15:07	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.5	HF	1.0		SU			09/22/23 10:09	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: DUP-1
 Date Collected: 09/18/23 12:00
 Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-12
 Matrix: Ground 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			09/28/23 18:37	5
Fluoride	<1.00		1.00		mg/L			09/28/23 18:37	5
Sulfate	60.4		5.00		mg/L			09/28/23 18:37	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		09/25/23 09:35	10/11/23 13:01	1
Arsenic	0.00466		0.00200		mg/L		09/25/23 09:35	10/11/23 13:01	1
Barium	0.236		0.00200		mg/L		09/25/23 09:35	10/11/23 13:01	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 13:01	1
Boron	<0.100		0.100		mg/L		09/25/23 09:35	10/11/23 13:01	1
Cadmium	<0.000200		0.000200		mg/L		09/25/23 09:35	10/11/23 13:01	1
Calcium	87.6		0.500		mg/L		09/25/23 09:35	10/11/23 13:01	1
Chromium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:01	1
Cobalt	0.00102		0.000500		mg/L		09/25/23 09:35	10/11/23 13:01	1
Lead	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 13:01	1
Lithium	<0.0100		0.0100		mg/L		09/25/23 09:35	10/11/23 13:01	1
Molybdenum	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 13:01	1
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:01	1
Thallium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 13:01	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/02/23 10:44	10/03/23 11:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	354		50.0		mg/L			09/22/23 15:07	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.2	HF	1.0		SU			09/22/23 10:11	1

Definitions/Glossary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Qualifiers

Metals

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F1	MS and/or MSD recovery exceeds control limits.

General Chemistry

Qualifier	Qualifier Description
HF	Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.

Glossary

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

QC Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-401074/3
Matrix: Water
Analysis Batch: 401074

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			09/28/23 16:43	1
Fluoride	<0.200		0.200		mg/L			09/28/23 16:43	1
Sulfate	<1.00		1.00		mg/L			09/28/23 16:43	1

Lab Sample ID: LCS 310-401074/4
Matrix: Water
Analysis Batch: 401074

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	9.971		mg/L		100	90 - 110
Fluoride	2.00	2.083		mg/L		104	90 - 110
Sulfate	10.0	10.21		mg/L		102	90 - 110

Lab Sample ID: MB 310-401079/3
Matrix: Water
Analysis Batch: 401079

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			09/28/23 13:24	1
Fluoride	<0.200		0.200		mg/L			09/28/23 13:24	1
Sulfate	<1.00		1.00		mg/L			09/28/23 13:24	1

Lab Sample ID: LCS 310-401079/4
Matrix: Water
Analysis Batch: 401079

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	9.929		mg/L		99	90 - 110
Fluoride	2.00	2.110		mg/L		105	90 - 110
Sulfate	10.0	10.61		mg/L		106	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-400452/1-A
Matrix: Water
Analysis Batch: 402213

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 400452

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 11:53	1
Arsenic	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 11:53	1
Barium	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 11:53	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 11:53	1
Boron	<0.100		0.100		mg/L		09/25/23 09:35	10/11/23 11:53	1
Cadmium	<0.000200		0.000200		mg/L		09/25/23 09:35	10/11/23 11:53	1
Calcium	<0.500		0.500		mg/L		09/25/23 09:35	10/11/23 11:53	1
Chromium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 11:53	1
Cobalt	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 11:53	1
Lead	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 11:53	1
Lithium	<0.0100		0.0100		mg/L		09/25/23 09:35	10/11/23 11:53	1
Molybdenum	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 11:53	1

Eurofins Cedar Falls

QC Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

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

Lab Sample ID: MB 310-400452/1-A
Matrix: Water
Analysis Batch: 402213

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 400452

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 11:53	1
Thallium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 11:53	1

Lab Sample ID: LCS 310-400452/2-A
Matrix: Water
Analysis Batch: 402213

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 400452

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	0.200	0.2648	*+	mg/L		132	80 - 120
Arsenic	0.200	0.2132		mg/L		107	80 - 120
Barium	0.100	0.1063		mg/L		106	80 - 120
Beryllium	0.100	0.1064		mg/L		106	80 - 120
Boron	0.200	0.2007		mg/L		100	80 - 120
Cadmium	0.100	0.1060		mg/L		106	80 - 120
Calcium	2.00	1.684		mg/L		84	80 - 120
Chromium	0.100	0.1080		mg/L		108	80 - 120
Cobalt	0.100	0.1036		mg/L		104	80 - 120
Lead	0.200	0.2200		mg/L		110	80 - 120
Lithium	0.200	0.2089		mg/L		104	80 - 120
Molybdenum	0.200	0.2043		mg/L		102	80 - 120
Selenium	0.400	0.4151		mg/L		104	80 - 120
Thallium	0.200	0.1721		mg/L		86	80 - 120

Lab Sample ID: 310-265406-1 MS
Matrix: Ground Water
Analysis Batch: 402213

Client Sample ID: MW-4A
Prep Type: Total/NA
Prep Batch: 400452

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	<0.00200	*+ F1	0.200	0.2663	F1	mg/L		133	75 - 125
Arsenic	<0.00200		0.200	0.2132		mg/L		106	75 - 125
Barium	0.181		0.100	0.2864		mg/L		105	75 - 125
Beryllium	<0.00100		0.100	0.1110		mg/L		111	75 - 125
Boron	<0.100		0.200	0.2278		mg/L		114	75 - 125
Cadmium	0.000285		0.100	0.1048		mg/L		104	75 - 125
Calcium	90.4		2.00	93.15	4	mg/L		138	75 - 125
Chromium	<0.00500		0.100	0.1067		mg/L		105	75 - 125
Cobalt	0.00374		0.100	0.1042		mg/L		100	75 - 125
Lead	0.000576		0.200	0.2128		mg/L		106	75 - 125
Lithium	<0.0100		0.200	0.2230		mg/L		109	75 - 125
Molybdenum	<0.00200		0.200	0.2137		mg/L		106	75 - 125
Selenium	<0.00500		0.400	0.4127		mg/L		103	75 - 125
Thallium	0.00300		0.200	0.1656		mg/L		81	75 - 125

Lab Sample ID: 310-265406-1 MSD
Matrix: Ground Water
Analysis Batch: 402213

Client Sample ID: MW-4A
Prep Type: Total/NA
Prep Batch: 400452

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Antimony	<0.00200	*+ F1	0.200	0.2671	F1	mg/L		134	75 - 125	0	20

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QC Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

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

Lab Sample ID: 310-265406-1 MSD
Matrix: Ground Water
Analysis Batch: 402213

Client Sample ID: MW-4A
Prep Type: Total/NA
Prep Batch: 400452

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Arsenic	<0.00200		0.200	0.2145		mg/L		107	75 - 125	1	20
Barium	0.181		0.100	0.2917		mg/L		111	75 - 125	2	20
Beryllium	<0.00100		0.100	0.1112		mg/L		111	75 - 125	0	20
Boron	<0.100		0.200	0.2260		mg/L		113	75 - 125	1	20
Cadmium	0.000285		0.100	0.1057		mg/L		105	75 - 125	1	20
Calcium	90.4		2.00	92.49	4	mg/L		105	75 - 125	1	20
Chromium	<0.00500		0.100	0.1067		mg/L		105	75 - 125	0	20
Cobalt	0.00374		0.100	0.1044		mg/L		101	75 - 125	0	20
Lead	0.000576		0.200	0.2125		mg/L		106	75 - 125	0	20
Lithium	<0.0100		0.200	0.2205		mg/L		108	75 - 125	1	20
Molybdenum	<0.00200		0.200	0.2124		mg/L		105	75 - 125	1	20
Selenium	<0.00500		0.400	0.4172		mg/L		104	75 - 125	1	20
Thallium	0.00300		0.200	0.1716		mg/L		84	75 - 125	4	20

Lab Sample ID: 310-265406-A-11-B DU
Matrix: Ground Water
Analysis Batch: 402213

Client Sample ID: 310-265406-A-11-B DU
Prep Type: Total/NA
Prep Batch: 400452

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Antimony	<0.00200	*+	<0.00200	*+	mg/L		NC	20
Arsenic	<0.00200		<0.00200		mg/L		NC	20
Barium	0.0698		0.06977		mg/L		0.1	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	70.5		70.95		mg/L		0.7	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 310-401176/1-A
Matrix: Water
Analysis Batch: 401339

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 401176

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Mercury	<0.000200		0.000200		mg/L		10/02/23 10:44	10/03/23 10:32	1

Lab Sample ID: LCS 310-401176/2-A
Matrix: Water
Analysis Batch: 401339

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 401176

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec
	Added	Result	Qualifier				Limits
Mercury	0.00167	0.001628		mg/L		98	80 - 120

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QC Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

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

Lab Sample ID: MB 310-400438/1
 Matrix: Water
 Analysis Batch: 400438

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			09/22/23 15:07	1

Lab Sample ID: LCS 310-400438/2
 Matrix: Water
 Analysis Batch: 400438

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	968.0		mg/L		97	90 - 110

Lab Sample ID: 310-265406-5 DU
 Matrix: Ground Water
 Analysis Batch: 400438

Client Sample ID: MW-10
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	318		344.0		mg/L		8	20

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-400377/1
 Matrix: Water
 Analysis Batch: 400377

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: 310-265406-1 DU
 Matrix: Ground Water
 Analysis Batch: 400377

Client Sample ID: MW-4A
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.5	HF	7.6		SU		0.1	20

QC Association Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

HPLC/IC

Analysis Batch: 401074

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-265406-1	MW-4A	Total/NA	Ground Water	9056A	
310-265406-2	MW-5B	Total/NA	Ground Water	9056A	
MB 310-401074/3	Method Blank	Total/NA	Water	9056A	
LCS 310-401074/4	Lab Control Sample	Total/NA	Water	9056A	

Analysis Batch: 401079

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-265406-3	MW-6A	Total/NA	Ground Water	9056A	
310-265406-4	MW-8	Total/NA	Ground Water	9056A	
310-265406-5	MW-10	Total/NA	Ground Water	9056A	
310-265406-6	MW-14A	Total/NA	Ground Water	9056A	
310-265406-6	MW-14A	Total/NA	Ground Water	9056A	
310-265406-7	MW-15A	Total/NA	Ground Water	9056A	
310-265406-8	MW-21	Total/NA	Ground Water	9056A	
310-265406-9	MW-22	Total/NA	Ground Water	9056A	
310-265406-10	MW-23	Total/NA	Ground Water	9056A	
310-265406-12	DUP-1	Total/NA	Ground Water	9056A	
MB 310-401079/3	Method Blank	Total/NA	Water	9056A	
LCS 310-401079/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 400452

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-265406-1	MW-4A	Total/NA	Ground Water	3005A	
310-265406-2	MW-5B	Total/NA	Ground Water	3005A	
310-265406-3	MW-6A	Total/NA	Ground Water	3005A	
310-265406-4	MW-8	Total/NA	Ground Water	3005A	
310-265406-5	MW-10	Total/NA	Ground Water	3005A	
310-265406-6	MW-14A	Total/NA	Ground Water	3005A	
310-265406-7	MW-15A	Total/NA	Ground Water	3005A	
310-265406-8	MW-21	Total/NA	Ground Water	3005A	
310-265406-9	MW-22	Total/NA	Ground Water	3005A	
310-265406-10	MW-23	Total/NA	Ground Water	3005A	
310-265406-12	DUP-1	Total/NA	Ground Water	3005A	
MB 310-400452/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-400452/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-265406-1 MS	MW-4A	Total/NA	Ground Water	3005A	
310-265406-1 MSD	MW-4A	Total/NA	Ground Water	3005A	
310-265406-A-11-B DU	310-265406-A-11-B DU	Total/NA	Ground Water	3005A	

Prep Batch: 401176

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-265406-1	MW-4A	Total/NA	Ground Water	7470A	
310-265406-2	MW-5B	Total/NA	Ground Water	7470A	
310-265406-3	MW-6A	Total/NA	Ground Water	7470A	
310-265406-4	MW-8	Total/NA	Ground Water	7470A	
310-265406-5	MW-10	Total/NA	Ground Water	7470A	
310-265406-6	MW-14A	Total/NA	Ground Water	7470A	
310-265406-7	MW-15A	Total/NA	Ground Water	7470A	
310-265406-8	MW-21	Total/NA	Ground Water	7470A	

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QC Association Summary

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Metals (Continued)

Prep Batch: 401176 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-265406-9	MW-22	Total/NA	Ground Water	7470A	
310-265406-10	MW-23	Total/NA	Ground Water	7470A	
310-265406-12	DUP-1	Total/NA	Ground Water	7470A	
MB 310-401176/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-401176/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 401339

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-265406-1	MW-4A	Total/NA	Ground Water	7470A	401176
310-265406-2	MW-5B	Total/NA	Ground Water	7470A	401176
310-265406-3	MW-6A	Total/NA	Ground Water	7470A	401176
310-265406-4	MW-8	Total/NA	Ground Water	7470A	401176
310-265406-5	MW-10	Total/NA	Ground Water	7470A	401176
310-265406-6	MW-14A	Total/NA	Ground Water	7470A	401176
310-265406-7	MW-15A	Total/NA	Ground Water	7470A	401176
310-265406-8	MW-21	Total/NA	Ground Water	7470A	401176
310-265406-9	MW-22	Total/NA	Ground Water	7470A	401176
310-265406-10	MW-23	Total/NA	Ground Water	7470A	401176
310-265406-12	DUP-1	Total/NA	Ground Water	7470A	401176
MB 310-401176/1-A	Method Blank	Total/NA	Water	7470A	401176
LCS 310-401176/2-A	Lab Control Sample	Total/NA	Water	7470A	401176

Analysis Batch: 402213

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-265406-1	MW-4A	Total/NA	Ground Water	6020B	400452
310-265406-2	MW-5B	Total/NA	Ground Water	6020B	400452
310-265406-3	MW-6A	Total/NA	Ground Water	6020B	400452
310-265406-4	MW-8	Total/NA	Ground Water	6020B	400452
310-265406-5	MW-10	Total/NA	Ground Water	6020B	400452
310-265406-6	MW-14A	Total/NA	Ground Water	6020B	400452
310-265406-6	MW-14A	Total/NA	Ground Water	6020B	400452
310-265406-7	MW-15A	Total/NA	Ground Water	6020B	400452
310-265406-7	MW-15A	Total/NA	Ground Water	6020B	400452
310-265406-8	MW-21	Total/NA	Ground Water	6020B	400452
310-265406-9	MW-22	Total/NA	Ground Water	6020B	400452
310-265406-10	MW-23	Total/NA	Ground Water	6020B	400452
310-265406-12	DUP-1	Total/NA	Ground Water	6020B	400452
MB 310-400452/1-A	Method Blank	Total/NA	Water	6020B	400452
LCS 310-400452/2-A	Lab Control Sample	Total/NA	Water	6020B	400452
310-265406-1 MS	MW-4A	Total/NA	Ground Water	6020B	400452
310-265406-1 MSD	MW-4A	Total/NA	Ground Water	6020B	400452
310-265406-A-11-B DU	310-265406-A-11-B DU	Total/NA	Ground Water	6020B	400452

General Chemistry

Analysis Batch: 400377

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-265406-1	MW-4A	Total/NA	Ground Water	SM 4500 H+ B	
310-265406-2	MW-5B	Total/NA	Ground Water	SM 4500 H+ B	
310-265406-3	MW-6A	Total/NA	Ground Water	SM 4500 H+ B	
310-265406-4	MW-8	Total/NA	Ground Water	SM 4500 H+ B	

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QC Association Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

General Chemistry (Continued)

Analysis Batch: 400377 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-265406-5	MW-10	Total/NA	Ground Water	SM 4500 H+ B	
310-265406-6	MW-14A	Total/NA	Ground Water	SM 4500 H+ B	
310-265406-7	MW-15A	Total/NA	Ground Water	SM 4500 H+ B	
310-265406-8	MW-21	Total/NA	Ground Water	SM 4500 H+ B	
310-265406-9	MW-22	Total/NA	Ground Water	SM 4500 H+ B	
310-265406-10	MW-23	Total/NA	Ground Water	SM 4500 H+ B	
310-265406-12	DUP-1	Total/NA	Ground Water	SM 4500 H+ B	
LCS 310-400377/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-265406-1 DU	MW-4A	Total/NA	Ground Water	SM 4500 H+ B	

Analysis Batch: 400438

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-265406-1	MW-4A	Total/NA	Ground Water	SM 2540C	
310-265406-2	MW-5B	Total/NA	Ground Water	SM 2540C	
310-265406-3	MW-6A	Total/NA	Ground Water	SM 2540C	
310-265406-4	MW-8	Total/NA	Ground Water	SM 2540C	
310-265406-5	MW-10	Total/NA	Ground Water	SM 2540C	
310-265406-6	MW-14A	Total/NA	Ground Water	SM 2540C	
310-265406-7	MW-15A	Total/NA	Ground Water	SM 2540C	
310-265406-8	MW-21	Total/NA	Ground Water	SM 2540C	
310-265406-9	MW-22	Total/NA	Ground Water	SM 2540C	
310-265406-10	MW-23	Total/NA	Ground Water	SM 2540C	
310-265406-12	DUP-1	Total/NA	Ground Water	SM 2540C	
MB 310-400438/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-400438/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-265406-5 DU	MW-10	Total/NA	Ground Water	SM 2540C	

Lab Chronicle

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-4A

Date Collected: 09/20/23 08:00

Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-1

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	401074	QTZ5	EET CF	09/28/23 22:21
Total/NA	Prep	3005A			400452	KCK5	EET CF	09/25/23 09:35
Total/NA	Analysis	6020B		1	402213	A6US	EET CF	10/11/23 11:57
Total/NA	Prep	7470A			401176	NFT2	EET CF	10/02/23 10:44
Total/NA	Analysis	7470A		1	401339	NFT2	EET CF	10/03/23 10:57
Total/NA	Analysis	SM 2540C		1	400438	ENB7	EET CF	09/22/23 15:07
Total/NA	Analysis	SM 4500 H+ B		1	400377	W9YR	EET CF	09/22/23 10:06

Client Sample ID: MW-5B

Date Collected: 09/20/23 10:55

Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-2

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	401074	QTZ5	EET CF	09/28/23 22:33
Total/NA	Prep	3005A			400452	KCK5	EET CF	09/25/23 09:35
Total/NA	Analysis	6020B		1	402213	A6US	EET CF	10/11/23 12:09
Total/NA	Prep	7470A			401176	NFT2	EET CF	10/02/23 10:44
Total/NA	Analysis	7470A		1	401339	NFT2	EET CF	10/03/23 11:00
Total/NA	Analysis	SM 2540C		1	400438	ENB7	EET CF	09/22/23 15:07
Total/NA	Analysis	SM 4500 H+ B		1	400377	W9YR	EET CF	09/22/23 09:56

Client Sample ID: MW-6A

Date Collected: 09/20/23 09:15

Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-3

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	401079	QTZ5	EET CF	09/28/23 15:44
Total/NA	Prep	3005A			400452	KCK5	EET CF	09/25/23 09:35
Total/NA	Analysis	6020B		1	402213	A6US	EET CF	10/11/23 12:12
Total/NA	Prep	7470A			401176	NFT2	EET CF	10/02/23 10:44
Total/NA	Analysis	7470A		1	401339	NFT2	EET CF	10/03/23 11:07
Total/NA	Analysis	SM 2540C		1	400438	ENB7	EET CF	09/22/23 15:07
Total/NA	Analysis	SM 4500 H+ B		1	400377	W9YR	EET CF	09/22/23 10:01

Client Sample ID: MW-8

Date Collected: 09/19/23 09:50

Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-4

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	401079	QTZ5	EET CF	09/28/23 16:31
Total/NA	Prep	3005A			400452	KCK5	EET CF	09/25/23 09:35
Total/NA	Analysis	6020B		1	402213	A6US	EET CF	10/11/23 12:14
Total/NA	Prep	7470A			401176	NFT2	EET CF	10/02/23 10:44
Total/NA	Analysis	7470A		1	401339	NFT2	EET CF	10/03/23 11:10

Eurofins Cedar Falls

Lab Chronicle

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-8
Date Collected: 09/19/23 09:50
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-4
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 2540C		1	400438	ENB7	EET CF	09/22/23 15:07
Total/NA	Analysis	SM 4500 H+ B		1	400377	W9YR	EET CF	09/22/23 10:13

Client Sample ID: MW-10
Date Collected: 09/18/23 11:45
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-5
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	401079	QTZ5	EET CF	09/28/23 16:46
Total/NA	Prep	3005A			400452	KCK5	EET CF	09/25/23 09:35
Total/NA	Analysis	6020B		1	402213	A6US	EET CF	10/11/23 12:36
Total/NA	Prep	7470A			401176	NFT2	EET CF	10/02/23 10:44
Total/NA	Analysis	7470A		1	401339	NFT2	EET CF	10/03/23 11:12
Total/NA	Analysis	SM 2540C		1	400438	ENB7	EET CF	09/22/23 15:07
Total/NA	Analysis	SM 4500 H+ B		1	400377	W9YR	EET CF	09/22/23 10:15

Client Sample ID: MW-14A
Date Collected: 09/19/23 11:50
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-6
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	401079	QTZ5	EET CF	09/28/23 17:02
Total/NA	Analysis	9056A		100	401079	QTZ5	EET CF	09/29/23 12:55
Total/NA	Prep	3005A			400452	KCK5	EET CF	09/25/23 09:35
Total/NA	Analysis	6020B		1	402213	A6US	EET CF	10/11/23 12:38
Total/NA	Prep	3005A			400452	KCK5	EET CF	09/25/23 09:35
Total/NA	Analysis	6020B		10	402213	A6US	EET CF	10/11/23 13:19
Total/NA	Prep	7470A			401176	NFT2	EET CF	10/02/23 10:44
Total/NA	Analysis	7470A		1	401339	NFT2	EET CF	10/03/23 11:14
Total/NA	Analysis	SM 2540C		1	400438	ENB7	EET CF	09/22/23 15:07
Total/NA	Analysis	SM 4500 H+ B		1	400377	W9YR	EET CF	09/22/23 10:08

Client Sample ID: MW-15A
Date Collected: 09/19/23 13:00
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-7
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	401079	QTZ5	EET CF	09/28/23 17:17
Total/NA	Prep	3005A			400452	KCK5	EET CF	09/25/23 09:35
Total/NA	Analysis	6020B		1	402213	A6US	EET CF	10/11/23 12:40
Total/NA	Prep	3005A			400452	KCK5	EET CF	09/25/23 09:35
Total/NA	Analysis	6020B		10	402213	A6US	EET CF	10/11/23 13:21
Total/NA	Prep	7470A			401176	NFT2	EET CF	10/02/23 10:44
Total/NA	Analysis	7470A		1	401339	NFT2	EET CF	10/03/23 11:16

Lab Chronicle

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: MW-15A

Date Collected: 09/19/23 13:00

Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-7

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 2540C		1	400438	ENB7	EET CF	09/22/23 15:07
Total/NA	Analysis	SM 4500 H+ B		1	400377	W9YR	EET CF	09/22/23 10:12

Client Sample ID: MW-21

Date Collected: 09/19/23 10:50

Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-8

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	401079	QTZ5	EET CF	09/28/23 17:33
Total/NA	Prep	3005A			400452	KCK5	EET CF	09/25/23 09:35
Total/NA	Analysis	6020B		1	402213	A6US	EET CF	10/11/23 12:43
Total/NA	Prep	7470A			401176	NFT2	EET CF	10/02/23 10:44
Total/NA	Analysis	7470A		1	401339	NFT2	EET CF	10/03/23 11:22
Total/NA	Analysis	SM 2540C		1	400438	ENB7	EET CF	09/22/23 15:07
Total/NA	Analysis	SM 4500 H+ B		1	400377	W9YR	EET CF	09/22/23 09:57

Client Sample ID: MW-22

Date Collected: 09/18/23 14:30

Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-9

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	401079	QTZ5	EET CF	09/28/23 17:49
Total/NA	Prep	3005A			400452	KCK5	EET CF	09/25/23 09:35
Total/NA	Analysis	6020B		1	402213	A6US	EET CF	10/11/23 12:45
Total/NA	Prep	7470A			401176	NFT2	EET CF	10/02/23 10:44
Total/NA	Analysis	7470A		1	401339	NFT2	EET CF	10/03/23 11:24
Total/NA	Analysis	SM 2540C		1	400438	ENB7	EET CF	09/22/23 15:07
Total/NA	Analysis	SM 4500 H+ B		1	400377	W9YR	EET CF	09/22/23 10:14

Client Sample ID: MW-23

Date Collected: 09/18/23 13:05

Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-10

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	401079	QTZ5	EET CF	09/28/23 18:06
Total/NA	Prep	3005A			400452	KCK5	EET CF	09/25/23 09:35
Total/NA	Analysis	6020B		1	402213	A6US	EET CF	10/11/23 12:47
Total/NA	Prep	7470A			401176	NFT2	EET CF	10/02/23 10:44
Total/NA	Analysis	7470A		1	401339	NFT2	EET CF	10/03/23 11:27
Total/NA	Analysis	SM 2540C		1	400438	ENB7	EET CF	09/22/23 15:07
Total/NA	Analysis	SM 4500 H+ B		1	400377	W9YR	EET CF	09/22/23 10:09

Lab Chronicle

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Client Sample ID: DUP-1

Date Collected: 09/18/23 12:00

Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-12

Matrix: Ground Water

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Analyst</u>	<u>Lab</u>	<u>Prepared or Analyzed</u>
Total/NA	Analysis	9056A		5	401079	QTZ5	EET CF	09/28/23 18:37
Total/NA	Prep	3005A			400452	KCK5	EET CF	09/25/23 09:35
Total/NA	Analysis	6020B		1	402213	A6US	EET CF	10/11/23 13:01
Total/NA	Prep	7470A			401176	NFT2	EET CF	10/02/23 10:44
Total/NA	Analysis	7470A		1	401339	NFT2	EET CF	10/03/23 11:29
Total/NA	Analysis	SM 2540C		1	400438	ENB7	EET CF	09/22/23 15:07
Total/NA	Analysis	SM 4500 H+ B		1	400377	W9YR	EET CF	09/22/23 10:11

Laboratory References:

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

- 1
- 2
- 3
- 4
- 5
- 6
- 7
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- 13
- 14

Accreditation/Certification Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

Laboratory: Eurofins Cedar Falls

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

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

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

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

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

Method Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-1

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

Protocol References:

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

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

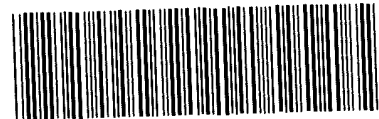
Laboratory References:

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





Environment Testing
America



310-265406 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscataine Power + water</u>			
City/State:	CITY	STATE	Project:
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>9/22/23</u>	<u>0835</u>	<u>[Signature]</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>0.0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>4.7</u>		Corrected Temp (°C): <u>4.7</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> 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?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE. If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			





Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscataine Power & Water</u>			
City/State:	CITY	STATE	Project:
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By
	<u>9/22/23</u>	<u>0835</u>	<u>[Signature]</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee			
<input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler ID:			
Multiple Coolers? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler # <u>2</u> of <u>3</u>			
Cooler Custody Seals Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Sample Custody Seals Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Trip Blank Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Which VOA samples are in cooler? ↓			
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>to 0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>3.3</u>		Corrected Temp (°C): <u>3.3</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>		<u>CONTAINER 2</u>
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> 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?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			





Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscatare Power & Water</u>			
City/State.	CITY	STATE	Project:
Receipt Information			
Date/Time Received:	DATE <u>9/22/23</u>	TIME <u>0835</u>	Received By: <u>[Signature]</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>3</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>to 0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>2.5</u>		Corrected Temp (°C): <u>2.5</u>	
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> 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?) <input type="checkbox"/> Yes <input type="checkbox"/> 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 Fax (319) 277-2425

Chain of Custody Record

Client Information Client Contact: Sam Bennett MP&W Company: Muscatine Power & Water Address: 1700 Dick Drake Way City: Muscatine State, Zip: IA, 52761 Phone: 234488 Email: sbennett@mpw.org Project Name: Muscatine Power & Water State Landfill Site: Iowa		Lab P.M.: Hayes, Shawn M E-Mail: shawn.hayes@testamericainc.com Carrier Tracking No(s): COC No: Page: 1 Job #:	
Due Date Requested: TAT Requested (days)		Analysis Requested	
PO #: 234488 WO #:		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Event: Fall 2023		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - ph 4-5 Z - other (specify)	
TestAmerica Project #:		Total Number of Containers:	
Site: Iowa		Special Instructions/Note:	
Sample Identification		Special Instructions/Note:	
Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=oil, A=air)
9/20/23	0800	G	GW
9/20/23	1055	G	GW
9/20/23	915	G	GW
9/19/23	950	G	GW
9/18/23	1145	G	GW
9/19/23	1150	G	GW
9/19/23	1300	G	GW
9/19/23	1050	G	GW
9/18/23	1430	G	GW
9/18/23	1305	G	GW
9/19/23	0900	G	GW
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological			
Deliverable Requested I, II, III, IV Other (specify)			
Empty Kit Relinquished by			
Relinquished by: <i>Shawn Hayes</i>		Date: 5/21/23 0900	
Relinquished by:		Date/Time:	
Relinquished by:		Date/Time:	
Relinquished by:		Date/Time:	
Custody Seals Intact:		Custody Seal No:	
Δ Yes Δ No		Cooler Temperature(s) °C and Other Remarks:	



Eurofins Cedar Falls

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

Chain of Custody Record

Client Information Client Contact: Sam Bennett MP&W Company: Muscatine Power & Water Address: 1700 Dick Drake Way City: Muscatine State, Zip: IA, 52761 Phone: 234488 Email: sbennett@mpw.org Project Name: Muscatine Power & Water State Landfill Site: Iowa		Lab PM: Hayes, Shawn M E-Mail: shawn.hayes@testamcainc.com Carrier Tracking No(s): Lab No: 2 Job #:	
Due Date Requested: TAT Requested (days): PO #: 234488 WO #:		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 Other:	
Sample Identification: MW-26 MW-27 Duplicate-1 Duplicate-2		Total Number of Containers: Special Instructions/Note:	
Sample Date: 9/20/23 Sample Time: 1235 Sample Type (C=Comp, G=grab): G Matrix (W=water, S=solid, O=oil, BT=Thru, A=Air): GW	Field Filtered Sample (Yes or No): Perform MS/MSD (Yes or No): 905A State Metals List 905A Chloride, Fluoride, Sulfate	Preservation Code: D N	Special Disposal (A fee may be assessed if samples are retained longer than 1 month): <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab Archive For: _____ Months
Possible Hazard Identification: <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological			
Deliverable Requested: I, II, III, IV, Other (specify)			
Empty Kit Relinquished by:		Date:	
Relinquished by: <i>NW/AMW</i>		Date/Time: 9/21/23 0900	
Relinquished by:		Date/Time:	
Relinquished by:		Date/Time:	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Cooler Temperature(s) °C and Other Remarks:	



Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-265406-1

Login Number: 265406

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Homolar, Dana J

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	4B showing on COC - containers have 4A - logged as 4A
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 <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

PREPARED FOR

Attn: Sam Bennett
Muscatine Power & Water
1700 Dick Drake Way
PO BOX 899
Muscatine, Iowa 52761

Generated 10/26/2023 8:28:23 AM

JOB DESCRIPTION

Muscatine Power & Water CCR Landfill

JOB NUMBER

310-265406-2

Eurofins Cedar Falls

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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

Authorization



Generated
10/26/2023 8:28:23 AM

Authorized for release by
Matthew Hummel, Project Manager I
Matthew.Hummel@et.eurofinsus.com
(319)595-2010



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Case Narrative

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Job ID: 310-265406-2

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-265406-2

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method. Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The samples were received on 9/22/2023 8:35 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 2.5°C, 3.3°C and 4.7°C

Gas Flow Proportional Counter

Method 9315_Ra226: Radium-226 batch 630051

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

MW-4A (310-265406-1), MW-5B (310-265406-2), MW-6A (310-265406-3), MW-8 (310-265406-4), MW-10 (310-265406-5), MW-14A (310-265406-6), MW-15A (310-265406-7), MW-21 (310-265406-8), MW-22 (310-265406-9), MW-23 (310-265406-10), DUP-1 (310-265406-12), (LCS 160-630051/2-A), (MB 160-630051/1-A) and (310-265406-D-6-A DU)

Method 9320_Ra228: Radium-228 batch 630054

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date.

MW-4A (310-265406-1), MW-5B (310-265406-2), MW-6A (310-265406-3), MW-8 (310-265406-4), MW-10 (310-265406-5), MW-14A (310-265406-6), MW-15A (310-265406-7), MW-21 (310-265406-8), MW-22 (310-265406-9), MW-23 (310-265406-10), DUP-1 (310-265406-12), (LCS 160-630054/2-A), (MB 160-630054/1-A) and (310-265406-D-6-B DU)

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: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-265406-1	MW-4A	Ground Water	09/20/23 08:00	09/22/23 08:35
310-265406-2	MW-5B	Ground Water	09/20/23 10:55	09/22/23 08:35
310-265406-3	MW-6A	Ground Water	09/20/23 09:15	09/22/23 08:35
310-265406-4	MW-8	Ground Water	09/19/23 09:50	09/22/23 08:35
310-265406-5	MW-10	Ground Water	09/18/23 11:45	09/22/23 08:35
310-265406-6	MW-14A	Ground Water	09/19/23 11:50	09/22/23 08:35
310-265406-7	MW-15A	Ground Water	09/19/23 13:00	09/22/23 08:35
310-265406-8	MW-21	Ground Water	09/19/23 10:50	09/22/23 08:35
310-265406-9	MW-22	Ground Water	09/18/23 14:30	09/22/23 08:35
310-265406-10	MW-23	Ground Water	09/18/23 13:05	09/22/23 08:35
310-265406-12	DUP-1	Ground Water	09/18/23 12:00	09/22/23 08:35

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Detection Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Client Sample ID: MW-4A

Lab Sample ID: 310-265406-1

No Detections.

Client Sample ID: MW-5B

Lab Sample ID: 310-265406-2

No Detections.

Client Sample ID: MW-6A

Lab Sample ID: 310-265406-3

No Detections.

Client Sample ID: MW-8

Lab Sample ID: 310-265406-4

No Detections.

Client Sample ID: MW-10

Lab Sample ID: 310-265406-5

No Detections.

Client Sample ID: MW-14A

Lab Sample ID: 310-265406-6

No Detections.

Client Sample ID: MW-15A

Lab Sample ID: 310-265406-7

No Detections.

Client Sample ID: MW-21

Lab Sample ID: 310-265406-8

No Detections.

Client Sample ID: MW-22

Lab Sample ID: 310-265406-9

No Detections.

Client Sample ID: MW-23

Lab Sample ID: 310-265406-10

No Detections.

Client Sample ID: DUP-1

Lab Sample ID: 310-265406-12

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Client Sample ID: MW-4A

Lab Sample ID: 310-265406-1

Date Collected: 09/20/23 08:00

Matrix: Ground Water

Date Received: 09/22/23 08:35

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.109	U	0.0831	0.0837	1.00	0.117	pCi/L	09/29/23 10:38	10/24/23 07:25	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.8		30 - 110					09/29/23 10:38	10/24/23 07:25	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	0.466	U	0.372	0.375	1.00	0.576	pCi/L	09/29/23 10:42	10/18/23 11:49	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.8		30 - 110					09/29/23 10:42	10/18/23 11:49	1
Y Carrier	80.7		30 - 110					09/29/23 10:42	10/18/23 11:49	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.575	U	0.381	0.384	5.00	0.576	pCi/L		10/25/23 16:15	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Client Sample ID: MW-5B
 Date Collected: 09/20/23 10:55
 Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-2
 Matrix: Ground Water

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.374		0.134	0.138	1.00	0.131	pCi/L	09/29/23 10:38	10/24/23 07:25	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	81.7		30 - 110					09/29/23 10:38	10/24/23 07:25	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	0.775		0.373	0.379	1.00	0.488	pCi/L	09/29/23 10:42	10/18/23 11:49	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	81.7		30 - 110					09/29/23 10:42	10/18/23 11:49	1
Y Carrier	84.1		30 - 110					09/29/23 10:42	10/18/23 11:49	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.15		0.396	0.403	5.00	0.488	pCi/L		10/25/23 16:15	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Client Sample ID: MW-6A

Lab Sample ID: 310-265406-3

Date Collected: 09/20/23 09:15

Matrix: Ground Water

Date Received: 09/22/23 08:35

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.237		0.0998	0.102	1.00	0.0931	pCi/L	09/29/23 10:38	10/24/23 07:26	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.8		30 - 110					09/29/23 10:38	10/24/23 07:26	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	0.679		0.384	0.389	1.00	0.550	pCi/L	09/29/23 10:42	10/18/23 11:49	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.8		30 - 110					09/29/23 10:42	10/18/23 11:49	1
Y Carrier	82.6		30 - 110					09/29/23 10:42	10/18/23 11:49	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.916		0.397	0.402	5.00	0.550	pCi/L		10/25/23 16:15	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Client Sample ID: MW-8

Lab Sample ID: 310-265406-4

Date Collected: 09/19/23 09:50

Matrix: Ground Water

Date Received: 09/22/23 08:35

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0608	U	0.0652	0.0654	1.00	0.101	pCi/L	09/29/23 10:38	10/24/23 07:26	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.3		30 - 110					09/29/23 10:38	10/24/23 07:26	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	0.973		0.444	0.453	1.00	0.604	pCi/L	09/29/23 10:42	10/18/23 11:49	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.3		30 - 110					09/29/23 10:42	10/18/23 11:49	1
Y Carrier	83.4		30 - 110					09/29/23 10:42	10/18/23 11:49	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.03		0.449	0.458	5.00	0.604	pCi/L		10/25/23 16:15	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Client Sample ID: MW-10

Lab Sample ID: 310-265406-5

Date Collected: 09/18/23 11:45

Matrix: Ground Water

Date Received: 09/22/23 08:35

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.466		0.137	0.143	1.00	0.102	pCi/L	09/29/23 10:38	10/24/23 07:26	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.6		30 - 110					09/29/23 10:38	10/24/23 07:26	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.01		0.400	0.411	1.00	0.491	pCi/L	09/29/23 10:42	10/18/23 11:49	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.6		30 - 110					09/29/23 10:42	10/18/23 11:49	1
Y Carrier	82.2		30 - 110					09/29/23 10:42	10/18/23 11:49	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.48		0.423	0.435	5.00	0.491	pCi/L		10/25/23 16:15	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Client Sample ID: MW-14A

Lab Sample ID: 310-265406-6

Date Collected: 09/19/23 11:50

Matrix: Ground Water

Date Received: 09/22/23 08:35

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.132	U	0.0979	0.0986	1.00	0.139	pCi/L	09/29/23 10:38	10/24/23 07:26	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	81.7		30 - 110					09/29/23 10:38	10/24/23 07:26	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	0.438	U	0.362	0.364	1.00	0.560	pCi/L	09/29/23 10:42	10/18/23 11:49	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	81.7		30 - 110					09/29/23 10:42	10/18/23 11:49	1
Y Carrier	83.0		30 - 110					09/29/23 10:42	10/18/23 11:49	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.570		0.375	0.377	5.00	0.560	pCi/L		10/25/23 16:19	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Client Sample ID: MW-15A

Lab Sample ID: 310-265406-7

Date Collected: 09/19/23 13:00

Matrix: Ground Water

Date Received: 09/22/23 08:35

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0536	U	0.0680	0.0682	1.00	0.112	pCi/L	09/29/23 10:38	10/24/23 07:26	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	82.4		30 - 110					09/29/23 10:38	10/24/23 07:26	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	0.0640	U	0.344	0.344	1.00	0.629	pCi/L	09/29/23 10:42	10/18/23 11:49	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	82.4		30 - 110					09/29/23 10:42	10/18/23 11:49	1
Y Carrier	78.5		30 - 110					09/29/23 10:42	10/18/23 11:49	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.118	U	0.351	0.351	5.00	0.629	pCi/L		10/25/23 16:19	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Client Sample ID: MW-21

Lab Sample ID: 310-265406-8

Date Collected: 09/19/23 10:50

Matrix: Ground Water

Date Received: 09/22/23 08:35

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0898	U	0.0880	0.0884	1.00	0.137	pCi/L	09/29/23 10:38	10/24/23 07:31	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.9		30 - 110					09/29/23 10:38	10/24/23 07:31	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	0.407	U	0.429	0.431	1.00	0.697	pCi/L	09/29/23 10:42	10/18/23 11:48	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.9		30 - 110					09/29/23 10:42	10/18/23 11:48	1
Y Carrier	77.8		30 - 110					09/29/23 10:42	10/18/23 11:48	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.497	U	0.438	0.440	5.00	0.697	pCi/L		10/25/23 16:19	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Client Sample ID: MW-22

Lab Sample ID: 310-265406-9

Date Collected: 09/18/23 14:30

Matrix: Ground Water

Date Received: 09/22/23 08:35

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.146	U	0.111	0.112	1.00	0.163	pCi/L	09/29/23 10:38	10/24/23 07:31	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	82.6		30 - 110					09/29/23 10:38	10/24/23 07:31	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	0.966		0.417	0.426	1.00	0.535	pCi/L	09/29/23 10:42	10/18/23 11:48	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	82.6		30 - 110					09/29/23 10:42	10/18/23 11:48	1
Y Carrier	81.9		30 - 110					09/29/23 10:42	10/18/23 11:48	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.11		0.432	0.440	5.00	0.535	pCi/L		10/25/23 16:19	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Client Sample ID: MW-23

Lab Sample ID: 310-265406-10

Date Collected: 09/18/23 13:05

Matrix: Ground Water

Date Received: 09/22/23 08:35

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0679	U	0.0893	0.0895	1.00	0.149	pCi/L	09/29/23 10:38	10/24/23 07:31	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	84.6		30 - 110					09/29/23 10:38	10/24/23 07:31	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	0.538	U	0.449	0.451	1.00	0.709	pCi/L	09/29/23 10:42	10/18/23 11:48	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	84.6		30 - 110					09/29/23 10:42	10/18/23 11:48	1
Y Carrier	84.1		30 - 110					09/29/23 10:42	10/18/23 11:48	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.606	U	0.458	0.460	5.00	0.709	pCi/L		10/25/23 16:19	1

Client Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Client Sample ID: DUP-1

Lab Sample ID: 310-265406-12

Date Collected: 09/18/23 12:00

Matrix: Ground Water

Date Received: 09/22/23 08:35

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.315		0.129	0.133	1.00	0.150	pCi/L	09/29/23 10:38	10/24/23 07:32	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.2		30 - 110					09/29/23 10:38	10/24/23 07:32	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	0.254	U	0.329	0.329	1.00	0.547	pCi/L	09/29/23 10:42	10/18/23 11:48	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.2		30 - 110					09/29/23 10:42	10/18/23 11:48	1
Y Carrier	86.7		30 - 110					09/29/23 10:42	10/18/23 11:48	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.568		0.353	0.355	5.00	0.547	pCi/L		10/25/23 16:19	1

Definitions/Glossary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Qualifiers

Rad

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

Glossary

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

QC Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-630051/1-A
Matrix: Water
Analysis Batch: 633137

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 630051

Analyte	MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.1018	U	0.0801	0.0807	1.00	0.114	pCi/L	09/29/23 10:38	10/24/23 07:23	1
Carrier	MB		Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.5		30 - 110					09/29/23 10:38	10/24/23 07:23	1

Lab Sample ID: LCS 160-630051/2-A
Matrix: Water
Analysis Batch: 633137

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 630051

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	10.61		1.13	1.00	0.113	pCi/L	94	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	91.7		30 - 110						

Lab Sample ID: 310-265406-6 DU
Matrix: Ground Water
Analysis Batch: 633137

Client Sample ID: MW-14A
Prep Type: Total/NA
Prep Batch: 630051

Analyte	Sample		DU		Total	RL	MDC	Unit	RER	RER Limit
	Result	Sample Qual	Result	DU Qual	Uncert. (2σ+/-)					
Radium-226	0.132	U	0.05241	U	0.0863	1.00	0.151	pCi/L	0.43	1
Carrier	DU %Yield	DU Qualifier	Limits							
Ba Carrier	67.7		30 - 110							

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-630054/1-A
Matrix: Water
Analysis Batch: 632342

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 630054

Analyte	MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.4379	U	0.374	0.376	1.00	0.587	pCi/L	09/29/23 10:42	10/18/23 11:49	1
Carrier	MB		Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.5		30 - 110					09/29/23 10:42	10/18/23 11:49	1
Y Carrier	79.6		30 - 110					09/29/23 10:42	10/18/23 11:49	1

QC Sample Results

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

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

Lab Sample ID: LCS 160-630054/2-A
Matrix: Water
Analysis Batch: 632342

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 630054

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	
										Radium-228
LCS LCS										
Carrier	%Yield	Qualifier	Limits							
Ba Carrier	91.7		30 - 110							
Y Carrier	82.2		30 - 110							

Lab Sample ID: 310-265406-6 DU
Matrix: Ground Water
Analysis Batch: 632342

Client Sample ID: MW-14A
Prep Type: Total/NA
Prep Batch: 630054

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	Limit
DU DU										
Carrier	%Yield	Qualifier	Limits							
Ba Carrier	67.7		30 - 110							
Y Carrier	83.0		30 - 110							

QC Association Summary

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Rad

Prep Batch: 630051

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-265406-1	MW-4A	Total/NA	Ground Water	PrecSep-21	
310-265406-2	MW-5B	Total/NA	Ground Water	PrecSep-21	
310-265406-3	MW-6A	Total/NA	Ground Water	PrecSep-21	
310-265406-4	MW-8	Total/NA	Ground Water	PrecSep-21	
310-265406-5	MW-10	Total/NA	Ground Water	PrecSep-21	
310-265406-6	MW-14A	Total/NA	Ground Water	PrecSep-21	
310-265406-7	MW-15A	Total/NA	Ground Water	PrecSep-21	
310-265406-8	MW-21	Total/NA	Ground Water	PrecSep-21	
310-265406-9	MW-22	Total/NA	Ground Water	PrecSep-21	
310-265406-10	MW-23	Total/NA	Ground Water	PrecSep-21	
310-265406-12	DUP-1	Total/NA	Ground Water	PrecSep-21	
MB 160-630051/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-630051/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
310-265406-6 DU	MW-14A	Total/NA	Ground Water	PrecSep-21	

Prep Batch: 630054

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-265406-1	MW-4A	Total/NA	Ground Water	PrecSep_0	
310-265406-2	MW-5B	Total/NA	Ground Water	PrecSep_0	
310-265406-3	MW-6A	Total/NA	Ground Water	PrecSep_0	
310-265406-4	MW-8	Total/NA	Ground Water	PrecSep_0	
310-265406-5	MW-10	Total/NA	Ground Water	PrecSep_0	
310-265406-6	MW-14A	Total/NA	Ground Water	PrecSep_0	
310-265406-7	MW-15A	Total/NA	Ground Water	PrecSep_0	
310-265406-8	MW-21	Total/NA	Ground Water	PrecSep_0	
310-265406-9	MW-22	Total/NA	Ground Water	PrecSep_0	
310-265406-10	MW-23	Total/NA	Ground Water	PrecSep_0	
310-265406-12	DUP-1	Total/NA	Ground Water	PrecSep_0	
MB 160-630054/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-630054/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
310-265406-6 DU	MW-14A	Total/NA	Ground Water	PrecSep_0	

Lab Chronicle

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Client Sample ID: MW-4A

Lab Sample ID: 310-265406-1

Date Collected: 09/20/23 08:00

Matrix: Ground Water

Date Received: 09/22/23 08:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			630051	KAC	EET SL	09/29/23 10:38
Total/NA	Analysis	9315		1	633137	FLC	EET SL	10/24/23 07:25
Total/NA	Prep	PrecSep_0			630054	KAC	EET SL	09/29/23 10:42
Total/NA	Analysis	9320		1	632342	FLC	EET SL	10/18/23 11:49
Total/NA	Analysis	Ra226_Ra228		1	633460	EMH	EET SL	10/25/23 16:15

Client Sample ID: MW-5B

Lab Sample ID: 310-265406-2

Date Collected: 09/20/23 10:55

Matrix: Ground Water

Date Received: 09/22/23 08:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			630051	KAC	EET SL	09/29/23 10:38
Total/NA	Analysis	9315		1	633137	FLC	EET SL	10/24/23 07:25
Total/NA	Prep	PrecSep_0			630054	KAC	EET SL	09/29/23 10:42
Total/NA	Analysis	9320		1	632342	FLC	EET SL	10/18/23 11:49
Total/NA	Analysis	Ra226_Ra228		1	633460	EMH	EET SL	10/25/23 16:15

Client Sample ID: MW-6A

Lab Sample ID: 310-265406-3

Date Collected: 09/20/23 09:15

Matrix: Ground Water

Date Received: 09/22/23 08:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			630051	KAC	EET SL	09/29/23 10:38
Total/NA	Analysis	9315		1	633137	FLC	EET SL	10/24/23 07:26
Total/NA	Prep	PrecSep_0			630054	KAC	EET SL	09/29/23 10:42
Total/NA	Analysis	9320		1	632342	FLC	EET SL	10/18/23 11:49
Total/NA	Analysis	Ra226_Ra228		1	633460	EMH	EET SL	10/25/23 16:15

Client Sample ID: MW-8

Lab Sample ID: 310-265406-4

Date Collected: 09/19/23 09:50

Matrix: Ground Water

Date Received: 09/22/23 08:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			630051	KAC	EET SL	09/29/23 10:38
Total/NA	Analysis	9315		1	633137	FLC	EET SL	10/24/23 07:26
Total/NA	Prep	PrecSep_0			630054	KAC	EET SL	09/29/23 10:42
Total/NA	Analysis	9320		1	632342	FLC	EET SL	10/18/23 11:49
Total/NA	Analysis	Ra226_Ra228		1	633460	EMH	EET SL	10/25/23 16:15

Lab Chronicle

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Client Sample ID: MW-10

Lab Sample ID: 310-265406-5

Date Collected: 09/18/23 11:45

Matrix: Ground Water

Date Received: 09/22/23 08:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			630051	KAC	EET SL	09/29/23 10:38
Total/NA	Analysis	9315		1	633137	FLC	EET SL	10/24/23 07:26
Total/NA	Prep	PrecSep_0			630054	KAC	EET SL	09/29/23 10:42
Total/NA	Analysis	9320		1	632342	FLC	EET SL	10/18/23 11:49
Total/NA	Analysis	Ra226_Ra228		1	633460	EMH	EET SL	10/25/23 16:15

Client Sample ID: MW-14A

Lab Sample ID: 310-265406-6

Date Collected: 09/19/23 11:50

Matrix: Ground Water

Date Received: 09/22/23 08:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			630051	KAC	EET SL	09/29/23 10:38
Total/NA	Analysis	9315		1	633137	FLC	EET SL	10/24/23 07:26
Total/NA	Prep	PrecSep_0			630054	KAC	EET SL	09/29/23 10:42
Total/NA	Analysis	9320		1	632342	FLC	EET SL	10/18/23 11:49
Total/NA	Analysis	Ra226_Ra228		1	633460	EMH	EET SL	10/25/23 16:19

Client Sample ID: MW-15A

Lab Sample ID: 310-265406-7

Date Collected: 09/19/23 13:00

Matrix: Ground Water

Date Received: 09/22/23 08:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			630051	KAC	EET SL	09/29/23 10:38
Total/NA	Analysis	9315		1	633137	FLC	EET SL	10/24/23 07:26
Total/NA	Prep	PrecSep_0			630054	KAC	EET SL	09/29/23 10:42
Total/NA	Analysis	9320		1	632342	FLC	EET SL	10/18/23 11:49
Total/NA	Analysis	Ra226_Ra228		1	633460	EMH	EET SL	10/25/23 16:19

Client Sample ID: MW-21

Lab Sample ID: 310-265406-8

Date Collected: 09/19/23 10:50

Matrix: Ground Water

Date Received: 09/22/23 08:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			630051	KAC	EET SL	09/29/23 10:38
Total/NA	Analysis	9315		1	633299	FLC	EET SL	10/24/23 07:31
Total/NA	Prep	PrecSep_0			630054	KAC	EET SL	09/29/23 10:42
Total/NA	Analysis	9320		1	632342	FLC	EET SL	10/18/23 11:48
Total/NA	Analysis	Ra226_Ra228		1	633460	EMH	EET SL	10/25/23 16:19

Lab Chronicle

Client: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Client Sample ID: MW-22

Lab Sample ID: 310-265406-9

Date Collected: 09/18/23 14:30

Matrix: Ground Water

Date Received: 09/22/23 08:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			630051	KAC	EET SL	09/29/23 10:38
Total/NA	Analysis	9315		1	633299	FLC	EET SL	10/24/23 07:31
Total/NA	Prep	PrecSep_0			630054	KAC	EET SL	09/29/23 10:42
Total/NA	Analysis	9320		1	632342	FLC	EET SL	10/18/23 11:48
Total/NA	Analysis	Ra226_Ra228		1	633460	EMH	EET SL	10/25/23 16:19

Client Sample ID: MW-23

Lab Sample ID: 310-265406-10

Date Collected: 09/18/23 13:05

Matrix: Ground Water

Date Received: 09/22/23 08:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			630051	KAC	EET SL	09/29/23 10:38
Total/NA	Analysis	9315		1	633299	FLC	EET SL	10/24/23 07:31
Total/NA	Prep	PrecSep_0			630054	KAC	EET SL	09/29/23 10:42
Total/NA	Analysis	9320		1	632342	FLC	EET SL	10/18/23 11:48
Total/NA	Analysis	Ra226_Ra228		1	633460	EMH	EET SL	10/25/23 16:19

Client Sample ID: DUP-1

Lab Sample ID: 310-265406-12

Date Collected: 09/18/23 12:00

Matrix: Ground Water

Date Received: 09/22/23 08:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			630051	KAC	EET SL	09/29/23 10:38
Total/NA	Analysis	9315		1	633299	FLC	EET SL	10/24/23 07:32
Total/NA	Prep	PrecSep_0			630054	KAC	EET SL	09/29/23 10:42
Total/NA	Analysis	9320		1	632344	FLC	EET SL	10/18/23 11:48
Total/NA	Analysis	Ra226_Ra228		1	633460	EMH	EET SL	10/25/23 16:19

Laboratory References:

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

Accreditation/Certification Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

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	Ground Water	Radium-226
9320	PrecSep_0	Ground Water	Radium-228
Ra226_Ra228		Ground Water	Combined Radium 226 + 228

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

Method Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Method	Method Description	Protocol	Laboratory
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
PrecSep_0	Preparation, Precipitate Separation	None	EET SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	EET SL

Protocol References:

None = None

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.

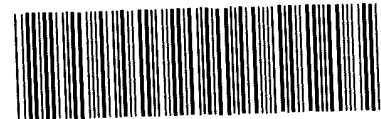
Laboratory References:

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





Environment Testing
America



310-265406 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscataine Power + water</u>			
City/State:	CITY	STATE	Project:
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>9/22/23</u>	<u>0835</u>	<u>[Signature]</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>0.0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>4.7</u>		Corrected Temp (°C): <u>4.7</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> 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?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE. If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			





Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscataine Power & Water</u>			
City/State:	CITY	STATE	Project:
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By
	<u>9/22/23</u>	<u>0835</u>	<u>[Signature]</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler ID: _____			
Multiple Coolers? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler # <u>2</u> of <u>3</u>			
Cooler Custody Seals Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Sample Custody Seals Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Trip Blank Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Which VOA samples are in cooler? ↓			
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>to 0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>3.3</u>		Corrected Temp (°C): <u>3.3</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> 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?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			





Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscatare Power & Water</u>			
City/State.	CITY	STATE	Project:
Receipt Information			
Date/Time Received:	DATE <u>9/22/23</u>	TIME <u>0835</u>	Received By: <u>[Signature]</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>3</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>to 0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>2.5</u>		Corrected Temp (°C): <u>2.5</u>	
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> 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?) <input type="checkbox"/> Yes <input type="checkbox"/> 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 Fax (319) 277-2425

Chain of Custody Record

Client Information Client Contact: Sam Bennett MP&W Company: Muscatine Power & Water Address: 1700 Dick Drake Way City: Muscatine State, Zip: IA, 52761 Phone: 234488 Email: sbennett@mpw.org Project Name: Muscatine Power & Water State Landfill Site: Iowa		Lab P.M.: Hayes, Shawn M E-Mail: shawn.hayes@testamericainc.com Carrier Tracking No(s): COC No: Page: 1 Job #:	
Due Date Requested: TAT Requested (days)		Analysis Requested	
PO #: 234488 WO #:		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Event: Fall 2023		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 X - EDTA Z - other (specify)	
TestAmerica Project #:		Total Number of Containers:	
Site: Iowa		Special Instructions/Note:	
Sample Identification		Special Instructions/Note:	
Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=oil, A=air)
9/20/23	0800	G	GW
9/20/23	1055	G	GW
9/20/23	915	G	GW
9/19/23	950	G	GW
9/18/23	1145	G	GW
9/19/23	1150	G	GW
9/19/23	1300	G	GW
9/19/23	1050	G	GW
9/18/23	1430	G	GW
9/18/23	1305	G	GW
9/19/23	0900	G	GW
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological			
Deliverable Requested I, II, III, IV Other (specify)			
Empty Kit Relinquished by			
Relinquished by: <i>Shawn Hayes</i>		Date: 9/21/23 0900	
Relinquished by:		Date/Time:	
Relinquished by:		Date/Time:	
Relinquished by:		Date/Time:	
Custody Seals Intact:		Custody Seal No:	
Δ Yes Δ No		Cooler Temperature(s) °C and Other Remarks:	



Chain of Custody Record

Client Information Client Contact: Sam Bennett MP&W Company: Muscatine Power & Water Address: 1700 Dick Drake Way City: Muscatine State/Zip: IA, 52761 Phone: 234488 Email: sbennett@mpw.org		Lab PM: Hayes, Shawn M E-Mail: shawn.hayes@testamerinc.com Project Name: Muscatine Power & Water CCR Landfill Site: Iowa Event: Fall 2023 Sample		Carrier Tracking No(s): COC No: Page: 1 Job #:															
Due Date Requested: TAT Requested (days): PO #: 234488 WO #:		Analysis Requested 6020A CCR Lsl, 7470A Mercury 2540C TDS, SM4500_H+ pH 9056A Chloride, Fluoride, Sulfate Radium-226 Radium-228		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:															
Matrix (Water, Solid, On-wast, A-AU) Sample Type (C=Comp, G=grab) Sample Time Sample Date Preservation Code		Field Filtered Sample (Yes or No) Perform MS/MSD (Yes or No) Total Number of Containers		Special Instructions/Note:															
MW-4B	G	0800	9/20/23	X	X	X	X	X											
MW-5B	G	1055	9/20/23	X	X	X	X	X											
MW-6A	G	915	9/20/23	X	X	X	X	X											
MW-8	G	950	9/19/23	X	X	X	X	X											
MW-10	G	1145	9/18/23	X	X	X	X	X											
MW-14A	G	1150	9/19/23	X	X	X	X	X											
MW-15A	G	1300	9/19/23	X	X	X	X	X											
MW-21	G	1050	9/19/23	X	X	X	X	X											
MW-22	G	1430	9/18/23	X	X	X	X	X											
MW-23	G	1305	9/18/23	X	X	X	X	X											
Duplicate-1	G	1200	9/18/23	X	X	X	X	X											
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested I, II, III, IV, Other (specify)																			
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Special Instructions/QC Requirements:																			
Empty Kit Relinquished by: _____ Date: _____ Relinquished by: _____ Date/Time: 9/22/23 0100 Company: mpw Relinquished by: _____ Date/Time: _____ Company: _____ Relinquished by: _____ Date/Time: _____ Company: _____ Custody Seals Intact: _____ Custody Seal No: _____ Cooler Temperature(s) °C and Other Remarks:																			



Eurofins Cedar Falls

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

Chain of Custody Record

Client Information Client Contact: Sam Bennett MP&W Company: Muscatine Power & Water Address: 1700 Dick Drake Way City: Muscatine State, Zip: IA, 52761 Phone: 234488 Email: sbennett@mpw.org Project Name: Muscatine Power & Water State Landfill Site: Iowa		Lab PM: Hayes, Shawn M E-Mail: shawn.hayes@testamcainc.com Phone: 563-262-3583 Carrier Tracking No(s): COC No: Page: 2 Job #:	
Due Date Requested: TAT Requested (days): PO #: WO #: TestAmerica Project #: Event: Fall 2023		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 Other:		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SZO3 S - H2SO4 T - TSP Dodecalhydrate U - Acetone V - MCAA W - ph 4-5 X - EDTA Z - other (specify)	
Sample Identification MW-26 MW-27 Duplicate-1 Duplicate-2		Total Number of Containers:	
Sample Date: 9/20/23 Sample Time: 1235 Sample Type (C=Comp, G=grab): G Matrix (W=water, S=solid, O=oil, BT=Thru, A=Air): GW		Special Instructions/Note:	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Deliverable Requested 1, II, III, IV, Other (specify)		Special Instructions/QC Requirements:	
Empty Kit Relinquished by:		Method of Shipment:	
Relinquished by: <i>NW/AM</i> Date/Time: 9/21/23 0900 Company: MPW		Received by:	
Relinquished by:		Received by:	
Relinquished by:		Received by: <i>[Signature]</i> Date/Time: 9/22/23 0835 Company: <i>[Signature]</i>	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Cooler Temperature(s) °C and Other Remarks:	



Eurofins Cedar Falls

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

Chain of Custody Record



eurofins

Environmental Test

Client Information (Sub Contract Lab)		Lab PM: Hummel, Matthew R	Carrier Tracking No(s): 310-65574.1
Shipping/Receiving		E-Mail: Matthew.Hummel@et.eurofins.com	Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc.		State of Origin: Iowa	Job #: 310-265406-2
Address: 13715 Rider Trail North, Earth City, MO, 63045		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Due Date Requested: 10/26/2023		Analysis Requested	
TAT Requested (days):		Perform MS/MSD (Yes or No)	
PO #		9315_Ra226/PreSep_21 Radium-226	
WO #		9320_Ra228/PreSep_0 Standard Target List	
Project # 31007856		Radium-228 (MD) Local Method	
Site: Muscatine Power & Water CCR Landfill		Total Number of Containers	
Sample Date		Field Filtered Sample (Yes or No)	
Sample Time		9315_Ra226/PreSep_21 Radium-226	
Sample Type (C=Comp, G=Grab)		9320_Ra228/PreSep_0 Standard Target List	
Matrix (W=Water, S=Solid, O=Water/Oil, BT=BTB, A=Air)		Radium-228 (MD) Local Method	
Preservation Code:		Total Number of Containers	
MW-4A (310-265406-1)		2	
MW-5B (310-265406-2)		2	
MW-6A (310-265406-3)		2	
MW-8 (310-265406-4)		2	
MW-10 (310-265406-5)		2	
MW-14A (310-265406-6)		2	
MW-15A (310-265406-7)		2	
MW-21 (310-265406-8)		2	
MW-22 (310-265406-9)		2	
<p>Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix, being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC.</p>			
Possible Hazard Identification			
Unconfirmed			
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2			
Empty Kit Relinquished by: _____ Date: _____			
Relinquished by: _____ Date/Time: _____			
Relinquished by: _____ Date/Time: _____			
Custody Seals Intact: _____ (Custody Seal No.: _____)			
Cooler Temperature(s) °C and Other Remarks: _____			

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

Special Instructions/QC Requirements: _____

Received by: _____ Date/Time: _____
 Received by: *MA. Pinetta* Date/Time: **SEP 25 2023 09:20**
 Received by: _____ Date/Time: _____

Company: _____
 Company: _____
 Company: _____

Ver: 06.08.2021



Chain of Custody Record



Client Information (Sub Contract Lab)		Lab PM: Hummel, Matthew R	Carrier Tracking No(s): 310-65574.2
Shipping/Receiving		E-Mail: Matthew.Hummel@et.eurofins.com	Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc.		State of Origin: Iowa	Job #: 310-265406-2
Address: 13715 Rider Trail North,		Preservation Codes: M - Hexane N - None O - AshNo2 P - Na2O4S Q - Na2SO3 R - Na2SO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Y - Trizma Z - other (specify)	
City: Earth City		Analysis Requested	
State, Zip: MO, 63045			
Phone: 314-298-8566(Tel) 314-298-8757(Fax)		Total Number of containers	
Email:		2	
Project Name: Muscatine Power & Water CCR Landfill		Special Instructions/Note:	
Site: SSOW#		2	
Due Date Requested: 10/26/2023		Field Filtered Sample (Yes or No)	
TAT Requested (days):		X	
PO #		9315_Ra226/PreSep_21 Radium-226	
WO #		9320_Ra226/PreSep_0 Standard Target List	
Project #: 31007856		9326Ra228_GFPc (MOD) Local Method	
Sample Identification - Client ID (Lab ID)		Perform MSMSD (Yes or No)	
Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=BIOSUR, A=Air)
9/18/23	13:05 Central	Water	Water
9/18/23	12:00 Central	Water	Water
<p>Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis of matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC.</p>			
Possible Hazard Identification			
Unconfirmed			
Deliverable Requested I, II, III, IV, Other (specify): Primary Deliverable Rank: 2			
Empty Kit Relinquished by:			
Relinquished by: <i>[Signature]</i>		Date: 9/22/23 11:55	
Relinquished by: FED EX		Date/Time: 9/22/23 11:55	
Relinquished by:		Date/Time:	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No:	
Cooler Temperature(s) °C and Other Remarks:		Received by: <i>M. Pinette</i>	
Received by:		Date/Time: SEP 25 2023 09:20	
Company:		Company:	
Company:		Company:	
Company:		Company:	
Special Instructions/QC Requirements:		Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For <input type="checkbox"/> Months	
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)		Method of Shipment: FED EX	

Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-265406-2

Login Number: 265406

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Homolar, Dana J

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.	False	4B showing on COC - containers have 4A - logged as 4A
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	

Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-265406-2

Login Number: 265406

List Number: 2

Creator: Pinette, Meadow L

List Source: Eurofins St. Louis

List Creation: 09/25/23 02:52 PM

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
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: Muscatine Power & Water
 Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Method: 9315 - Radium-226 (GFPC)

Matrix: Ground Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	
310-265406-1	MW-4A	87.8	
310-265406-2	MW-5B	81.7	
310-265406-3	MW-6A	88.8	
310-265406-4	MW-8	87.3	
310-265406-5	MW-10	86.6	
310-265406-6	MW-14A	81.7	
310-265406-6 DU	MW-14A	67.7	
310-265406-7	MW-15A	82.4	
310-265406-8	MW-21	83.9	
310-265406-9	MW-22	82.6	
310-265406-10	MW-23	84.6	
310-265406-12	DUP-1	90.2	

Tracer/Carrier Legend
 Ba = Ba Carrier

Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	
LCS 160-630051/2-A	Lab Control Sample	91.7	
MB 160-630051/1-A	Method Blank	88.5	

Tracer/Carrier Legend
 Ba = Ba Carrier

Method: 9320 - Radium-228 (GFPC)

Matrix: Ground Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)
310-265406-1	MW-4A	87.8	80.7
310-265406-2	MW-5B	81.7	84.1
310-265406-3	MW-6A	88.8	82.6
310-265406-4	MW-8	87.3	83.4
310-265406-5	MW-10	86.6	82.2
310-265406-6	MW-14A	81.7	83.0
310-265406-6 DU	MW-14A	67.7	83.0
310-265406-7	MW-15A	82.4	78.5
310-265406-8	MW-21	83.9	77.8
310-265406-9	MW-22	82.6	81.9
310-265406-10	MW-23	84.6	84.1
310-265406-12	DUP-1	90.2	86.7

Tracer/Carrier Legend
 Ba = Ba Carrier
 Y = Y Carrier

Tracer/Carrier Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water CCR Landfill

Job ID: 310-265406-2

Method: 9320 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)
LCS 160-630054/2-A	Lab Control Sample	91.7	82.2
MB 160-630054/1-A	Method Blank	88.5	79.6

Tracer/Carrier Legend

Ba = Ba Carrier

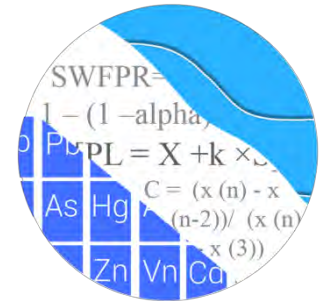
Y = Y Carrier

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

Appendix C

Groundwater Statistical Analysis

GROUNDWATER STATS CONSULTING



November 10, 2023

GHD

Attn: Mr. Michael Alowitz
11228 Aurora Avenue
Des Moines Iowa 50322-7904

Re: Muscatine Power & Water –
April & September 2023 Detection & Assessment Monitoring Report

Dear Mr. Alowitz,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the statistical analysis of groundwater data for the April and September 2023 sample event at the Muscatine Power & Water for the Coal Combustion Residuals (CCR) program. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals from Electric Utilities (CCR Rule, 2015) as well as with the United States Environmental Protection Agency (USEPA) Unified Guidance (2009).

Sampling began for the CCR program in June 2016 for all wells except newly installed well MW-22 which has been sampled since 2018. The monitoring well network at Muscatine Power & Water consists of the following:

- **Upgradient wells:** MW-8, MW-10, MW-22, and MW-23
- **Downgradient wells** MW-4B, MW-5B, MW-6A, MW-14A, MW-15A, and MW-21

The CCR program consists of the following constituents:

- **Appendix III** (Detection Monitoring) - boron, calcium, chloride, fluoride, pH, sulfate, and TDS
- **Appendix IV** (Assessment Monitoring) - antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, combined radium 226 + 228, fluoride, lead, lithium, mercury, molybdenum, selenium, and thallium

Data were sent electronically to Groundwater Stats Consulting, and the statistical analysis was reviewed by Kristina Rayner, Senior Statistician and Founder of Groundwater Stats Consulting.

When there are no detections present in downgradient wells for a given constituent, statistical analyses are not required. A summary of downgradient well/constituent pairs with 100% non-detects follows this letter.

Time series plots for Appendix III and IV parameters at all wells are provided for the purpose of screening data at these wells (Figure A). Additionally, a separate section of box plots is included for all constituents at upgradient and downgradient wells (Figure B). The time series plots are used to initially screen for suspected outliers and trends, while the box plots provide visual representation of variation within individual wells and between all wells. Values in background which have been flagged as outliers may be seen in a lighter font and as a disconnected symbol on the graphs.

In earlier analyses, data at all wells were evaluated for the following: 1) outliers; 2) trends; 3) most appropriate statistical method for Appendix III parameters based on site characteristics of groundwater data upgradient of the facility; and 4) eligibility of downgradient wells when intrawell statistical methods are recommended. Power curves were provided and demonstrated that the selected statistical methods for Appendix III parameters comply with the USEPA Unified Guidance. The EPA suggests the selected statistical method should provide at least 55% power at 3 standard deviations or at least 80% power at 4 standard deviations.

Summary of Statistical Methods – Appendix III Parameters:

Based on the earlier evaluation described above, the following methods were selected:

- Interwell prediction limits, combined with a 1-of-2 resample plan for boron, calcium, chloride, fluoride, pH, sulfate, and TDS

Parametric prediction limits are utilized when the screened historical data follow a normal or transformed-normal distribution. When data cannot be normalized or the majority of data are non-detects, a nonparametric test is utilized. While the false positive rate associated with the parametric limits is based on an annual 10% (5% per semi-annual event) as recommended by the EPA Unified Guidance (2009), the false positive rate associated with the nonparametric limits is dependent upon the available background sample size, number of future comparisons, and verification resample plan. The distribution of data is tested using the Shapiro-Wilk/Shapiro-Francia test for normality.

After testing for normality and performing any adjustments as discussed below (US EPA, 2009), data are analyzed using either parametric or non-parametric prediction limits.

- No statistical analyses are required on wells and analytes containing 100% non-detects (USEPA Unified Guidance, 2009, Chapter 6).
- When data contain <15% non-detects in background, simple substitution of one-half the reporting limit is utilized in the statistical analysis. The reporting limit utilized for non-detects is the most recent practical quantification limit (PQL) as reported by the laboratory.
- When data contain between 15-50% non-detects, the Kaplan-Meier non-detect adjustment is applied to the background data for parametric limits. This technique adjusts the mean and standard deviation of the historical concentrations to account for concentrations below the reporting limit.
- Nonparametric prediction limits are used on data containing greater than 50% non-detects.

Natural systems continuously evolve due to physical changes made to the environment. Examples include capping a landfill, paving areas near a well, or lining a drainage channel to prevent erosion. Periodic updating of background statistical limits is necessary to accommodate these types of changes. In the interwell case, prediction limits are updated with upgradient well data during each event after careful screening for any new outliers. In some cases, the earlier portion of data are deselected prior to construction of limits to provide sensitive limits that will rapidly detect changes in groundwater quality. Even though the data are excluded from the calculation, the values will continue to be reported and shown in tables and graphs.

Original Background Screening Summary – Conducted in October 2017

Background data were originally screened in October 2017 for all parameters at each well for the constituents listed above, and the results of the screening were submitted during that time. A summary of the October 2017 screening is discussed below.

Outlier Screening

Time series plots were used to initially screen for suspected outliers, trends, and seasonal patterns. Outliers and trends in background data result in increased variation and statistical limits that are not conservative from a regulatory perspective, if not addressed.

Box plots provide visual representation of variation within individual wells and between all wells. Data were further evaluated through the Analysis of Variance test to determine

whether observed variation is statistically significant, and guide the decision logic for determining an appropriate statistical limit as discussed below.

A handful of possible outliers were identified and formally tested using Tukey's box plot method. When outliers were confirmed, these values were flagged in the computer database with "o" in order to deselect prior to construction of statistical limits. Flagged values appear as a disconnected, lighter symbol on the time series graphs. A summary of Tukey's test results was included with the screening.

Seasonality

No seasonal patterns were visually apparent in any of the detected data; therefore, no deseasonalizing adjustments were made to the data. When seasonal patterns are observed, data may be optionally deseasonalized so that the resulting limits will correctly account for the seasonality as a predictable pattern rather than random variation or a release.

Trend Testing

The Sen's Slope/Mann Kendall trend test was used to evaluate all proposed background data through August 2017 to identify statistically significant increasing or decreasing trends. In the absence of suspected contamination, significant trending data are typically not included as part of the background data used for construction of prediction limits. This step serves to eliminate the trend and, thus, reduce variation in background. When statistically significant decreasing trends are present, earlier data are evaluated to determine whether earlier concentration levels are significantly different than current reported concentrations and will be deselected as necessary. When the historical records of data are truncated for the reasons above, a summary report will be provided to show the date ranges used in construction of the statistical limits.

The results of the trend analyses showed a statistically significant decreasing trend for chloride in upgradient well MW-08. This trend was relatively low in magnitude when compared to average concentrations; therefore, no adjustments were made to the data sets. No other statistically significant trends were identified for any of the Appendix III parameters. The results of the trend tests were included with the screening.

Determination of Statistical Methods

The Analysis of Variance (ANOVA), tolerance limits, and confidence intervals were used to identify the most appropriate statistical approach for Muscatine Power & Water. Based

on the results from the 2017 background screening, interwell methods were recommended initially in lieu of intrawell methods. Interwell tests compare downgradient well data to statistical limits constructed from pooled upgradient well data. This method is appropriate when average concentrations are similar across upgradient wells. Intrawell tests compare compliance data from a single well to screened historical data within the same well, and are appropriate when upgradient wells exhibit spatial variation; when statistical limits constructed from upgradient wells would not be conservative from a regulatory perspective; and when downgradient water quality is unimpacted compared to upgradient water quality for the same parameters.

If further research identifies whether the elevated downgradient concentrations are likely the result of natural geological conditions or an off-site source, data would be re-evaluated to determine the most appropriate statistical Detection Monitoring method.

Statistical Evaluation – Appendix III Parameters – April & September 2023

Interwell prediction limits were constructed as recommended in the CCR Rule (2015) and in the EPA Unified Guidance (2009), based on a 1-of-2 resample plan using pooled upgradient well data for all Appendix III parameters through April 2023 and September 2023 (Figures D and E, respectively). Interwell prediction limits pool upgradient well data to establish a background limit for an individual constituent. The April and September 2023 samples from each downgradient well are compared to the respective background limit to determine whether initial exceedances are present.

Prior to constructing statistical limits, data from upgradient wells for Appendix III parameters are reassessed for outliers during each analysis. The highest value for TDS at upgradient well MW-08 was flagged as an outlier in order to maintain statistical limits that are conservative (i.e., lower) from a regulatory perspective. A summary of flagged outliers follows this report (Figure C).

In the event of an initial exceedance of compliance well data, the 1-of-2 resample plan allows for collection of one additional sample to determine whether the initial exceedance is confirmed. When an independent resample confirms the initial exceedance, a statistically significant increase is identified and further research would be required to identify the cause of the exceedance (i.e., impact from the site, natural variation, or an off-site source). If the resample falls within the statistical limit, the initial exceedance is considered to be a false positive result and, therefore, no exceedance is noted and no further action is necessary. If no resample is collected, the original result is considered a confirmed exceedance.

Parametric prediction limits were constructed when background data followed a normal or transformed-normal distribution. Non-parametric prediction limits are provided for data sets with greater than 50% non-detects, and for data sets which do not follow a normal or transformed-normal distribution. A summary table of well/constituent pairs found to exceed their respective limits follows this letter and prediction limit exceedances were noted for the following well/constituent pairs:

April 2023

- Boron: MW-14A, MW-15A, and MW-21
- Calcium: MW-14A
- Chloride: MW-5B
- Sulfate: MW-14A
- TDS: MW-14A

September 2023

- Boron: MW-14A, MW-15A, and MW-21
- Calcium: MW-14A
- Chloride: MW-5B
- pH: MW-5B, MW-14A, and MW-21
- Sulfate: MW-14A
- TDS: MW-14A and MW-15A

Trend Tests

When prediction limit exceedances are identified in downgradient wells, data are further evaluated using the Sen's Slope/Mann Kendall trend test at the 99% confidence level to determine whether concentrations are statistically increasing, decreasing, or stable (Figure F). Upgradient wells are included in the trend analyses for all parameters found to exceed their prediction limit in downgradient wells to identify whether similar patterns exist upgradient of the site which is an indication of natural variability in groundwater unrelated to practices at the site. A summary of the trend test results follows this letter. Statistically significant trends were identified for the following well/constituent pairs:

Increasing:

- Sulfate: MW-22 (upgradient)

Decreasing:

- Boron: MW-15A
- Calcium: MW-08 (upgradient)
- Chloride: MW-22 (upgradient) and MW-5B

- Sulfate: MW-08 (upgradient)
- TDS: MW-08 (upgradient), MW-10 (upgradient) and MW-15A

Statistical Evaluation – Appendix IV – April & September 2023

For Appendix IV parameters, confidence intervals for each downgradient well/constituent were compared against corresponding Groundwater Protection Standards (GWPS). GWPS were developed as described below. Well/constituent pairs that have 100% non-detects or only trace values below the reporting limits do not require analysis. Data from upgradient wells for Appendix IV parameters are reassessed for outliers during each analysis. No additional outliers were identified and a summary of flagged outliers follows this report (Figure C).

Interwell Upper Tolerance Limits

Parametric tolerance limits were used to calculate background limits from pooled upgradient well data through both April 2023 and September 2023 events for Appendix IV parameters, with a target of 95% confidence and 95% coverage, to determine background limits (Figure G). The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples.

Groundwater Protection Standards

The background limits were compared to the Maximum Contaminant Levels (MCLs), CCR Rule-Specified levels, and background limits in the Groundwater Protection Standard (GWPS) table following this letter to determine the highest limit for use as the GWPS in the Confidence Interval comparisons (Figure H).

Confidence Intervals

Confidence intervals were then constructed on downgradient wells with data through both April 2023 and September 2023 events for each of the Appendix IV parameters using the highest limit of the MCL, CCR Rule-Specified level, or background limit as discussed above (Figure I). Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. No statistical exceedances were identified and a summary of the confidence interval results follows this letter.

Thank you for the opportunity to assist you in the statistical analysis of groundwater quality for Muscatine Power & Water. If you have any questions or comments, please feel free to contact us.

For Groundwater Stats Consulting,



Andrew T. Collins
Project Manager



Kristina L. Rayner
Senior Statistician

100% Non-Detects: Appendix IV Downgradient

Analysis Run 11/8/2023 8:15 PM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Antimony (mg/L)

MW-14A, MW-15A, MW-21, MW-4B, MW-5B, MW-6A

Arsenic (mg/L)

MW-14A, MW-15A, MW-21, MW-4B, MW-5B, MW-6A

Beryllium (mg/L)

MW-14A, MW-15A, MW-21, MW-4B, MW-5B, MW-6A

Cadmium (mg/L)

MW-14A, MW-15A, MW-21, MW-6A

Chromium (mg/L)

MW-14A, MW-15A, MW-4B, MW-5B, MW-6A

Cobalt (mg/L)

MW-14A, MW-15A, MW-21, MW-5B, MW-6A

Lead (mg/L)

MW-14A, MW-15A, MW-6A

Lithium (mg/L)

MW-14A, MW-15A, MW-4B, MW-5B, MW-6A

Mercury (mg/L)

MW-14A, MW-15A, MW-21, MW-4B, MW-6A

Molybdenum (mg/L)

MW-14A, MW-15A, MW-6A

Selenium (mg/L)

MW-4B, MW-5B, MW-6A

Thallium (mg/L)

MW-14A, MW-15A, MW-21, MW-6A

Interwell Prediction Limits - April 2023 - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 7:51 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-14A	0.322	n/a	4/11/2023	14.8	Yes	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-15A	0.322	n/a	4/11/2023	5.8	Yes	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-21	0.322	n/a	4/11/2023	3.35	Yes	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Calcium (mg/L)	MW-14A	152	n/a	4/11/2023	318	Yes	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-5B	30	n/a	4/12/2023	38.7	Yes	65	n/a	n/a	29.23	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-14A	366	n/a	4/11/2023	1150	Yes	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-14A	662.6	n/a	4/11/2023	2140	Yes	64	20.34	2.877	0	None	sqrt(x)	0.001254	Param Inter 1 of 2

Interwell Prediction Limits - April 2023 - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 7:51 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-14A	0.322	n/a	4/11/2023	14.8	Yes	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-15A	0.322	n/a	4/11/2023	5.8	Yes	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-21	0.322	n/a	4/11/2023	3.35	Yes	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-4B	0.322	n/a	4/12/2023	0.1ND	No	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-5B	0.322	n/a	4/12/2023	0.1ND	No	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-6A	0.322	n/a	4/12/2023	0.1ND	No	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Calcium (mg/L)	MW-14A	152	n/a	4/11/2023	318	Yes	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-15A	152	n/a	4/11/2023	110	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-21	152	n/a	4/11/2023	76	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-4B	152	n/a	4/12/2023	91.3	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-5B	152	n/a	4/12/2023	107	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-6A	152	n/a	4/12/2023	95.4	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-14A	30	n/a	4/11/2023	20.3	No	65	n/a	n/a	29.23	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-15A	30	n/a	4/11/2023	7.3	No	65	n/a	n/a	29.23	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-21	30	n/a	4/11/2023	5.93	No	65	n/a	n/a	29.23	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-4B	30	n/a	4/12/2023	18	No	65	n/a	n/a	29.23	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-5B	30	n/a	4/12/2023	38.7	Yes	65	n/a	n/a	29.23	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-6A	30	n/a	4/12/2023	15.4	No	65	n/a	n/a	29.23	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Fluoride (mg/L)	MW-14A	1	n/a	4/11/2023	1ND	No	64	n/a	n/a	87.5	n/a	n/a	0.000468	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-15A	1	n/a	4/11/2023	1ND	No	64	n/a	n/a	87.5	n/a	n/a	0.000468	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-21	1	n/a	4/11/2023	1ND	No	64	n/a	n/a	87.5	n/a	n/a	0.000468	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-4B	1	n/a	4/12/2023	1ND	No	64	n/a	n/a	87.5	n/a	n/a	0.000468	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-5B	1	n/a	4/12/2023	1ND	No	64	n/a	n/a	87.5	n/a	n/a	0.000468	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-6A	1	n/a	4/12/2023	1ND	No	64	n/a	n/a	87.5	n/a	n/a	0.000468	NP Inter (NDs) 1 of 2
pH (SU)	MW-14A	7.814	6.875	4/11/2023	6.97	No	65	7.344	0.2505	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-15A	7.814	6.875	4/11/2023	7.24	No	65	7.344	0.2505	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-21	7.814	6.875	4/11/2023	7.24	No	65	7.344	0.2505	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-4B	7.814	6.875	4/12/2023	7.23	No	65	7.344	0.2505	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-5B	7.814	6.875	4/12/2023	6.96	No	65	7.344	0.2505	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-6A	7.814	6.875	4/12/2023	7.08	No	65	7.344	0.2505	0	None	No	0.0006268	Param Inter 1 of 2
Sulfate (mg/L)	MW-14A	366	n/a	4/11/2023	1150	Yes	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-15A	366	n/a	4/11/2023	254	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-21	366	n/a	4/11/2023	215	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-4B	366	n/a	4/12/2023	54	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-5B	366	n/a	4/12/2023	45.8	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-6A	366	n/a	4/12/2023	20.5	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-14A	662.6	n/a	4/11/2023	2140	Yes	64	20.34	2.877	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-15A	662.6	n/a	4/11/2023	646	No	64	20.34	2.877	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-21	662.6	n/a	4/11/2023	646	No	64	20.34	2.877	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-4B	662.6	n/a	4/12/2023	396	No	64	20.34	2.877	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-5B	662.6	n/a	4/12/2023	478	No	64	20.34	2.877	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-6A	662.6	n/a	4/12/2023	428	No	64	20.34	2.877	0	None	sqrt(x)	0.001254	Param Inter 1 of 2

Interwell Prediction Limits - September 2023 - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 7:50 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-14A	0.322	n/a	9/19/2023	18.1	Yes	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-15A	0.322	n/a	9/19/2023	9.28	Yes	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-21	0.322	n/a	9/19/2023	4.42	Yes	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Calcium (mg/L)	MW-14A	152	n/a	9/19/2023	291	Yes	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-5B	30	n/a	9/20/2023	41.8	Yes	69	n/a	n/a	28.99	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
pH (SU)	MW-14A	7.81	6.835	9/19/2023	6.78	Yes	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-21	7.81	6.835	9/19/2023	6.55	Yes	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-5B	7.81	6.835	9/20/2023	6.42	Yes	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
Sulfate (mg/L)	MW-14A	366	n/a	9/19/2023	1440	Yes	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-14A	658.7	n/a	9/19/2023	1800	Yes	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-15A	658.7	n/a	9/19/2023	720	Yes	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2

Interwell Prediction Limits - September 2023 - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 7:50 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-14A	0.322	n/a	9/19/2023	18.1	Yes	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-15A	0.322	n/a	9/19/2023	9.28	Yes	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-21	0.322	n/a	9/19/2023	4.42	Yes	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-4B	0.322	n/a	9/20/2023	0.1ND	No	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-5B	0.322	n/a	9/20/2023	0.1ND	No	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-6A	0.322	n/a	9/20/2023	0.1ND	No	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Calcium (mg/L)	MW-14A	152	n/a	9/19/2023	291	Yes	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-15A	152	n/a	9/19/2023	126	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-21	152	n/a	9/19/2023	96	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-4B	152	n/a	9/20/2023	90.4	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-5B	152	n/a	9/20/2023	115	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-6A	152	n/a	9/20/2023	82.1	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-14A	30	n/a	9/19/2023	20.9	No	69	n/a	n/a	28.99	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-15A	30	n/a	9/19/2023	8.41	No	69	n/a	n/a	28.99	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-21	30	n/a	9/19/2023	8.23	No	69	n/a	n/a	28.99	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-4B	30	n/a	9/20/2023	17.4	No	69	n/a	n/a	28.99	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-5B	30	n/a	9/20/2023	41.8	Yes	69	n/a	n/a	28.99	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-6A	30	n/a	9/20/2023	12.2	No	69	n/a	n/a	28.99	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Fluoride (mg/L)	MW-14A	1	n/a	9/19/2023	1ND	No	68	n/a	n/a	88.24	n/a	n/a	0.0004142	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-15A	1	n/a	9/19/2023	1ND	No	68	n/a	n/a	88.24	n/a	n/a	0.0004142	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-21	1	n/a	9/19/2023	1ND	No	68	n/a	n/a	88.24	n/a	n/a	0.0004142	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-4B	1	n/a	9/20/2023	1ND	No	68	n/a	n/a	88.24	n/a	n/a	0.0004142	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-5B	1	n/a	9/20/2023	1ND	No	68	n/a	n/a	88.24	n/a	n/a	0.0004142	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-6A	1	n/a	9/20/2023	1ND	No	68	n/a	n/a	88.24	n/a	n/a	0.0004142	NP Inter (NDs) 1 of 2
pH (SU)	MW-14A	7.81	6.835	9/19/2023	6.78	Yes	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-15A	7.81	6.835	9/19/2023	6.97	No	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-21	7.81	6.835	9/19/2023	6.55	Yes	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-4B	7.81	6.835	9/20/2023	7.03	No	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-5B	7.81	6.835	9/20/2023	6.42	Yes	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-6A	7.81	6.835	9/20/2023	6.88	No	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
Sulfate (mg/L)	MW-14A	366	n/a	9/19/2023	1440	Yes	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-15A	366	n/a	9/19/2023	365	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-21	366	n/a	9/19/2023	303	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-4B	366	n/a	9/20/2023	53.1	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-5B	366	n/a	9/20/2023	53.4	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-6A	366	n/a	9/20/2023	10.1	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-14A	658.7	n/a	9/19/2023	1800	Yes	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-15A	658.7	n/a	9/19/2023	720	Yes	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-21	658.7	n/a	9/19/2023	626	No	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-4B	658.7	n/a	9/20/2023	364	No	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-5B	658.7	n/a	9/20/2023	476	No	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-6A	658.7	n/a	9/20/2023	332	No	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2

Trend Tests - Prediction Limit Exceedances - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 7:53 AM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Alpha</u>	<u>Method</u>
Boron (mg/L)	MW-15A	-1.547	-162	-98	Yes	23	0	n/a	0.01	NP
Calcium (mg/L)	MW-08 (bg)	-5.597	-111	-92	Yes	22	0	n/a	0.01	NP
Chloride (mg/L)	MW-22 (bg)	-2.316	-56	-43	Yes	13	0	n/a	0.01	NP
Chloride (mg/L)	MW-5B	-4.554	-128	-98	Yes	23	0	n/a	0.01	NP
Sulfate (mg/L)	MW-08 (bg)	-15.06	-137	-92	Yes	22	0	n/a	0.01	NP
Sulfate (mg/L)	MW-22 (bg)	9.305	62	43	Yes	13	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-08 (bg)	-60.24	-145	-87	Yes	21	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-10 (bg)	-21.76	-113	-92	Yes	22	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-15A	-146.9	-154	-98	Yes	23	0	n/a	0.01	NP

Trend Tests - Prediction Limit Exceedances - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 7:53 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Alpha	Method
Boron (mg/L)	MW-08 (bg)	0	5	92	No	22	95.45	n/a	0.01	NP
Boron (mg/L)	MW-10 (bg)	0	0	92	No	22	100	n/a	0.01	NP
Boron (mg/L)	MW-14A	0.2483	31	98	No	23	0	n/a	0.01	NP
Boron (mg/L)	MW-15A	-1.547	-162	-98	Yes	23	0	n/a	0.01	NP
Boron (mg/L)	MW-21	-0.2223	-49	-98	No	23	4.348	n/a	0.01	NP
Boron (mg/L)	MW-22 (bg)	0	18	43	No	13	61.54	n/a	0.01	NP
Boron (mg/L)	MW-23 (bg)	0	22	38	No	12	66.67	n/a	0.01	NP
Calcium (mg/L)	MW-08 (bg)	-5.597	-111	-92	Yes	22	0	n/a	0.01	NP
Calcium (mg/L)	MW-10 (bg)	-0.3168	-26	-92	No	22	0	n/a	0.01	NP
Calcium (mg/L)	MW-14A	-3.438	-63	-98	No	23	0	n/a	0.01	NP
Calcium (mg/L)	MW-22 (bg)	-0.3874	-14	-43	No	13	0	n/a	0.01	NP
Calcium (mg/L)	MW-23 (bg)	-1.728	-38	-38	No	12	0	n/a	0.01	NP
Chloride (mg/L)	MW-08 (bg)	0.2173	37	92	No	22	0	n/a	0.01	NP
Chloride (mg/L)	MW-10 (bg)	0	-3	-92	No	22	90.91	n/a	0.01	NP
Chloride (mg/L)	MW-22 (bg)	-2.316	-56	-43	Yes	13	0	n/a	0.01	NP
Chloride (mg/L)	MW-23 (bg)	0.872	34	38	No	12	0	n/a	0.01	NP
Chloride (mg/L)	MW-5B	-4.554	-128	-98	Yes	23	0	n/a	0.01	NP
pH (SU)	MW-08 (bg)	0.009687	30	92	No	22	0	n/a	0.01	NP
pH (SU)	MW-10 (bg)	-0.01207	-14	-92	No	22	0	n/a	0.01	NP
pH (SU)	MW-14A	-0.003544	-13	-92	No	22	0	n/a	0.01	NP
pH (SU)	MW-21	0.01563	23	98	No	23	0	n/a	0.01	NP
pH (SU)	MW-22 (bg)	-0.03561	-9	-43	No	13	0	n/a	0.01	NP
pH (SU)	MW-23 (bg)	-0.06906	-17	-38	No	12	0	n/a	0.01	NP
pH (SU)	MW-5B	-0.01585	-22	-92	No	22	0	n/a	0.01	NP
Sulfate (mg/L)	MW-08 (bg)	-15.06	-137	-92	Yes	22	0	n/a	0.01	NP
Sulfate (mg/L)	MW-10 (bg)	-0.5256	-13	-92	No	22	0	n/a	0.01	NP
Sulfate (mg/L)	MW-14A	-16.29	-37	-98	No	23	0	n/a	0.01	NP
Sulfate (mg/L)	MW-22 (bg)	9.305	62	43	Yes	13	0	n/a	0.01	NP
Sulfate (mg/L)	MW-23 (bg)	-1.032	-33	-38	No	12	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-08 (bg)	-60.24	-145	-87	Yes	21	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-10 (bg)	-21.76	-113	-92	Yes	22	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-14A	-90.12	-88	-98	No	23	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-15A	-146.9	-154	-98	Yes	23	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-22 (bg)	-5.507	-29	-43	No	13	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-23 (bg)	-17.46	-30	-38	No	12	0	n/a	0.01	NP

Upper Tolerance Limits Summary Table

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/8/2023, 8:12 PM

<u>Constituent</u>	<u>Upper Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</u>	<u>Bg N</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Antimony (mg/L)	0.002	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)
Arsenic (mg/L)	0.00784	n/a	n/a	n/a	67	n/a	n/a	58.21	n/a	n/a	0.03217	NP Inter(NDs)
Barium (mg/L)	0.256	n/a	n/a	n/a	67	n/a	n/a	0	n/a	n/a	0.03217	NP Inter(normality)
Beryllium (mg/L)	0.001	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)
Cadmium (mg/L)	0.0002	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)
Chromium (mg/L)	0.005	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)
Cobalt (mg/L)	0.00558	n/a	n/a	n/a	68	n/a	n/a	38.24	n/a	n/a	0.03056	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	1.289	n/a	n/a	n/a	53	0.5306	0.3703	0	None	No	0.05	Inter
Fluoride (mg/L)	1	n/a	n/a	n/a	68	n/a	n/a	88.24	n/a	n/a	0.03056	NP Inter(NDs)
Lead (mg/L)	0.00204	n/a	n/a	n/a	67	n/a	n/a	89.55	n/a	n/a	0.03217	NP Inter(NDs)
Lithium (mg/L)	0.01	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)
Mercury (mg/L)	0.0002	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)
Molybdenum (mg/L)	0.00822	n/a	n/a	n/a	69	n/a	n/a	66.67	n/a	n/a	0.02904	NP Inter(NDs)
Selenium (mg/L)	0.005	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)
Thallium (mg/L)	0.001	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)

MUSCATINE POWER & WATER GWPS				
Constituent Name	MCL	CCR Rule-Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.002	0.006
Arsenic, Total (mg/L)	0.01		0.0078	0.01
Barium, Total (mg/L)	2		0.26	2
Beryllium, Total (mg/L)	0.004		0.001	0.004
Cadmium, Total (mg/L)	0.005		0.0002	0.005
Chromium, Total (mg/L)	0.1		0.005	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.0056	0.006
Combined Radium, Total (pCi/L)	5		1.29	5
Fluoride, Total (mg/L)	4		1	4
Lead, Total (mg/L)	0.015		0.002	0.015
Lithium, Total (mg/L)	n/a	0.04	0.01	0.04
Mercury, Total (mg/L)	0.002		0.0002	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.0082	0.1
Selenium, Total (mg/L)	0.05		0.005	0.05
Thallium, Total (mg/L)	0.002		0.001	0.002

*MCL = Maximum Contaminant Level

*CCR = Coal Combustion Residual

*GWPS = Groundwater Protection Standard

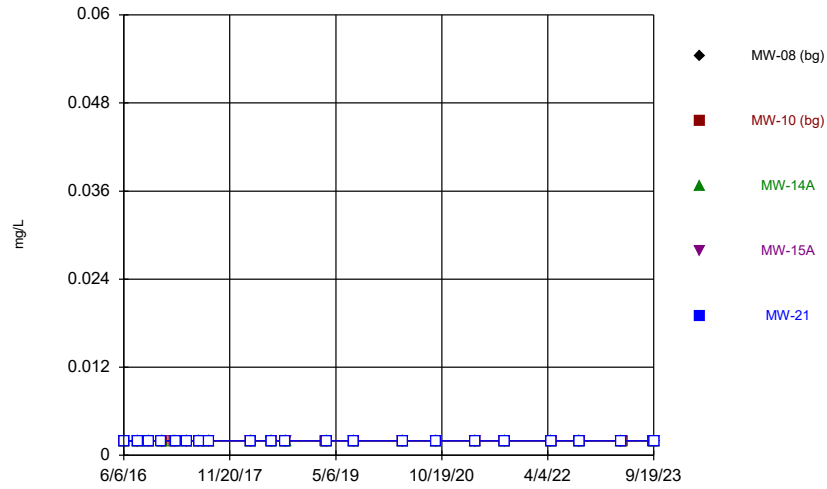
Confidence Intervals - All Results (No Significant)

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 7:54 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	ND Adj.	Transform	Alpha	Method
Barium (mg/L)	MW-14A	0.03663	0.03205	2	No	21	0	None	No	0.01	Param.
Barium (mg/L)	MW-15A	0.04015	0.03485	2	No	20	0	None	No	0.01	Param.
Barium (mg/L)	MW-21	0.05447	0.03953	2	No	21	0	None	No	0.01	Param.
Barium (mg/L)	MW-4B	0.164	0.1386	2	No	21	0	None	No	0.01	Param.
Barium (mg/L)	MW-5B	0.3126	0.2714	2	No	21	0	None	No	0.01	Param.
Barium (mg/L)	MW-6A	0.2266	0.2008	2	No	21	0	None	No	0.01	Param.
Cadmium (mg/L)	MW-4B	0.000285	0.0002	0.005	No	21	95.24	None	No	0.01	NP (NDs)
Cadmium (mg/L)	MW-5B	0.000255	0.0002	0.005	No	21	95.24	None	No	0.01	NP (NDs)
Chromium (mg/L)	MW-21	0.006434	0.005579	0.1	No	21	19.05	Kaplan-Meier	No	0.01	Param.
Cobalt (mg/L)	MW-4B	0.00147	0.0005	0.006	No	21	61.9	None	No	0.01	NP (NDs)
Combined Radium 226 + 228 (pCi/L)	MW-14A	0.4407	0.1611	5	No	17	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-15A	0.3808	0.1154	5	No	17	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-21	0.5112	0.1814	5	No	17	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-4B	0.7247	0.4121	5	No	17	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-5B	1.018	0.6673	5	No	17	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-6A	0.7934	0.4838	5	No	17	0	None	No	0.01	Param.
Fluoride (mg/L)	MW-14A	1	0.867	4	No	21	90.48	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-15A	1	0.625	4	No	21	80.95	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-21	1	0.993	4	No	22	90.91	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-4B	1	0.801	4	No	22	81.82	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-5B	1.88	0.627	4	No	22	86.36	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-6A	1.89	0.814	4	No	22	77.27	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-21	0.000633	0.0005	0.015	No	21	95.24	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-4B	0.000532	0.0005	0.015	No	20	90	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-5B	0.000627	0.0005	0.015	No	21	95.24	None	No	0.01	NP (NDs)
Lithium (mg/L)	MW-21	0.0213	0.01	0.04	No	21	47.62	None	No	0.01	NP (normality)
Mercury (mg/L)	MW-5B	0.000813	0.0002	0.002	No	21	95.24	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-21	0.00383	0.002	0.1	No	21	95.24	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-4B	0.00296	0.002	0.1	No	21	95.24	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-5B	0.00212	0.002	0.1	No	21	95.24	None	No	0.01	NP (NDs)
Selenium (mg/L)	MW-14A	0.00821	0.005	0.05	No	21	47.62	None	No	0.01	NP (normality)
Selenium (mg/L)	MW-15A	0.00502	0.005	0.05	No	21	95.24	None	No	0.01	NP (NDs)
Selenium (mg/L)	MW-21	0.01011	0.006573	0.05	No	21	23.81	Kaplan-Meier	No	0.01	Param.
Thallium (mg/L)	MW-4B	0.00288	0.001	0.002	No	21	90.48	None	No	0.01	NP (NDs)
Thallium (mg/L)	MW-5B	0.00393	0.001	0.002	No	21	90.48	None	No	0.01	NP (NDs)

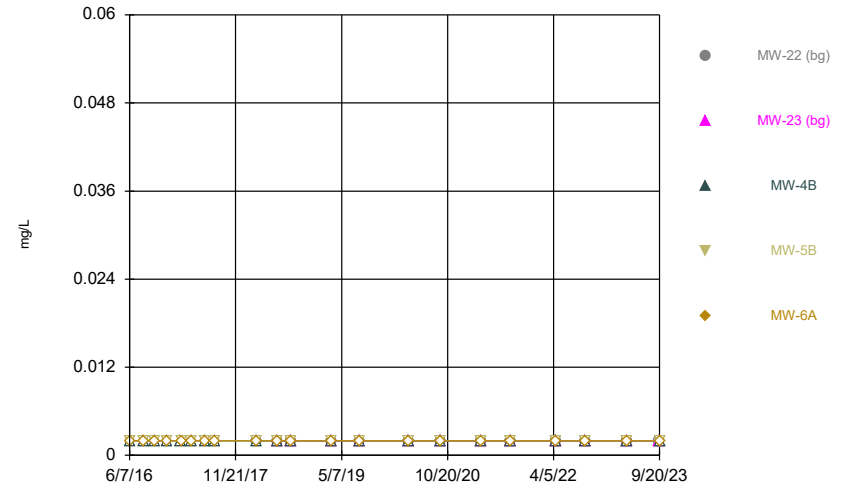
FIGURE A.

Time Series



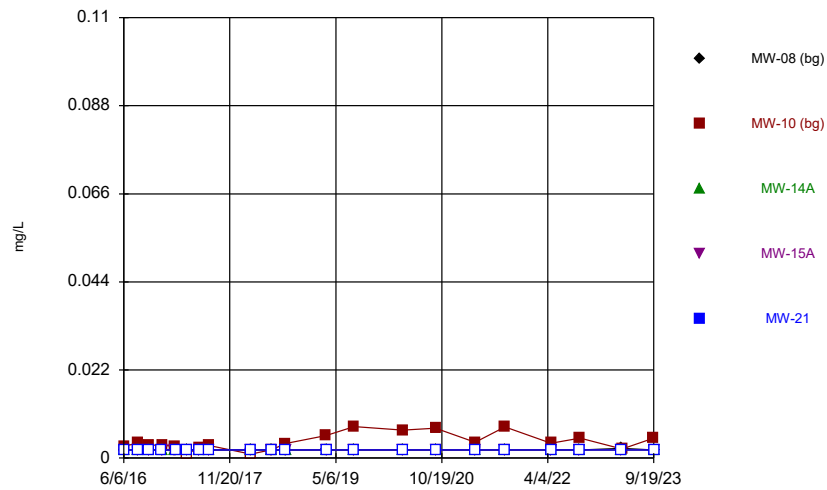
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



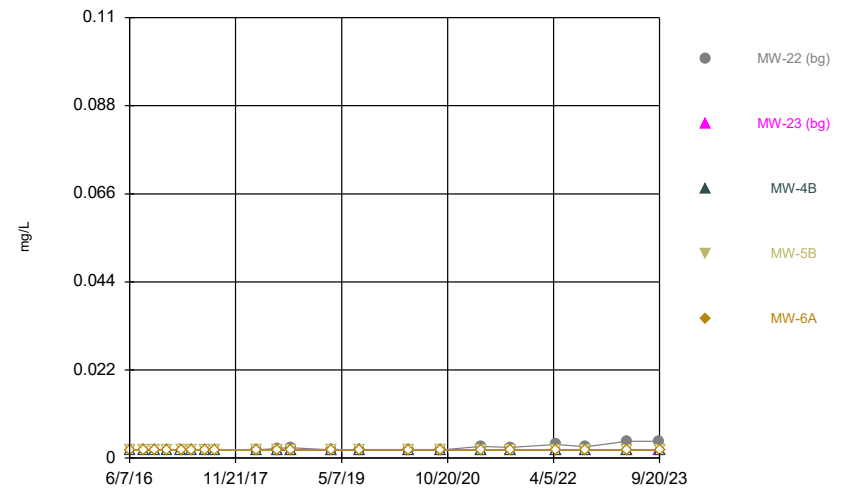
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



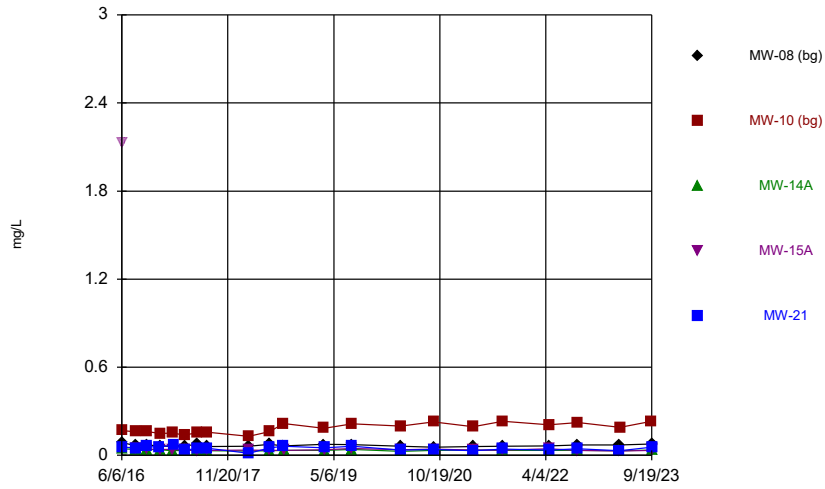
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



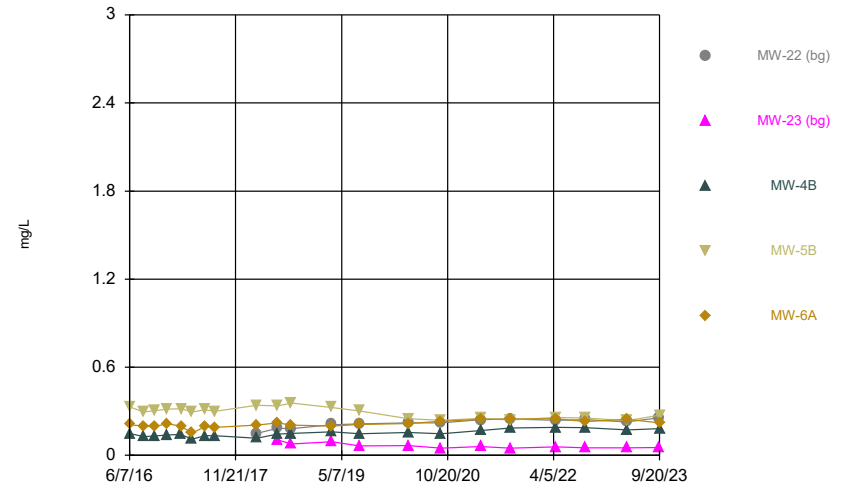
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Time Series



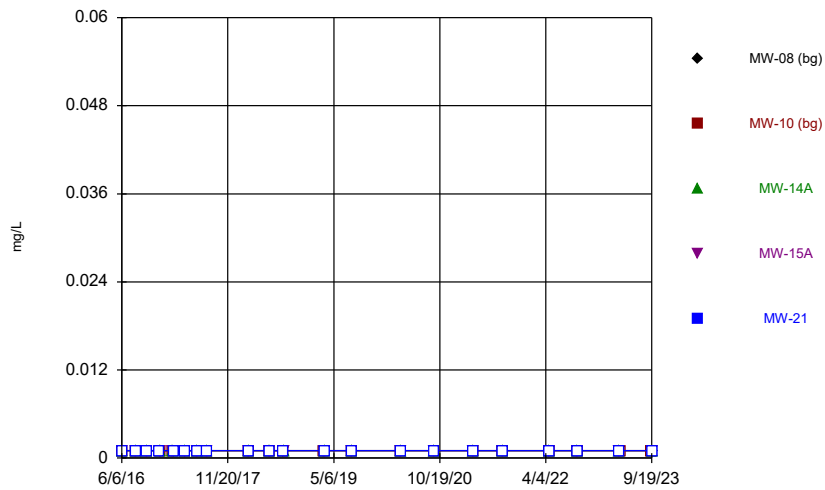
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 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



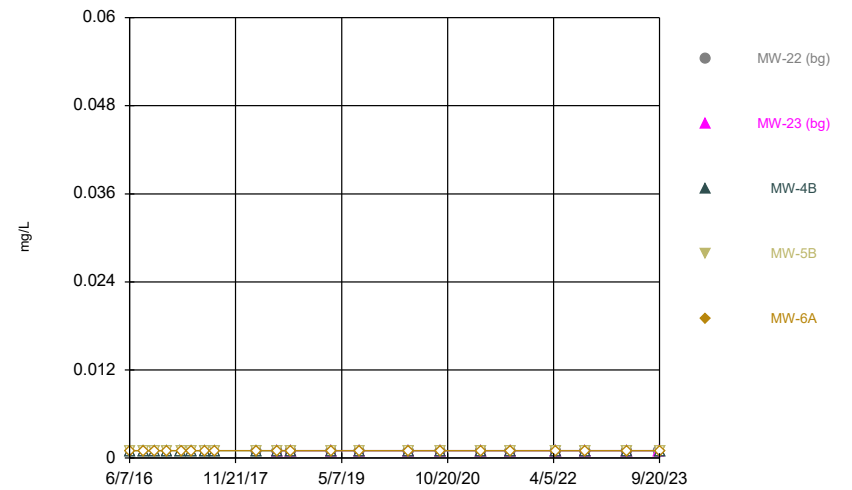
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Time Series



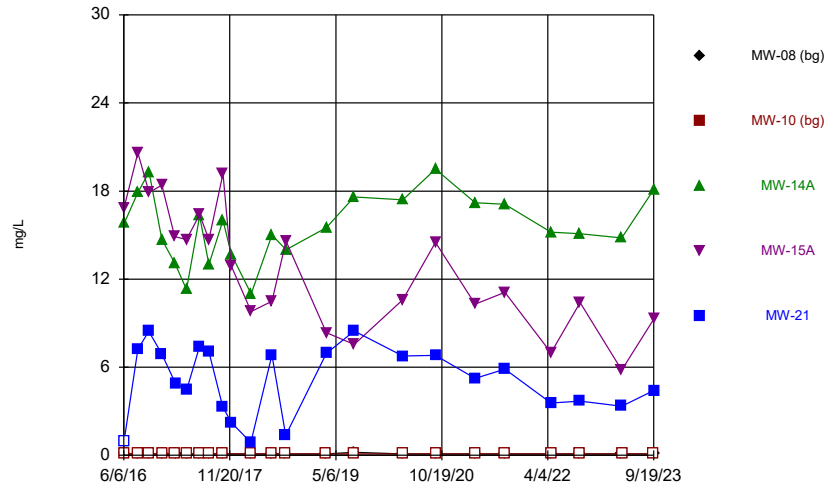
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Time Series



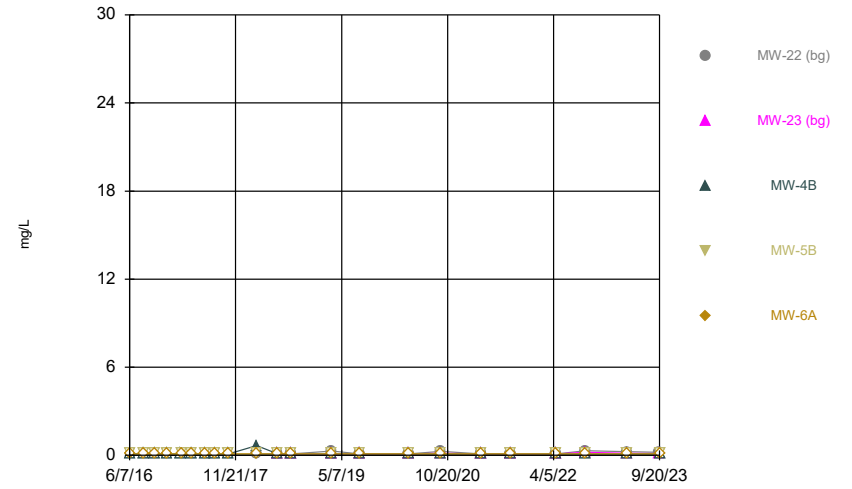
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Time Series



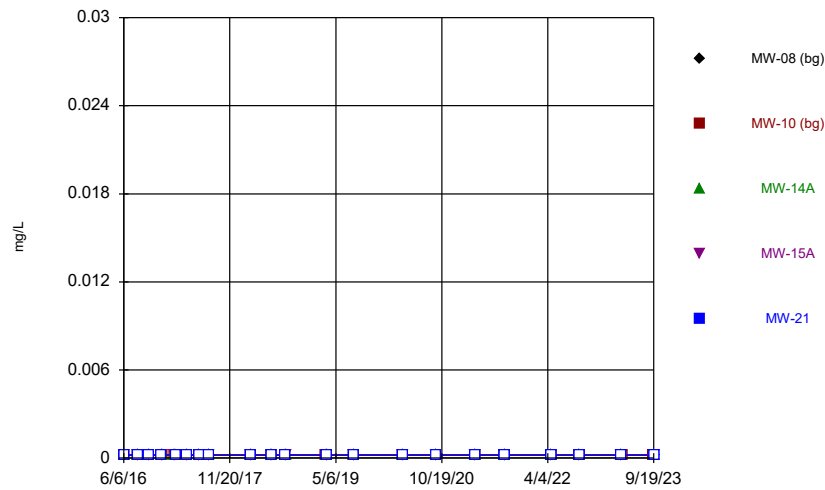
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Time Series



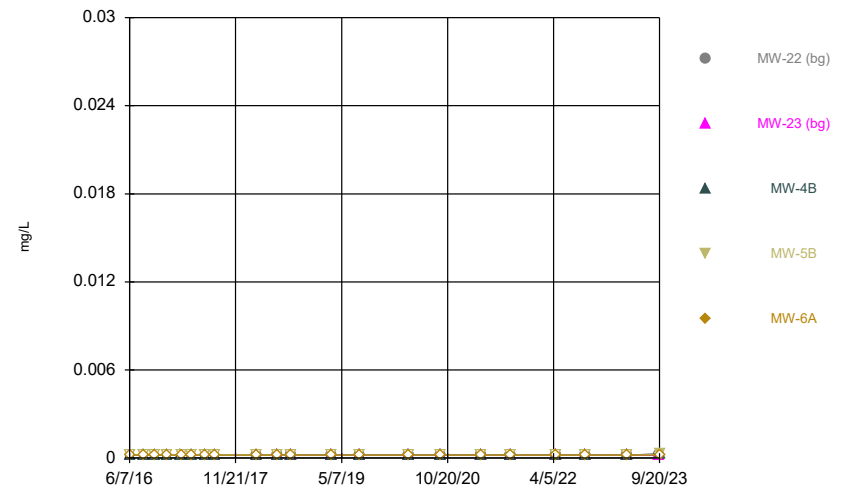
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



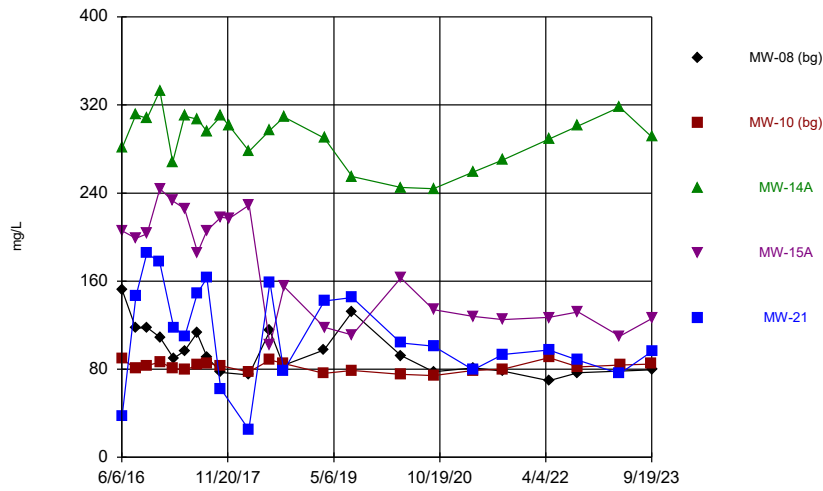
Constituent: Cadmium Analysis Run 11/9/2023 7:45 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



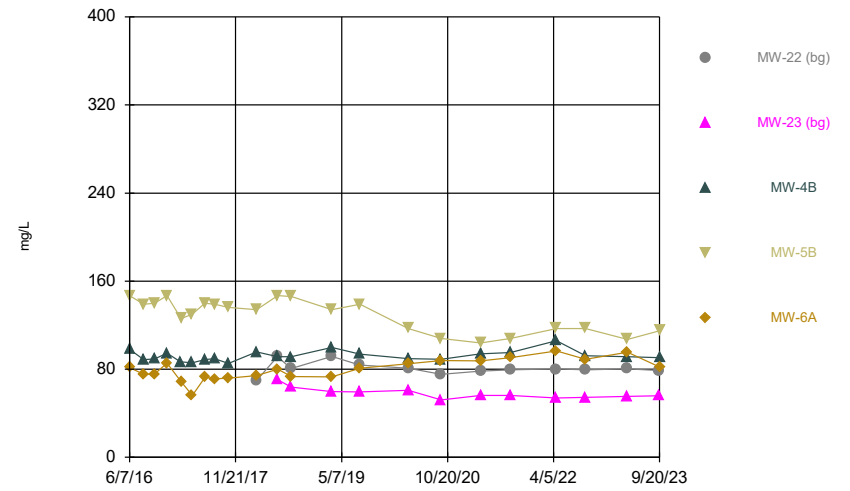
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



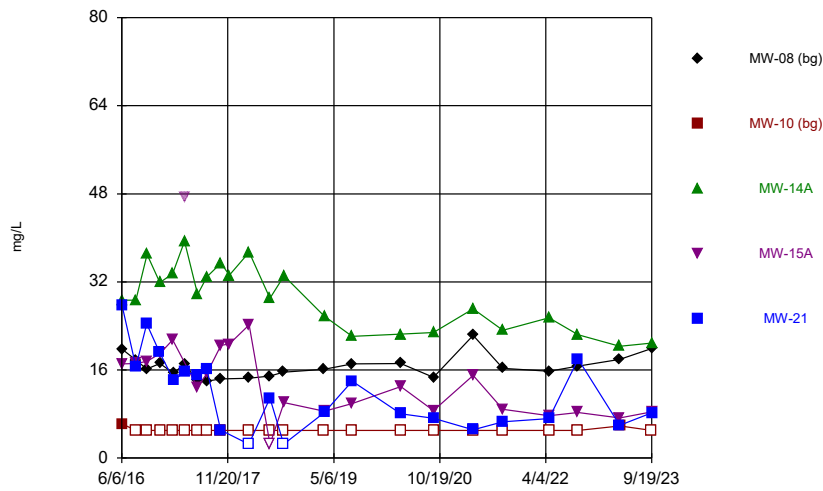
Constituent: Calcium Analysis Run 11/9/2023 7:45 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



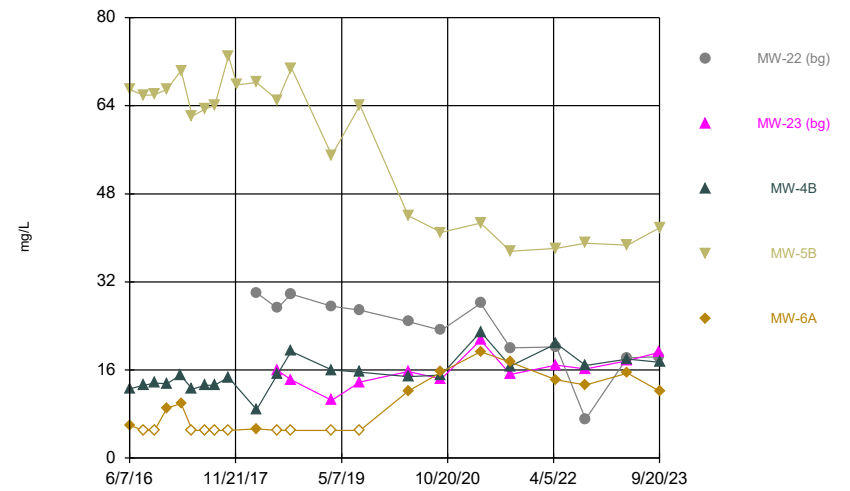
Constituent: Calcium Analysis Run 11/9/2023 7:45 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



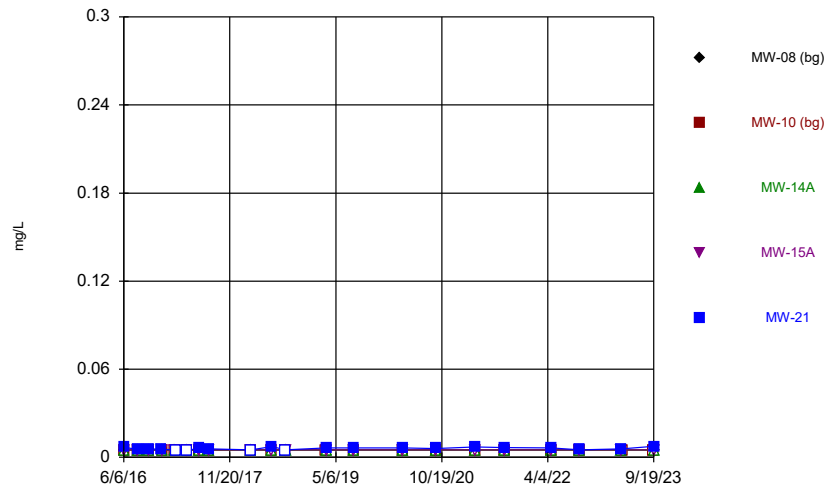
Constituent: Chloride Analysis Run 11/9/2023 7:45 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



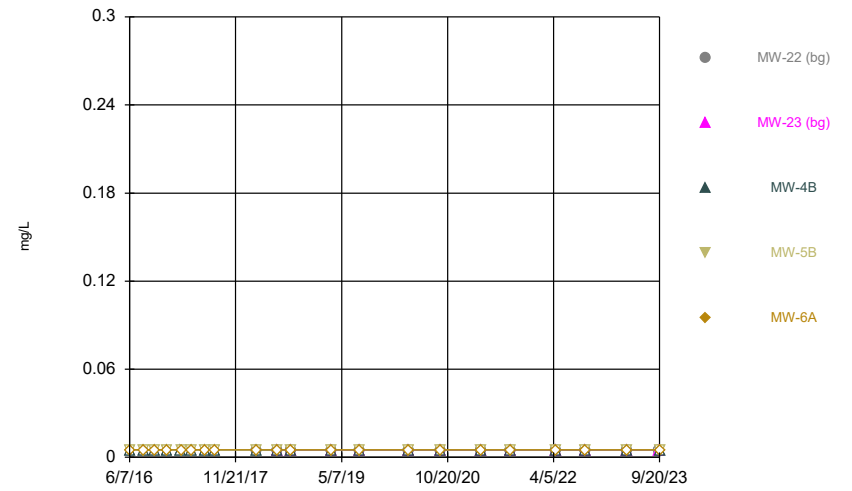
Constituent: Chloride Analysis Run 11/9/2023 7:45 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



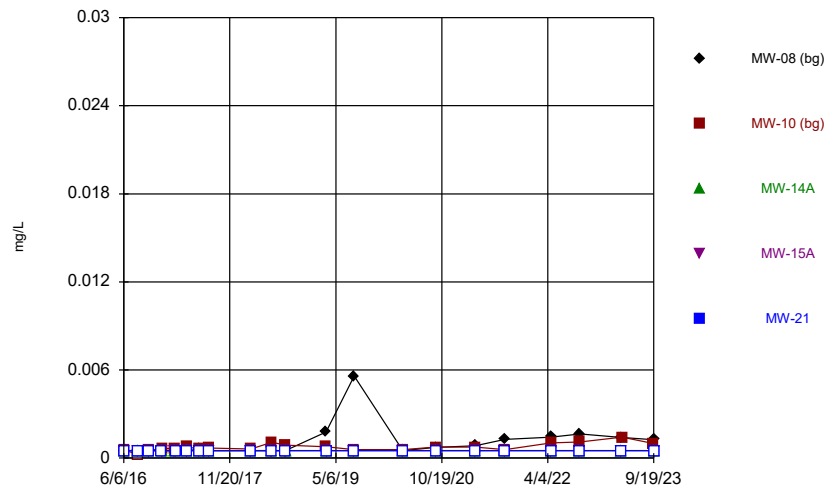
Constituent: Chromium Analysis Run 11/9/2023 7:45 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



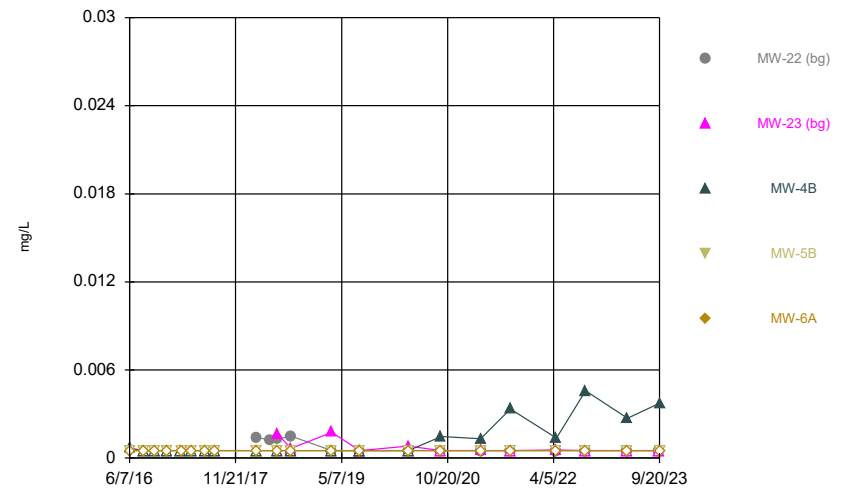
Constituent: Chromium Analysis Run 11/9/2023 7:45 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



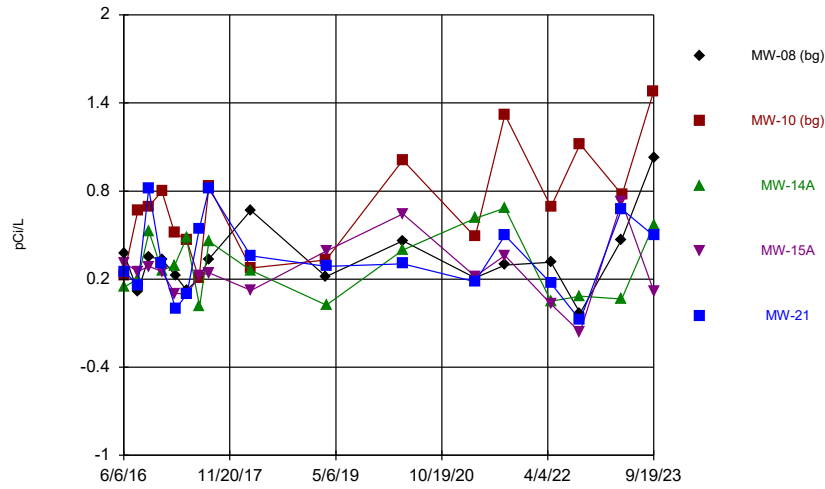
Constituent: Cobalt Analysis Run 11/9/2023 7:45 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



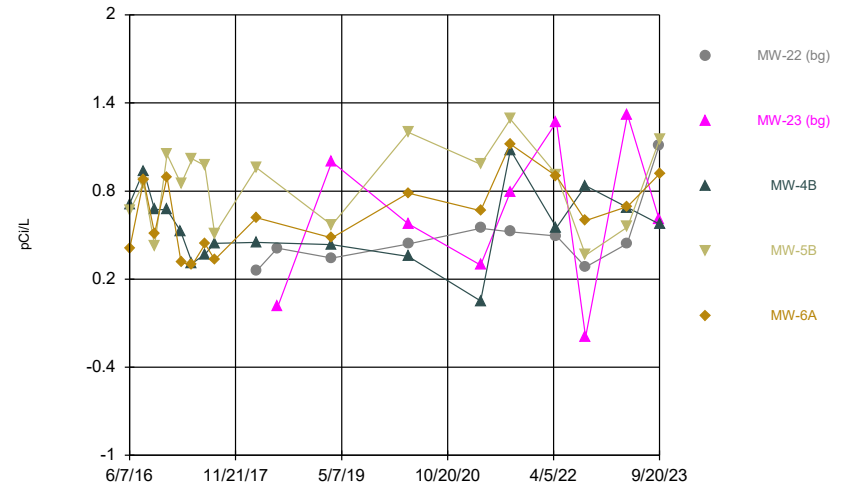
Constituent: Cobalt Analysis Run 11/9/2023 7:45 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



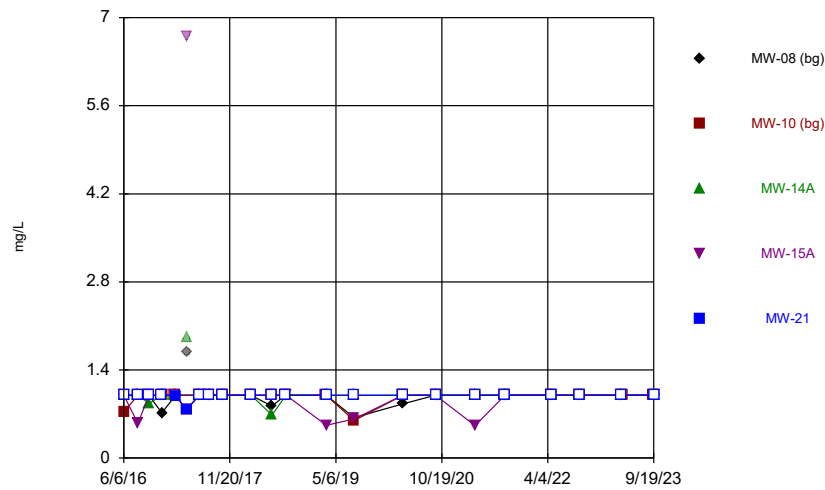
Constituent: Combined Radium 226 + 228 Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



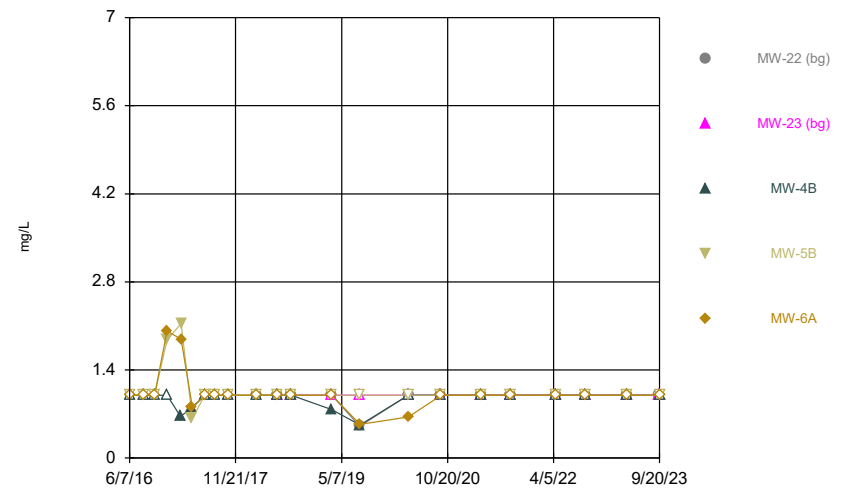
Constituent: Combined Radium 226 + 228 Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



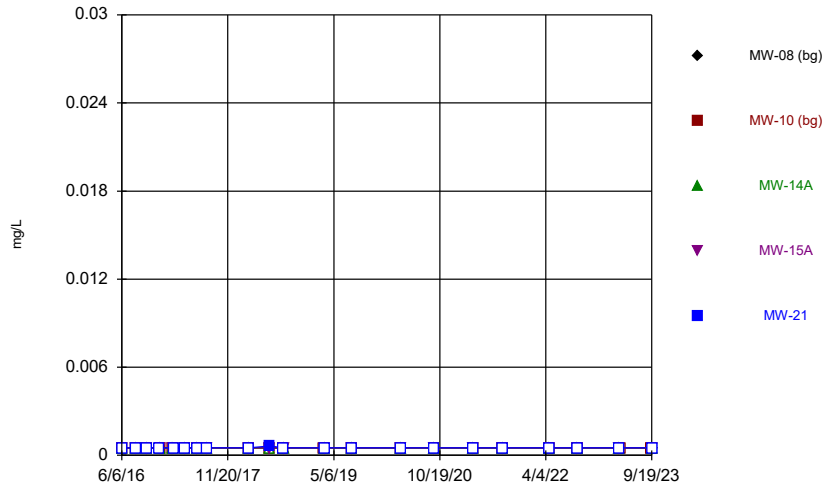
Constituent: Fluoride Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



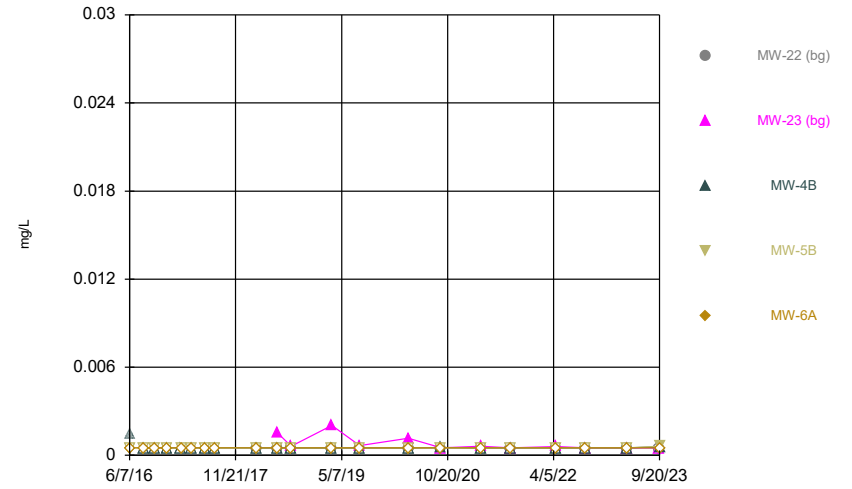
Constituent: Fluoride Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



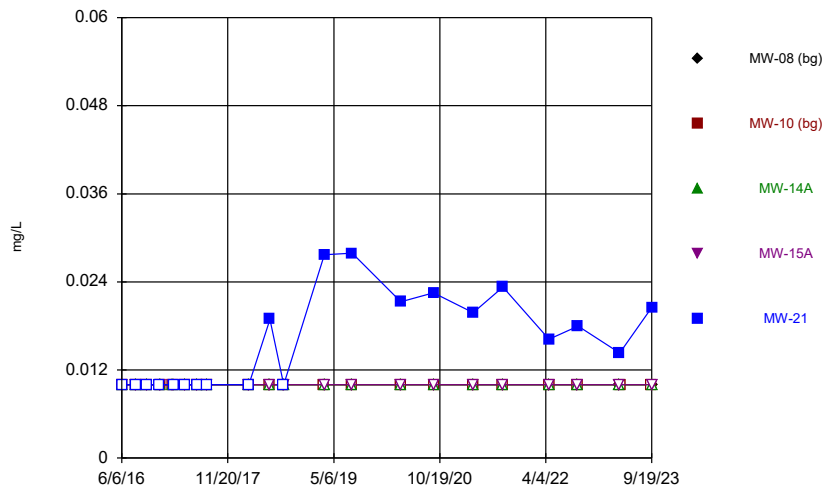
Constituent: Lead Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



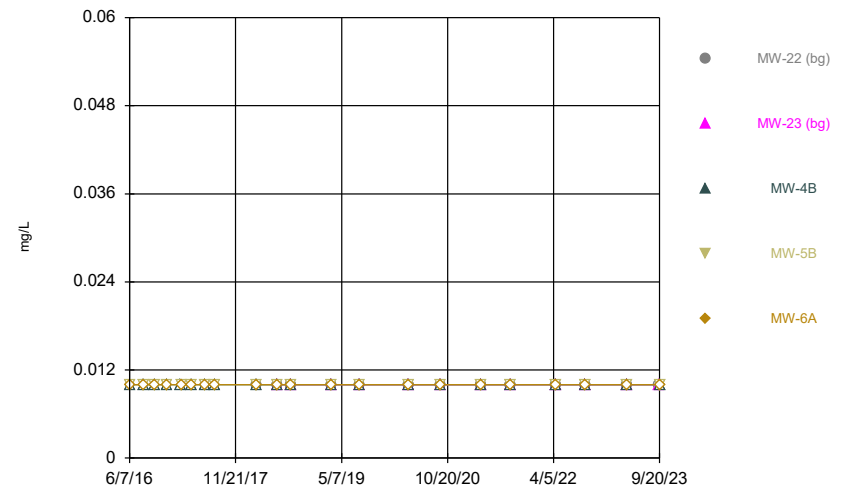
Constituent: Lead Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



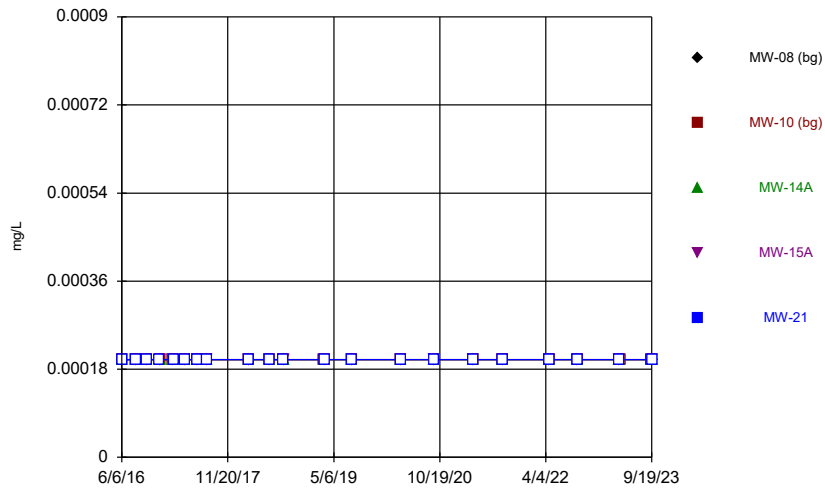
Constituent: Lithium Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



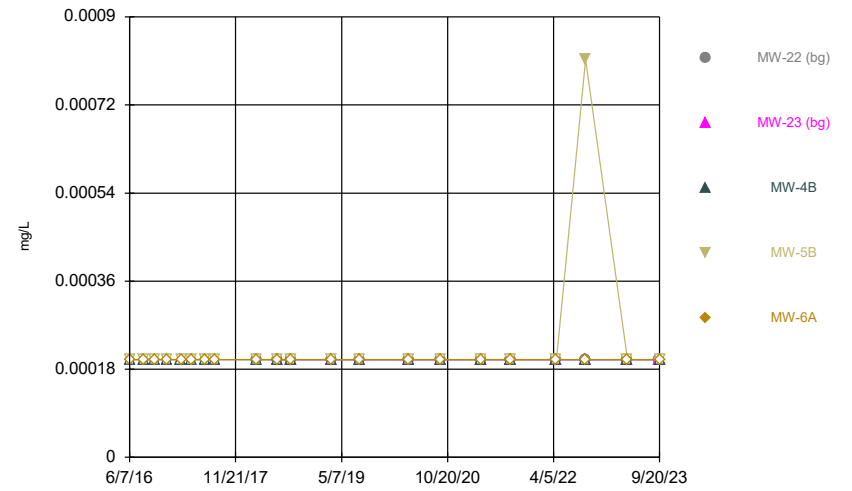
Constituent: Lithium Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



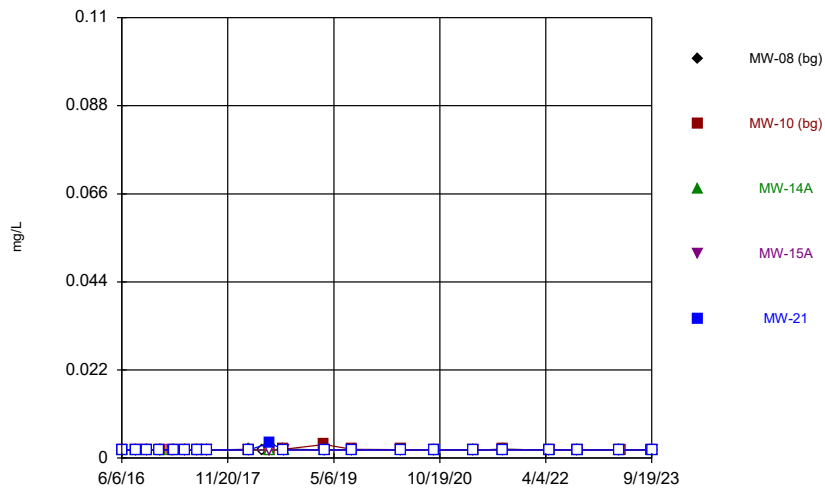
Constituent: Mercury Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



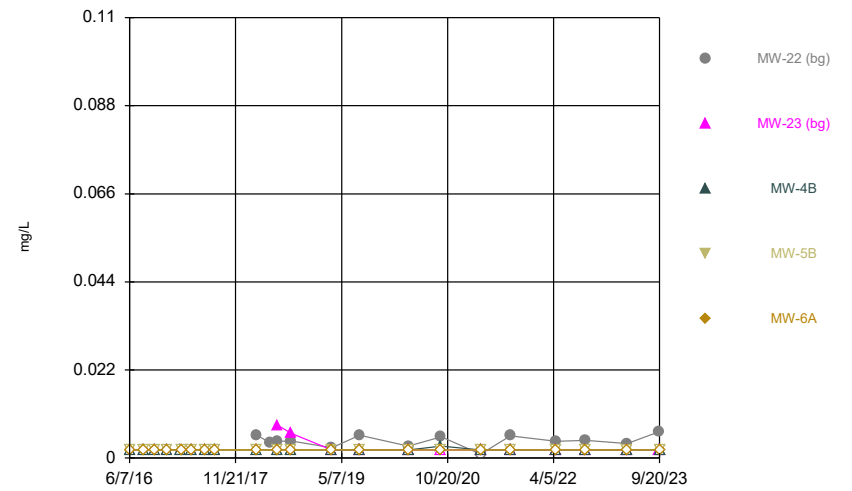
Constituent: Mercury Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



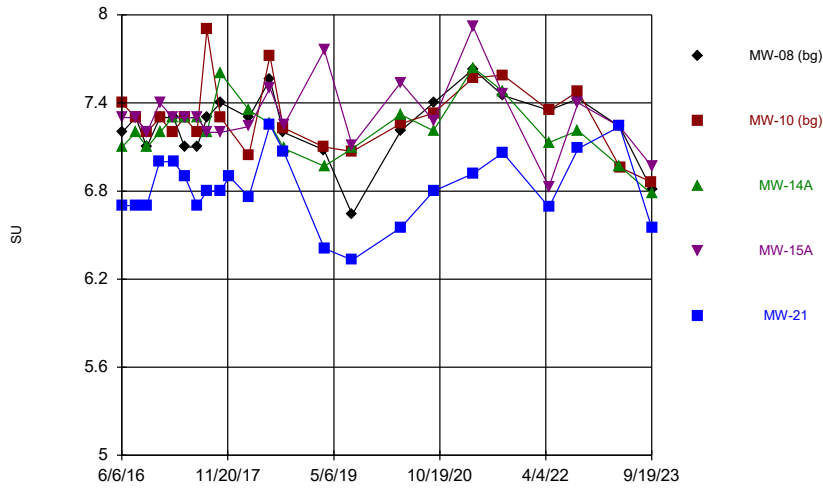
Constituent: Molybdenum Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series

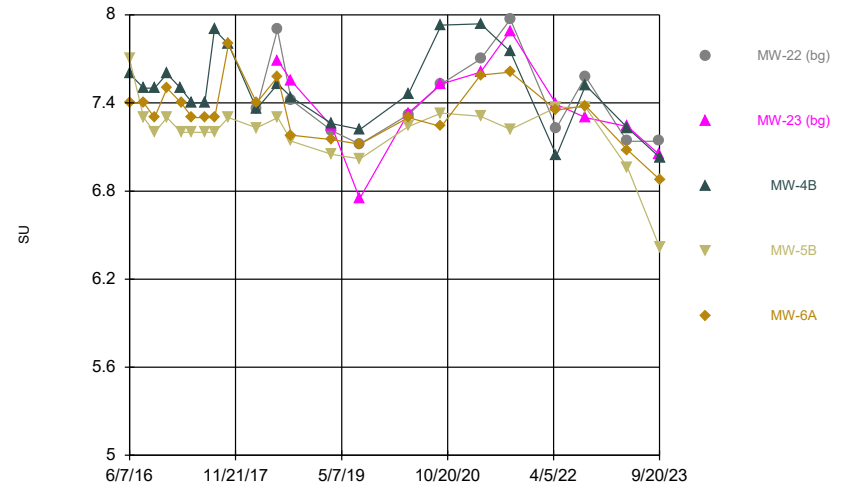


Constituent: Molybdenum Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

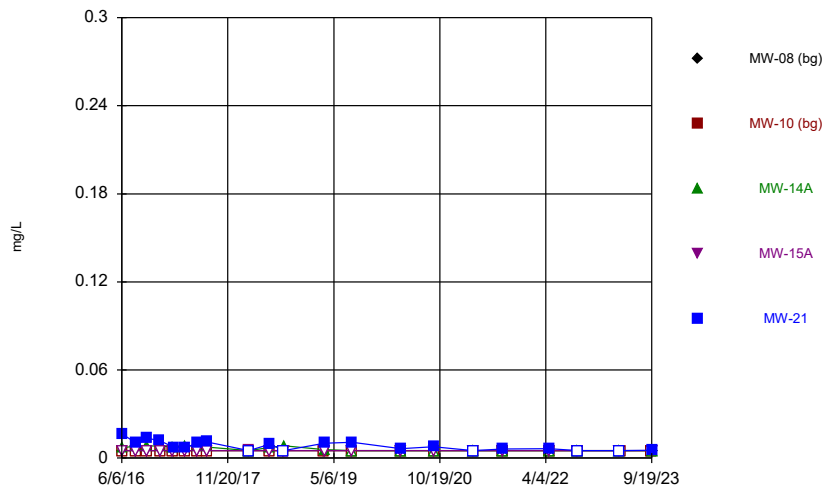
Time Series



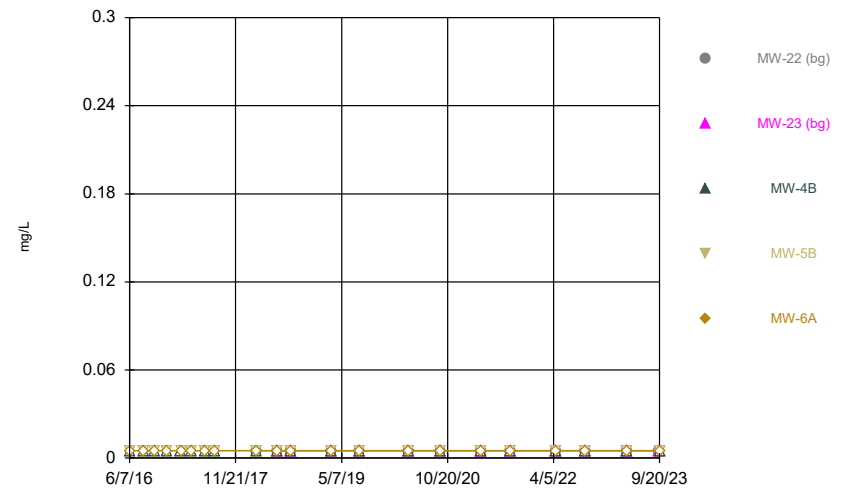
Time Series



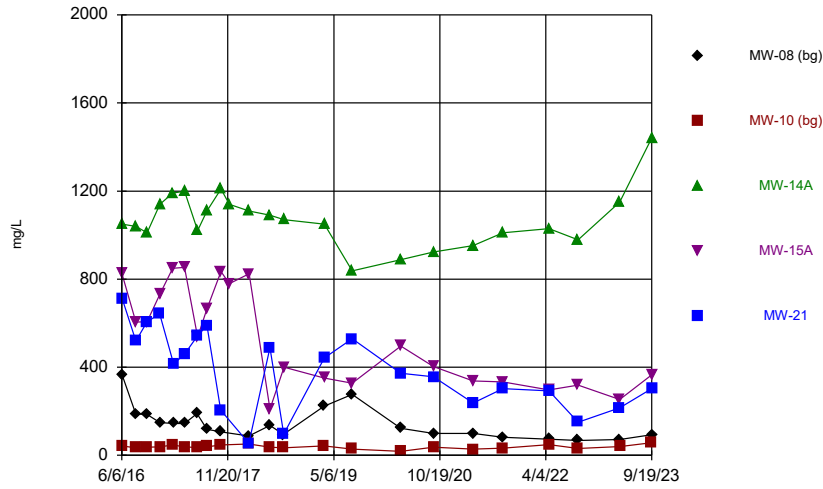
Time Series



Time Series

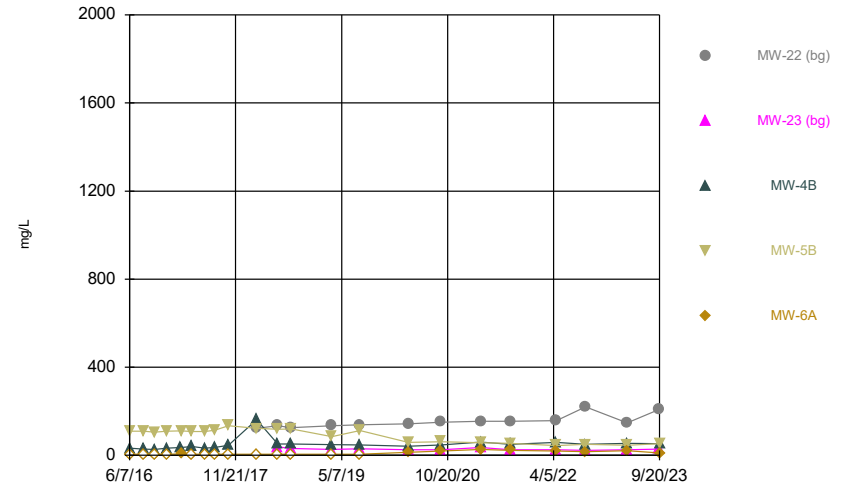


Time Series



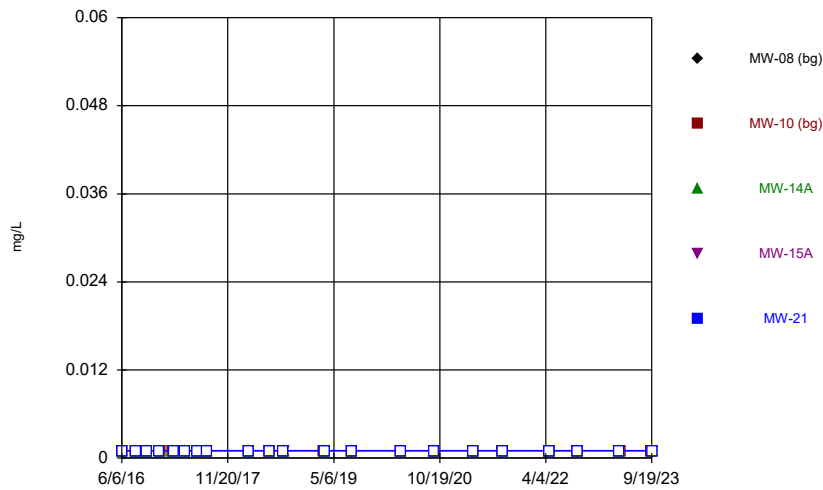
Constituent: Sulfate Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



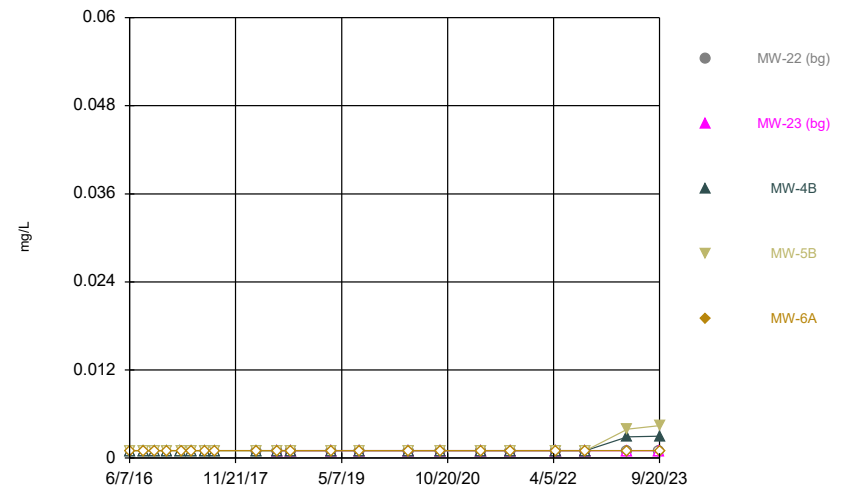
Constituent: Sulfate Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



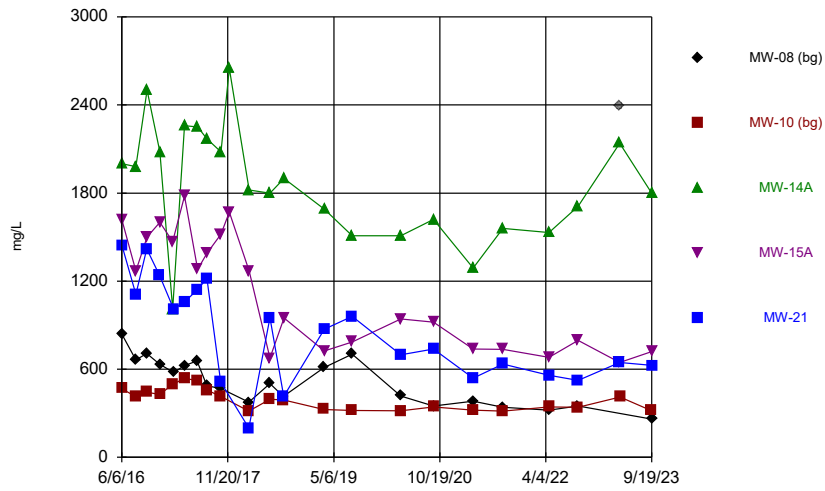
Constituent: Thallium Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



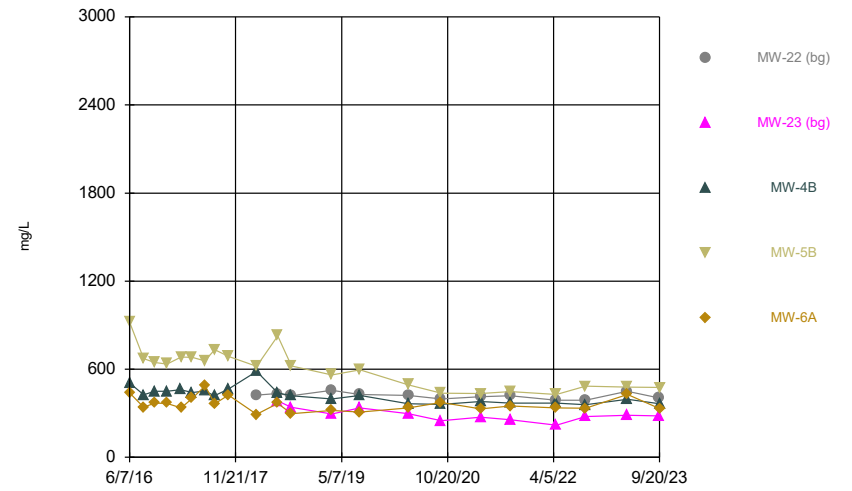
Constituent: Thallium Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



Constituent: Total Dissolved Solids Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series



Constituent: Total Dissolved Solids Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series

Constituent: Antimony (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.002		<0.002	
6/7/2016	<0.002				
6/8/2016			<0.002		<0.002
8/15/2016		<0.002	<0.002	<0.002	<0.002
8/16/2016	<0.002				
10/10/2016	<0.002	<0.002			<0.002
10/11/2016			<0.002	<0.002	
12/12/2016					<0.002
12/14/2016	<0.002	<0.002	<0.002	<0.002	
2/17/2017		<0.002	<0.002	<0.002	
2/21/2017	<0.002				<0.002
4/17/2017	<0.002	<0.002	<0.002	<0.002	
4/18/2017					<0.002
6/19/2017	<0.002	<0.002			
6/20/2017					<0.002
6/21/2017			<0.002	<0.002	
8/7/2017	<0.002	<0.002			
8/8/2017			<0.002	<0.002	<0.002
3/5/2018		<0.002			
3/6/2018	<0.002				<0.002
3/7/2018			<0.002	<0.002	
6/19/2018	<0.002	<0.002			<0.002
6/20/2018			<0.002	<0.002	
8/27/2018	<0.002	<0.002			
8/28/2018					<0.002
8/29/2018			<0.002	<0.002	
3/18/2019	<0.002				
3/19/2019		<0.002			
3/20/2019			<0.002	<0.002	<0.002
8/6/2019	<0.002				
8/7/2019		<0.002	<0.002	<0.002	<0.002
4/7/2020	<0.002	<0.002	<0.002	<0.002	<0.002
9/18/2020	<0.002	<0.002	<0.002	<0.002	<0.002
4/5/2021	<0.002	<0.002	<0.002	<0.002	<0.002
9/1/2021	<0.002	<0.002	<0.002	<0.002	<0.002
4/20/2022	<0.002	<0.002	<0.002	<0.002	<0.002
9/14/2022	<0.002	<0.002	<0.002	<0.002	<0.002
4/11/2023	<0.002		<0.002	<0.002	<0.002
4/12/2023		<0.002			
9/18/2023		<0.002			
9/19/2023	<0.002		<0.002	<0.002	<0.002

Time Series

Constituent: Antimony (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.002	<0.002	<0.002
8/16/2016			<0.002	<0.002	<0.002
10/11/2016			<0.002	<0.002	<0.002
12/12/2016			<0.002	<0.002	<0.002
2/17/2017			<0.002		
2/21/2017				<0.002	<0.002
4/17/2017			<0.002	<0.002	<0.002
6/20/2017			<0.002	<0.002	
6/21/2017					<0.002
8/7/2017			<0.002		
8/8/2017				<0.002	<0.002
3/6/2018	<0.002		<0.002	<0.002	<0.002
6/19/2018	<0.002				
6/20/2018		<0.002			
6/21/2018			<0.002	<0.002	<0.002
8/27/2018	<0.002	<0.002			
8/28/2018			<0.002		
8/29/2018				<0.002	<0.002
3/19/2019	<0.002	<0.002	<0.002	<0.002	<0.002
8/6/2019	<0.002	<0.002			
8/7/2019			<0.002	<0.002	<0.002
4/7/2020	<0.002	<0.002	<0.002	<0.002	<0.002
9/18/2020	<0.002	<0.002	<0.002	<0.002	<0.002
4/5/2021	<0.002	<0.002	<0.002	<0.002	<0.002
9/1/2021	<0.002	<0.002	<0.002	<0.002	<0.002
4/20/2022	<0.002	<0.002	<0.002	<0.002	<0.002
9/14/2022	<0.002	<0.002	<0.002	<0.002	<0.002
4/10/2023	<0.002				
4/12/2023		<0.002	<0.002	<0.002	<0.002
9/18/2023	<0.002	<0.002			
9/20/2023			<0.002	<0.002	<0.002

Time Series

Constituent: Arsenic (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		0.00298		<0.002	
6/7/2016	<0.002				
6/8/2016			<0.002		<0.002
8/15/2016		0.00369	<0.002	<0.002	<0.002
8/16/2016	<0.002				
10/10/2016	<0.002	0.00328			<0.002
10/11/2016			<0.002	<0.002	
12/12/2016					<0.002
12/14/2016	<0.002	0.00312	<0.002	<0.002	
2/17/2017		0.00298	<0.002	<0.002	
2/21/2017	<0.002				<0.002
4/17/2017	<0.002	<0.002	<0.002	<0.002	
4/18/2017					<0.002
6/19/2017	<0.002	0.00262			
6/20/2017					<0.002
6/21/2017			<0.002	<0.002	
8/7/2017	<0.002	0.00317			
8/8/2017			<0.002	<0.002	<0.002
3/5/2018		<0.002			
3/6/2018	<0.002				<0.002
3/7/2018			<0.002	<0.002	
6/19/2018	<0.002	0.00211			<0.002
6/20/2018			<0.002	<0.002	
8/27/2018	<0.002	0.0036			
8/28/2018					<0.002
8/29/2018			<0.002	<0.002	
3/18/2019	<0.002				
3/19/2019		0.0056			
3/20/2019			<0.002	<0.002	<0.002
8/6/2019	<0.002				
8/7/2019		0.00784	<0.002	<0.002	<0.002
4/7/2020	<0.002	0.00697	<0.002	<0.002	<0.002
9/18/2020	<0.002	0.00748	<0.002	<0.002	<0.002
4/5/2021	<0.002	0.00393	<0.002	<0.002	<0.002
9/1/2021	<0.002	0.00781	<0.002	<0.002	<0.002
4/20/2022	<0.002	0.00371	<0.002	<0.002	<0.002
9/14/2022	<0.002	0.00497	<0.002	<0.002	<0.002
4/11/2023	0.00247		<0.002	<0.002	<0.002
4/12/2023		0.00224			
9/18/2023		0.00501			
9/19/2023	<0.002		<0.002	<0.002	<0.002

Time Series

Constituent: Arsenic (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.002	<0.002	<0.002
8/16/2016			<0.002	<0.002	<0.002
10/11/2016			<0.002	<0.002	<0.002
12/12/2016			<0.002	<0.002	<0.002
2/17/2017			<0.002		
2/21/2017				<0.002	<0.002
4/17/2017			<0.002	<0.002	<0.002
6/20/2017			<0.002	<0.002	
6/21/2017					<0.002
8/7/2017			<0.002		
8/8/2017				<0.002	<0.002
3/6/2018	<0.002		<0.002	<0.002	<0.002
6/19/2018	0.00245				
6/20/2018		<0.002			
6/21/2018			<0.002	<0.002	<0.002
8/27/2018	0.00261	<0.002			
8/28/2018			<0.002		
8/29/2018				<0.002	<0.002
3/19/2019	<0.002	<0.002	<0.002	<0.002	<0.002
8/6/2019	<0.002	<0.002			
8/7/2019			<0.002	<0.002	<0.002
4/7/2020	<0.002	<0.002	<0.002	<0.002	<0.002
9/18/2020	<0.002	<0.002	<0.002	<0.002	<0.002
4/5/2021	0.00289	<0.002	<0.002	<0.002	<0.002
9/1/2021	0.00267	<0.002	<0.002	<0.002	<0.002
4/20/2022	0.0034	<0.002	<0.002	<0.002	<0.002
9/14/2022	0.00285	<0.002	<0.002	<0.002	<0.002
4/10/2023	0.00421				
4/12/2023		<0.002	<0.002	<0.002	<0.002
9/18/2023	0.00421	<0.002			
9/20/2023			<0.002	<0.002	<0.002

Time Series

Constituent: Barium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		0.168		2.13 (o)	
6/7/2016	0.0861				
6/8/2016			0.0443		0.0573
8/15/2016		0.161	0.0402	0.044	0.0482
8/16/2016	0.0671				
10/10/2016	0.0706	0.163			0.0606
10/11/2016			0.0391	0.0426	
12/12/2016					0.056
12/14/2016	0.0645	0.15	0.0383	0.0406	
2/17/2017		0.151	0.0306	0.0402	
2/21/2017	0.0594 (F1)				0.0735
4/17/2017	0.0636	0.138	0.0341	0.0364	
4/18/2017					0.0356
6/19/2017	0.076	0.154			
6/20/2017					0.0461
6/21/2017			0.0338	0.0327	
8/7/2017	0.0596	0.157			
8/8/2017			0.031	0.0338	0.0499
3/5/2018		0.129			
3/6/2018	0.0617				0.0148
3/7/2018			0.0285	0.0352	
6/19/2018	0.0761	0.162			0.0515
6/20/2018			0.0314	0.0338	
8/27/2018	0.0649	0.216			
8/28/2018					0.0622
8/29/2018			0.0344	0.0335	
3/18/2019	0.0751				
3/19/2019		0.185			
3/20/2019			0.0328	0.037	0.0511
8/6/2019	0.0733				
8/7/2019		0.215	0.0398	0.047	0.0624
4/7/2020	0.0613	0.199	0.0266	0.0389	0.0352
9/18/2020	0.0549	0.227	0.0328	0.0416	0.0407
4/5/2021	0.0596	0.196	0.0355	0.0365	0.0309
9/1/2021	0.0623	0.233	0.0345	0.0355	0.0434
4/20/2022	0.0631	0.208	0.0327	0.0443	0.036
9/14/2022	0.0703	0.223	0.034	0.0327	0.0447
4/11/2023	0.07		0.032	0.0299	0.031
4/12/2023		0.19			
9/18/2023		0.233			
9/19/2023	0.0782		0.0348	0.0338	0.0559

Time Series

Constituent: Barium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			0.15	0.331	0.209
8/16/2016			0.128	0.295	0.199
10/11/2016			0.131	0.304	0.196
12/12/2016			0.139	0.315	0.216
2/17/2017			0.143		
2/21/2017				0.316	0.197
4/17/2017			0.111	0.296	0.152
6/20/2017			0.133	0.31	
6/21/2017					0.197
8/7/2017			0.133		
8/8/2017				0.3	0.19
3/6/2018	0.15		0.117	0.341	0.206
6/19/2018	0.184				
6/20/2018		0.106			
6/21/2018			0.144	0.336	0.222
8/27/2018	0.181	0.0779			
8/28/2018			0.149		
8/29/2018				0.357	0.206
3/19/2019	0.209	0.0922	0.161	0.326	0.2
8/6/2019	0.215	0.0635			
8/7/2019			0.147	0.301	0.211
4/7/2020	0.222	0.0654	0.156	0.25	0.216
9/18/2020	0.222	0.0491	0.147	0.239	0.231
4/5/2021	0.242	0.0608	0.169	0.252	0.245
9/1/2021	0.247	0.0497	0.186	0.241	0.248
4/20/2022	0.239	0.0572	0.191	0.258	0.249
9/14/2022	0.243	0.0507	0.188	0.253	0.229
4/10/2023	0.227				
4/12/2023		0.0518	0.173	0.237	0.246
9/18/2023	0.256	0.0533			
9/20/2023			0.181	0.274	0.222

Time Series

Constituent: Beryllium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.001		<0.001	
6/7/2016	<0.001				
6/8/2016			<0.001		<0.001
8/15/2016		<0.001	<0.001	<0.001	<0.001
8/16/2016	<0.001				
10/10/2016	<0.001	<0.001			<0.001
10/11/2016			<0.001	<0.001	
12/12/2016					<0.001
12/14/2016	<0.001	<0.001	<0.001	<0.001	
2/17/2017		<0.001	<0.001	<0.001	
2/21/2017	<0.001				<0.001
4/17/2017	<0.001	<0.001	<0.001	<0.001	
4/18/2017					<0.001
6/19/2017	<0.001	<0.001			
6/20/2017					<0.001
6/21/2017			<0.001	<0.001	
8/7/2017	<0.001	<0.001			
8/8/2017			<0.001	<0.001	<0.001
3/5/2018		<0.001			
3/6/2018	<0.001				<0.001
3/7/2018			<0.001	<0.001	
6/19/2018	<0.001	<0.001			<0.001
6/20/2018			<0.001	<0.001	
8/27/2018	<0.001	<0.001			
8/28/2018					<0.001
8/29/2018			<0.001	<0.001	
3/18/2019	<0.001				
3/19/2019		<0.001			
3/20/2019			<0.001	<0.001	<0.001
8/6/2019	<0.001				
8/7/2019		<0.001	<0.001	<0.001	<0.001
4/7/2020	<0.001	<0.001	<0.001	<0.001	<0.001
9/18/2020	<0.001	<0.001	<0.001	<0.001	<0.001
4/5/2021	<0.001	<0.001	<0.001	<0.001	<0.001
9/1/2021	<0.001	<0.001	<0.001	<0.001	<0.001
4/20/2022	<0.001	<0.001	<0.001	<0.001	<0.001
9/14/2022	<0.001	<0.001	<0.001	<0.001	<0.001
4/11/2023	<0.001		<0.001	<0.001	<0.001
4/12/2023		<0.001			
9/18/2023		<0.001			
9/19/2023	<0.001		<0.001	<0.001	<0.001

Time Series

Constituent: Beryllium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.001	<0.001	<0.001
8/16/2016			<0.001	<0.001	<0.001
10/11/2016			<0.001	<0.001	<0.001
12/12/2016			<0.001	<0.001	<0.001
2/17/2017			<0.001		
2/21/2017				<0.001	<0.001
4/17/2017			<0.001	<0.001	<0.001
6/20/2017			<0.001	<0.001	
6/21/2017					<0.001
8/7/2017			<0.001		
8/8/2017				<0.001	<0.001
3/6/2018	<0.001		<0.001	<0.001	<0.001
6/19/2018	<0.001				
6/20/2018		<0.001			
6/21/2018			<0.001	<0.001	<0.001
8/27/2018	<0.001	<0.001			
8/28/2018			<0.001		
8/29/2018				<0.001	<0.001
3/19/2019	<0.001	<0.001	<0.001	<0.001	<0.001
8/6/2019	<0.001	<0.001			
8/7/2019			<0.001	<0.001	<0.001
4/7/2020	<0.001	<0.001	<0.001	<0.001	<0.001
9/18/2020	<0.001	<0.001	<0.001	<0.001	<0.001
4/5/2021	<0.001	<0.001	<0.001	<0.001	<0.001
9/1/2021	<0.001	<0.001	<0.001	<0.001	<0.001
4/20/2022	<0.001	<0.001	<0.001	<0.001	<0.001
9/14/2022	<0.001	<0.001	<0.001	<0.001	<0.001
4/10/2023	<0.001				
4/12/2023		<0.001	<0.001	<0.001	<0.001
9/18/2023	<0.001	<0.001			
9/20/2023			<0.001	<0.001	<0.001

Time Series

Constituent: Boron (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.1		16.8	
6/7/2016	<0.1				
6/8/2016			15.8		<2
8/15/2016		<0.1	17.9	20.6	7.23
8/16/2016	<0.1				
10/10/2016	<0.1	<0.1			8.45
10/11/2016			19.3	17.9	
12/12/2016					6.93
12/14/2016	<0.1	<0.1	14.7	18.4	
2/17/2017		<0.1	13.1	14.9	
2/21/2017	<0.1				4.87
4/17/2017	<0.1	<0.1	11.3	14.7	
4/18/2017					4.49
6/19/2017	<0.1	<0.1			
6/20/2017					7.36
6/21/2017			16.3	16.4	
8/7/2017	<0.1	<0.1			
8/8/2017			13	14.7	7.05
10/16/2017	<0.1	<0.1			3.33
10/17/2017			16	19.2	
11/28/2017			13.7 (R)	12.9 (R)	2.24 (R)
3/5/2018		<0.1			
3/6/2018	<0.1				0.885
3/7/2018			11	9.8	
6/19/2018	<0.1	<0.1			6.84
6/20/2018			15	10.5	
8/27/2018	<0.1	<0.1			
8/28/2018					1.36
8/29/2018			14	14.6	
3/18/2019	<0.1				
3/19/2019		<0.1			
3/20/2019			15.5	8.35	6.95
8/6/2019	0.205				
8/7/2019		<0.1	17.6	7.56	8.46
4/7/2020	<0.1	<0.1	17.4	10.6	6.76
9/18/2020	<0.1	<0.1	19.5	14.5	6.82
4/5/2021	<0.1	<0.1	17.2	10.3	5.24
9/1/2021	<0.1	<0.1	17.1	11.1	5.88
4/20/2022	<0.1	<0.1	15.2	6.98	3.57
9/14/2022	<0.1	<0.1	15.1	10.4	3.69
4/11/2023	<0.1		14.8	5.8	3.35
4/12/2023		<0.1			
9/18/2023		<0.1			
9/19/2023	<0.1		18.1	9.28	4.42

Time Series

Constituent: Boron (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.1	<0.1	<0.1
8/16/2016			<0.1	<0.1	<0.1
10/11/2016			<0.1	<0.1	<0.1
12/12/2016			<0.1	<0.1	<0.1
2/17/2017			<0.1		
2/21/2017				<0.1	<0.1
4/17/2017			<0.1	<0.1	<0.1
6/20/2017			<0.1	<0.1	
6/21/2017					<0.1
8/7/2017			<0.1		
8/8/2017				<0.1	<0.1
10/16/2017			<0.1		
10/17/2017				<0.1	<0.1
3/6/2018	<0.1		0.66	<0.1	<0.1
6/19/2018	<0.1				
6/20/2018		<0.1			
6/21/2018			<0.1	<0.1	<0.1
8/27/2018	<0.1	<0.1			
8/28/2018			<0.1		
8/29/2018				<0.1	<0.1
3/19/2019	0.299	<0.1	<0.1	<0.1	<0.1
8/6/2019	<0.1	<0.1			
8/7/2019			<0.1	<0.1	<0.1
4/7/2020	<0.1	<0.1	<0.1	<0.1	<0.1
9/18/2020	0.263	0.15	<0.1	<0.1	<0.1
4/5/2021	<0.1	<0.1	<0.1	<0.1	<0.1
9/1/2021	<0.1	<0.1	<0.1	<0.1	<0.1
4/20/2022	<0.1	<0.1	<0.1	<0.1	<0.1
9/14/2022	0.322	0.204	<0.1	<0.1	<0.1
4/10/2023	0.247				
4/12/2023		0.145	<0.1	<0.1	<0.1
9/18/2023	0.207	0.128			
9/20/2023			<0.1	<0.1	<0.1

Time Series

Constituent: Cadmium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.0002		<0.0002	
6/7/2016	<0.0002				
6/8/2016			<0.0002		<0.0002
8/15/2016		<0.0002	<0.0002	<0.0002	<0.0002
8/16/2016	<0.0002				
10/10/2016	<0.0002	<0.0002			<0.0002
10/11/2016			<0.0002	<0.0002	
12/12/2016					<0.0002
12/14/2016	<0.0002	<0.0002	<0.0002	<0.0002	
2/17/2017		<0.0002	<0.0002	<0.0002	
2/21/2017	<0.0002				<0.0002
4/17/2017	<0.0002	<0.0002	<0.0002	<0.0002	
4/18/2017					<0.0002
6/19/2017	<0.0002	<0.0002			
6/20/2017					<0.0002
6/21/2017			<0.0002	<0.0002	
8/7/2017	<0.0002	<0.0002			
8/8/2017			<0.0002	<0.0002	<0.0002
3/5/2018		<0.0002			
3/6/2018	<0.0002				<0.0002
3/7/2018			<0.0002	<0.0002	
6/19/2018	<0.0002	<0.0002			<0.0002
6/20/2018			<0.0002	<0.0002	
8/27/2018	<0.0002	<0.0002			
8/28/2018					<0.0002
8/29/2018			<0.0002	<0.0002	
3/18/2019	<0.0002				
3/19/2019		<0.0002			
3/20/2019			<0.0002	<0.0002	<0.0002
8/6/2019	<0.0002				
8/7/2019		<0.0002	<0.0002	<0.0002	<0.0002
4/7/2020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/18/2020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4/5/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/1/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4/20/2022	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/14/2022	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4/11/2023	<0.0002		<0.0002	<0.0002	<0.0002
4/12/2023		<0.0002			
9/18/2023		<0.0002			
9/19/2023	<0.0002		<0.0002	<0.0002	<0.0002

Time Series

Constituent: Cadmium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.0002	<0.0002	<0.0002
8/16/2016			<0.0002	<0.0002	<0.0002
10/11/2016			<0.0002	<0.0002	<0.0002
12/12/2016			<0.0002	<0.0002	<0.0002
2/17/2017			<0.0002		
2/21/2017				<0.0002	<0.0002
4/17/2017			<0.0002	<0.0002	<0.0002
6/20/2017			<0.0002	<0.0002	
6/21/2017					<0.0002
8/7/2017			<0.0002		
8/8/2017				<0.0002	<0.0002
3/6/2018	<0.0002		<0.0002	<0.0002	<0.0002
6/19/2018	<0.0002				
6/20/2018		<0.0002			
6/21/2018			<0.0002	<0.0002	<0.0002
8/27/2018	<0.0002	<0.0002			
8/28/2018			<0.0002		
8/29/2018				<0.0002	<0.0002
3/19/2019	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
8/6/2019	<0.0002	<0.0002			
8/7/2019			<0.0002	<0.0002	<0.0002
4/7/2020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/18/2020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4/5/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/1/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4/20/2022	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/14/2022	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4/10/2023	<0.0002				
4/12/2023		<0.0002	<0.0002	<0.0002	<0.0002
9/18/2023	<0.0002	<0.0002			
9/20/2023			0.000285	0.000255	<0.0002

Time Series

Constituent: Calcium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		89.3		206	
6/7/2016	152				
6/8/2016			281		37.2
8/15/2016		80.7	311	199	146
8/16/2016	117				
10/10/2016	118	83.3			185
10/11/2016			308	203	
12/12/2016					178
12/14/2016	109	86.5	333	244	
2/17/2017		81.2	268	233	
2/21/2017	89.9				118
4/17/2017	96.5	79.2	310	226	
4/18/2017					110
6/19/2017	113	83.6			
6/20/2017					149
6/21/2017			307	186	
8/7/2017	91.3	85.5			
8/8/2017			296	206	163
10/16/2017	77	83.3			62.3
10/17/2017			310	218	
11/28/2017			301 (R)	217 (R)	
3/5/2018		77.3			
3/6/2018	74.7				25.1
3/7/2018			278	229	
6/19/2018	115	88.5			159
6/20/2018			297	102	
8/27/2018	83.6	85.4			
8/28/2018					78.7
8/29/2018			309	155	
3/18/2019	97.6				
3/19/2019		76.3			
3/20/2019			290	118	142
8/6/2019	132				
8/7/2019		78.9	255	111	145
4/7/2020	92.4	75.4	245	163	104
9/18/2020	77.7	74.2	244	134	101
4/5/2021	81.2	78.8	259	128	79.5
9/1/2021	78.3	80	270	125	93.5
4/20/2022	69.6	90.4	289	127	97.5
9/14/2022	76.8	82	301	132	88.2
4/11/2023	78.2		318	110	76
4/12/2023		83.7			
9/18/2023		84.7			
9/19/2023	79.4		291	126	96

Time Series

Constituent: Calcium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			98.2	147	81.4
8/16/2016			88.8	139	75.4
10/11/2016			89.3	140	75.7
12/12/2016			94.5	147	85.6
2/17/2017			86.8		
2/21/2017				126	68.8
4/17/2017			85.9	130	56.3
6/20/2017			88.7	140	
6/21/2017					72.9
8/7/2017			89.7		
8/8/2017				139	71.2
10/16/2017			85.3		
10/17/2017				136	71.9
3/6/2018	69.8		95.8	134	74.1
6/19/2018	91.5				
6/20/2018		70.5			
6/21/2018			91.4	147	80.1
8/27/2018	80.7	63.9			
8/28/2018			91.3		
8/29/2018				146	73.3
3/19/2019	91.6	59.7	99.7	134	73.2
8/6/2019	83.8	59.5			
8/7/2019			93.8	139	80.9
4/7/2020	80.9	61	89.6	117	85.1
9/18/2020	75.5	52.1	89	108	87.9
4/5/2021	78.4	56.3	94.1	104	87.6
9/1/2021	79.4	56.1	95.1	108	90.6
4/20/2022	80.2	54	106	117	96.5
9/14/2022	79.6	54.5	92.3	117	89
4/10/2023	80.4				
4/12/2023		55.3	91.3	107	95.4
9/18/2023	79	56			
9/20/2023			90.4	115	82.1

Time Series

Constituent: Chloride (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		6.22		17.1	
6/7/2016	19.8				
6/8/2016			28.7		27.7
8/15/2016		<5	28.7	17.2	16.6
8/16/2016	17.8				
10/10/2016	16.2	<5			24.4
10/11/2016			37	17.6	
12/12/2016					19.2
12/14/2016	17.2	<5	31.9	19	
2/17/2017		<5	33.5	21.5	
2/21/2017	15.4				14.2
4/17/2017	17.1	<5	39.4	47.4 (o)	
4/18/2017					15.6
6/19/2017	14.1	<5			
6/20/2017					15.1
6/21/2017			29.7	12.8	
8/7/2017	14	<5			
8/8/2017			32.9	15.4	16.1
10/16/2017	14.4	<5			5.09
10/17/2017			35.4	20.5	
11/28/2017			33.2 (R)	20.7 (R)	
3/5/2018		<5			
3/6/2018	14.5				<5
3/7/2018			37.4	24.2	
6/19/2018	14.9	<5			10.9
6/20/2018			29	<5	
8/27/2018	15.6	<5			
8/28/2018					<5
8/29/2018			33.1	10.1	
3/18/2019	16.1				
3/19/2019		<5			
3/20/2019			25.8	8.54	8.3
8/6/2019	17.1				
8/7/2019		<5	22.1	9.91	14
4/7/2020	17.2	<5	22.5	13	8.05
9/18/2020	14.7	<5	22.8	8.63	7.21
4/5/2021	22.3	<5	27.1	15	5.14
9/1/2021	16.3	<5	23.2	8.86	6.58
4/20/2022	15.8	<5	25.5	7.71	7.19
9/14/2022	16.7	<5	22.4	8.29	18
4/11/2023	17.9		20.3	7.3	5.93
4/12/2023		5.86			
9/18/2023		<5			
9/19/2023	19.9		20.9	8.41	8.23

Time Series

Constituent: Chloride (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			12.6	67	5.97
8/16/2016			13.2	65.9	<5
10/11/2016			13.6	66	<5
12/12/2016			13.5	67	9.08
2/17/2017			15.1		
2/21/2017				70.4	9.93
4/17/2017			12.5	62.1	<5
6/20/2017			13.2	63.4	
6/21/2017					<5
8/7/2017			13.2		
8/8/2017				64	<5
10/16/2017			14.7		
10/17/2017				73	<5
11/28/2017				67.8 (R)	
3/6/2018	30		8.81	68.2	5.33
6/19/2018	27.2				
6/20/2018		15.9			
6/21/2018			15.3	65	<5
8/27/2018	29.8	14.2			
8/28/2018			19.4		
8/29/2018				70.8	<5
3/19/2019	27.6	10.5	16	55	<5
8/6/2019	26.9	13.8			
8/7/2019			15.6	64.1	<5
4/7/2020	24.8	15.7	14.8	44	12.2
9/18/2020	23.2	14.4	15.1	41	15.6
4/5/2021	28.1	21.4	22.9	42.7	19.3
9/1/2021	20	15.2	16.7	37.6	17.4
4/20/2022	20.2	16.9	20.8	38.1	14.2
9/14/2022	7.04	16.2	16.8	39	13.3
4/10/2023	18.2				
4/12/2023		17.7	18	38.7	15.4
9/18/2023	18.4	19.2			
9/20/2023			17.4	41.8	12.2

Time Series

Constituent: Chromium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.005		<0.005	
6/7/2016	<0.005				
6/8/2016			<0.005		0.00694
8/15/2016		<0.005	<0.005	<0.005	0.00538
8/16/2016	<0.005				
10/10/2016	<0.005	<0.005			0.00582
10/11/2016			<0.005	<0.005	
12/12/2016					0.00561
12/14/2016	<0.005	<0.005	<0.005	<0.005	
2/17/2017		<0.005	<0.005 (F2)	<0.005	
2/21/2017	<0.005				<0.005
4/17/2017	<0.005	<0.005	<0.005	<0.005	
4/18/2017					<0.005
6/19/2017	<0.005	<0.005			
6/20/2017					0.00586
6/21/2017			<0.005	<0.005	
8/7/2017	<0.005	<0.005			
8/8/2017			<0.005	<0.005	0.00572
3/5/2018		<0.005			
3/6/2018	<0.005				<0.005
3/7/2018			<0.005	<0.005	
6/19/2018	<0.005	<0.005			0.00726
6/20/2018			<0.005	<0.005	
8/27/2018	<0.005	<0.005			
8/28/2018					<0.005
8/29/2018			<0.005	<0.005	
3/18/2019	<0.005				
3/19/2019		<0.005			
3/20/2019			<0.005	<0.005	0.00647
8/6/2019	<0.005				
8/7/2019		<0.005	<0.005	<0.005	0.00637
4/7/2020	<0.005	<0.005	<0.005	<0.005	0.00644
9/18/2020	<0.005	<0.005	<0.005	<0.005	0.00589
4/5/2021	<0.005	<0.005	<0.005	<0.005	0.00708
9/1/2021	<0.005	<0.005	<0.005	<0.005	0.00659
4/20/2022	<0.005	<0.005	<0.005	<0.005	0.00636
9/14/2022	<0.005	<0.005	<0.005	<0.005	0.00505
4/11/2023	<0.005		<0.005	<0.005	0.00577
4/12/2023		<0.005			
9/18/2023		<0.005			
9/19/2023	<0.005		<0.005	<0.005	0.00752

Time Series

Constituent: Chromium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.005	<0.005	<0.005
8/16/2016			<0.005	<0.005	<0.005
10/11/2016			<0.005	<0.005	<0.005
12/12/2016			<0.005	<0.005	<0.005
2/17/2017			<0.005		
2/21/2017				<0.005	<0.005
4/17/2017			<0.005	<0.005	<0.005
6/20/2017			<0.005	<0.005	
6/21/2017					<0.005
8/7/2017			<0.005		
8/8/2017				<0.005	<0.005
3/6/2018	<0.005		<0.005	<0.005	<0.005
6/19/2018	<0.005				
6/20/2018		<0.005			
6/21/2018			<0.005	<0.005	<0.005
8/27/2018	<0.005	<0.005			
8/28/2018			<0.005		
8/29/2018				<0.005	<0.005
3/19/2019	<0.005	<0.005	<0.005	<0.005	<0.005
8/6/2019	<0.005	<0.005			
8/7/2019			<0.005	<0.005	<0.005
4/7/2020	<0.005	<0.005	<0.005	<0.005	<0.005
9/18/2020	<0.005	<0.005	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	<0.005	<0.005
4/10/2023	<0.005				
4/12/2023		<0.005	<0.005	<0.005	<0.005
9/18/2023	<0.005	<0.005			
9/20/2023			<0.005	<0.005	<0.005

Time Series

Constituent: Cobalt (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		0.000555		<0.0005	
6/7/2016	<0.0005				
6/8/2016			<0.0005		<0.0005
8/15/2016		<0.0005	<0.0005	<0.0005	<0.0005
8/16/2016	<0.0005				
10/10/2016	<0.0005	0.000523			<0.0005
10/11/2016			<0.0005	<0.0005	
12/12/2016					<0.0005
12/14/2016	<0.0005	0.000638	<0.0005	<0.0005	
2/17/2017		0.000663	<0.0005	<0.0005	
2/21/2017	<0.0005				<0.0005
4/17/2017	<0.0005	0.000779	<0.0005	<0.0005	
4/18/2017					<0.0005
6/19/2017	0.000601	0.000621			
6/20/2017					<0.0005
6/21/2017			<0.0005	<0.0005	
8/7/2017	0.00051	0.000695			
8/8/2017			<0.0005	<0.0005	<0.0005
3/5/2018		0.000627			
3/6/2018	<0.0005				<0.0005
3/7/2018			<0.0005	<0.0005	
6/19/2018	<0.0005	0.00107			<0.0005
6/20/2018			<0.0005	<0.0005	
8/27/2018	<0.0005	0.00088			
8/28/2018					<0.0005
8/29/2018			<0.0005	<0.0005	
3/18/2019	0.00177				
3/19/2019		0.000783			
3/20/2019			<0.0005	<0.0005	<0.0005
8/6/2019	0.00558				
8/7/2019		0.000572	<0.0005	<0.0005	<0.0005
4/7/2020	0.000517	0.000581	<0.0005	<0.0005	<0.0005
9/18/2020	0.000738	0.000751	<0.0005	<0.0005	<0.0005
4/5/2021	0.000839	0.000752	<0.0005	<0.0005	<0.0005
9/1/2021	0.00127	0.000576	<0.0005	<0.0005	<0.0005
4/20/2022	0.00143	0.00104	<0.0005	<0.0005	<0.0005
9/14/2022	0.00164	0.00109	<0.0005	<0.0005	<0.0005
4/11/2023	0.0014		<0.0005	<0.0005	<0.0005
4/12/2023		0.00142			
9/18/2023		0.000995			
9/19/2023	0.00126		<0.0005	<0.0005	<0.0005

Time Series

Constituent: Cobalt (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			0.000681	<0.0005	<0.0005
8/16/2016			<0.0005	<0.0005	<0.0005
10/11/2016			<0.0005	<0.0005	<0.0005
12/12/2016			<0.0005	<0.0005	<0.0005
2/17/2017			<0.0005		
2/21/2017				<0.0005	<0.0005
4/17/2017			<0.0005	<0.0005	<0.0005
6/20/2017			<0.0005	<0.0005	
6/21/2017					<0.0005
8/7/2017			<0.0005		
8/8/2017				<0.0005	<0.0005
3/6/2018	0.00142		<0.0005	<0.0005	<0.0005
5/14/2018	0.0012				
6/19/2018	0.00129				
6/20/2018		0.00161			
6/21/2018			<0.0005	<0.0005	<0.0005
8/27/2018	0.00149	0.00066			
8/28/2018			<0.0005		
8/29/2018				<0.0005	<0.0005
3/19/2019	<0.0005	0.00176	<0.0005	<0.0005	<0.0005
8/6/2019	<0.0005	<0.0005			
8/7/2019			<0.0005	<0.0005	<0.0005
4/7/2020	<0.0005	0.000817	<0.0005	<0.0005	<0.0005
9/18/2020	<0.0005	<0.0005	0.00147	<0.0005	<0.0005
4/5/2021	<0.0005	0.000517	0.00132	<0.0005	<0.0005
9/1/2021	<0.0005	<0.0005	0.00335	<0.0005	<0.0005
4/20/2022	<0.0005	0.000561	0.00135	<0.0005	<0.0005
9/14/2022	<0.0005	<0.0005	0.00459	<0.0005	<0.0005
4/10/2023	<0.0005				
4/12/2023		<0.0005	0.00271	<0.0005	<0.0005
9/18/2023	<0.0005	<0.0005			
9/20/2023			0.00374	<0.0005	<0.0005

Time Series

Constituent: Combined Radium 226 + 228 (pCi/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		0.223 (U)		0.31 (U)	
6/7/2016	0.375 (U)				
6/8/2016			0.145 (U)		0.253 (U)
8/15/2016		0.668	0.202 (U)	0.251 (U)	0.159 (U)
8/16/2016	0.115 (U)				
10/10/2016	0.35 (U)	0.694			0.817
10/11/2016			0.523	0.286 (U)	
12/12/2016					0.306 (U)
12/14/2016	0.336 (U)	0.799	0.26 (U)	0.251 (U)	
2/17/2017		0.513	0.293 (U)	0.103 (U)	
2/21/2017	0.221 (U)				-0.000573 (U)
4/17/2017	0.126 (U)	0.47	0.48	0.0966 (U)	
4/18/2017					0.0953 (U)
6/19/2017	0.204 (U)	0.204 (U)			
6/20/2017					0.545
6/21/2017			0.0131 (U)	0.221 (U)	
8/7/2017	0.336 (U)	0.831			
8/8/2017			0.456	0.244 (U)	0.814
3/5/2018		0.276 (U)			
3/6/2018	0.668				0.358
3/7/2018			0.258 (U)	0.123 (U)	
3/18/2019	0.217 (U)				
3/19/2019		0.331 (U)			
3/20/2019			0.0223 (U)	0.391 (U)	0.287 (U)
4/7/2020	0.462	1.01	0.397 (U)	0.645	0.305 (U)
4/5/2021	0.208 (U)	0.488	0.614	0.219 (U)	0.182 (U)
9/1/2021	0.296 (U)	1.32	0.684	0.362 (U)	0.499
4/20/2022	0.316 (U)	0.693	0.0486 (U)	0.0289 (U)	0.171 (U)
9/14/2022	-0.0309 (U)	1.12	0.0843 (U)	-0.159 (U)	-0.0783 (U)
4/11/2023	0.469 (U)		0.0651 (U)	0.727	0.678
4/12/2023		0.775			
9/18/2023		1.48			
9/19/2023	1.03		0.57	0.118 (U)	0.497 (U)

Time Series

Constituent: Combined Radium 226 + 228 (pCi/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			0.711 (U)	0.665	0.405
8/16/2016			0.938 (U)	0.854	0.876
10/11/2016			0.674	0.428 (U)	0.512
12/12/2016			0.672	1.05	0.894
2/17/2017			0.528		
2/21/2017				0.85	0.314 (U)
4/17/2017			0.309 (U)	1.02	0.298 (U)
6/20/2017			0.368	0.973	
6/21/2017					0.44
8/7/2017			0.443		
8/8/2017				0.507	0.333 (U)
3/6/2018	0.257 (U)		0.45	0.959	0.618
6/19/2018	0.412 (U)				
6/20/2018		0.0129 (U)			
3/19/2019	0.343 (U)	1	0.436	0.568	0.481
4/7/2020	0.44	0.576	0.354 (U)	1.2	0.787
4/5/2021	0.547	0.296 (U)	0.0519 (U)	0.982	0.667
9/1/2021	0.522	0.794	1.08	1.29	1.12
4/20/2022	0.494	1.27	0.55 (U)	0.913	0.901
9/14/2022	0.283 (U)	-0.195 (U)	0.836	0.363 (U)	0.599
4/10/2023	0.442 (U)				
4/12/2023		1.32	0.687	0.556	0.695
9/18/2023	1.11	0.606 (U)			
9/20/2023			0.575 (U)	1.15	0.916

Time Series

Constituent: Fluoride (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		0.731		<1	
6/7/2016	<1				
6/8/2016			<1		<1
8/15/2016		<1	<1	0.549	<1
8/16/2016	<1				
10/10/2016	<1	<1			<1
10/11/2016			0.867	<1	
12/12/2016					<1
12/14/2016	0.72	<1	<1	<1	
2/17/2017		<1	<1	<1	
2/21/2017	<1				0.993
4/17/2017	1.69 (o)	0.774	1.93 (o)	6.7 (o)	
4/18/2017					0.768
6/19/2017	<1	<1			
6/20/2017					<1
6/21/2017			<1	<1	
8/7/2017	<1	<1			
8/8/2017			<1	<1	<1
10/16/2017	<1	<1			<1
10/17/2017			<1	<1	
3/5/2018		<1			
3/6/2018	<1				<1
3/7/2018			<1	<1	
6/19/2018	0.826	<1			<1
6/20/2018			0.684	<1	
8/27/2018	<1	<1			
8/28/2018					<1
8/29/2018			<1	<1	
3/18/2019	<1				
3/19/2019		<1			
3/20/2019			<1	0.523	<1
8/6/2019	0.643				
8/7/2019		0.596	<1	0.625	<1
4/7/2020	0.864	<1	<1	<1	<1
9/18/2020	<1	<1	<1	<1	<1
4/5/2021	<1	<1	<1	0.516	<1
9/1/2021	<1	<1	<1	<1	<1
4/20/2022	<1	<1	<1	<1	<1
9/14/2022	<1	<1	<1	<1	<1
4/11/2023	<1		<1	<1	<1
4/12/2023		<1			
9/18/2023		<1			
9/19/2023	<1		<1	<1	<1

Time Series

Constituent: Fluoride (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<1	<1	<1
8/16/2016			<1	<1	<1
10/11/2016			<1	<1	<1
12/12/2016			<1	1.88	2.02
2/17/2017			0.664		
2/21/2017				2.14	1.89
4/17/2017			0.801	0.627	0.814
6/20/2017			<1	<1	
6/21/2017					<1
8/7/2017			<1		
8/8/2017				<1	<1
10/16/2017			<1		
10/17/2017				<1	<1
3/6/2018	<1		<1	<1	<1
6/19/2018	<1				
6/20/2018		<1			
6/21/2018			<1	<1	<1
8/27/2018	<1	<1			
8/28/2018			<1		
8/29/2018				<1	<1
3/19/2019	<1	<1	0.771	<1	<1
8/6/2019	0.507	<1			
8/7/2019			0.525	<1	0.535
4/7/2020	<1	<1	<1	<1	0.652
9/18/2020	<1	<1	<1	<1	<1
4/5/2021	<1	<1	<1	<1	<1
9/1/2021	<1	<1	<1	<1	<1
4/20/2022	<1	<1	<1	<1	<1
9/14/2022	<1	<1	<1	<1	<1
4/10/2023	<1				
4/12/2023		<1	<1	<1	<1
9/18/2023	<1	<1			
9/20/2023			<1	<1	<1

Time Series

Constituent: Lead (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.0005		<0.0005	
6/7/2016	<0.0005				
6/8/2016			<0.0005		<0.0005
8/15/2016		<0.0005	<0.0005	<0.0005	<0.0005
8/16/2016	<0.0005				
10/10/2016	<0.0005	<0.0005			<0.0005
10/11/2016			<0.0005	<0.0005	
12/12/2016					<0.0005
12/14/2016	<0.0005	<0.0005	<0.0005	<0.0005	
2/17/2017		<0.0005	<0.0005	<0.0005	
2/21/2017	<0.0005				<0.0005
4/17/2017	<0.0005	<0.0005	<0.0005	<0.0005	
4/18/2017					<0.0005
6/19/2017	<0.0005	<0.0005			
6/20/2017					<0.0005
6/21/2017			<0.0005	<0.0005	
8/7/2017	<0.0005	<0.0005			
8/8/2017			<0.0005	<0.0005	<0.0005
3/5/2018		<0.0005			
3/6/2018	<0.0005				<0.0005
3/7/2018			<0.0005	<0.0005	
6/19/2018	<0.0005	<0.0005			0.000633
6/20/2018			<0.0005	<0.0005	
8/27/2018	<0.0005	<0.0005			
8/28/2018					<0.0005
8/29/2018			<0.0005	<0.0005	
3/18/2019	<0.0005				
3/19/2019		<0.0005			
3/20/2019			<0.0005	<0.0005	<0.0005
8/6/2019	<0.0005				
8/7/2019		<0.0005	<0.0005	<0.0005	<0.0005
4/7/2020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
9/18/2020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/5/2021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
9/1/2021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/20/2022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
9/14/2022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/11/2023	<0.0005		<0.0005	<0.0005	<0.0005
4/12/2023		<0.0005			
9/18/2023		<0.0005			
9/19/2023	<0.0005		<0.0005	<0.0005	<0.0005

Time Series

Constituent: Lead (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			0.00147 (o)	<0.0005	<0.0005
8/16/2016			<0.0005	<0.0005	<0.0005
10/11/2016			<0.0005	<0.0005	<0.0005
12/12/2016			<0.0005	<0.0005	<0.0005
2/17/2017			<0.0005		
2/21/2017				<0.0005	<0.0005
4/17/2017			<0.0005	<0.0005	<0.0005
6/20/2017			<0.0005	<0.0005	
6/21/2017					<0.0005
8/7/2017			<0.0005		
8/8/2017				<0.0005	<0.0005
3/6/2018	<0.0005		<0.0005	<0.0005	<0.0005
6/19/2018	<0.0005				
6/20/2018		0.00151			
6/21/2018			<0.0005	<0.0005	<0.0005
8/27/2018	<0.0005	0.000626			
8/28/2018			<0.0005		
8/29/2018				<0.0005	<0.0005
3/19/2019	<0.0005	0.00204	<0.0005	<0.0005	<0.0005
8/6/2019	<0.0005	0.000663			
8/7/2019			<0.0005	<0.0005	<0.0005
4/7/2020	<0.0005	0.00116	<0.0005	<0.0005	<0.0005
9/18/2020	<0.0005	<0.0005	0.000532	<0.0005	<0.0005
4/5/2021	<0.0005	0.000624	<0.0005	<0.0005	<0.0005
9/1/2021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/20/2022	<0.0005	0.000596	<0.0005	<0.0005	<0.0005
9/14/2022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/10/2023	<0.0005				
4/12/2023		<0.0005	<0.0005	<0.0005	<0.0005
9/18/2023	<0.0005	<0.0005			
9/20/2023			0.000576	0.000627	<0.0005

Time Series

Constituent: Lithium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.01		<0.01	
6/7/2016	<0.01				
6/8/2016			<0.01		<0.01
8/15/2016		<0.01	<0.01	<0.01	<0.01
8/16/2016	<0.01				
10/10/2016	<0.01	<0.01			<0.01
10/11/2016			<0.01	<0.01	
12/12/2016					<0.01
12/14/2016	<0.01	<0.01	<0.01	<0.01	
2/17/2017		<0.01	<0.01	<0.01	
2/21/2017	<0.01				<0.01
4/17/2017	<0.01	<0.01	<0.01	<0.01	
4/18/2017					<0.01
6/19/2017	<0.01	<0.01			
6/20/2017					<0.01
6/21/2017			<0.01	<0.01	
8/7/2017	<0.01	<0.01			
8/8/2017			<0.01	<0.01	<0.01
3/5/2018		<0.01			
3/6/2018	<0.01				<0.01
3/7/2018			<0.01	<0.01	
6/19/2018	<0.01	<0.01			0.0189
6/20/2018			<0.01	<0.01	
8/27/2018	<0.01	<0.01			
8/28/2018					<0.01
8/29/2018			<0.01	<0.01	
3/18/2019	<0.01				
3/19/2019		<0.01			
3/20/2019			<0.01	<0.01	0.0277
8/6/2019	<0.01				
8/7/2019		<0.01	<0.01	<0.01	0.0279
4/7/2020	<0.01	<0.01	<0.01	<0.01	0.0213
9/18/2020	<0.01	<0.01	<0.01	<0.01	0.0225
4/5/2021	<0.01	<0.01	<0.01	<0.01	0.0198
9/1/2021	<0.01	<0.01	<0.01	<0.01	0.0233
4/20/2022	<0.01	<0.01	<0.01	<0.01	0.0162
9/14/2022	<0.01	<0.01	<0.01	<0.01	0.018
4/11/2023	<0.01		<0.01	<0.01	0.0143
4/12/2023		<0.01			
9/18/2023		<0.01			
9/19/2023	<0.01		<0.01	<0.01	0.0205

Time Series

Constituent: Lithium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.01	<0.01	<0.01
8/16/2016			<0.01	<0.01	<0.01
10/11/2016			<0.01	<0.01	<0.01
12/12/2016			<0.01	<0.01	<0.01
2/17/2017			<0.01		
2/21/2017				<0.01	<0.01
4/17/2017			<0.01	<0.01	<0.01
6/20/2017			<0.01	<0.01	
6/21/2017					<0.01
8/7/2017			<0.01		
8/8/2017				<0.01	<0.01
3/6/2018	<0.01		<0.01	<0.01	<0.01
6/19/2018	<0.01				
6/20/2018		<0.01			
6/21/2018			<0.01	<0.01	<0.01
8/27/2018	<0.01	<0.01			
8/28/2018			<0.01		
8/29/2018				<0.01	<0.01
3/19/2019	<0.01	<0.01	<0.01	<0.01	<0.01
8/6/2019	<0.01	<0.01			
8/7/2019			<0.01	<0.01	<0.01
4/7/2020	<0.01	<0.01	<0.01	<0.01	<0.01
9/18/2020	<0.01	<0.01	<0.01	<0.01	<0.01
4/5/2021	<0.01	<0.01	<0.01	<0.01	<0.01
9/1/2021	<0.01	<0.01	<0.01	<0.01	<0.01
4/20/2022	<0.01	<0.01	<0.01	<0.01	<0.01
9/14/2022	<0.01	<0.01	<0.01	<0.01	<0.01
4/10/2023	<0.01				
4/12/2023		<0.01	<0.01	<0.01	<0.01
9/18/2023	<0.01	<0.01			
9/20/2023			<0.01	<0.01	<0.01

Time Series

Constituent: Mercury (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.0002		<0.0002	
6/7/2016	<0.0002				
6/8/2016			<0.0002		<0.0002
8/15/2016		<0.0002	<0.0002	<0.0002	<0.0002
8/16/2016	<0.0002				
10/10/2016	<0.0002	<0.0002			<0.0002
10/11/2016			<0.0002	<0.0002	
12/12/2016					<0.0002
12/14/2016	<0.0002	<0.0002	<0.0002	<0.0002	
2/17/2017		<0.0002	<0.0002	<0.0002	
2/21/2017	<0.0002				<0.0002
4/17/2017	<0.0002	<0.0002 (F1)	<0.0002	<0.0002	
4/18/2017					<0.0002
6/19/2017	<0.0002	<0.0002			
6/20/2017					<0.0002
6/21/2017			<0.0002	<0.0002	
8/7/2017	<0.0002	<0.0002			
8/8/2017			<0.0002	<0.0002	<0.0002
3/5/2018		<0.0002			
3/6/2018	<0.0002				<0.0002
3/7/2018			<0.0002	<0.0002	
6/19/2018	<0.0002	<0.0002			<0.0002
6/20/2018			<0.0002	<0.0002	
8/27/2018	<0.0002	<0.0002			
8/28/2018					<0.0002
8/29/2018			<0.0002	<0.0002	
3/18/2019	<0.0002				
3/19/2019		<0.0002			
3/20/2019			<0.0002	<0.0002	<0.0002
8/6/2019	<0.0002				
8/7/2019		<0.0002	<0.0002	<0.0002	<0.0002
4/7/2020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/18/2020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4/5/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/1/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4/20/2022	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/14/2022	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4/11/2023	<0.0002		<0.0002	<0.0002	<0.0002
4/12/2023		<0.0002			
9/18/2023		<0.0002			
9/19/2023	<0.0002		<0.0002	<0.0002	<0.0002

Time Series

Constituent: Mercury (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.0002	<0.0002	<0.0002
8/16/2016			<0.0002	<0.0002	<0.0002
10/11/2016			<0.0002	<0.0002	<0.0002
12/12/2016			<0.0002	<0.0002	<0.0002
2/17/2017			<0.0002		
2/21/2017				<0.0002	<0.0002
4/17/2017			<0.0002	<0.0002	<0.0002
6/20/2017			<0.0002	<0.0002	
6/21/2017					<0.0002
8/7/2017			<0.0002		
8/8/2017				<0.0002	<0.0002
3/6/2018	<0.0002		<0.0002	<0.0002	<0.0002
6/19/2018	<0.0002				
6/20/2018		<0.0002			
6/21/2018			<0.0002	<0.0002	<0.0002
8/27/2018	<0.0002	<0.0002			
8/28/2018			<0.0002		
8/29/2018				<0.0002	<0.0002
3/19/2019	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
8/6/2019	<0.0002	<0.0002			
8/7/2019			<0.0002	<0.0002	<0.0002
4/7/2020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/18/2020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4/5/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/1/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4/20/2022	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/14/2022	<0.0002	<0.0002	<0.0002	0.000813	<0.0002
4/10/2023	<0.0002				
4/12/2023		<0.0002	<0.0002	<0.0002	<0.0002
9/18/2023	<0.0002	<0.0002			
9/20/2023			<0.0002	<0.0002	<0.0002

Time Series

Constituent: Molybdenum (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.002		<0.002	
6/7/2016	<0.002				
6/8/2016			<0.002		<0.002
8/15/2016		<0.002	<0.002	<0.002	<0.002
8/16/2016	<0.002				
10/10/2016	<0.002	<0.002			<0.002
10/11/2016			<0.002	<0.002	
12/12/2016					<0.002
12/14/2016	<0.002	<0.002	<0.002	<0.002	
2/17/2017		<0.002	<0.002	<0.002	
2/21/2017	<0.002				<0.002
4/17/2017	<0.002	<0.002	<0.002	<0.002	
4/18/2017					<0.002
6/19/2017	<0.002	<0.002			
6/20/2017					<0.002
6/21/2017			<0.002	<0.002	
8/7/2017	<0.002	<0.002			
8/8/2017			<0.002	<0.002	<0.002
3/5/2018		<0.002			
3/6/2018	0.0022				<0.002
3/7/2018			<0.002	<0.002	
5/14/2018	<0.002				
6/19/2018	<0.002	<0.002			0.00383
6/20/2018			<0.002	<0.002	
8/27/2018	0.00224	0.0022			
8/28/2018					<0.002
8/29/2018			<0.002	<0.002	
3/18/2019	<0.002				
3/19/2019		0.00341			
3/20/2019			<0.002	<0.002	<0.002
8/6/2019	<0.002				
8/7/2019		0.00219	<0.002	<0.002	<0.002
4/7/2020	<0.002	0.00215	<0.002	<0.002	<0.002
9/18/2020	<0.002	<0.002	<0.002	<0.002	<0.002
4/5/2021	<0.002	<0.002	<0.002	<0.002	<0.002
9/1/2021	0.00218	0.00217	<0.002	<0.002	<0.002
4/20/2022	<0.002	<0.002	<0.002	<0.002	<0.002
9/14/2022	<0.002	<0.002	<0.002	<0.002	<0.002
4/11/2023	<0.002		<0.002	<0.002	<0.002
4/12/2023		<0.002			
9/18/2023		<0.002			
9/19/2023	<0.002		<0.002	<0.002	<0.002

Time Series

Constituent: Molybdenum (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.002	<0.002	<0.002
8/16/2016			<0.002	<0.002	<0.002
10/11/2016			<0.002	<0.002	<0.002
12/12/2016			<0.002	<0.002	<0.002
2/17/2017			<0.002		
2/21/2017				<0.002	<0.002
4/17/2017			<0.002	<0.002	<0.002
6/20/2017			<0.002	<0.002	
6/21/2017					<0.002
8/7/2017			<0.002		
8/8/2017				<0.002	<0.002
3/6/2018	0.00568		<0.002	<0.002	<0.002
5/14/2018	0.00385				
6/19/2018	0.00423				
6/20/2018		0.00822			
6/21/2018			<0.002	<0.002	<0.002
8/27/2018	0.00424	0.00617			
8/28/2018			<0.002		
8/29/2018				<0.002	<0.002
3/19/2019	0.00263	<0.002	<0.002	0.00212	<0.002
8/6/2019	0.00574	<0.002			
8/7/2019			<0.002	<0.002	<0.002
4/7/2020	0.00297	<0.002	<0.002	<0.002	<0.002
9/18/2020	0.00529	<0.002	0.00296	<0.002	<0.002
4/5/2021	<0.002	<0.002	<0.002	<0.002	<0.002
9/1/2021	0.00558	<0.002	<0.002	<0.002	<0.002
4/20/2022	0.0042	<0.002	<0.002	<0.002	<0.002
9/14/2022	0.00446	<0.002	<0.002	<0.002	<0.002
4/10/2023	0.00364				
4/12/2023		<0.002	<0.002	<0.002	<0.002
9/18/2023	0.00661	<0.002			
9/20/2023			<0.002	<0.002	<0.002

Time Series

Constituent: pH (SU) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		7.4		7.3	
6/7/2016	7.2				
6/8/2016			7.1		6.7
8/15/2016		7.3	7.2	7.3	6.7
8/16/2016	7.3				
10/10/2016	7.1	7.2			6.7
10/11/2016			7.1	7.2	
12/12/2016					7
12/14/2016	7.3	7.3	7.2	7.4	
2/17/2017		7.2	7.3	7.3	
2/21/2017	7.3				7
4/17/2017	7.1	7.3	7.3	7.3	
4/18/2017					6.9
6/19/2017	7.1	7.2			
6/20/2017					6.7
6/21/2017			7.3	7.3	
8/7/2017	7.3	7.9			
8/8/2017			7.2	7.2	6.8
10/16/2017	7.4	7.3			6.8
10/17/2017			7.6	7.2	
11/28/2017					6.9 (R)
3/5/2018		7.04			
3/6/2018	7.3				6.76
3/7/2018			7.35	7.24	
6/19/2018	7.56	7.72			7.25
6/20/2018			7.26	7.5	
8/27/2018	7.2	7.23			
8/28/2018					7.07
8/29/2018			7.09	7.25	
3/19/2019	7.08	7.1			
3/20/2019			6.97	7.76	6.41
8/6/2019	6.64				
8/7/2019		7.07	7.09	7.11	6.33
4/7/2020	7.21	7.26	7.32	7.54	6.55
9/18/2020	7.4	7.33	7.21	7.28	6.8
4/5/2021	7.63	7.57	7.64	7.92	6.92
9/1/2021	7.45	7.59	7.48	7.46	7.06
4/20/2022	7.35	7.35	7.13	6.83	6.69
9/14/2022	7.43	7.48	7.21	7.4	7.09
4/11/2023	7.24		6.97	7.24	7.24
4/12/2023		6.96			
9/18/2023		6.86			
9/19/2023	6.81		6.78	6.97	6.55

Time Series

Constituent: pH (SU) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			7.6	7.7	7.4
8/16/2016			7.5	7.3	7.4
10/11/2016			7.5	7.2	7.3
12/12/2016			7.6	7.3	7.5
2/17/2017			7.5		
2/21/2017				7.2	7.4
4/17/2017			7.4	7.2	7.3
6/20/2017			7.4	7.2	
6/21/2017					7.3
8/7/2017			7.9		
8/8/2017				7.2	7.3
10/16/2017			7.8		
10/17/2017				7.3	7.8
3/6/2018	7.36		7.36	7.23	7.4
6/19/2018	7.9				
6/20/2018		7.69			
6/21/2018			7.53	7.3	7.58
8/27/2018	7.42	7.55			
8/28/2018			7.44		
8/29/2018				7.14	7.18
3/19/2019	7.21	7.24	7.26	7.05	7.15
8/6/2019	7.12	6.75			
8/7/2019			7.22	7.02	7.12
4/7/2020	7.32	7.33	7.46	7.24	7.3
9/18/2020	7.53	7.53	7.93	7.33	7.24
4/5/2021	7.7	7.61	7.94	7.31	7.59
9/1/2021	7.97	7.89	7.75	7.22	7.61
4/20/2022	7.23	7.39	7.04	7.37	7.35
9/14/2022	7.58	7.3	7.52	7.37	7.38
4/10/2023	7.14				
4/12/2023		7.24	7.23	6.96	7.08
9/18/2023	7.14	7.05			
9/20/2023			7.03	6.42	6.88

Time Series

Constituent: Selenium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.005		<0.005	
6/7/2016	<0.005				
6/8/2016			0.0071		0.0165
8/15/2016		<0.005	0.00811	<0.005	0.0103
8/16/2016	<0.005				
10/10/2016	<0.005	<0.005			0.0137
10/11/2016			0.00821	<0.005	
12/12/2016					0.0119
12/14/2016	<0.005	<0.005	0.00834	<0.005	
2/17/2017		<0.005	0.00752	<0.005	
2/21/2017	<0.005				0.0074
4/17/2017	<0.005	<0.005	0.00823	<0.005	
4/18/2017					0.00674
6/19/2017	<0.005	<0.005			
6/20/2017					0.0106
6/21/2017			0.00829	<0.005	
8/7/2017	<0.005	<0.005			
8/8/2017			0.00759	<0.005	0.0109
3/5/2018		<0.005			
3/6/2018	<0.005				<0.005
3/7/2018			<0.005	0.00502	
6/19/2018	<0.005	<0.005			0.00939
6/20/2018			0.00739	<0.005	
8/27/2018	<0.005	<0.005			
8/28/2018					<0.005
8/29/2018			0.00827	<0.005	
3/18/2019	<0.005				
3/19/2019		<0.005			
3/20/2019			0.00569	<0.005	0.0102
8/6/2019	<0.005				
8/7/2019		<0.005	<0.005	<0.005	0.0108
4/7/2020	<0.005	<0.005	<0.005	<0.005	0.00632
9/18/2020	<0.005	<0.005	<0.005	<0.005	0.00762
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	<0.005	0.00617
4/20/2022	<0.005	<0.005	<0.005	<0.005	0.00634
9/14/2022	<0.005	<0.005	<0.005	<0.005	<0.005
4/11/2023	<0.005		<0.005	<0.005	<0.005
4/12/2023		<0.005			
9/18/2023		<0.005			
9/19/2023	<0.005		<0.005	<0.005	0.0053

Time Series

Constituent: Selenium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.005	<0.005	<0.005
8/16/2016			<0.005	<0.005	<0.005
10/11/2016			<0.005	<0.005	<0.005
12/12/2016			<0.005	<0.005	<0.005
2/17/2017			<0.005		
2/21/2017				<0.005	<0.005
4/17/2017			<0.005	<0.005	<0.005
6/20/2017			<0.005	<0.005	
6/21/2017					<0.005
8/7/2017			<0.005		
8/8/2017				<0.005	<0.005
3/6/2018	<0.005		<0.005	<0.005	<0.005
6/19/2018	<0.005				
6/20/2018		<0.005			
6/21/2018			<0.005	<0.005	<0.005
8/27/2018	<0.005	<0.005			
8/28/2018			<0.005		
8/29/2018				<0.005	<0.005
3/19/2019	<0.005	<0.005	<0.005	<0.005	<0.005
8/6/2019	<0.005	<0.005			
8/7/2019			<0.005	<0.005	<0.005
4/7/2020	<0.005	<0.005	<0.005	<0.005	<0.005
9/18/2020	<0.005	<0.005	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	<0.005	<0.005
4/10/2023	<0.005				
4/12/2023		<0.005	<0.005	<0.005	<0.005
9/18/2023	<0.005	<0.005			
9/20/2023			<0.005	<0.005	<0.005

Time Series

Constituent: Sulfate (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		42.1		827	
6/7/2016	366				
6/8/2016			1050		713
8/15/2016		33.8	1040	605	520
8/16/2016	187				
10/10/2016	187	36.4			603
10/11/2016			1010	607	
12/12/2016					645
12/14/2016	149	38.4	1140	732	
2/17/2017		47.3	1190	849	
2/21/2017	145				415
4/17/2017	145	38.3	1200	853	
4/18/2017					461
6/19/2017	190	35.4			
6/20/2017					541
6/21/2017			1020	537	
8/7/2017	119	39			
8/8/2017			1110	664	590
10/16/2017	106	46.9			206
10/17/2017			1210	835	
11/28/2017			1140 (R)	779 (R)	
3/5/2018		51.4			
3/6/2018	87.3				53.7
3/7/2018			1110	824	
6/19/2018	136	37.3			489
6/20/2018			1090	210	
8/27/2018	94.7	34.3			
8/28/2018					96.6
8/29/2018			1070	400	
3/18/2019	223				
3/19/2019		42.8			
3/20/2019			1050	351	442
8/6/2019	276				
8/7/2019		28.8	837	327	529
4/7/2020	123	18.6	888	496	373
9/18/2020	100	36.5	924	403	356
4/5/2021	99.7	27.6	952	338	237
9/1/2021	82.7	32.3	1010	333	303
4/20/2022	72.8	48.3	1030	297	293
9/14/2022	67.1	31.2	978	319	151
4/11/2023	72.2		1150	254	215
4/12/2023		39.8			
9/18/2023		57.4			
9/19/2023	94.2		1440	365	303

Time Series

Constituent: Sulfate (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			32.2	109	<5
8/16/2016			28.4	109	<5
10/11/2016			27.2	105	<5
12/12/2016			32.7	109	<5
2/17/2017			36		
2/21/2017				111	5.94
4/17/2017			39.5	108	<5
6/20/2017			33	108	
6/21/2017					<5
8/7/2017			35.3		
8/8/2017				114	<5
10/16/2017			45.4		
10/17/2017				135	<5
3/6/2018	123		162	122	<5
6/19/2018	134				
6/20/2018		38.4			
6/21/2018			51.3	119	<5
8/27/2018	125	31.7			
8/28/2018			52.2		
8/29/2018				120	<5
3/19/2019	134	26.2	48	85	<5
8/6/2019	139	29.7			
8/7/2019			47	112	<5
4/7/2020	143	25.5	41.5	58.9	13.6
9/18/2020	151	25.8	46.9	61.9	19.1
4/5/2021	154	35.5	60.1	57.4	27.3
9/1/2021	154	25.8	50.2	53.7	22.7
4/20/2022	158	25.4	58.4	44.7	18.9
9/14/2022	220	23	49.5	49.9	16.4
4/10/2023	147				
4/12/2023		25	54	45.8	20.5
9/18/2023	208	28.6			
9/20/2023			53.1	53.4	10.1

Time Series

Constituent: Thallium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.001		<0.001	
6/7/2016	<0.001				
6/8/2016			<0.001		<0.001
8/15/2016		<0.001	<0.001	<0.001	<0.001
8/16/2016	<0.001				
10/10/2016	<0.001	<0.001			<0.001
10/11/2016			<0.001	<0.001	
12/12/2016					<0.001
12/14/2016	<0.001	<0.001	<0.001	<0.001	
2/17/2017		<0.001	<0.001	<0.001	
2/21/2017	<0.001				<0.001
4/17/2017	<0.001	<0.001	<0.001	<0.001	
4/18/2017					<0.001
6/19/2017	<0.001	<0.001			
6/20/2017					<0.001
6/21/2017			<0.001	<0.001	
8/7/2017	<0.001	<0.001			
8/8/2017			<0.001	<0.001	<0.001
3/5/2018		<0.001			
3/6/2018	<0.001				<0.001
3/7/2018			<0.001	<0.001	
6/19/2018	<0.001	<0.001			<0.001
6/20/2018			<0.001	<0.001	
8/27/2018	<0.001	<0.001			
8/28/2018					<0.001
8/29/2018			<0.001	<0.001	
3/18/2019	<0.001				
3/19/2019		<0.001			
3/20/2019			<0.001	<0.001	<0.001
8/6/2019	<0.001				
8/7/2019		<0.001	<0.001	<0.001	<0.001
4/7/2020	<0.001	<0.001	<0.001	<0.001	<0.001
9/18/2020	<0.001	<0.001	<0.001	<0.001	<0.001
4/5/2021	<0.001	<0.001	<0.001	<0.001	<0.001
9/1/2021	<0.001	<0.001	<0.001	<0.001	<0.001
4/20/2022	<0.001	<0.001	<0.001	<0.001	<0.001
9/14/2022	<0.001	<0.001	<0.001	<0.001	<0.001
4/11/2023	<0.001		<0.001	<0.001	<0.001
4/12/2023		<0.001			
9/18/2023		<0.001			
9/19/2023	<0.001		<0.001	<0.001	<0.001

Time Series

Constituent: Thallium (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.001	<0.001	<0.001
8/16/2016			<0.001	<0.001	<0.001
10/11/2016			<0.001	<0.001	<0.001
12/12/2016			<0.001	<0.001	<0.001
2/17/2017			<0.001		
2/21/2017				<0.001	<0.001
4/17/2017			<0.001	<0.001	<0.001
6/20/2017			<0.001	<0.001	
6/21/2017					<0.001
8/7/2017			<0.001		
8/8/2017				<0.001	<0.001
3/6/2018	<0.001		<0.001	<0.001	<0.001
6/19/2018	<0.001				
6/20/2018		<0.001			
6/21/2018			<0.001	<0.001	<0.001
8/27/2018	<0.001	<0.001			
8/28/2018			<0.001		
8/29/2018				<0.001	<0.001
3/19/2019	<0.001	<0.001	<0.001	<0.001	<0.001
8/6/2019	<0.001	<0.001			
8/7/2019			<0.001	<0.001	<0.001
4/7/2020	<0.001	<0.001	<0.001	<0.001	<0.001
9/18/2020	<0.001	<0.001	<0.001	<0.001	<0.001
4/5/2021	<0.001	<0.001	<0.001	<0.001	<0.001
9/1/2021	<0.001	<0.001	<0.001	<0.001	<0.001
4/20/2022	<0.001	<0.001	<0.001	<0.001	<0.001
9/14/2022	<0.001	<0.001	<0.001	<0.001	<0.001
4/10/2023	<0.001				
4/12/2023		<0.001	0.00288	0.00393	<0.001
9/18/2023	<0.001	<0.001			
9/20/2023			0.003	0.00442	<0.001

Time Series

Constituent: Total Dissolved Solids (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		468		1620	
6/7/2016	836				
6/8/2016			2000		1440
8/15/2016		412	1980	1270	1110
8/16/2016	664				
10/10/2016	708	444			1420
10/11/2016			2500	1500	
12/12/2016					1240
12/14/2016	634	428	2080	1600	
2/17/2017		498	1010	1470	
2/21/2017	578				1010
4/17/2017	624	538	2260	1780	
4/18/2017					1060
6/19/2017	656	524			
6/20/2017					1140
6/21/2017			2250	1280	
8/7/2017	488	458			
8/8/2017			2170	1390	1220
10/16/2017	470	414			514
10/17/2017			2080	1520	
11/28/2017			2650 (R)	1670 (R)	
3/5/2018		314			
3/6/2018	376				200
3/7/2018			1820	1270	
6/19/2018	502	396			952
6/20/2018			1800	676	
8/27/2018	414	392			
8/28/2018					416
8/29/2018			1900	948	
3/18/2019	612				
3/19/2019		326			
3/20/2019			1690	724	872
8/6/2019	702				
8/7/2019		320	1510	786	960
4/7/2020	418	316	1510	942	698
9/18/2020	350	344	1620	920	738
4/5/2021	382	322	1290	738	540
9/1/2021	342	314	1560	736	636
4/20/2022	322	344	1530	682	558
9/14/2022	350	340	1710	796	524
4/11/2023	2390 (o)		2140	646	646
4/12/2023		410			
9/18/2023		318			
9/19/2023	260		1800	720	626

Time Series

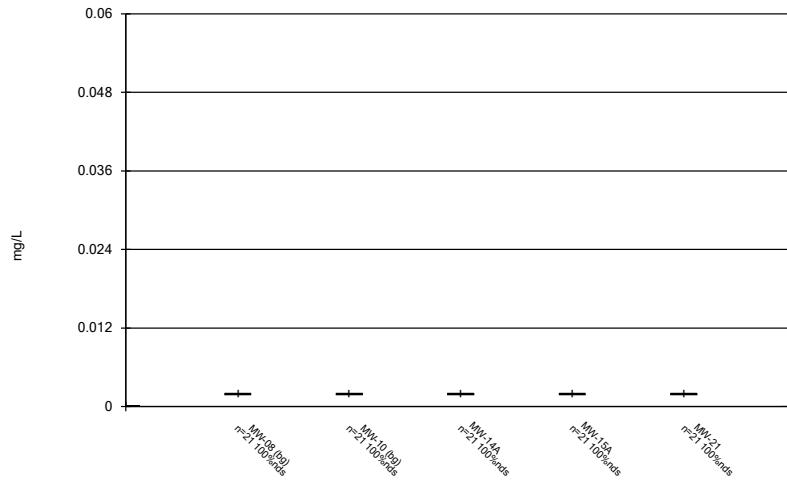
Constituent: Total Dissolved Solids (mg/L) Analysis Run 11/9/2023 7:46 AM View: Federal Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			507	920	440
8/16/2016			426	672	340
10/11/2016			450	646	370
12/12/2016			450	636	368
2/17/2017			460		
2/21/2017				684	336
4/17/2017			442	680	402
6/20/2017			452	656	
6/21/2017					486
8/7/2017			420		
8/8/2017				734	364
10/16/2017			466		
10/17/2017				688	424
3/6/2018	424		586	620	292
6/19/2018	434				
6/20/2018		384			
6/21/2018			440	828	368
8/27/2018	420	340			
8/28/2018			420		
8/29/2018				622	298
3/19/2019	456	296	398	562	320
8/6/2019	428	336			
8/7/2019			422	596	308
4/7/2020	422	298	366	494	336
9/18/2020	398	250	360	436	374
4/5/2021	412	274	380	434	330
9/1/2021	420	256	370	448	350
4/20/2022	388	218	370	428	336
9/14/2022	390	278	358	484	334
4/10/2023	450				
4/12/2023		286	396	478	428
9/18/2023	404	282			
9/20/2023			364	476	332

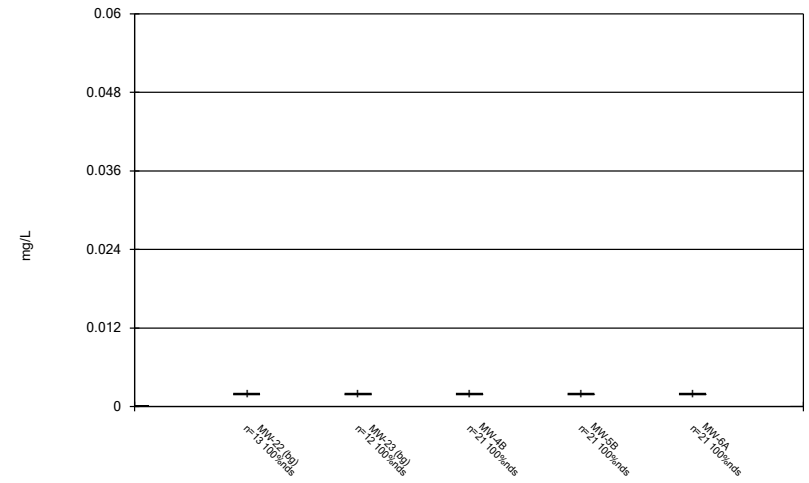
FIGURE B.

Box & Whiskers Plot



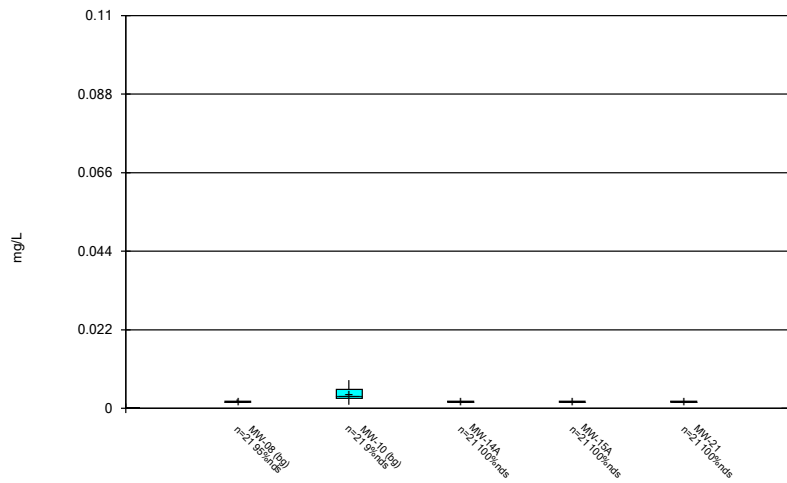
Constituent: Antimony Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



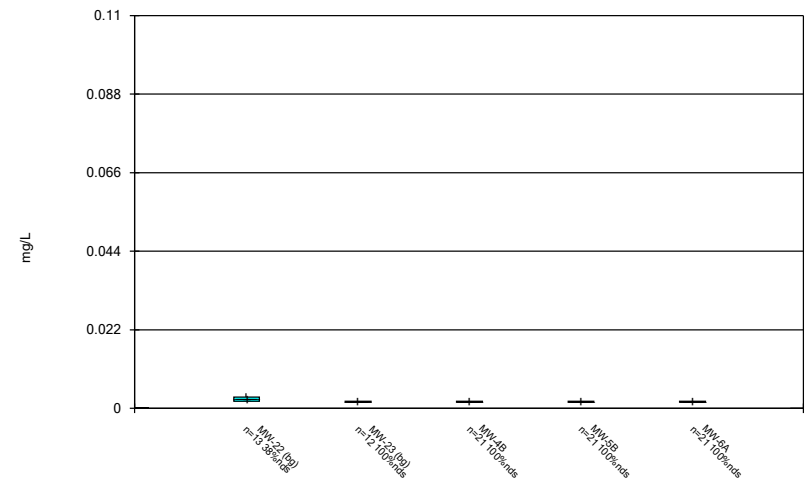
Constituent: Antimony Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



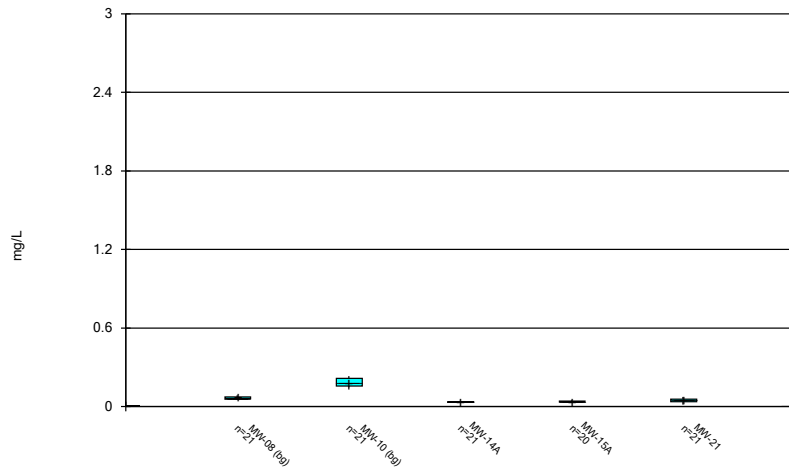
Constituent: Arsenic Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



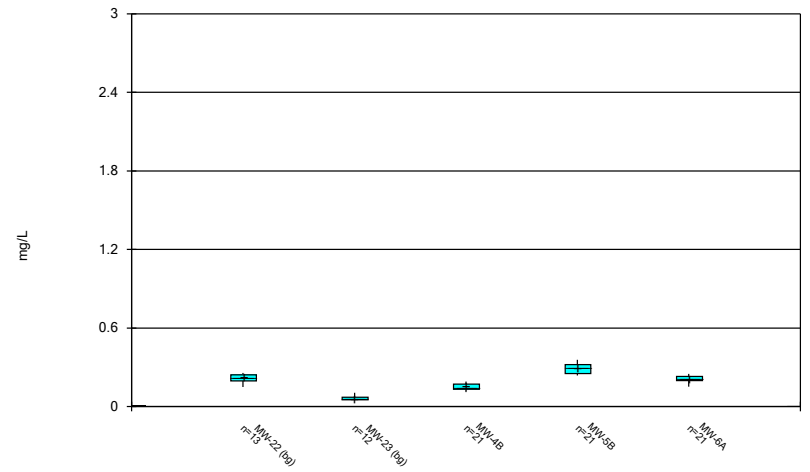
Constituent: Arsenic Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



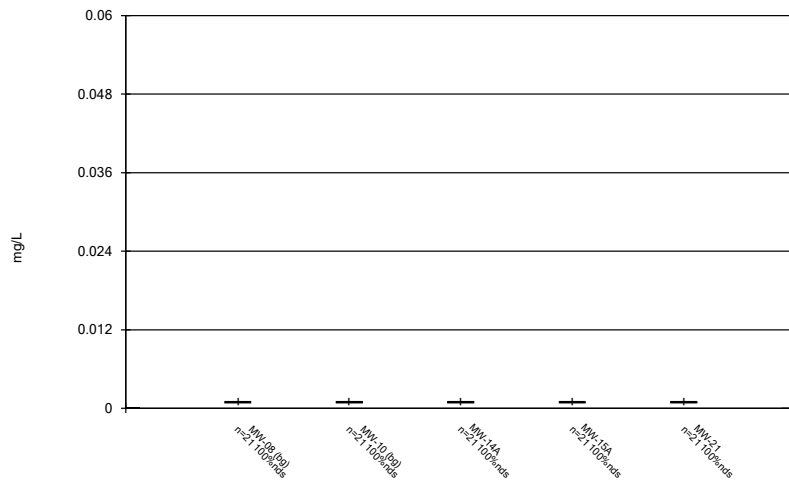
Constituent: Barium Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



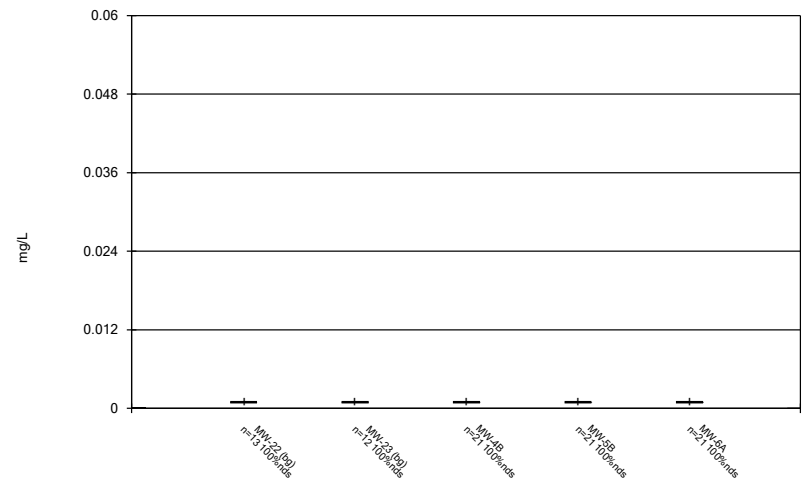
Constituent: Barium Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



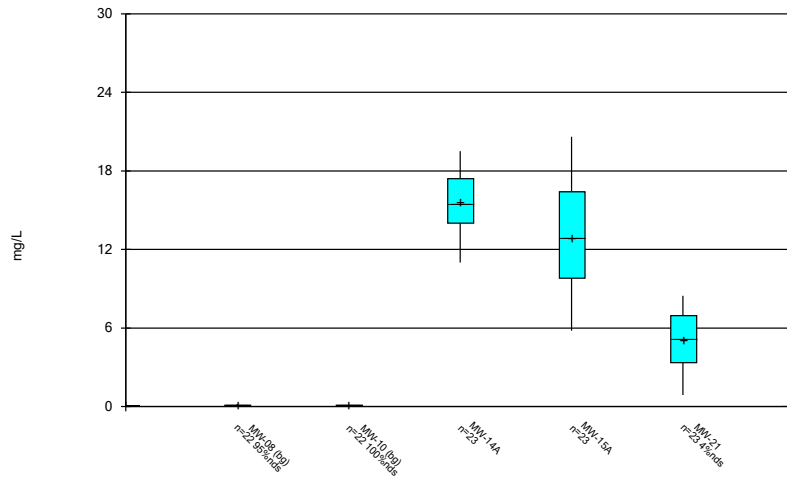
Constituent: Beryllium Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



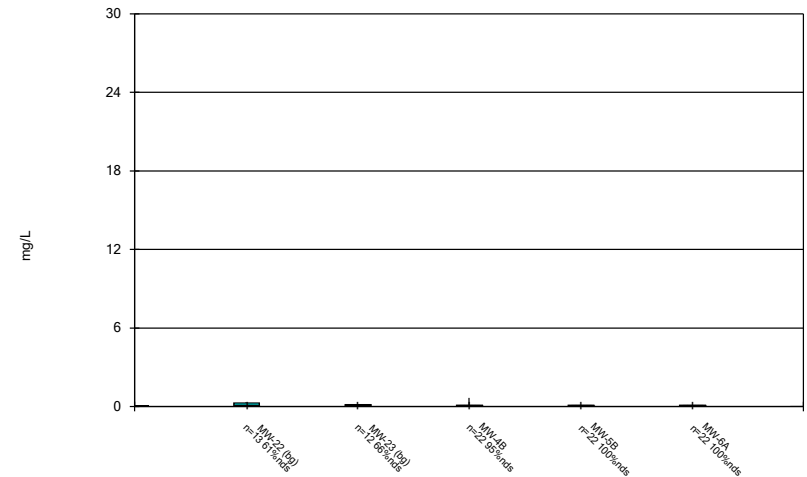
Constituent: Beryllium Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



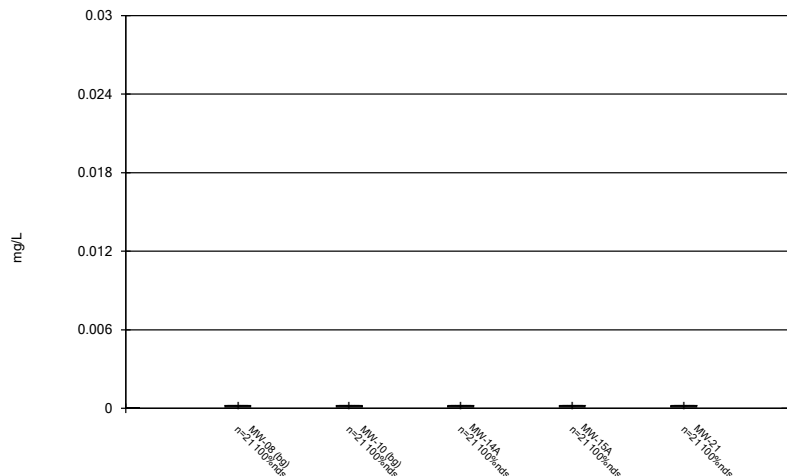
Constituent: Boron Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



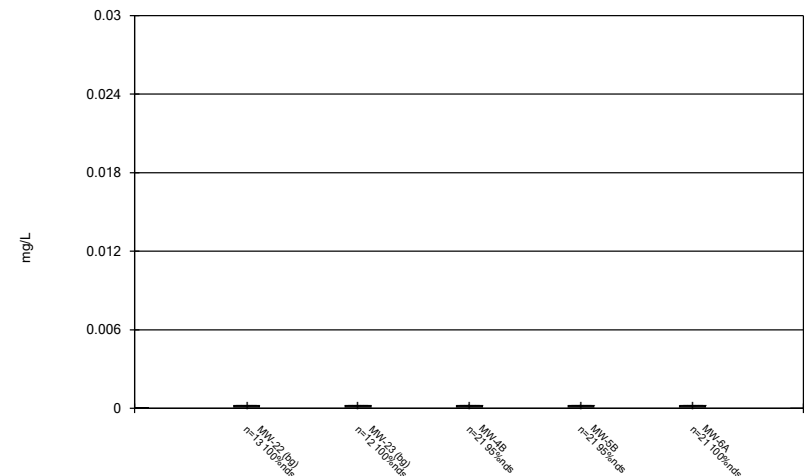
Constituent: Boron Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



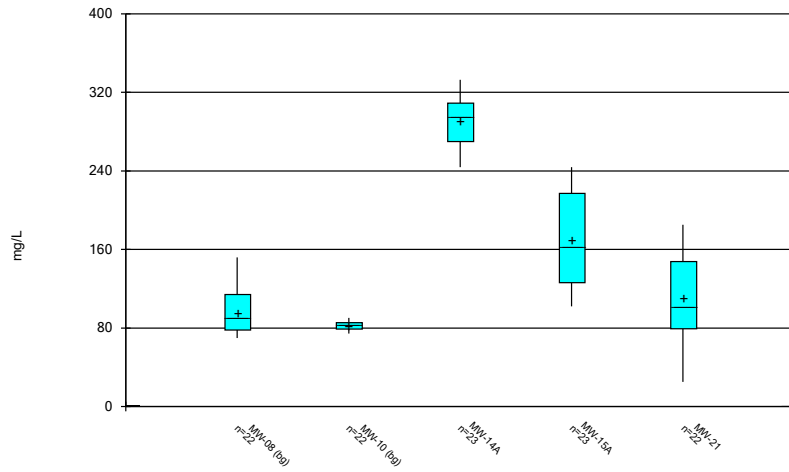
Constituent: Cadmium Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



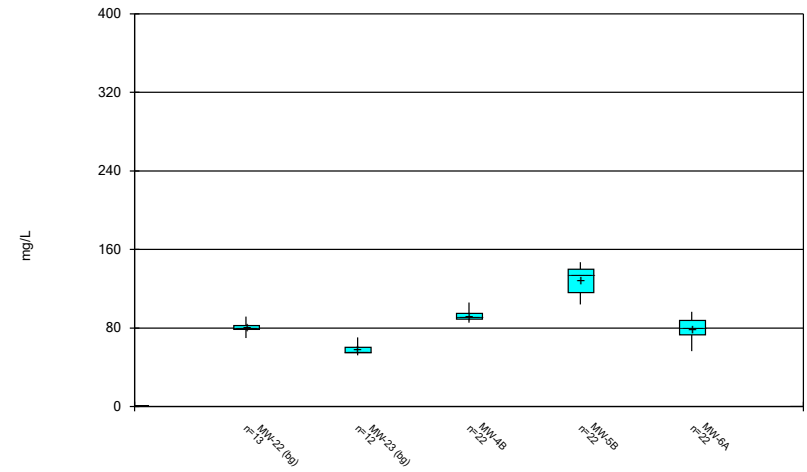
Constituent: Cadmium Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



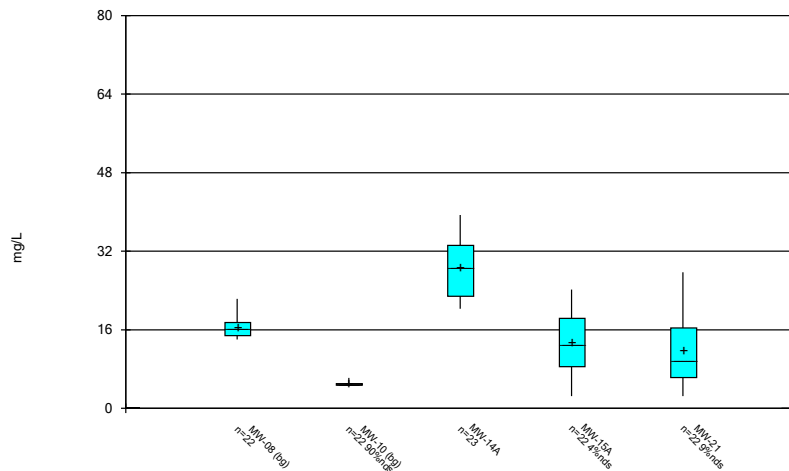
Constituent: Calcium Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



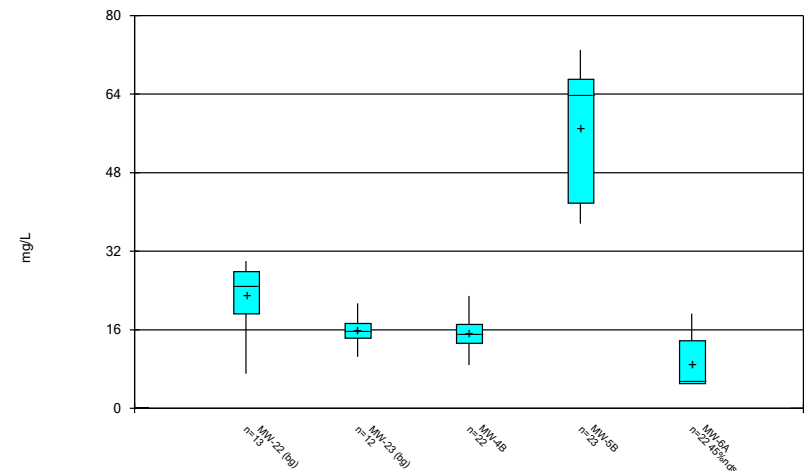
Constituent: Calcium Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



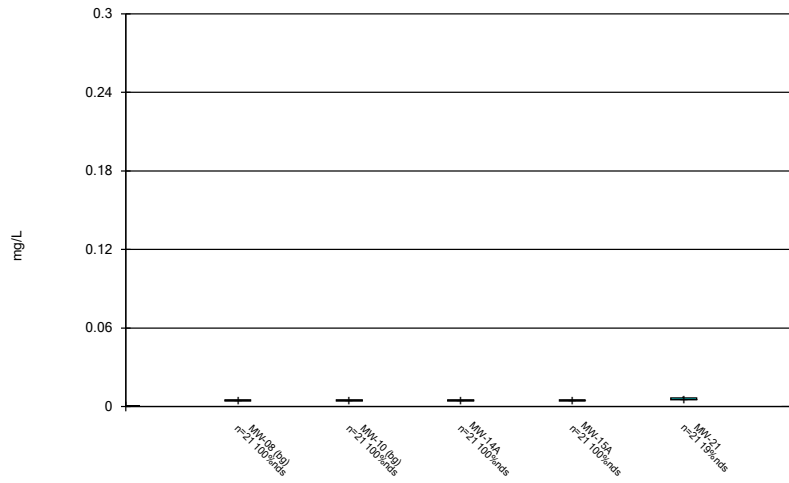
Constituent: Chloride Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



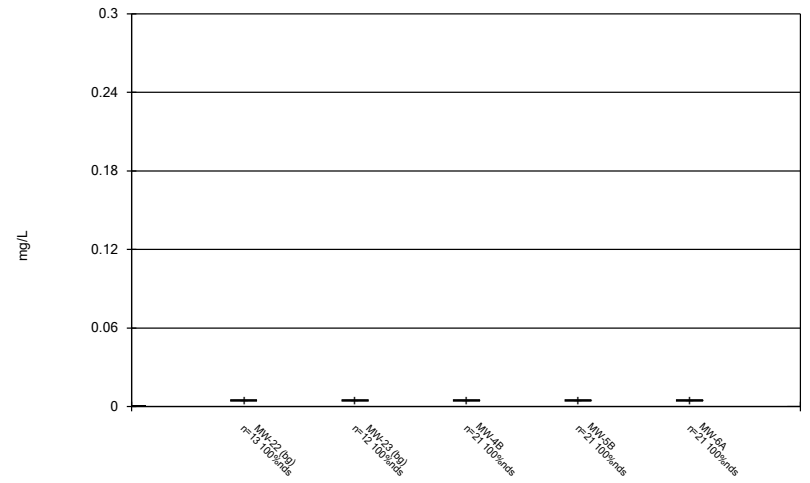
Constituent: Chloride Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



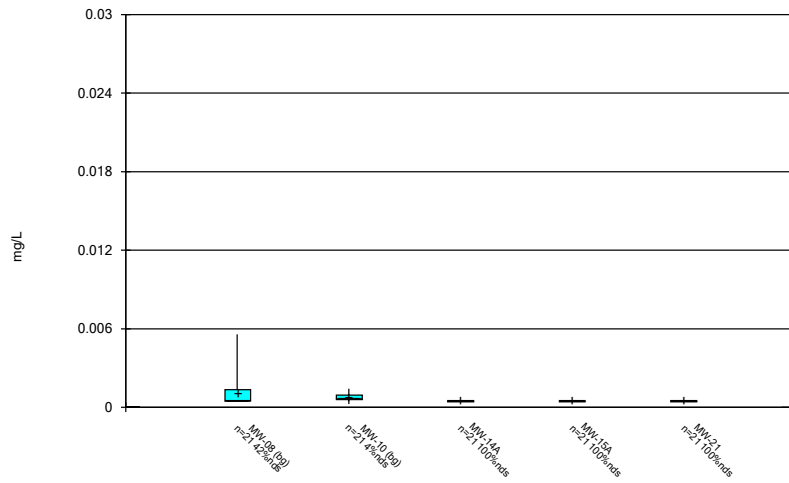
Constituent: Chromium Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



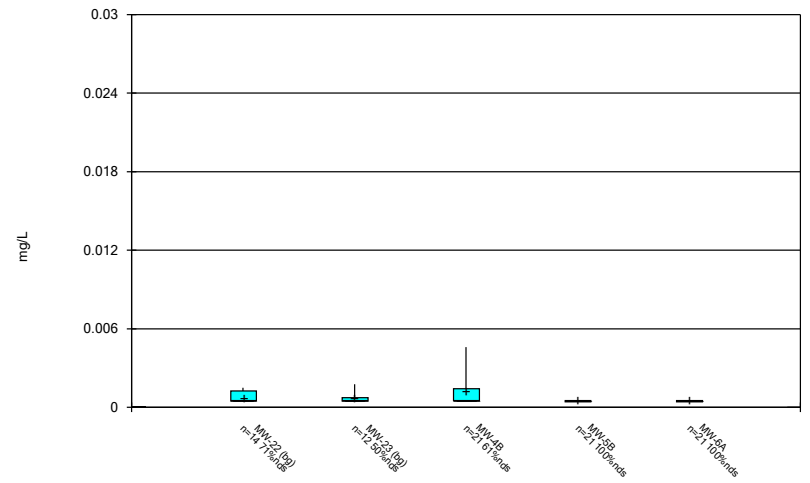
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



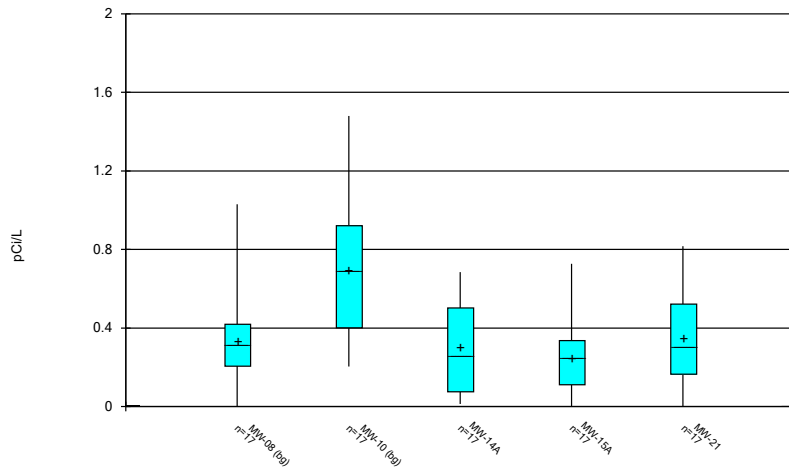
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



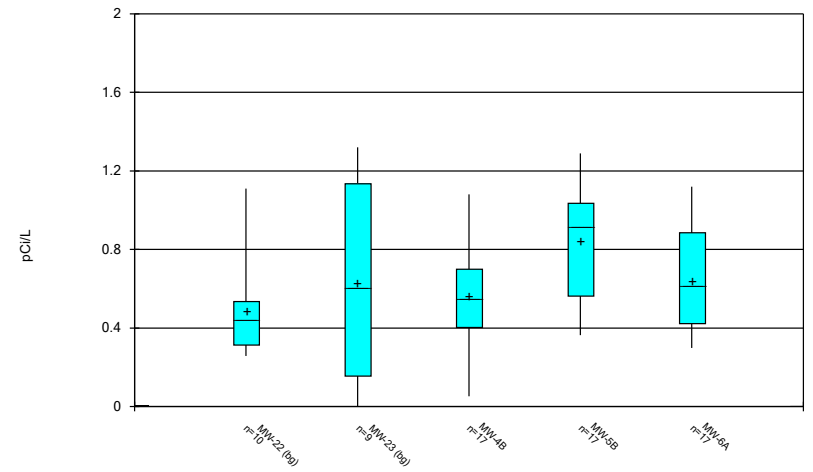
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



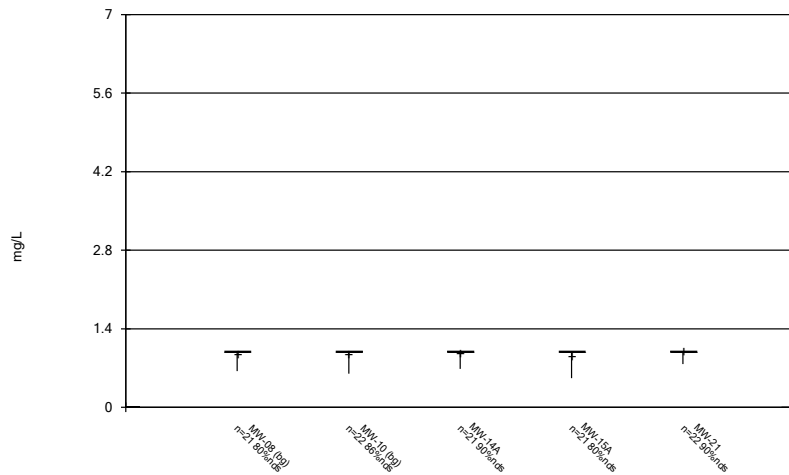
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



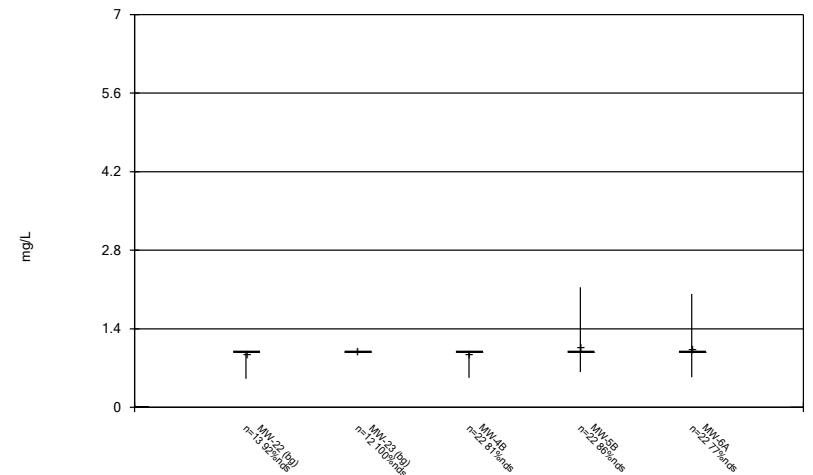
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



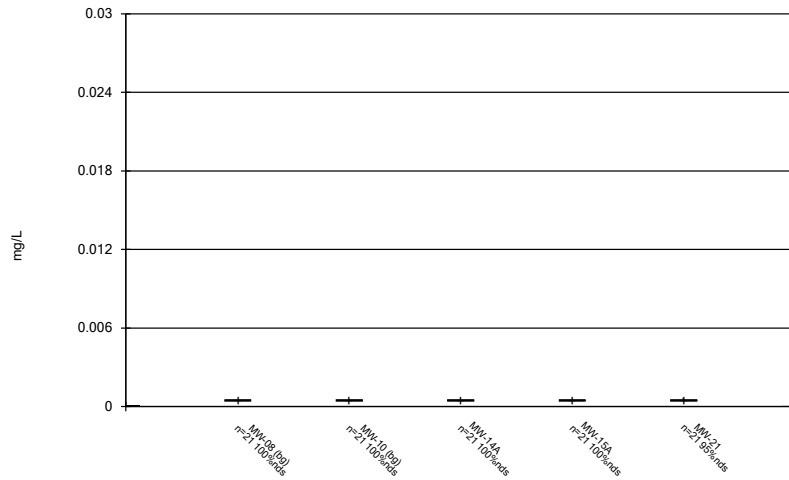
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



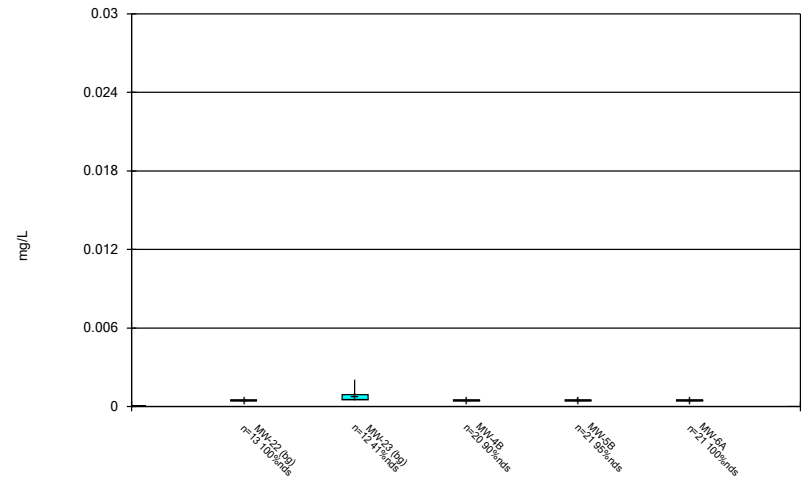
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



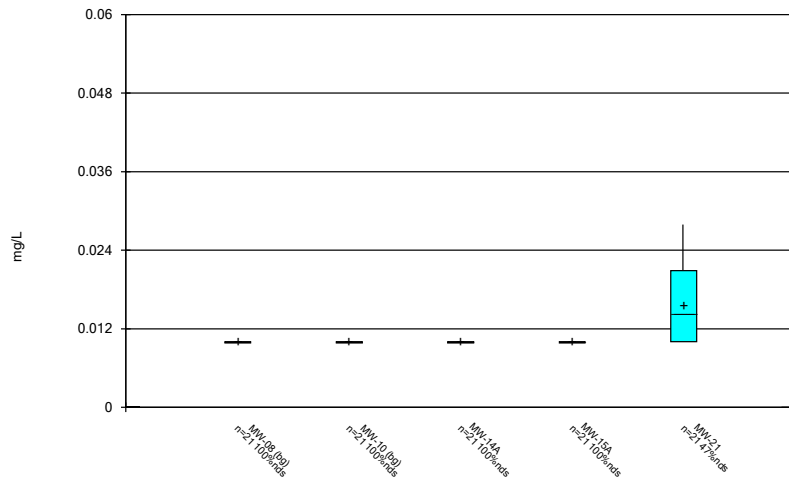
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



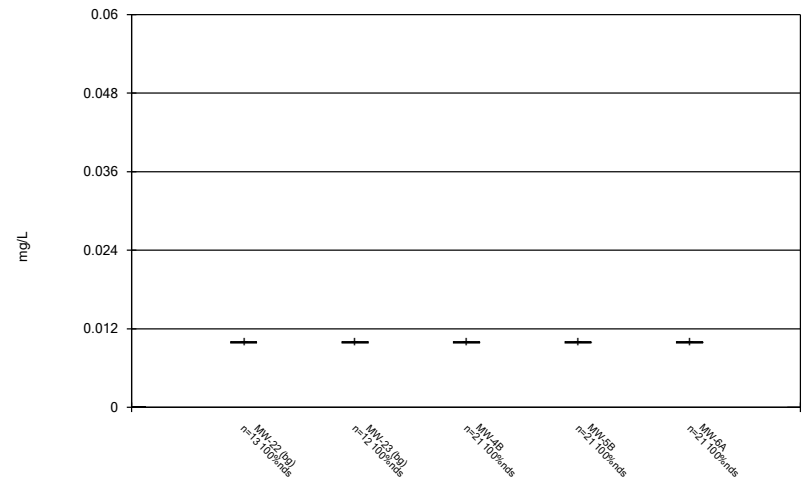
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



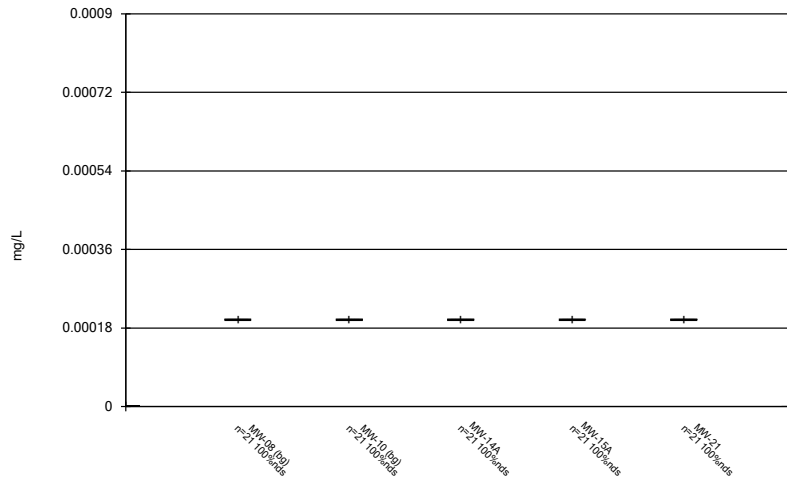
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



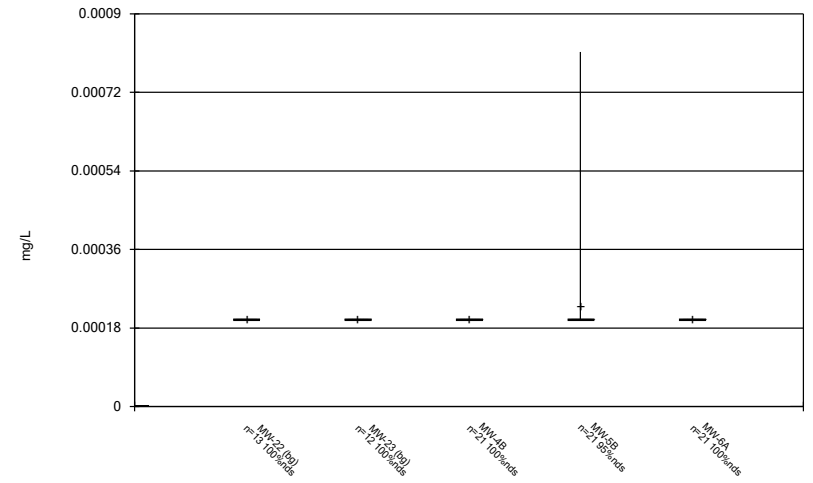
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



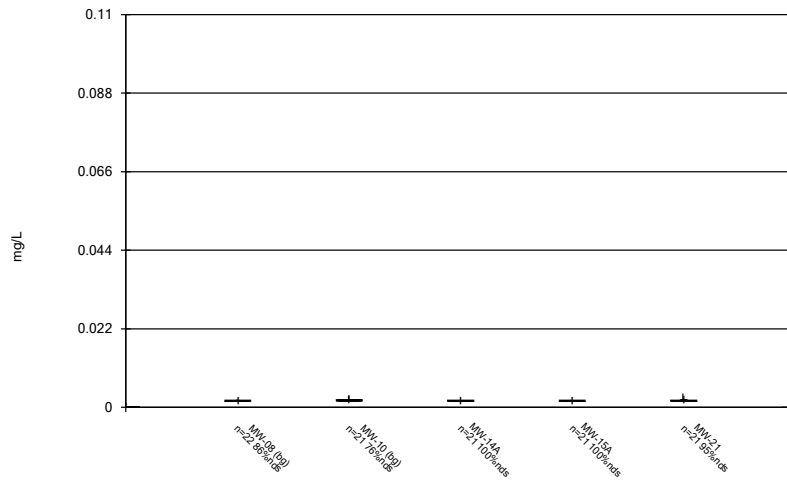
Constituent: Mercury Analysis Run 11/9/2023 7:48 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



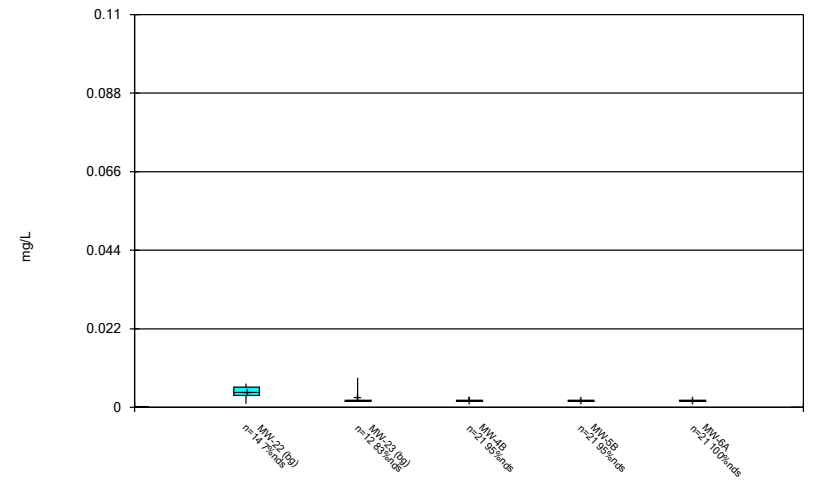
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



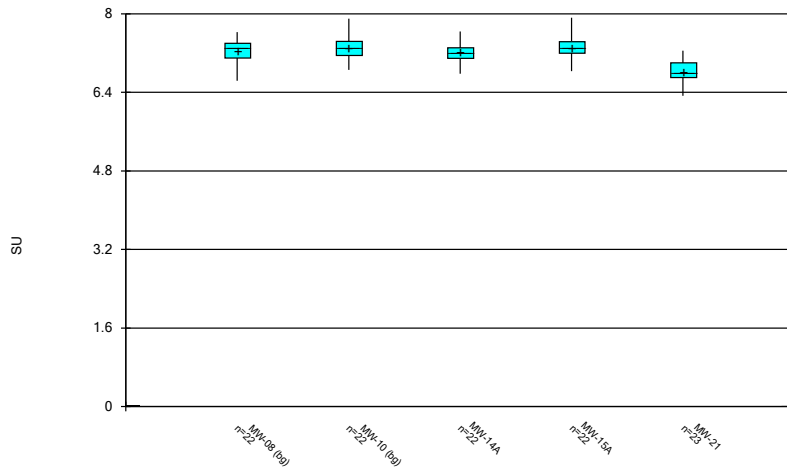
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



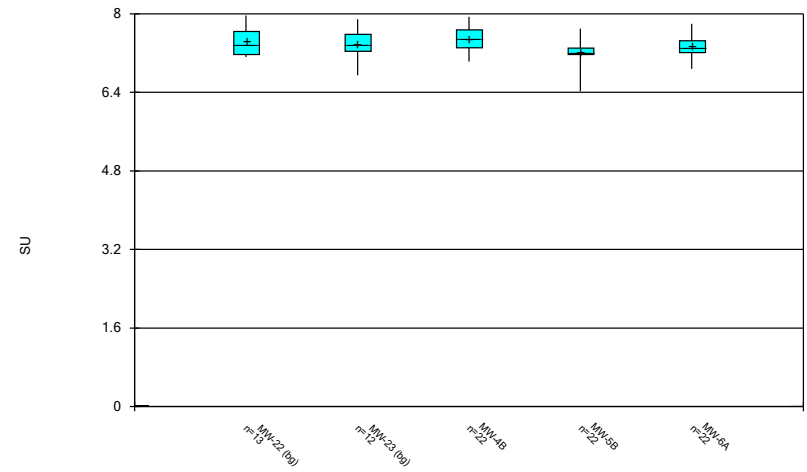
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



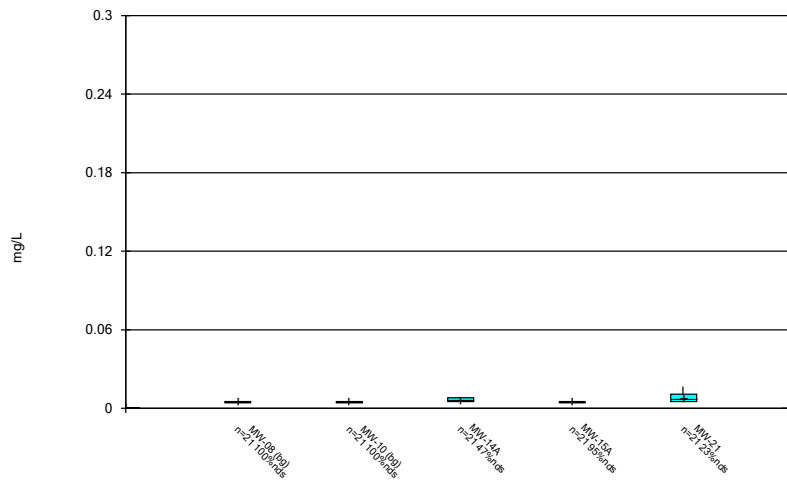
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



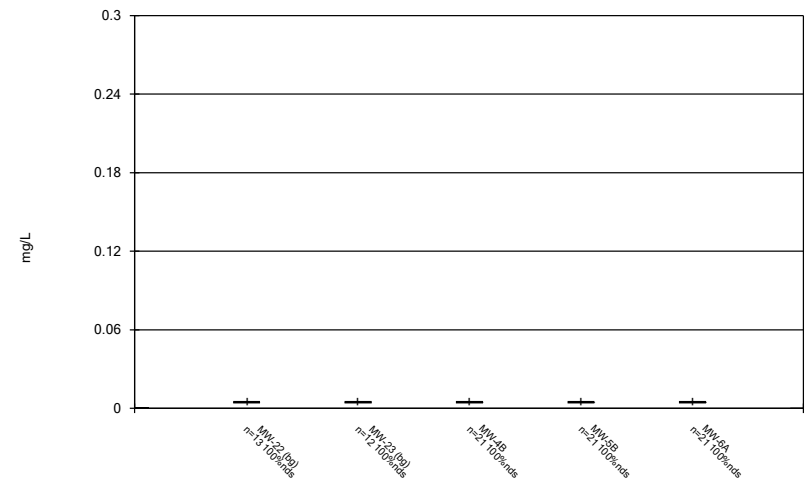
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



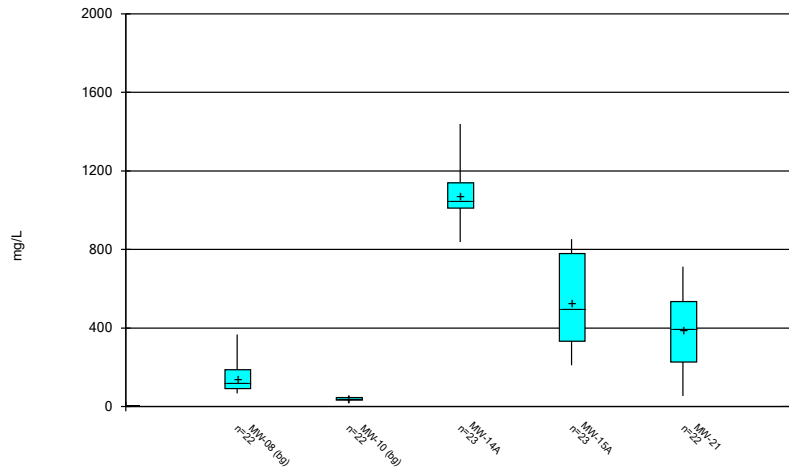
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



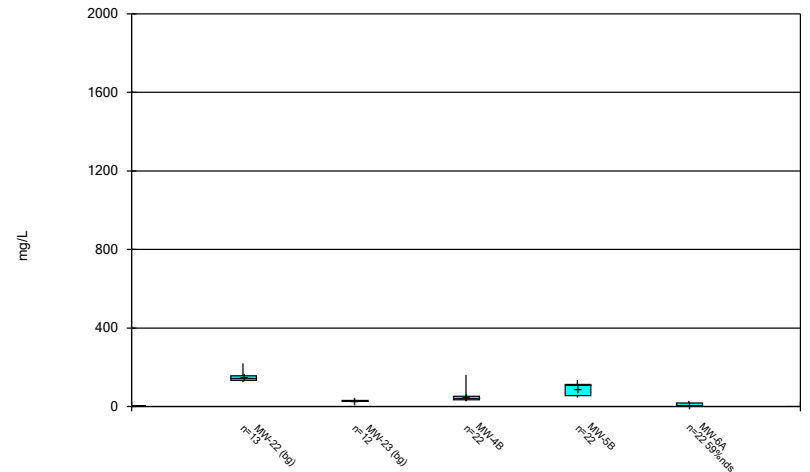
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Box & Whiskers Plot



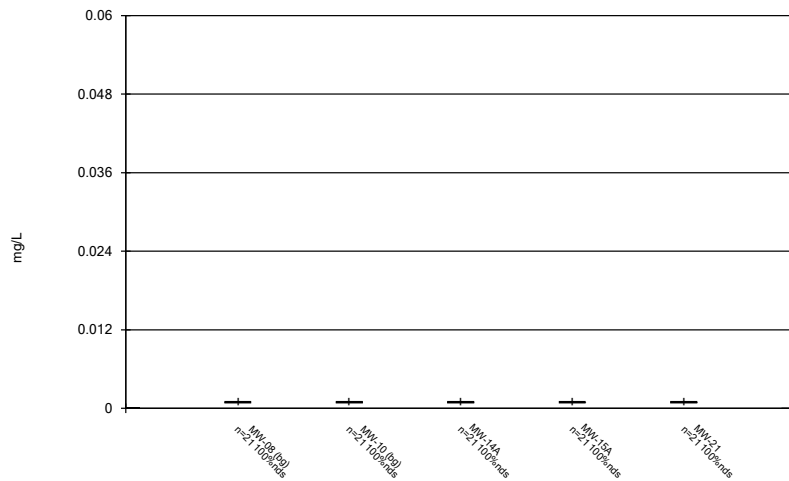
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



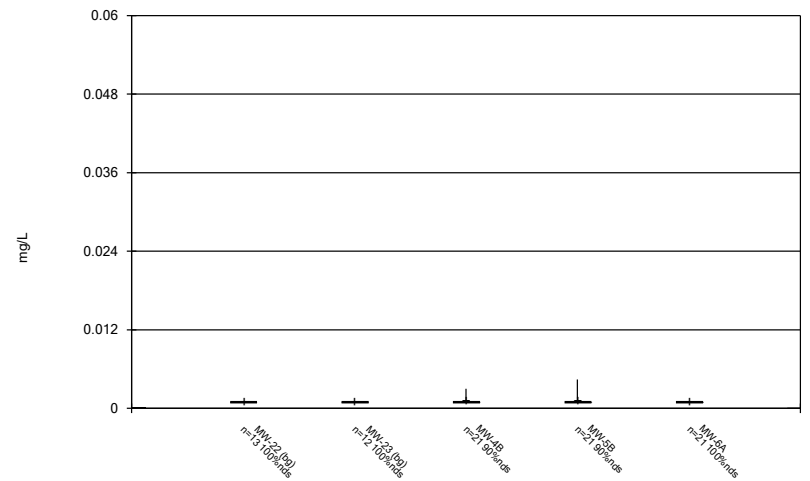
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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



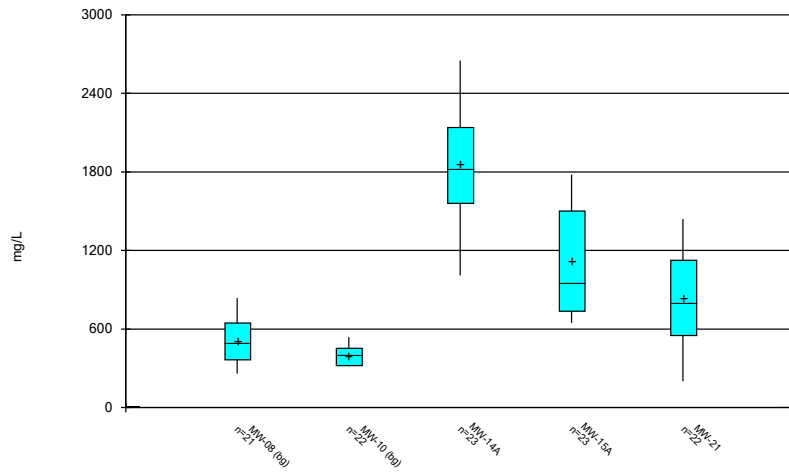
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Box & Whiskers Plot



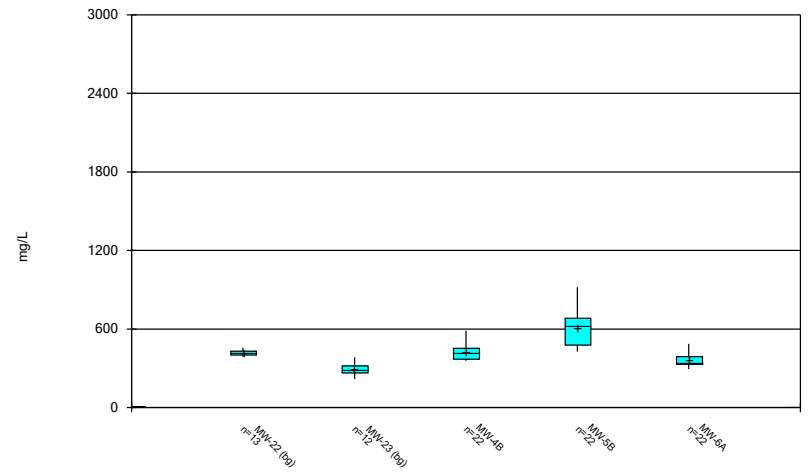
Constituent: Thallium Analysis Run 11/9/2023 7:49 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



Constituent: Total Dissolved Solids Analysis Run 11/9/2023 7:49 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Box & Whiskers Plot



Constituent: Total Dissolved Solids Analysis Run 11/9/2023 7:49 AM View: Federal Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

FIGURE C.

Outlier Summary

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/8/2023, 7:53 PM

	MW-15A Barium (mg/L)	MW-15A Chloride (mg/L)	MW-08 Fluoride (mg/L)	MW-14A Fluoride (mg/L)	MW-15A Fluoride (mg/L)	MW-4B Lead (mg/L)	MW-08 Total Dissolved Solids (mg/L)
6/6/2016	2.13 (o)						
6/7/2016					0.00147 (o)		
4/17/2017	47.4 (o)	1.69 (o)	1.93 (o)	6.7 (o)			
4/11/2023							2390 (o)

FIGURE D.

Interwell Prediction Limits - April 2023 - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 7:51 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-14A	0.322	n/a	4/11/2023	14.8	Yes	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-15A	0.322	n/a	4/11/2023	5.8	Yes	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-21	0.322	n/a	4/11/2023	3.35	Yes	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Calcium (mg/L)	MW-14A	152	n/a	4/11/2023	318	Yes	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-5B	30	n/a	4/12/2023	38.7	Yes	65	n/a	n/a	29.23	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-14A	366	n/a	4/11/2023	1150	Yes	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-14A	662.6	n/a	4/11/2023	2140	Yes	64	20.34	2.877	0	None	sqrt(x)	0.001254	Param Inter 1 of 2

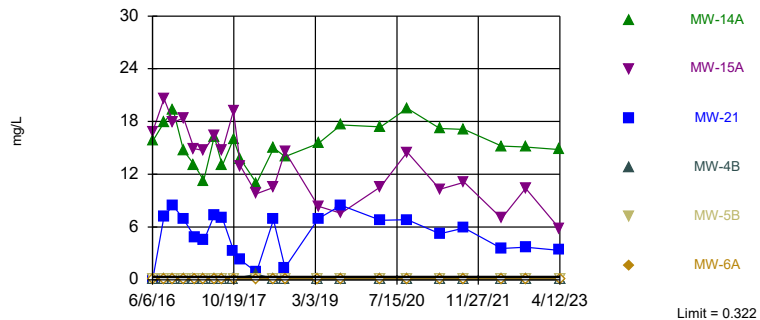
Interwell Prediction Limits - April 2023 - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 7:51 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-14A	0.322	n/a	4/11/2023	14.8	Yes	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-15A	0.322	n/a	4/11/2023	5.8	Yes	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-21	0.322	n/a	4/11/2023	3.35	Yes	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-4B	0.322	n/a	4/12/2023	0.1ND	No	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-5B	0.322	n/a	4/12/2023	0.1ND	No	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-6A	0.322	n/a	4/12/2023	0.1ND	No	65	n/a	n/a	87.69	n/a	n/a	0.0004546	NP Inter (NDs) 1 of 2
Calcium (mg/L)	MW-14A	152	n/a	4/11/2023	318	Yes	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-15A	152	n/a	4/11/2023	110	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-21	152	n/a	4/11/2023	76	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-4B	152	n/a	4/12/2023	91.3	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-5B	152	n/a	4/12/2023	107	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-6A	152	n/a	4/12/2023	95.4	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-14A	30	n/a	4/11/2023	20.3	No	65	n/a	n/a	29.23	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-15A	30	n/a	4/11/2023	7.3	No	65	n/a	n/a	29.23	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-21	30	n/a	4/11/2023	5.93	No	65	n/a	n/a	29.23	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-4B	30	n/a	4/12/2023	18	No	65	n/a	n/a	29.23	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-5B	30	n/a	4/12/2023	38.7	Yes	65	n/a	n/a	29.23	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-6A	30	n/a	4/12/2023	15.4	No	65	n/a	n/a	29.23	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Fluoride (mg/L)	MW-14A	1	n/a	4/11/2023	1ND	No	64	n/a	n/a	87.5	n/a	n/a	0.000468	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-15A	1	n/a	4/11/2023	1ND	No	64	n/a	n/a	87.5	n/a	n/a	0.000468	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-21	1	n/a	4/11/2023	1ND	No	64	n/a	n/a	87.5	n/a	n/a	0.000468	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-4B	1	n/a	4/12/2023	1ND	No	64	n/a	n/a	87.5	n/a	n/a	0.000468	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-5B	1	n/a	4/12/2023	1ND	No	64	n/a	n/a	87.5	n/a	n/a	0.000468	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-6A	1	n/a	4/12/2023	1ND	No	64	n/a	n/a	87.5	n/a	n/a	0.000468	NP Inter (NDs) 1 of 2
pH (SU)	MW-14A	7.814	6.875	4/11/2023	6.97	No	65	7.344	0.2505	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-15A	7.814	6.875	4/11/2023	7.24	No	65	7.344	0.2505	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-21	7.814	6.875	4/11/2023	7.24	No	65	7.344	0.2505	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-4B	7.814	6.875	4/12/2023	7.23	No	65	7.344	0.2505	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-5B	7.814	6.875	4/12/2023	6.96	No	65	7.344	0.2505	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-6A	7.814	6.875	4/12/2023	7.08	No	65	7.344	0.2505	0	None	No	0.0006268	Param Inter 1 of 2
Sulfate (mg/L)	MW-14A	366	n/a	4/11/2023	1150	Yes	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-15A	366	n/a	4/11/2023	254	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-21	366	n/a	4/11/2023	215	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-4B	366	n/a	4/12/2023	54	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-5B	366	n/a	4/12/2023	45.8	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-6A	366	n/a	4/12/2023	20.5	No	65	n/a	n/a	0	n/a	n/a	0.0004546	NP Inter (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-14A	662.6	n/a	4/11/2023	2140	Yes	64	20.34	2.877	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-15A	662.6	n/a	4/11/2023	646	No	64	20.34	2.877	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-21	662.6	n/a	4/11/2023	646	No	64	20.34	2.877	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-4B	662.6	n/a	4/12/2023	396	No	64	20.34	2.877	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-5B	662.6	n/a	4/12/2023	478	No	64	20.34	2.877	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-6A	662.6	n/a	4/12/2023	428	No	64	20.34	2.877	0	None	sqrt(x)	0.001254	Param Inter 1 of 2

Exceeds Limit: MW-14A, MW-15A, MW-21

Prediction Limit Interwell Non-parametric

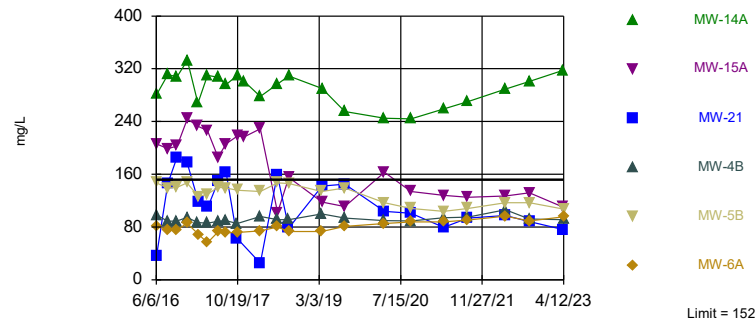


Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 65 background values. 87.69% NDs. Annual per-constituent alpha = 0.005441. Individual comparison alpha = 0.0004546 (1 of 2). Comparing 6 points to limit.

Constituent: Boron Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Exceeds Limit: MW-14A

Prediction Limit Interwell Non-parametric

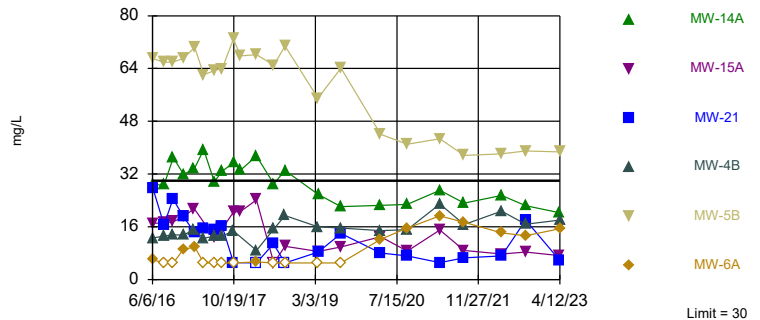


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 65 background values. Annual per-constituent alpha = 0.005441. Individual comparison alpha = 0.0004546 (1 of 2). Comparing 6 points to limit.

Constituent: Calcium Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Exceeds Limit: MW-5B

Prediction Limit Interwell Non-parametric

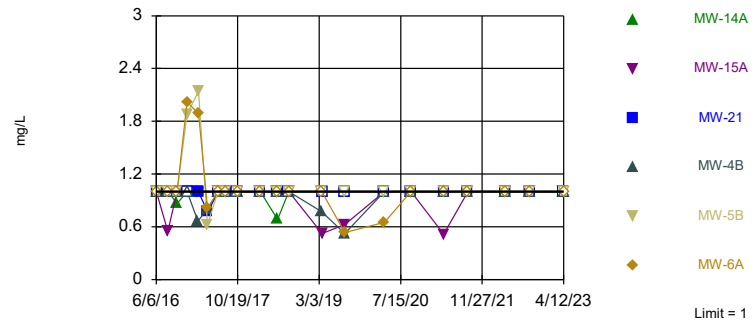


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 65 background values. 29.23% NDs. Annual per-constituent alpha = 0.005441. Individual comparison alpha = 0.0004546 (1 of 2). Comparing 6 points to limit.

Constituent: Chloride Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Within Limit

Prediction Limit Interwell Non-parametric

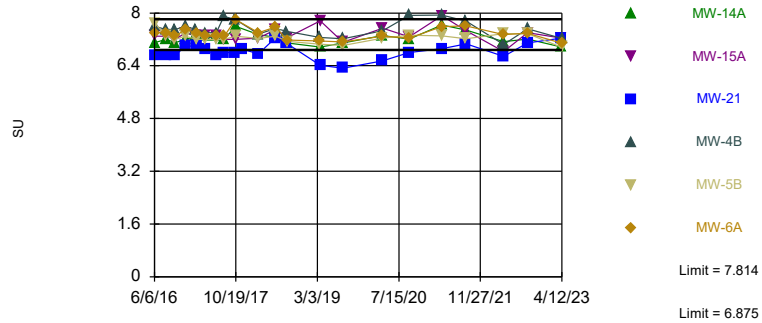


Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 64 background values. 87.5% NDs. Annual per-constituent alpha = 0.005602. Individual comparison alpha = 0.000468 (1 of 2). Comparing 6 points to limit.

Constituent: Fluoride Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Within Limits

Prediction Limit
Interwell Parametric



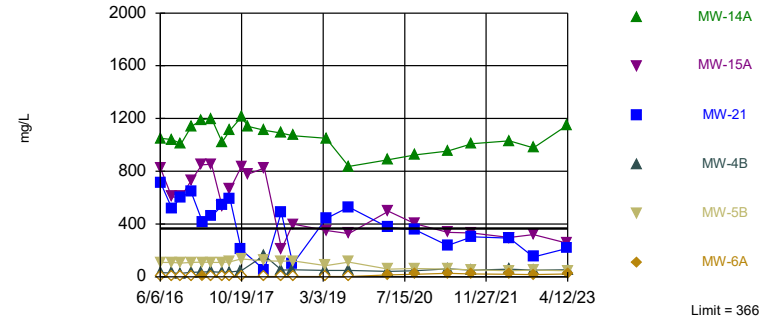
Background Data Summary: Mean=7.344, Std. Dev.=0.2505, n=65. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9532, critical = 0.948. Kappa = 1.874 (c=7, w=6, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0006268. Comparing 6 points to limit.

Constituent: pH Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Hollow symbols indicate censored values.

Exceeds Limit: MW-14A

Prediction Limit
Interwell Non-parametric

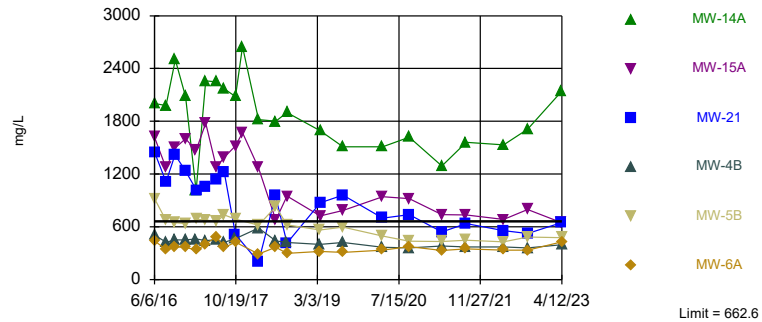


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 65 background values. Annual per-constituent alpha = 0.005441. Individual comparison alpha = 0.0004546 (1 of 2). Comparing 6 points to limit.

Constituent: Sulfate Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Exceeds Limit: MW-14A

Prediction Limit
Interwell Parametric



Background Data Summary (based on square root transformation): Mean=20.34, Std. Dev.=2.877, n=64. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9515, critical = 0.947. Kappa = 1.876 (c=7, w=6, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.001254. Comparing 6 points to limit.

Constituent: Total Dissolved Solids Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-5B	MW-6A	MW-14A	MW-21	MW-22 (bg)
6/6/2016	16.8	<0.1							
6/7/2016			<0.1	<0.1	<0.1	<0.1			
6/8/2016							15.8	<0.1	
8/15/2016	20.6	<0.1					17.9	7.23	
8/16/2016			<0.1	<0.1	<0.1	<0.1			
10/10/2016		<0.1	<0.1					8.45	
10/11/2016	17.9			<0.1	<0.1	<0.1	19.3		
12/12/2016				<0.1	<0.1	<0.1		6.93	
12/14/2016	18.4	<0.1	<0.1				14.7		
2/17/2017	14.9	<0.1		<0.1			13.1		
2/21/2017			<0.1		<0.1	<0.1		4.87	
4/17/2017	14.7	<0.1	<0.1	<0.1	<0.1	<0.1	11.3		
4/18/2017								4.49	
6/19/2017		<0.1	<0.1						
6/20/2017				<0.1	<0.1			7.36	
6/21/2017	16.4					<0.1	16.3		
8/7/2017		<0.1	<0.1	<0.1					
8/8/2017	14.7				<0.1	<0.1	13	7.05	
10/16/2017		<0.1	<0.1	<0.1				3.33	
10/17/2017	19.2				<0.1	<0.1	16		
11/28/2017	12.9 (R)						13.7 (R)	2.24 (R)	
3/5/2018		<0.1							
3/6/2018			<0.1	0.66	<0.1	<0.1		0.885	<0.1
3/7/2018	9.8						11		
6/19/2018		<0.1	<0.1					6.84	<0.1
6/20/2018	10.5						15		
6/21/2018				<0.1	<0.1	<0.1			
8/27/2018		<0.1	<0.1						<0.1
8/28/2018				<0.1				1.36	
8/29/2018	14.6				<0.1	<0.1	14		
3/18/2019			<0.1						
3/19/2019		<0.1		<0.1	<0.1	<0.1			0.299
3/20/2019	8.35						15.5	6.95	
8/6/2019			0.205						<0.1
8/7/2019	7.56	<0.1		<0.1	<0.1	<0.1	17.6	8.46	
4/7/2020	10.6	<0.1	<0.1	<0.1	<0.1	<0.1	17.4	6.76	<0.1
9/18/2020	14.5	<0.1	<0.1	<0.1	<0.1	<0.1	19.5	6.82	0.263
4/5/2021	10.3	<0.1	<0.1	<0.1	<0.1	<0.1	17.2	5.24	<0.1
9/1/2021	11.1	<0.1	<0.1	<0.1	<0.1	<0.1	17.1	5.88	<0.1
4/20/2022	6.98	<0.1	<0.1	<0.1	<0.1	<0.1	15.2	3.57	<0.1
9/14/2022	10.4	<0.1	<0.1	<0.1	<0.1	<0.1	15.1	3.69	0.322
4/10/2023									0.247
4/11/2023	5.8		<0.1				14.8	3.35	
4/12/2023		<0.1		<0.1	<0.1	<0.1			

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	<0.1
6/21/2018	
8/27/2018	<0.1
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	<0.1
3/20/2019	
8/6/2019	<0.1
8/7/2019	
4/7/2020	<0.1
9/18/2020	0.15
4/5/2021	<0.1
9/1/2021	<0.1
4/20/2022	<0.1
9/14/2022	0.204
4/10/2023	
4/11/2023	
4/12/2023	0.145

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-5B	MW-6A	MW-14A	MW-21	MW-22 (bg)
6/6/2016	206	89.3							
6/7/2016			152	98.2	147	81.4			
6/8/2016							281	37.2	
8/15/2016	199	80.7					311	146	
8/16/2016			117	88.8	139	75.4			
10/10/2016		83.3	118						185
10/11/2016	203			89.3	140	75.7	308		
12/12/2016				94.5	147	85.6			178
12/14/2016	244	86.5	109				333		
2/17/2017	233	81.2		86.8			268		
2/21/2017			89.9		126	68.8			118
4/17/2017	226	79.2	96.5	85.9	130	56.3	310		
4/18/2017									110
6/19/2017		83.6	113						
6/20/2017				88.7	140				149
6/21/2017	186					72.9	307		
8/7/2017		85.5	91.3	89.7					
8/8/2017	206				139	71.2	296		163
10/16/2017		83.3	77	85.3					62.3
10/17/2017	218				136	71.9	310		
11/28/2017	217 (R)						301 (R)		
3/5/2018		77.3							
3/6/2018			74.7	95.8	134	74.1		25.1	69.8
3/7/2018	229						278		
6/19/2018		88.5	115					159	91.5
6/20/2018	102						297		
6/21/2018				91.4	147	80.1			
8/27/2018		85.4	83.6						80.7
8/28/2018				91.3				78.7	
8/29/2018	155				146	73.3	309		
3/18/2019			97.6						
3/19/2019		76.3		99.7	134	73.2			91.6
3/20/2019	118						290	142	
8/6/2019			132						83.8
8/7/2019	111	78.9		93.8	139	80.9	255	145	
4/7/2020	163	75.4	92.4	89.6	117	85.1	245	104	80.9
9/18/2020	134	74.2	77.7	89	108	87.9	244	101	75.5
4/5/2021	128	78.8	81.2	94.1	104	87.6	259	79.5	78.4
9/1/2021	125	80	78.3	95.1	108	90.6	270	93.5	79.4
4/20/2022	127	90.4	69.6	106	117	96.5	289	97.5	80.2
9/14/2022	132	82	76.8	92.3	117	89	301	88.2	79.6
4/10/2023									80.4
4/11/2023	110		78.2				318	76	
4/12/2023		83.7		91.3	107	95.4			

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	70.5
6/21/2018	
8/27/2018	63.9
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	59.7
3/20/2019	
8/6/2019	59.5
8/7/2019	
4/7/2020	61
9/18/2020	52.1
4/5/2021	56.3
9/1/2021	56.1
4/20/2022	54
9/14/2022	54.5
4/10/2023	
4/11/2023	
4/12/2023	55.3

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-5B	MW-6A	MW-4B	MW-14A	MW-21	MW-22 (bg)
6/6/2016	17.1	6.22							
6/7/2016			19.8	67	5.97	12.6			
6/8/2016							28.7	27.7	
8/15/2016	17.2	<5					28.7	16.6	
8/16/2016			17.8	65.9	<5	13.2			
10/10/2016		<5	16.2					24.4	
10/11/2016	17.6			66	<5	13.6	37		
12/12/2016				67	9.08	13.5		19.2	
12/14/2016	19	<5	17.2				31.9		
2/17/2017	21.5	<5				15.1	33.5		
2/21/2017			15.4	70.4	9.93			14.2	
4/17/2017	47.4 (o)	<5	17.1	62.1	<5	12.5	39.4		
4/18/2017								15.6	
6/19/2017		<5	14.1						
6/20/2017				63.4		13.2		15.1	
6/21/2017	12.8				<5		29.7		
8/7/2017		<5	14			13.2			
8/8/2017	15.4			64	<5		32.9	16.1	
10/16/2017		<5	14.4			14.7		5.09	
10/17/2017	20.5			73	<5		35.4		
11/28/2017	20.7 (R)			67.8 (R)			33.2 (R)		
3/5/2018		<5							
3/6/2018			14.5	68.2	5.33	8.81		<5	30
3/7/2018	24.2						37.4		
6/19/2018		<5	14.9					10.9	27.2
6/20/2018	<5						29		
6/21/2018				65	<5	15.3			
8/27/2018		<5	15.6						29.8
8/28/2018						19.4		<5	
8/29/2018	10.1			70.8	<5		33.1		
3/18/2019			16.1						
3/19/2019		<5		55	<5	16			27.6
3/20/2019	8.54						25.8	8.3	
8/6/2019			17.1						26.9
8/7/2019	9.91	<5		64.1	<5	15.6	22.1	14	
4/7/2020	13	<5	17.2	44	12.2	14.8	22.5	8.05	24.8
9/18/2020	8.63	<5	14.7	41	15.6	15.1	22.8	7.21	23.2
4/5/2021	15	<5	22.3	42.7	19.3	22.9	27.1	5.14	28.1
9/1/2021	8.86	<5	16.3	37.6	17.4	16.7	23.2	6.58	20
4/20/2022	7.71	<5	15.8	38.1	14.2	20.8	25.5	7.19	20.2
9/14/2022	8.29	<5	16.7	39	13.3	16.8	22.4	18	7.04
4/10/2023									18.2
4/11/2023	7.3		17.9				20.3	5.93	
4/12/2023		5.86		38.7	15.4	18			

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	15.9
6/21/2018	
8/27/2018	14.2
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	10.5
3/20/2019	
8/6/2019	13.8
8/7/2019	
4/7/2020	15.7
9/18/2020	14.4
4/5/2021	21.4
9/1/2021	15.2
4/20/2022	16.9
9/14/2022	16.2
4/10/2023	
4/11/2023	
4/12/2023	17.7

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-6A	MW-4B	MW-5B	MW-21	MW-14A	MW-22 (bg)
6/6/2016	<1	0.731							
6/7/2016			<1	<1	<1	<1			
6/8/2016							<1	<1	
8/15/2016	0.549	<1					<1	<1	
8/16/2016			<1	<1	<1	<1			
10/10/2016		<1	<1				<1		
10/11/2016	<1			<1	<1	<1		0.867	
12/12/2016				2.02	<1	1.88	<1		
12/14/2016	<1	<1	0.72					<1	
2/17/2017	<1	<1			0.664			<1	
2/21/2017			<1	1.89		2.14	0.993		
4/17/2017	6.7 (o)	0.774	1.69 (o)	0.814	0.801	0.627		1.93 (o)	
4/18/2017							0.768		
6/19/2017		<1	<1						
6/20/2017					<1	<1	<1		
6/21/2017	<1			<1				<1	
8/7/2017		<1	<1		<1				
8/8/2017	<1			<1		<1	<1	<1	
10/16/2017		<1	<1		<1		<1		
10/17/2017	<1			<1		<1		<1	
3/5/2018		<1							
3/6/2018			<1	<1	<1	<1	<1		<1
3/7/2018	<1							<1	
6/19/2018		<1	0.826				<1		<1
6/20/2018	<1							0.684	
6/21/2018				<1	<1	<1			
8/27/2018		<1	<1						<1
8/28/2018					<1		<1		
8/29/2018	<1			<1		<1		<1	
3/18/2019			<1						
3/19/2019		<1		<1	0.771	<1			<1
3/20/2019	0.523						<1	<1	
8/6/2019			0.643						0.507
8/7/2019	0.625	0.596		0.535	0.525	<1	<1	<1	
4/7/2020	<1	<1	0.864	0.652	<1	<1	<1	<1	<1
9/18/2020	<1	<1	<1	<1	<1	<1	<1	<1	<1
4/5/2021	0.516	<1	<1	<1	<1	<1	<1	<1	<1
9/1/2021	<1	<1	<1	<1	<1	<1	<1	<1	<1
4/20/2022	<1	<1	<1	<1	<1	<1	<1	<1	<1
9/14/2022	<1	<1	<1	<1	<1	<1	<1	<1	<1
4/10/2023									<1
4/11/2023	<1		<1				<1	<1	
4/12/2023		<1		<1	<1	<1			

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	<1
6/21/2018	
8/27/2018	<1
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	<1
3/20/2019	
8/6/2019	<1
8/7/2019	
4/7/2020	<1
9/18/2020	<1
4/5/2021	<1
9/1/2021	<1
4/20/2022	<1
9/14/2022	<1
4/10/2023	
4/11/2023	
4/12/2023	<1

Prediction Limit

Constituent: pH (SU) Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-5B	MW-6A	MW-14A	MW-21	MW-22 (bg)
6/6/2016	7.3	7.4							
6/7/2016			7.2	7.6	7.7	7.4			
6/8/2016							7.1	6.7	
8/15/2016	7.3	7.3					7.2	6.7	
8/16/2016			7.3	7.5	7.3	7.4			
10/10/2016		7.2	7.1					6.7	
10/11/2016	7.2			7.5	7.2	7.3	7.1		
12/12/2016				7.6	7.3	7.5		7	
12/14/2016	7.4	7.3	7.3				7.2		
2/17/2017	7.3	7.2		7.5			7.3		
2/21/2017			7.3		7.2	7.4		7	
4/17/2017	7.3	7.3	7.1	7.4	7.2	7.3	7.3		
4/18/2017								6.9	
6/19/2017		7.2	7.1						
6/20/2017				7.4	7.2			6.7	
6/21/2017	7.3					7.3	7.3		
8/7/2017		7.9	7.3	7.9					
8/8/2017	7.2				7.2	7.3	7.2	6.8	
10/16/2017		7.3	7.4	7.8				6.8	
10/17/2017	7.2				7.3	7.8	7.6		
11/28/2017								6.9 (R)	
3/5/2018		7.04							
3/6/2018			7.3	7.36	7.23	7.4		6.76	7.36
3/7/2018	7.24						7.35		
6/19/2018		7.72	7.56					7.25	7.9
6/20/2018	7.5						7.26		
6/21/2018				7.53	7.3	7.58			
8/27/2018		7.23	7.2						7.42
8/28/2018				7.44				7.07	
8/29/2018	7.25				7.14	7.18	7.09		
3/19/2019		7.1	7.08	7.26	7.05	7.15			7.21
3/20/2019	7.76						6.97	6.41	
8/6/2019			6.64						7.12
8/7/2019	7.11	7.07		7.22	7.02	7.12	7.09	6.33	
4/7/2020	7.54	7.26	7.21	7.46	7.24	7.3	7.32	6.55	7.32
9/18/2020	7.28	7.33	7.4	7.93	7.33	7.24	7.21	6.8	7.53
4/5/2021	7.92	7.57	7.63	7.94	7.31	7.59	7.64	6.92	7.7
9/1/2021	7.46	7.59	7.45	7.75	7.22	7.61	7.48	7.06	7.97
4/20/2022	6.83	7.35	7.35	7.04	7.37	7.35	7.13	6.69	7.23
9/14/2022	7.4	7.48	7.43	7.52	7.37	7.38	7.21	7.09	7.58
4/10/2023									7.14
4/11/2023	7.24		7.24				6.97	7.24	
4/12/2023		6.96		7.23	6.96	7.08			

Prediction Limit

Constituent: pH (SU) Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	7.69
6/21/2018	
8/27/2018	7.55
8/28/2018	
8/29/2018	
3/19/2019	7.24
3/20/2019	
8/6/2019	6.75
8/7/2019	
4/7/2020	7.33
9/18/2020	7.53
4/5/2021	7.61
9/1/2021	7.89
4/20/2022	7.39
9/14/2022	7.3
4/10/2023	
4/11/2023	
4/12/2023	7.24

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-5B	MW-6A	MW-14A	MW-21	MW-22 (bg)
6/6/2016	827	42.1							
6/7/2016			366	32.2	109	<5			
6/8/2016							1050	713	
8/15/2016	605	33.8					1040	520	
8/16/2016			187	28.4	109	<5			
10/10/2016		36.4	187					603	
10/11/2016	607			27.2	105	<5	1010		
12/12/2016				32.7	109	<5		645	
12/14/2016	732	38.4	149				1140		
2/17/2017	849	47.3		36			1190		
2/21/2017			145		111	5.94		415	
4/17/2017	853	38.3	145	39.5	108	<5	1200		
4/18/2017								461	
6/19/2017		35.4	190						
6/20/2017				33	108			541	
6/21/2017	537					<5	1020		
8/7/2017		39	119	35.3					
8/8/2017	664				114	<5	1110	590	
10/16/2017		46.9	106	45.4				206	
10/17/2017	835				135	<5	1210		
11/28/2017	779 (R)						1140 (R)		
3/5/2018		51.4							
3/6/2018			87.3	162	122	<5		53.7	123
3/7/2018	824						1110		
6/19/2018		37.3	136					489	134
6/20/2018	210						1090		
6/21/2018				51.3	119	<5			
8/27/2018		34.3	94.7						125
8/28/2018				52.2				96.6	
8/29/2018	400				120	<5	1070		
3/18/2019			223						
3/19/2019		42.8		48	85	<5			134
3/20/2019	351						1050	442	
8/6/2019			276						139
8/7/2019	327	28.8		47	112	<5	837	529	
4/7/2020	496	18.6	123	41.5	58.9	13.6	888	373	143
9/18/2020	403	36.5	100	46.9	61.9	19.1	924	356	151
4/5/2021	338	27.6	99.7	60.1	57.4	27.3	952	237	154
9/1/2021	333	32.3	82.7	50.2	53.7	22.7	1010	303	154
4/20/2022	297	48.3	72.8	58.4	44.7	18.9	1030	293	158
9/14/2022	319	31.2	67.1	49.5	49.9	16.4	978	151	220
4/10/2023									147
4/11/2023	254		72.2				1150	215	
4/12/2023		39.8		54	45.8	20.5			

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	38.4
6/21/2018	
8/27/2018	31.7
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	26.2
3/20/2019	
8/6/2019	29.7
8/7/2019	
4/7/2020	25.5
9/18/2020	25.8
4/5/2021	35.5
9/1/2021	25.8
4/20/2022	25.4
9/14/2022	23
4/10/2023	
4/11/2023	
4/12/2023	25

Prediction Limit

Constituent: Total Dissolved Solids (mg/L) Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-5B	MW-6A	MW-14A	MW-21	MW-22 (bg)
6/6/2016	1620	468							
6/7/2016			836	507	920	440			
6/8/2016							2000	1440	
8/15/2016	1270	412					1980	1110	
8/16/2016			664	426	672	340			
10/10/2016		444	708					1420	
10/11/2016	1500			450	646	370	2500		
12/12/2016				450	636	368		1240	
12/14/2016	1600	428	634				2080		
2/17/2017	1470	498		460			1010		
2/21/2017			578		684	336		1010	
4/17/2017	1780	538	624	442	680	402	2260		
4/18/2017								1060	
6/19/2017		524	656						
6/20/2017				452	656			1140	
6/21/2017	1280					486	2250		
8/7/2017		458	488	420					
8/8/2017	1390				734	364	2170	1220	
10/16/2017		414	470	466				514	
10/17/2017	1520				688	424	2080		
11/28/2017	1670 (R)						2650 (R)		
3/5/2018		314							
3/6/2018			376	586	620	292		200	424
3/7/2018	1270						1820		
6/19/2018		396	502					952	434
6/20/2018	676						1800		
6/21/2018				440	828	368			
8/27/2018		392	414						420
8/28/2018				420				416	
8/29/2018	948				622	298	1900		
3/18/2019			612						
3/19/2019		326		398	562	320			456
3/20/2019	724						1690	872	
8/6/2019			702						428
8/7/2019	786	320		422	596	308	1510	960	
4/7/2020	942	316	418	366	494	336	1510	698	422
9/18/2020	920	344	350	360	436	374	1620	738	398
4/5/2021	738	322	382	380	434	330	1290	540	412
9/1/2021	736	314	342	370	448	350	1560	636	420
4/20/2022	682	344	322	370	428	336	1530	558	388
9/14/2022	796	340	350	358	484	334	1710	524	390
4/10/2023									450
4/11/2023	646		2390 (o)				2140	646	
4/12/2023		410		396	478	428			

Prediction Limit

Constituent: Total Dissolved Solids (mg/L) Analysis Run 11/9/2023 7:51 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	384
6/21/2018	
8/27/2018	340
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	296
3/20/2019	
8/6/2019	336
8/7/2019	
4/7/2020	298
9/18/2020	250
4/5/2021	274
9/1/2021	256
4/20/2022	218
9/14/2022	278
4/10/2023	
4/11/2023	
4/12/2023	286

FIGURE E.

Interwell Prediction Limits - September 2023 - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 7:50 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-14A	0.322	n/a	9/19/2023	18.1	Yes	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-15A	0.322	n/a	9/19/2023	9.28	Yes	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-21	0.322	n/a	9/19/2023	4.42	Yes	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Calcium (mg/L)	MW-14A	152	n/a	9/19/2023	291	Yes	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-5B	30	n/a	9/20/2023	41.8	Yes	69	n/a	n/a	28.99	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
pH (SU)	MW-14A	7.81	6.835	9/19/2023	6.78	Yes	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-21	7.81	6.835	9/19/2023	6.55	Yes	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-5B	7.81	6.835	9/20/2023	6.42	Yes	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
Sulfate (mg/L)	MW-14A	366	n/a	9/19/2023	1440	Yes	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-14A	658.7	n/a	9/19/2023	1800	Yes	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-15A	658.7	n/a	9/19/2023	720	Yes	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2

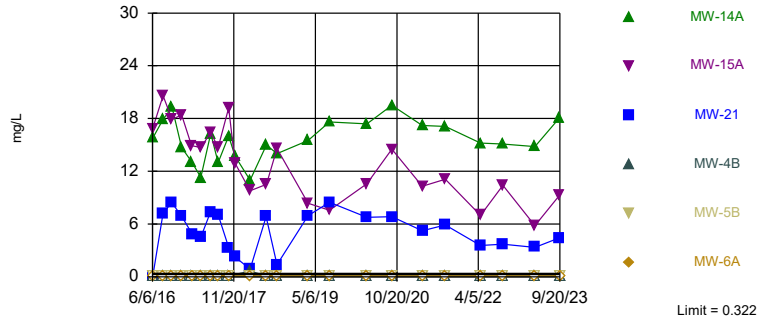
Interwell Prediction Limits - September 2023 - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 7:50 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-14A	0.322	n/a	9/19/2023	18.1	Yes	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-15A	0.322	n/a	9/19/2023	9.28	Yes	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-21	0.322	n/a	9/19/2023	4.42	Yes	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-4B	0.322	n/a	9/20/2023	0.1ND	No	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-5B	0.322	n/a	9/20/2023	0.1ND	No	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-6A	0.322	n/a	9/20/2023	0.1ND	No	69	n/a	n/a	85.51	n/a	n/a	0.0004008	NP Inter (NDs) 1 of 2
Calcium (mg/L)	MW-14A	152	n/a	9/19/2023	291	Yes	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-15A	152	n/a	9/19/2023	126	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-21	152	n/a	9/19/2023	96	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-4B	152	n/a	9/20/2023	90.4	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-5B	152	n/a	9/20/2023	115	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-6A	152	n/a	9/20/2023	82.1	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-14A	30	n/a	9/19/2023	20.9	No	69	n/a	n/a	28.99	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-15A	30	n/a	9/19/2023	8.41	No	69	n/a	n/a	28.99	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-21	30	n/a	9/19/2023	8.23	No	69	n/a	n/a	28.99	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-4B	30	n/a	9/20/2023	17.4	No	69	n/a	n/a	28.99	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-5B	30	n/a	9/20/2023	41.8	Yes	69	n/a	n/a	28.99	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-6A	30	n/a	9/20/2023	12.2	No	69	n/a	n/a	28.99	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Fluoride (mg/L)	MW-14A	1	n/a	9/19/2023	1ND	No	68	n/a	n/a	88.24	n/a	n/a	0.0004142	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-15A	1	n/a	9/19/2023	1ND	No	68	n/a	n/a	88.24	n/a	n/a	0.0004142	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-21	1	n/a	9/19/2023	1ND	No	68	n/a	n/a	88.24	n/a	n/a	0.0004142	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-4B	1	n/a	9/20/2023	1ND	No	68	n/a	n/a	88.24	n/a	n/a	0.0004142	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-5B	1	n/a	9/20/2023	1ND	No	68	n/a	n/a	88.24	n/a	n/a	0.0004142	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-6A	1	n/a	9/20/2023	1ND	No	68	n/a	n/a	88.24	n/a	n/a	0.0004142	NP Inter (NDs) 1 of 2
pH (SU)	MW-14A	7.81	6.835	9/19/2023	6.78	Yes	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-15A	7.81	6.835	9/19/2023	6.97	No	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-21	7.81	6.835	9/19/2023	6.55	Yes	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-4B	7.81	6.835	9/20/2023	7.03	No	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-5B	7.81	6.835	9/20/2023	6.42	Yes	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-6A	7.81	6.835	9/20/2023	6.88	No	69	7.322	0.261	0	None	No	0.0006268	Param Inter 1 of 2
Sulfate (mg/L)	MW-14A	366	n/a	9/19/2023	1440	Yes	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-15A	366	n/a	9/19/2023	365	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-21	366	n/a	9/19/2023	303	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-4B	366	n/a	9/20/2023	53.1	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-5B	366	n/a	9/20/2023	53.4	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-6A	366	n/a	9/20/2023	10.1	No	69	n/a	n/a	0	n/a	n/a	0.0004008	NP Inter (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-14A	658.7	n/a	9/19/2023	1800	Yes	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-15A	658.7	n/a	9/19/2023	720	Yes	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-21	658.7	n/a	9/19/2023	626	No	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-4B	658.7	n/a	9/20/2023	364	No	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-5B	658.7	n/a	9/20/2023	476	No	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-6A	658.7	n/a	9/20/2023	332	No	68	7.398	0.6963	0	None	x^(1/3)	0.001254	Param Inter 1 of 2

Exceeds Limit: MW-14A, MW-15A, MW-21

Prediction Limit Interwell Non-parametric

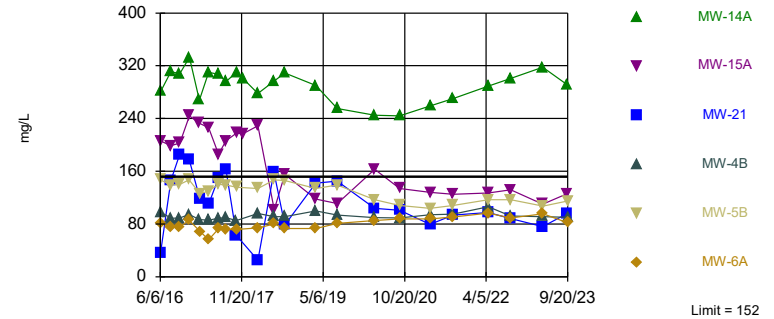


Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 69 background values. 85.51% NDs. Annual per-constituent alpha = 0.004799. Individual comparison alpha = 0.0004008 (1 of 2). Comparing 6 points to limit.

Constituent: Boron Analysis Run 11/9/2023 7:49 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Exceeds Limit: MW-14A

Prediction Limit Interwell Non-parametric

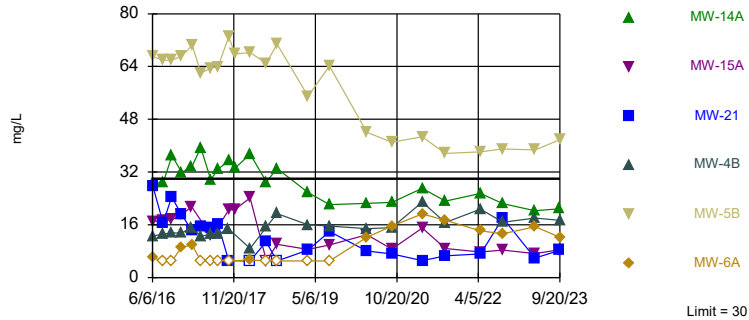


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 69 background values. Annual per-constituent alpha = 0.004799. Individual comparison alpha = 0.0004008 (1 of 2). Comparing 6 points to limit.

Constituent: Calcium Analysis Run 11/9/2023 7:49 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Exceeds Limit: MW-5B

Prediction Limit Interwell Non-parametric

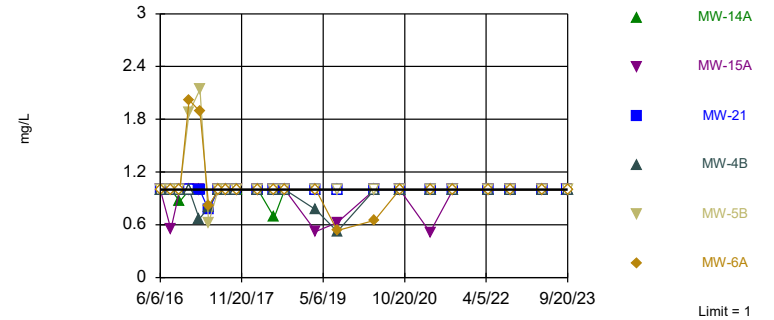


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 69 background values. 28.99% NDs. Annual per-constituent alpha = 0.004799. Individual comparison alpha = 0.0004008 (1 of 2). Comparing 6 points to limit.

Constituent: Chloride Analysis Run 11/9/2023 7:49 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Within Limit

Prediction Limit Interwell Non-parametric

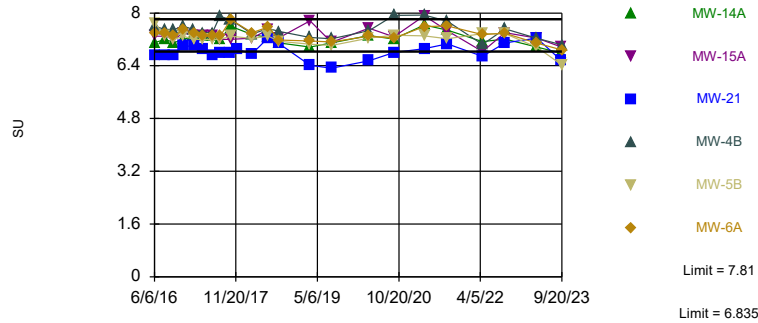


Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 68 background values. 88.24% NDs. Annual per-constituent alpha = 0.004959. Individual comparison alpha = 0.0004142 (1 of 2). Comparing 6 points to limit.

Constituent: Fluoride Analysis Run 11/9/2023 7:49 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Exceeds Limits: MW-14A, MW-21, MW-5B

Prediction Limit Interwell Parametric



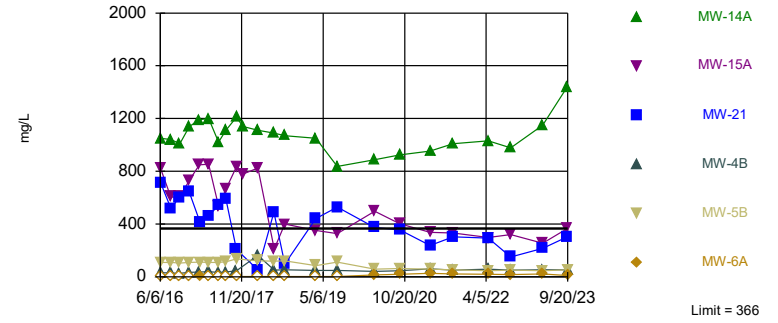
Background Data Summary: Mean=7.322, Std. Dev.=0.261, n=69. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9676, critical = 0.951. Kappa = 1.869 (c=7, w=6, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0006268. Comparing 6 points to limit.

Constituent: pH Analysis Run 11/9/2023 7:49 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Hollow symbols indicate censored values.

Exceeds Limit: MW-14A

Prediction Limit Interwell Non-parametric

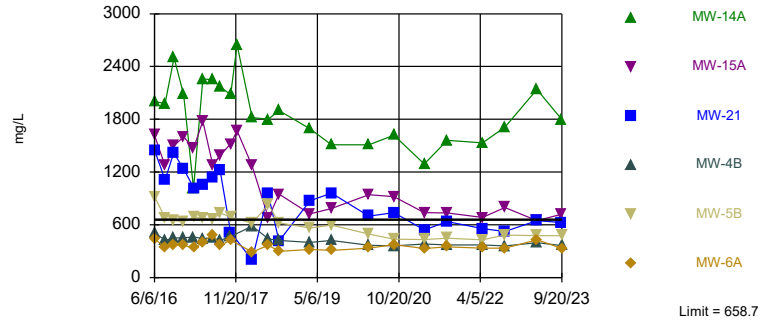


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 69 background values. Annual per-constituent alpha = 0.004799. Individual comparison alpha = 0.0004008 (1 of 2). Comparing 6 points to limit.

Constituent: Sulfate Analysis Run 11/9/2023 7:49 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Exceeds Limit: MW-14A, MW-15A

Prediction Limit Interwell Parametric



Background Data Summary (based on cube root transformation): Mean=7.398, Std. Dev.=0.6963, n=68. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.961, critical = 0.95. Kappa = 1.871 (c=7, w=6, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.001254. Comparing 6 points to limit.

Constituent: Total Dissolved Solids Analysis Run 11/9/2023 7:49 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-5B	MW-6A	MW-14A	MW-21	MW-22 (bg)
6/6/2016	16.8	<0.1							
6/7/2016			<0.1	<0.1	<0.1	<0.1			
6/8/2016							15.8	<0.1	
8/15/2016	20.6	<0.1					17.9	7.23	
8/16/2016			<0.1	<0.1	<0.1	<0.1			
10/10/2016		<0.1	<0.1					8.45	
10/11/2016	17.9			<0.1	<0.1	<0.1	19.3		
12/12/2016				<0.1	<0.1	<0.1		6.93	
12/14/2016	18.4	<0.1	<0.1				14.7		
2/17/2017	14.9	<0.1		<0.1			13.1		
2/21/2017			<0.1		<0.1	<0.1		4.87	
4/17/2017	14.7	<0.1	<0.1	<0.1	<0.1	<0.1	11.3		
4/18/2017								4.49	
6/19/2017		<0.1	<0.1						
6/20/2017				<0.1	<0.1			7.36	
6/21/2017	16.4					<0.1	16.3		
8/7/2017		<0.1	<0.1	<0.1					
8/8/2017	14.7				<0.1	<0.1	13	7.05	
10/16/2017		<0.1	<0.1	<0.1				3.33	
10/17/2017	19.2				<0.1	<0.1	16		
11/28/2017	12.9 (R)						13.7 (R)	2.24 (R)	
3/5/2018		<0.1							
3/6/2018			<0.1	0.66	<0.1	<0.1		0.885	<0.1
3/7/2018	9.8						11		
6/19/2018		<0.1	<0.1					6.84	<0.1
6/20/2018	10.5						15		
6/21/2018				<0.1	<0.1	<0.1			
8/27/2018		<0.1	<0.1						<0.1
8/28/2018				<0.1				1.36	
8/29/2018	14.6				<0.1	<0.1	14		
3/18/2019			<0.1						
3/19/2019		<0.1		<0.1	<0.1	<0.1			0.299
3/20/2019	8.35						15.5	6.95	
8/6/2019			0.205						<0.1
8/7/2019	7.56	<0.1		<0.1	<0.1	<0.1	17.6	8.46	
4/7/2020	10.6	<0.1	<0.1	<0.1	<0.1	<0.1	17.4	6.76	<0.1
9/18/2020	14.5	<0.1	<0.1	<0.1	<0.1	<0.1	19.5	6.82	0.263
4/5/2021	10.3	<0.1	<0.1	<0.1	<0.1	<0.1	17.2	5.24	<0.1
9/1/2021	11.1	<0.1	<0.1	<0.1	<0.1	<0.1	17.1	5.88	<0.1
4/20/2022	6.98	<0.1	<0.1	<0.1	<0.1	<0.1	15.2	3.57	<0.1
9/14/2022	10.4	<0.1	<0.1	<0.1	<0.1	<0.1	15.1	3.69	0.322
4/10/2023									0.247
4/11/2023	5.8		<0.1				14.8	3.35	
4/12/2023		<0.1		<0.1	<0.1	<0.1			
9/18/2023		<0.1							0.207
9/19/2023	9.28		<0.1				18.1	4.42	
9/20/2023				<0.1	<0.1	<0.1			

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	<0.1
6/21/2018	
8/27/2018	<0.1
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	<0.1
3/20/2019	
8/6/2019	<0.1
8/7/2019	
4/7/2020	<0.1
9/18/2020	0.15
4/5/2021	<0.1
9/1/2021	<0.1
4/20/2022	<0.1
9/14/2022	0.204
4/10/2023	
4/11/2023	
4/12/2023	0.145
9/18/2023	0.128
9/19/2023	
9/20/2023	

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-15A	MW-08 (bg)	MW-5B	MW-4B	MW-6A	MW-21	MW-14A	MW-22 (bg)
6/6/2016	89.3	206							
6/7/2016			152	147	98.2	81.4			
6/8/2016							37.2	281	
8/15/2016	80.7	199					146	311	
8/16/2016			117	139	88.8	75.4			
10/10/2016	83.3		118				185		
10/11/2016		203		140	89.3	75.7		308	
12/12/2016				147	94.5	85.6	178		
12/14/2016	86.5	244	109						333
2/17/2017	81.2	233			86.8				268
2/21/2017			89.9	126		68.8	118		
4/17/2017	79.2	226	96.5	130	85.9	56.3		310	
4/18/2017							110		
6/19/2017	83.6		113						
6/20/2017				140	88.7		149		
6/21/2017		186				72.9		307	
8/7/2017	85.5		91.3		89.7				
8/8/2017		206		139		71.2	163	296	
10/16/2017	83.3		77		85.3		62.3		
10/17/2017		218		136		71.9		310	
11/28/2017		217 (R)						301 (R)	
3/5/2018	77.3								
3/6/2018			74.7	134	95.8	74.1	25.1		69.8
3/7/2018		229						278	
6/19/2018	88.5		115				159		91.5
6/20/2018		102						297	
6/21/2018				147	91.4	80.1			
8/27/2018	85.4		83.6						80.7
8/28/2018					91.3		78.7		
8/29/2018		155		146		73.3		309	
3/18/2019			97.6						
3/19/2019	76.3			134	99.7	73.2			91.6
3/20/2019		118					142	290	
8/6/2019			132						83.8
8/7/2019	78.9	111		139	93.8	80.9	145	255	
4/7/2020	75.4	163	92.4	117	89.6	85.1	104	245	80.9
9/18/2020	74.2	134	77.7	108	89	87.9	101	244	75.5
4/5/2021	78.8	128	81.2	104	94.1	87.6	79.5	259	78.4
9/1/2021	80	125	78.3	108	95.1	90.6	93.5	270	79.4
4/20/2022	90.4	127	69.6	117	106	96.5	97.5	289	80.2
9/14/2022	82	132	76.8	117	92.3	89	88.2	301	79.6
4/10/2023									80.4
4/11/2023		110	78.2				76	318	
4/12/2023	83.7			107	91.3	95.4			
9/18/2023	84.7								79
9/19/2023		126	79.4				96	291	
9/20/2023				115	90.4	82.1			

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	70.5
6/21/2018	
8/27/2018	63.9
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	59.7
3/20/2019	
8/6/2019	59.5
8/7/2019	
4/7/2020	61
9/18/2020	52.1
4/5/2021	56.3
9/1/2021	56.1
4/20/2022	54
9/14/2022	54.5
4/10/2023	
4/11/2023	
4/12/2023	55.3
9/18/2023	56
9/19/2023	
9/20/2023	

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-5B	MW-4B	MW-6A	MW-14A	MW-21	MW-22 (bg)
6/6/2016	17.1	6.22							
6/7/2016			19.8	67	12.6	5.97			
6/8/2016							28.7	27.7	
8/15/2016	17.2	<5					28.7	16.6	
8/16/2016			17.8	65.9	13.2	<5			
10/10/2016		<5	16.2					24.4	
10/11/2016	17.6			66	13.6	<5	37		
12/12/2016				67	13.5	9.08		19.2	
12/14/2016	19	<5	17.2				31.9		
2/17/2017	21.5	<5			15.1		33.5		
2/21/2017			15.4	70.4		9.93		14.2	
4/17/2017	47.4 (o)	<5	17.1	62.1	12.5	<5	39.4		
4/18/2017								15.6	
6/19/2017		<5	14.1						
6/20/2017				63.4	13.2			15.1	
6/21/2017	12.8					<5	29.7		
8/7/2017		<5	14		13.2				
8/8/2017	15.4			64		<5	32.9	16.1	
10/16/2017		<5	14.4		14.7			5.09	
10/17/2017	20.5			73		<5	35.4		
11/28/2017	20.7 (R)			67.8 (R)			33.2 (R)		
3/5/2018		<5							
3/6/2018			14.5	68.2	8.81	5.33		<5	30
3/7/2018	24.2						37.4		
6/19/2018		<5	14.9					10.9	27.2
6/20/2018	<5						29		
6/21/2018				65	15.3	<5			
8/27/2018		<5	15.6						29.8
8/28/2018					19.4			<5	
8/29/2018	10.1			70.8		<5	33.1		
3/18/2019			16.1						
3/19/2019		<5		55	16	<5			27.6
3/20/2019	8.54						25.8	8.3	
8/6/2019			17.1						26.9
8/7/2019	9.91	<5		64.1	15.6	<5	22.1	14	
4/7/2020	13	<5	17.2	44	14.8	12.2	22.5	8.05	24.8
9/18/2020	8.63	<5	14.7	41	15.1	15.6	22.8	7.21	23.2
4/5/2021	15	<5	22.3	42.7	22.9	19.3	27.1	5.14	28.1
9/1/2021	8.86	<5	16.3	37.6	16.7	17.4	23.2	6.58	20
4/20/2022	7.71	<5	15.8	38.1	20.8	14.2	25.5	7.19	20.2
9/14/2022	8.29	<5	16.7	39	16.8	13.3	22.4	18	7.04
4/10/2023									18.2
4/11/2023	7.3		17.9				20.3	5.93	
4/12/2023		5.86		38.7	18	15.4			
9/18/2023		<5							18.4
9/19/2023	8.41		19.9				20.9	8.23	
9/20/2023				41.8	17.4	12.2			

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	15.9
6/21/2018	
8/27/2018	14.2
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	10.5
3/20/2019	
8/6/2019	13.8
8/7/2019	
4/7/2020	15.7
9/18/2020	14.4
4/5/2021	21.4
9/1/2021	15.2
4/20/2022	16.9
9/14/2022	16.2
4/10/2023	
4/11/2023	
4/12/2023	17.7
9/18/2023	19.2
9/19/2023	
9/20/2023	

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-5B	MW-6A	MW-4B	MW-21	MW-14A	MW-22 (bg)
6/6/2016	<1	0.731							
6/7/2016			<1	<1	<1	<1			
6/8/2016							<1	<1	
8/15/2016	0.549	<1					<1	<1	
8/16/2016			<1	<1	<1	<1			
10/10/2016		<1	<1				<1		
10/11/2016	<1			<1	<1	<1		0.867	
12/12/2016				1.88	2.02	<1	<1		
12/14/2016	<1	<1	0.72					<1	
2/17/2017	<1	<1				0.664		<1	
2/21/2017			<1	2.14	1.89		0.993		
4/17/2017	6.7 (o)	0.774	1.69 (o)	0.627	0.814	0.801		1.93 (o)	
4/18/2017							0.768		
6/19/2017		<1	<1						
6/20/2017				<1		<1	<1		
6/21/2017	<1				<1			<1	
8/7/2017		<1	<1			<1			
8/8/2017	<1			<1	<1		<1	<1	
10/16/2017		<1	<1			<1	<1		
10/17/2017	<1			<1	<1			<1	
3/5/2018		<1							
3/6/2018			<1	<1	<1	<1	<1		<1
3/7/2018	<1							<1	
6/19/2018		<1	0.826				<1		<1
6/20/2018	<1							0.684	
6/21/2018				<1	<1	<1			
8/27/2018		<1	<1						<1
8/28/2018						<1	<1		
8/29/2018	<1			<1	<1			<1	
3/18/2019			<1						
3/19/2019		<1		<1	<1	0.771			<1
3/20/2019	0.523						<1	<1	
8/6/2019			0.643						0.507
8/7/2019	0.625	0.596		<1	0.535	0.525	<1	<1	
4/7/2020	<1	<1	0.864	<1	0.652	<1	<1	<1	<1
9/18/2020	<1	<1	<1	<1	<1	<1	<1	<1	<1
4/5/2021	0.516	<1	<1	<1	<1	<1	<1	<1	<1
9/1/2021	<1	<1	<1	<1	<1	<1	<1	<1	<1
4/20/2022	<1	<1	<1	<1	<1	<1	<1	<1	<1
9/14/2022	<1	<1	<1	<1	<1	<1	<1	<1	<1
4/10/2023									<1
4/11/2023	<1		<1				<1	<1	
4/12/2023		<1		<1	<1	<1			
9/18/2023		<1							<1
9/19/2023	<1		<1				<1	<1	
9/20/2023				<1	<1	<1			

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	<1
6/21/2018	
8/27/2018	<1
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	<1
3/20/2019	
8/6/2019	<1
8/7/2019	
4/7/2020	<1
9/18/2020	<1
4/5/2021	<1
9/1/2021	<1
4/20/2022	<1
9/14/2022	<1
4/10/2023	
4/11/2023	
4/12/2023	<1
9/18/2023	<1
9/19/2023	
9/20/2023	

Prediction Limit

Constituent: pH (SU) Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-15A	MW-08 (bg)	MW-5B	MW-4B	MW-6A	MW-21	MW-14A	MW-22 (bg)
6/6/2016	7.4	7.3							
6/7/2016			7.2	7.7	7.6	7.4			
6/8/2016							6.7	7.1	
8/15/2016	7.3	7.3					6.7	7.2	
8/16/2016			7.3	7.3	7.5	7.4			
10/10/2016	7.2		7.1				6.7		
10/11/2016		7.2		7.2	7.5	7.3		7.1	
12/12/2016				7.3	7.6	7.5	7		
12/14/2016	7.3	7.4	7.3					7.2	
2/17/2017	7.2	7.3			7.5			7.3	
2/21/2017			7.3	7.2		7.4	7		
4/17/2017	7.3	7.3	7.1	7.2	7.4	7.3		7.3	
4/18/2017							6.9		
6/19/2017	7.2		7.1						
6/20/2017				7.2	7.4		6.7		
6/21/2017		7.3				7.3		7.3	
8/7/2017	7.9		7.3		7.9				
8/8/2017		7.2		7.2		7.3	6.8	7.2	
10/16/2017	7.3		7.4		7.8		6.8		
10/17/2017		7.2		7.3		7.8		7.6	
11/28/2017							6.9 (R)		
3/5/2018	7.04								
3/6/2018			7.3	7.23	7.36	7.4	6.76		7.36
3/7/2018		7.24						7.35	
6/19/2018	7.72		7.56				7.25		7.9
6/20/2018		7.5						7.26	
6/21/2018				7.3	7.53	7.58			
8/27/2018	7.23		7.2						7.42
8/28/2018					7.44		7.07		
8/29/2018		7.25		7.14		7.18		7.09	
3/19/2019	7.1		7.08	7.05	7.26	7.15			7.21
3/20/2019		7.76					6.41	6.97	
8/6/2019			6.64						7.12
8/7/2019	7.07	7.11		7.02	7.22	7.12	6.33	7.09	
4/7/2020	7.26	7.54	7.21	7.24	7.46	7.3	6.55	7.32	7.32
9/18/2020	7.33	7.28	7.4	7.33	7.93	7.24	6.8	7.21	7.53
4/5/2021	7.57	7.92	7.63	7.31	7.94	7.59	6.92	7.64	7.7
9/1/2021	7.59	7.46	7.45	7.22	7.75	7.61	7.06	7.48	7.97
4/20/2022	7.35	6.83	7.35	7.37	7.04	7.35	6.69	7.13	7.23
9/14/2022	7.48	7.4	7.43	7.37	7.52	7.38	7.09	7.21	7.58
4/10/2023									7.14
4/11/2023		7.24	7.24				7.24	6.97	
4/12/2023	6.96			6.96	7.23	7.08			
9/18/2023	6.86								7.14
9/19/2023		6.97	6.81				6.55	6.78	
9/20/2023				6.42	7.03	6.88			

Prediction Limit

Constituent: pH (SU) Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	7.69
6/21/2018	
8/27/2018	7.55
8/28/2018	
8/29/2018	
3/19/2019	7.24
3/20/2019	
8/6/2019	6.75
8/7/2019	
4/7/2020	7.33
9/18/2020	7.53
4/5/2021	7.61
9/1/2021	7.89
4/20/2022	7.39
9/14/2022	7.3
4/10/2023	
4/11/2023	
4/12/2023	7.24
9/18/2023	7.05
9/19/2023	
9/20/2023	

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-15A	MW-08 (bg)	MW-5B	MW-4B	MW-6A	MW-21	MW-14A	MW-22 (bg)
6/6/2016	42.1	827							
6/7/2016			366	109	32.2	<5			
6/8/2016							713	1050	
8/15/2016	33.8	605					520	1040	
8/16/2016			187	109	28.4	<5			
10/10/2016	36.4		187				603		
10/11/2016		607		105	27.2	<5		1010	
12/12/2016				109	32.7	<5	645		
12/14/2016	38.4	732	149					1140	
2/17/2017	47.3	849			36			1190	
2/21/2017			145	111		5.94	415		
4/17/2017	38.3	853	145	108	39.5	<5		1200	
4/18/2017							461		
6/19/2017	35.4		190						
6/20/2017				108	33		541		
6/21/2017		537				<5		1020	
8/7/2017	39		119		35.3				
8/8/2017		664		114		<5	590	1110	
10/16/2017	46.9		106		45.4		206		
10/17/2017		835		135		<5		1210	
11/28/2017		779 (R)						1140 (R)	
3/5/2018	51.4								
3/6/2018			87.3	122	162	<5	53.7		123
3/7/2018		824						1110	
6/19/2018	37.3		136				489		134
6/20/2018		210						1090	
6/21/2018				119	51.3	<5			
8/27/2018	34.3		94.7						125
8/28/2018					52.2		96.6		
8/29/2018		400		120		<5		1070	
3/18/2019			223						
3/19/2019	42.8			85	48	<5			134
3/20/2019		351					442	1050	
8/6/2019			276						139
8/7/2019	28.8	327		112	47	<5	529	837	
4/7/2020	18.6	496	123	58.9	41.5	13.6	373	888	143
9/18/2020	36.5	403	100	61.9	46.9	19.1	356	924	151
4/5/2021	27.6	338	99.7	57.4	60.1	27.3	237	952	154
9/1/2021	32.3	333	82.7	53.7	50.2	22.7	303	1010	154
4/20/2022	48.3	297	72.8	44.7	58.4	18.9	293	1030	158
9/14/2022	31.2	319	67.1	49.9	49.5	16.4	151	978	220
4/10/2023									147
4/11/2023		254	72.2				215	1150	
4/12/2023	39.8			45.8	54	20.5			
9/18/2023	57.4								208
9/19/2023		365	94.2				303	1440	
9/20/2023				53.4	53.1	10.1			

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	38.4
6/21/2018	
8/27/2018	31.7
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	26.2
3/20/2019	
8/6/2019	29.7
8/7/2019	
4/7/2020	25.5
9/18/2020	25.8
4/5/2021	35.5
9/1/2021	25.8
4/20/2022	25.4
9/14/2022	23
4/10/2023	
4/11/2023	
4/12/2023	25
9/18/2023	28.6
9/19/2023	
9/20/2023	

Prediction Limit

Constituent: Total Dissolved Solids (mg/L) Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-15A	MW-5B	MW-6A	MW-4B	MW-08 (bg)	MW-14A	MW-21	MW-22 (bg)
6/6/2016	468	1620							
6/7/2016			920	440	507	836			
6/8/2016							2000	1440	
8/15/2016	412	1270					1980	1110	
8/16/2016			672	340	426	664			
10/10/2016	444					708		1420	
10/11/2016		1500	646	370	450		2500		
12/12/2016			636	368	450			1240	
12/14/2016	428	1600				634	2080		
2/17/2017	498	1470			460		1010		
2/21/2017			684	336		578		1010	
4/17/2017	538	1780	680	402	442	624	2260		
4/18/2017								1060	
6/19/2017	524					656			
6/20/2017			656		452			1140	
6/21/2017		1280		486			2250		
8/7/2017	458				420	488			
8/8/2017		1390	734	364			2170	1220	
10/16/2017	414				466	470		514	
10/17/2017		1520	688	424			2080		
11/28/2017		1670 (R)					2650 (R)		
3/5/2018	314								
3/6/2018			620	292	586	376		200	424
3/7/2018		1270					1820		
6/19/2018	396					502		952	434
6/20/2018		676					1800		
6/21/2018			828	368	440				
8/27/2018	392					414			420
8/28/2018					420			416	
8/29/2018		948	622	298			1900		
3/18/2019						612			
3/19/2019	326		562	320	398				456
3/20/2019		724					1690	872	
8/6/2019						702			428
8/7/2019	320	786	596	308	422		1510	960	
4/7/2020	316	942	494	336	366	418	1510	698	422
9/18/2020	344	920	436	374	360	350	1620	738	398
4/5/2021	322	738	434	330	380	382	1290	540	412
9/1/2021	314	736	448	350	370	342	1560	636	420
4/20/2022	344	682	428	336	370	322	1530	558	388
9/14/2022	340	796	484	334	358	350	1710	524	390
4/10/2023									450
4/11/2023		646				2390 (o)	2140	646	
4/12/2023	410		478	428	396				
9/18/2023	318								404
9/19/2023		720				260	1800	626	
9/20/2023			476	332	364				

Prediction Limit

Constituent: Total Dissolved Solids (mg/L) Analysis Run 11/9/2023 7:50 AM View: Federal Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	384
6/21/2018	
8/27/2018	340
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	296
3/20/2019	
8/6/2019	336
8/7/2019	
4/7/2020	298
9/18/2020	250
4/5/2021	274
9/1/2021	256
4/20/2022	218
9/14/2022	278
4/10/2023	
4/11/2023	
4/12/2023	286
9/18/2023	282
9/19/2023	
9/20/2023	

FIGURE F.

Trend Tests - Prediction Limit Exceedances - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 7:53 AM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Alpha</u>	<u>Method</u>
Boron (mg/L)	MW-15A	-1.547	-162	-98	Yes	23	0	n/a	0.01	NP
Calcium (mg/L)	MW-08 (bg)	-5.597	-111	-92	Yes	22	0	n/a	0.01	NP
Chloride (mg/L)	MW-22 (bg)	-2.316	-56	-43	Yes	13	0	n/a	0.01	NP
Chloride (mg/L)	MW-5B	-4.554	-128	-98	Yes	23	0	n/a	0.01	NP
Sulfate (mg/L)	MW-08 (bg)	-15.06	-137	-92	Yes	22	0	n/a	0.01	NP
Sulfate (mg/L)	MW-22 (bg)	9.305	62	43	Yes	13	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-08 (bg)	-60.24	-145	-87	Yes	21	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-10 (bg)	-21.76	-113	-92	Yes	22	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-15A	-146.9	-154	-98	Yes	23	0	n/a	0.01	NP

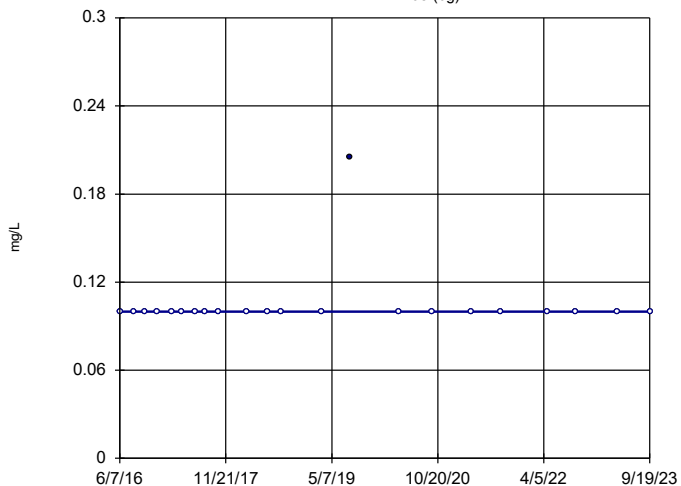
Trend Tests - Prediction Limit Exceedances - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 7:53 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Alpha	Method
Boron (mg/L)	MW-08 (bg)	0	5	92	No	22	95.45	n/a	0.01	NP
Boron (mg/L)	MW-10 (bg)	0	0	92	No	22	100	n/a	0.01	NP
Boron (mg/L)	MW-14A	0.2483	31	98	No	23	0	n/a	0.01	NP
Boron (mg/L)	MW-15A	-1.547	-162	-98	Yes	23	0	n/a	0.01	NP
Boron (mg/L)	MW-21	-0.2223	-49	-98	No	23	4.348	n/a	0.01	NP
Boron (mg/L)	MW-22 (bg)	0	18	43	No	13	61.54	n/a	0.01	NP
Boron (mg/L)	MW-23 (bg)	0	22	38	No	12	66.67	n/a	0.01	NP
Calcium (mg/L)	MW-08 (bg)	-5.597	-111	-92	Yes	22	0	n/a	0.01	NP
Calcium (mg/L)	MW-10 (bg)	-0.3168	-26	-92	No	22	0	n/a	0.01	NP
Calcium (mg/L)	MW-14A	-3.438	-63	-98	No	23	0	n/a	0.01	NP
Calcium (mg/L)	MW-22 (bg)	-0.3874	-14	-43	No	13	0	n/a	0.01	NP
Calcium (mg/L)	MW-23 (bg)	-1.728	-38	-38	No	12	0	n/a	0.01	NP
Chloride (mg/L)	MW-08 (bg)	0.2173	37	92	No	22	0	n/a	0.01	NP
Chloride (mg/L)	MW-10 (bg)	0	-3	-92	No	22	90.91	n/a	0.01	NP
Chloride (mg/L)	MW-22 (bg)	-2.316	-56	-43	Yes	13	0	n/a	0.01	NP
Chloride (mg/L)	MW-23 (bg)	0.872	34	38	No	12	0	n/a	0.01	NP
Chloride (mg/L)	MW-5B	-4.554	-128	-98	Yes	23	0	n/a	0.01	NP
pH (SU)	MW-08 (bg)	0.009687	30	92	No	22	0	n/a	0.01	NP
pH (SU)	MW-10 (bg)	-0.01207	-14	-92	No	22	0	n/a	0.01	NP
pH (SU)	MW-14A	-0.003544	-13	-92	No	22	0	n/a	0.01	NP
pH (SU)	MW-21	0.01563	23	98	No	23	0	n/a	0.01	NP
pH (SU)	MW-22 (bg)	-0.03561	-9	-43	No	13	0	n/a	0.01	NP
pH (SU)	MW-23 (bg)	-0.06906	-17	-38	No	12	0	n/a	0.01	NP
pH (SU)	MW-5B	-0.01585	-22	-92	No	22	0	n/a	0.01	NP
Sulfate (mg/L)	MW-08 (bg)	-15.06	-137	-92	Yes	22	0	n/a	0.01	NP
Sulfate (mg/L)	MW-10 (bg)	-0.5256	-13	-92	No	22	0	n/a	0.01	NP
Sulfate (mg/L)	MW-14A	-16.29	-37	-98	No	23	0	n/a	0.01	NP
Sulfate (mg/L)	MW-22 (bg)	9.305	62	43	Yes	13	0	n/a	0.01	NP
Sulfate (mg/L)	MW-23 (bg)	-1.032	-33	-38	No	12	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-08 (bg)	-60.24	-145	-87	Yes	21	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-10 (bg)	-21.76	-113	-92	Yes	22	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-14A	-90.12	-88	-98	No	23	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-15A	-146.9	-154	-98	Yes	23	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-22 (bg)	-5.507	-29	-43	No	13	0	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-23 (bg)	-17.46	-30	-38	No	12	0	n/a	0.01	NP

Sen's Slope Estimator

MW-08 (bg)

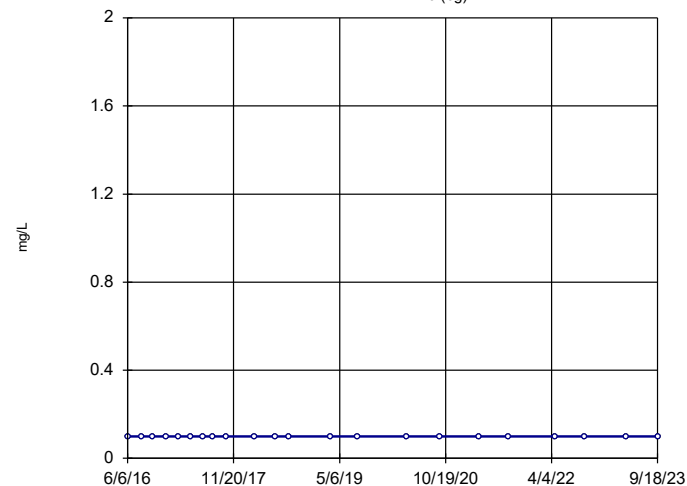


n = 22
Slope = 0
units per year.
Mann-Kendall
statistic = 5
critical = 92
Trend not sig-
nificant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: Boron Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-10 (bg)

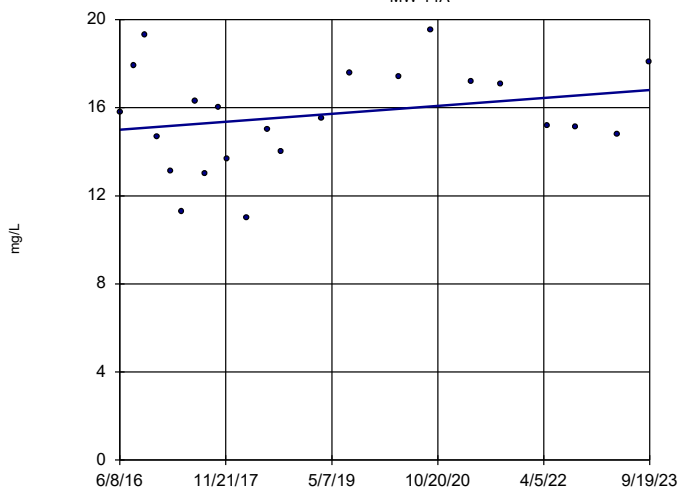


n = 22
Slope = 0
units per year.
Mann-Kendall
statistic = 0
critical = 92
Trend not sig-
nificant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: Boron Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-14A

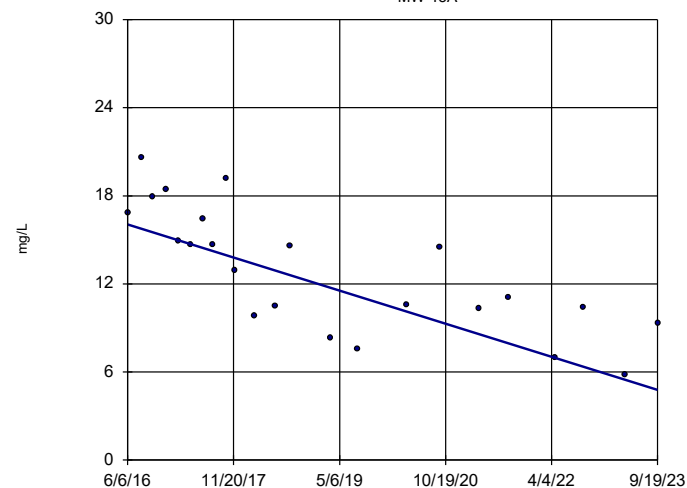


n = 23
Slope = 0.2483
units per year.
Mann-Kendall
statistic = 31
critical = 98
Trend not sig-
nificant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: Boron Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-15A

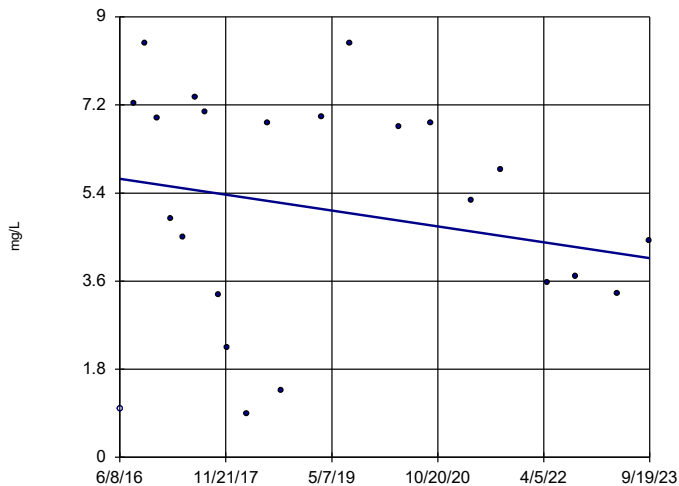


n = 23
Slope = -1.547
units per year.
Mann-Kendall
statistic = -162
critical = -98
Decreasing trend
significant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: Boron Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-21

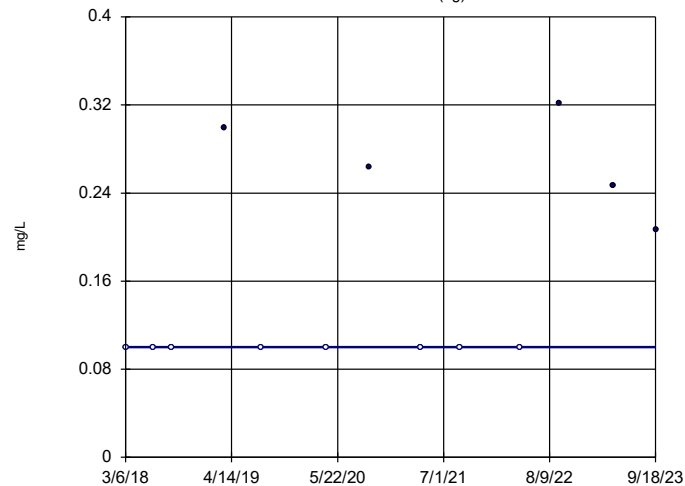


n = 23
Slope = -0.2223
units per year.
Mann-Kendall
statistic = -49
critical = -98
Trend not sig-
nificant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: Boron Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-22 (bg)

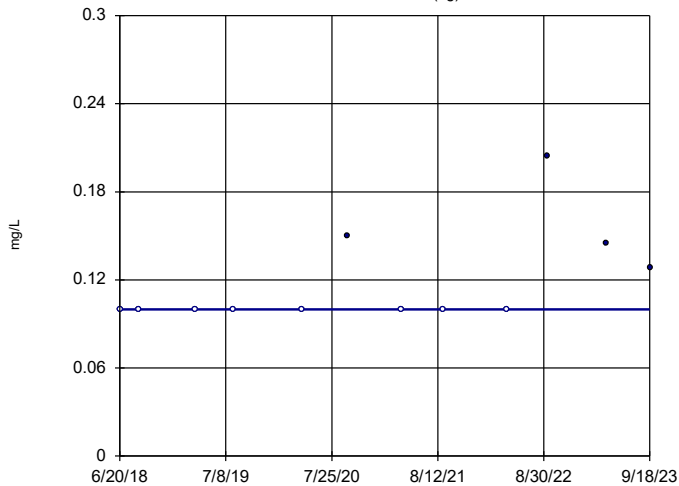


n = 13
Slope = 0
units per year.
Mann-Kendall
statistic = 18
critical = 43
Trend not sig-
nificant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: Boron Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-23 (bg)

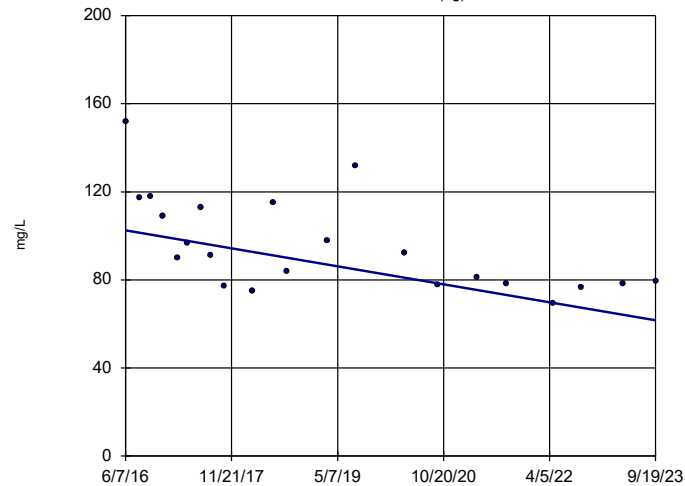


n = 12
Slope = 0
units per year.
Mann-Kendall
statistic = 22
critical = 38
Trend not sig-
nificant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: Boron Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-08 (bg)

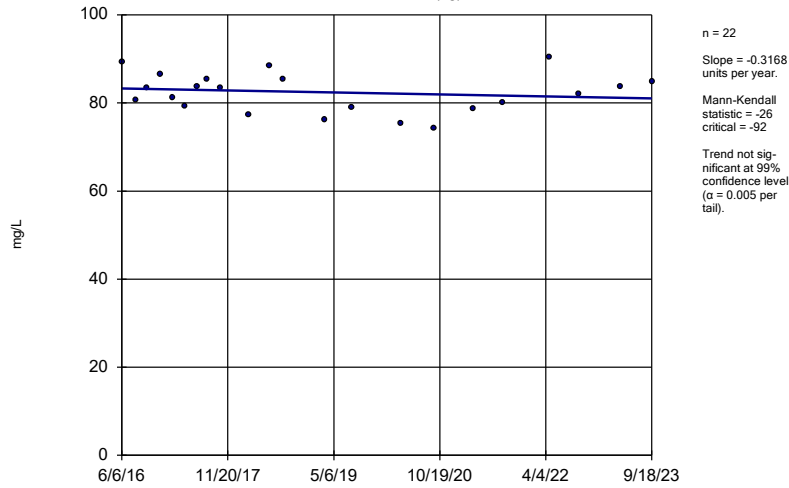


n = 22
Slope = -5.597
units per year.
Mann-Kendall
statistic = -111
critical = -92
Decreasing trend
significant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: Calcium Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

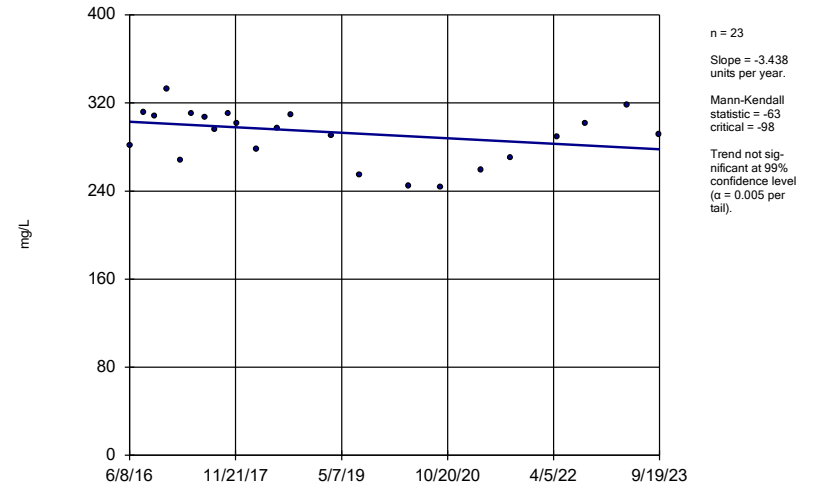
MW-10 (bg)



Constituent: Calcium Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

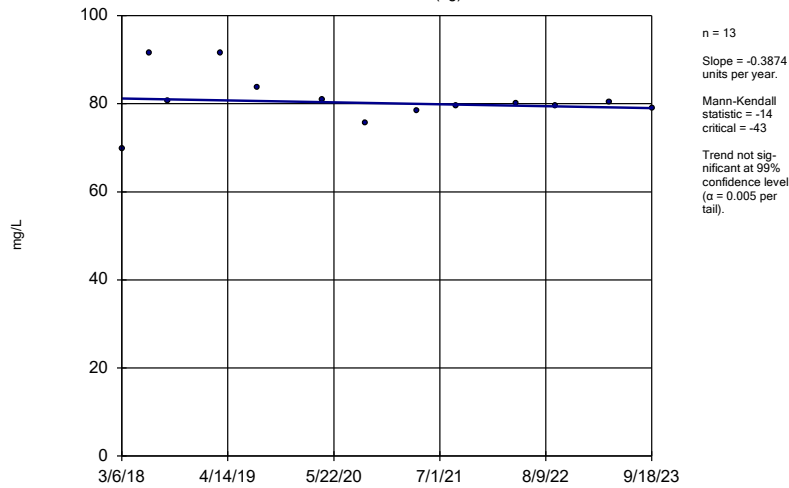
MW-14A



Constituent: Calcium Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

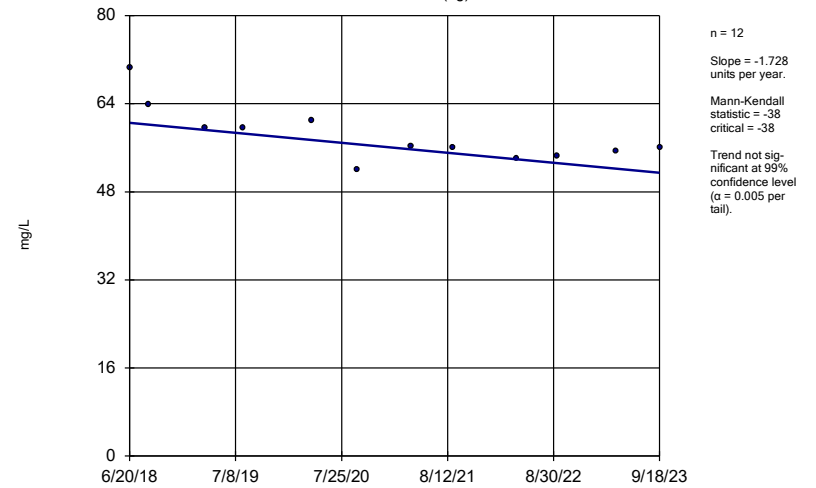
MW-22 (bg)



Constituent: Calcium Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

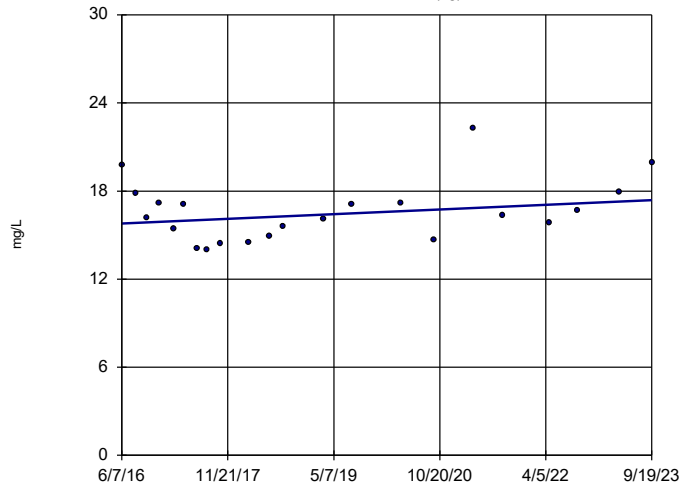
MW-23 (bg)



Constituent: Calcium Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

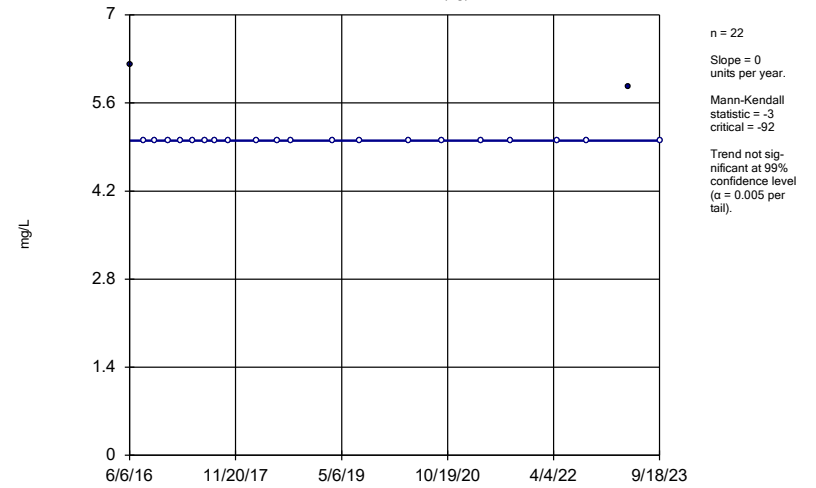
MW-08 (bg)



Constituent: Chloride Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

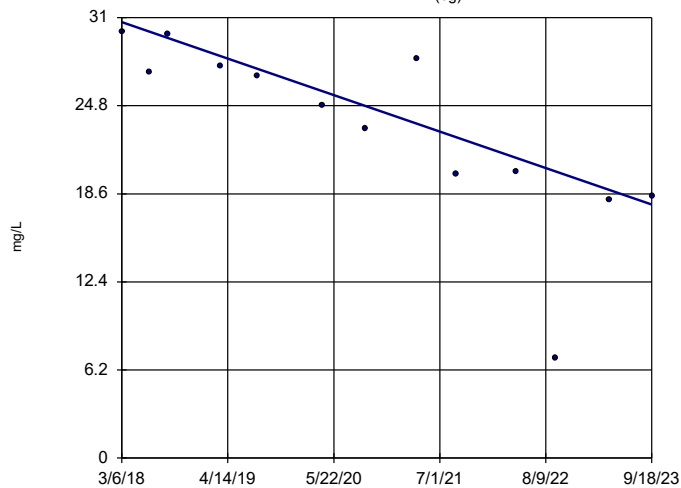
MW-10 (bg)



Constituent: Chloride Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

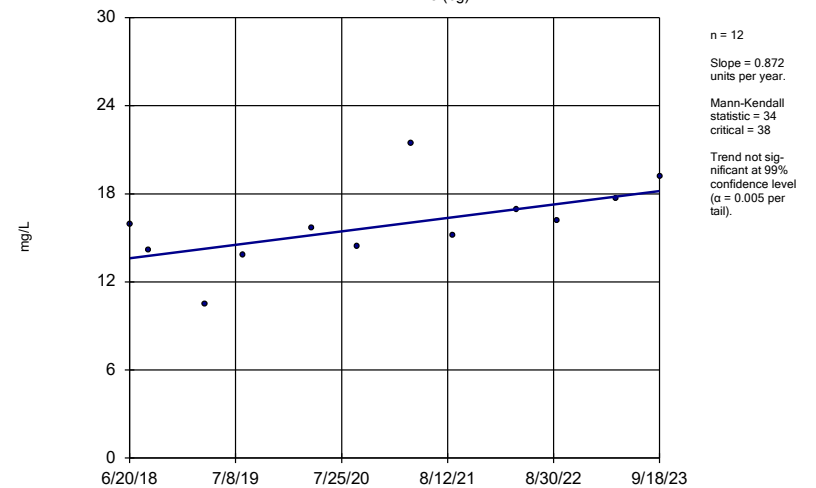
MW-22 (bg)



Constituent: Chloride Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

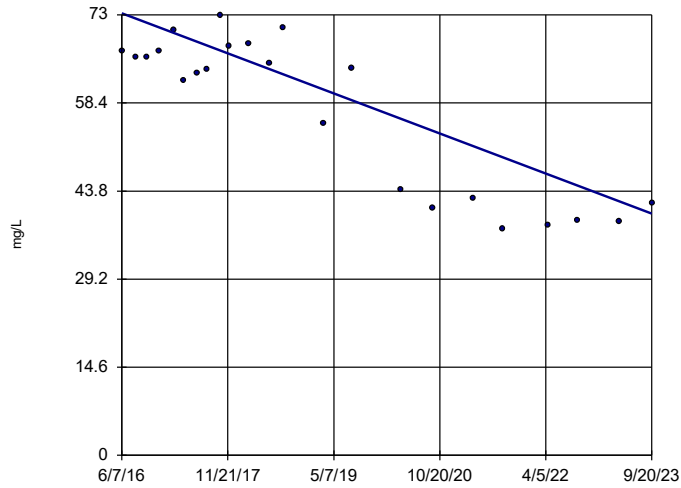
MW-23 (bg)



Constituent: Chloride Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-5B

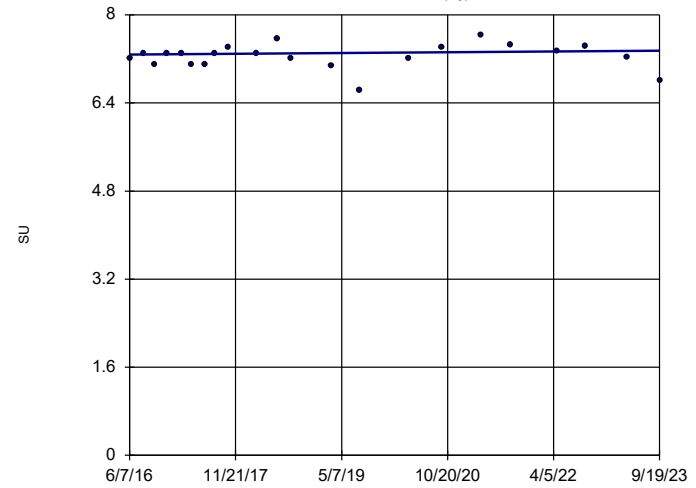


n = 23
 Slope = -4.554
 units per year.
 Mann-Kendall
 statistic = -128
 critical = -98
 Decreasing trend
 significant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Chloride Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-08 (bg)

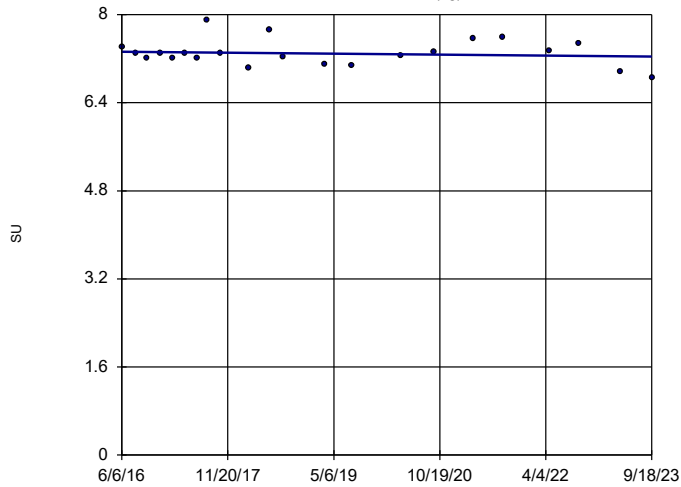


n = 22
 Slope = 0.009687
 units per year.
 Mann-Kendall
 statistic = 30
 critical = 92
 Trend not sig-
 nificant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: pH Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-10 (bg)

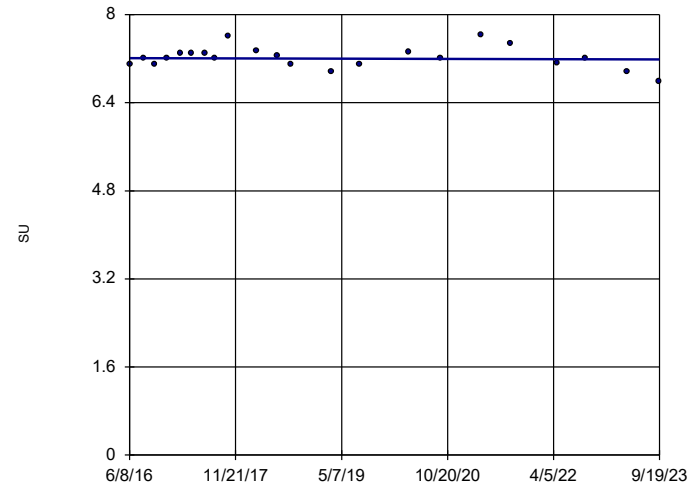


n = 22
 Slope = -0.01207
 units per year.
 Mann-Kendall
 statistic = -14
 critical = -92
 Trend not sig-
 nificant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: pH Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-14A

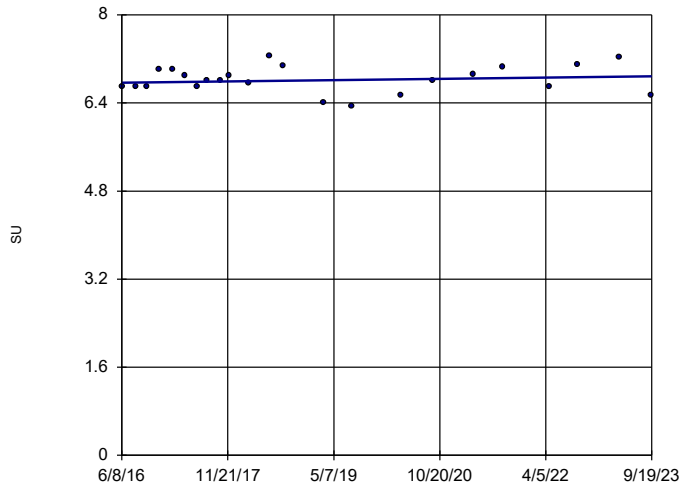


n = 22
 Slope = -0.003544
 units per year.
 Mann-Kendall
 statistic = -13
 critical = -92
 Trend not sig-
 nificant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: pH Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

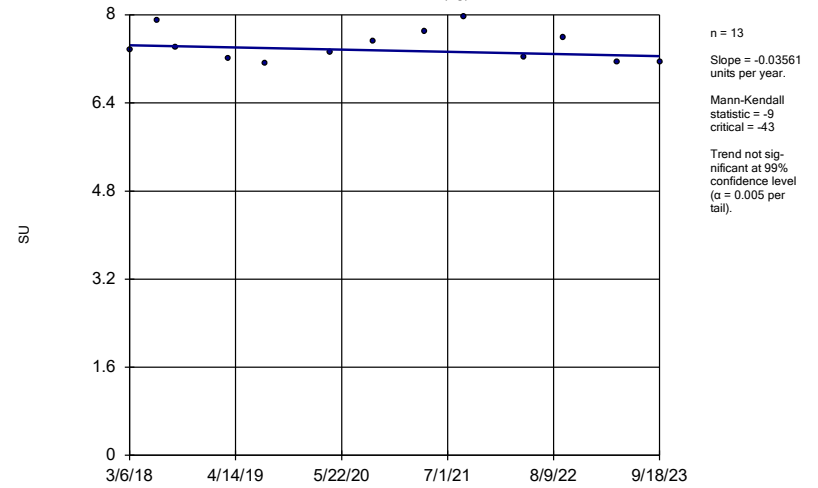
MW-21



Constituent: pH Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

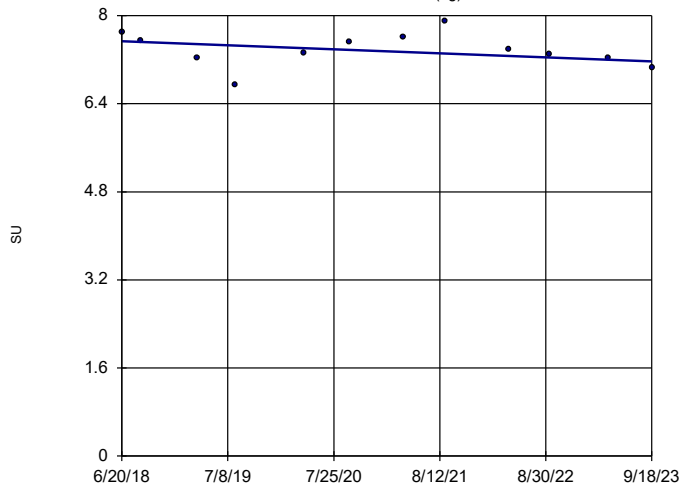
MW-22 (bg)



Constituent: pH Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

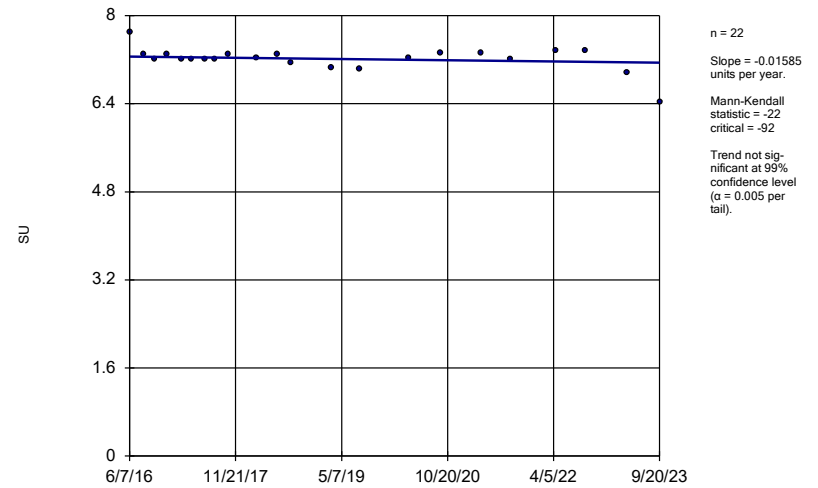
MW-23 (bg)



Constituent: pH Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

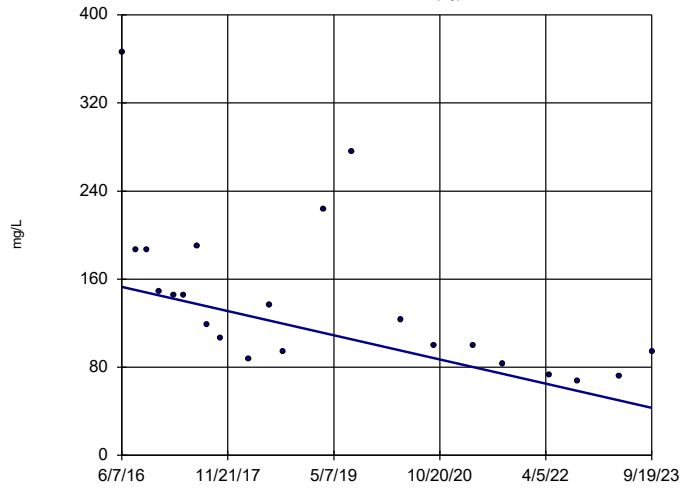
MW-5B



Constituent: pH Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-08 (bg)

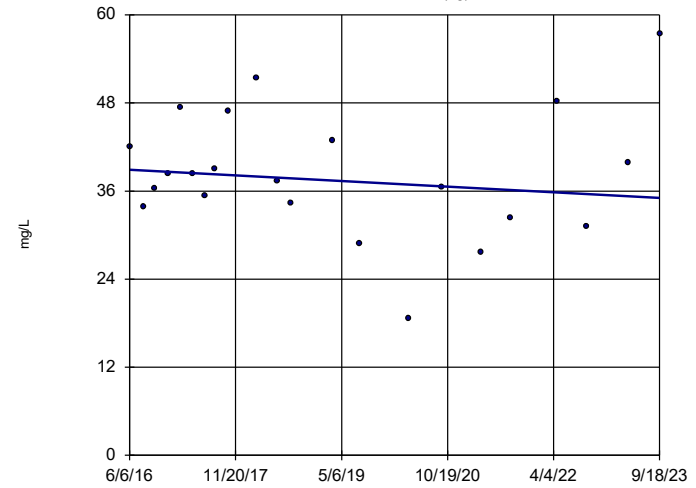


n = 22
 Slope = -15.06 units per year.
 Mann-Kendall statistic = -137
 critical = -92
 Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-10 (bg)

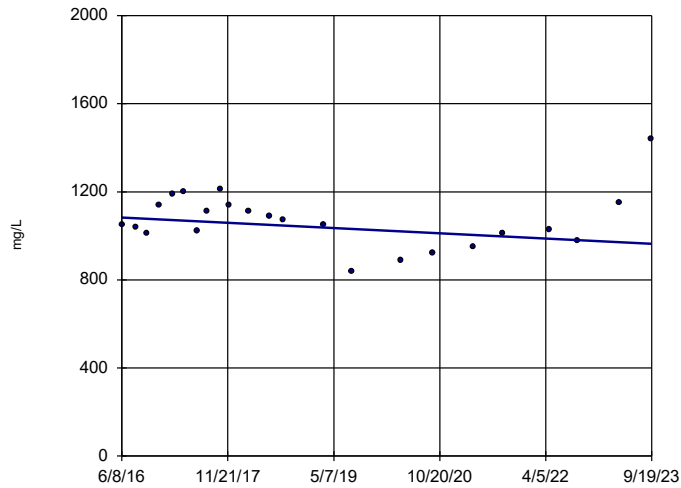


n = 22
 Slope = -0.5256 units per year.
 Mann-Kendall statistic = -13
 critical = -92
 Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-14A

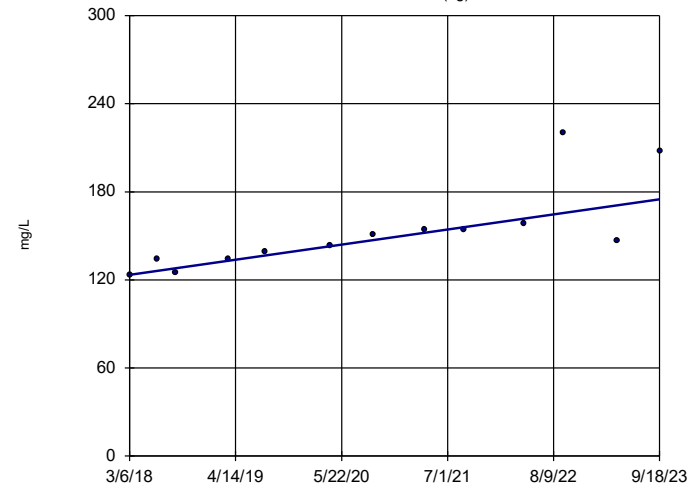


n = 23
 Slope = -16.29 units per year.
 Mann-Kendall statistic = -37
 critical = -98
 Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-22 (bg)

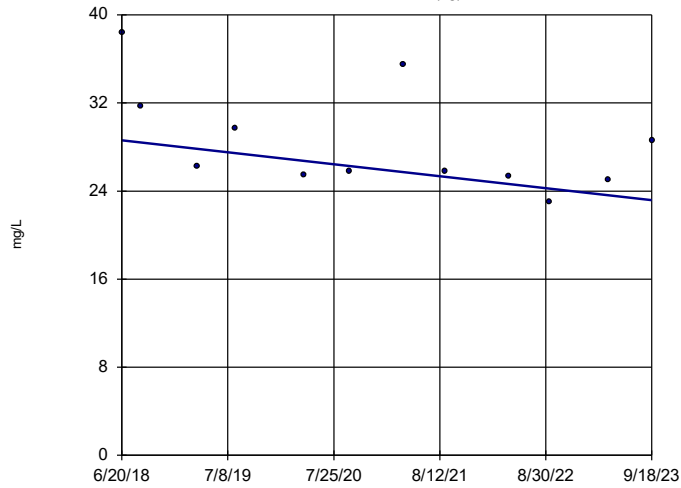


n = 13
 Slope = 9.305 units per year.
 Mann-Kendall statistic = 62
 critical = 43
 Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-23 (bg)

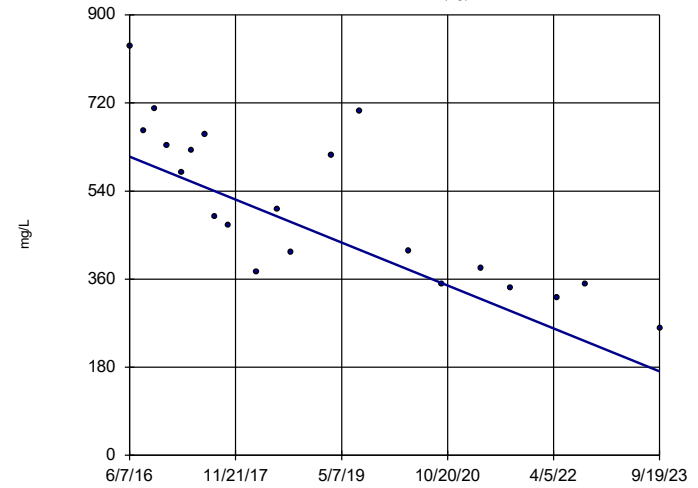


n = 12
 Slope = -1.032
 units per year.
 Mann-Kendall
 statistic = -33
 critical = -38
 Trend not sig-
 nificant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Sulfate Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-08 (bg)

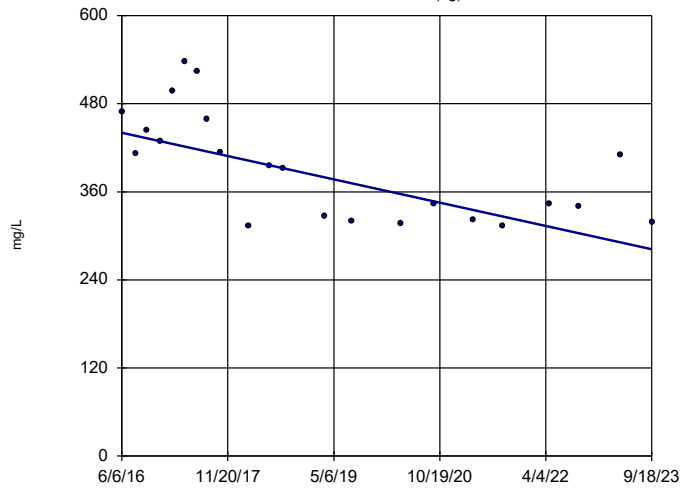


n = 21
 Slope = -60.24
 units per year.
 Mann-Kendall
 statistic = -145
 critical = -87
 Decreasing trend
 significant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Total Dissolved Solids Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-10 (bg)

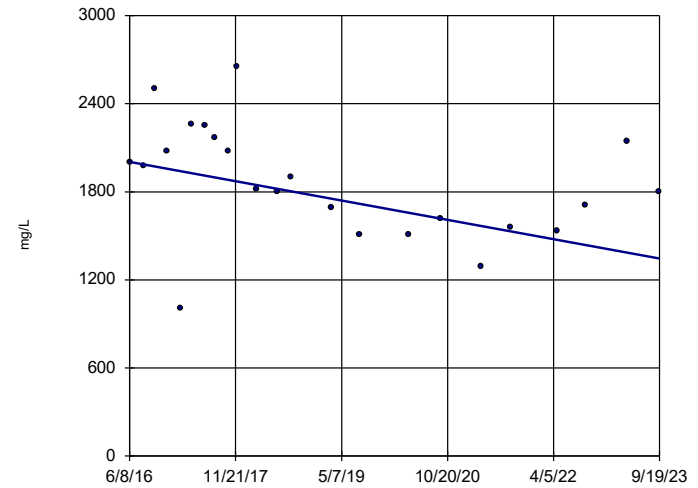


n = 22
 Slope = -21.76
 units per year.
 Mann-Kendall
 statistic = -113
 critical = -92
 Decreasing trend
 significant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Total Dissolved Solids Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-14A

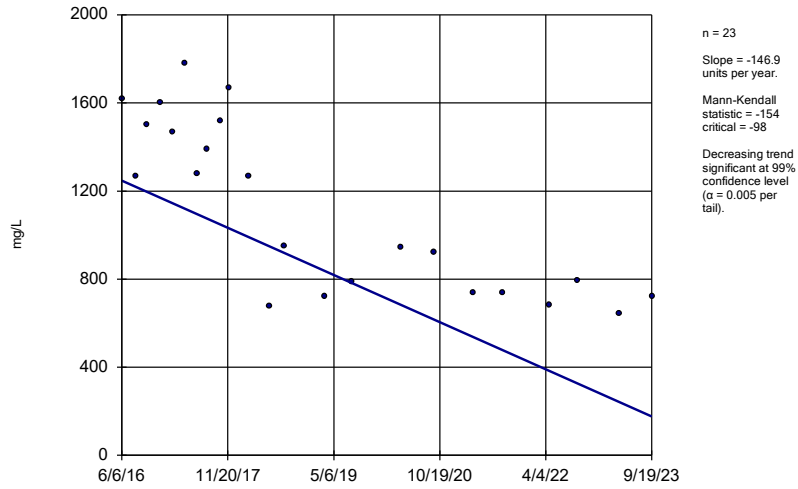


n = 23
 Slope = -90.12
 units per year.
 Mann-Kendall
 statistic = -88
 critical = -98
 Trend not sig-
 nificant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Total Dissolved Solids Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

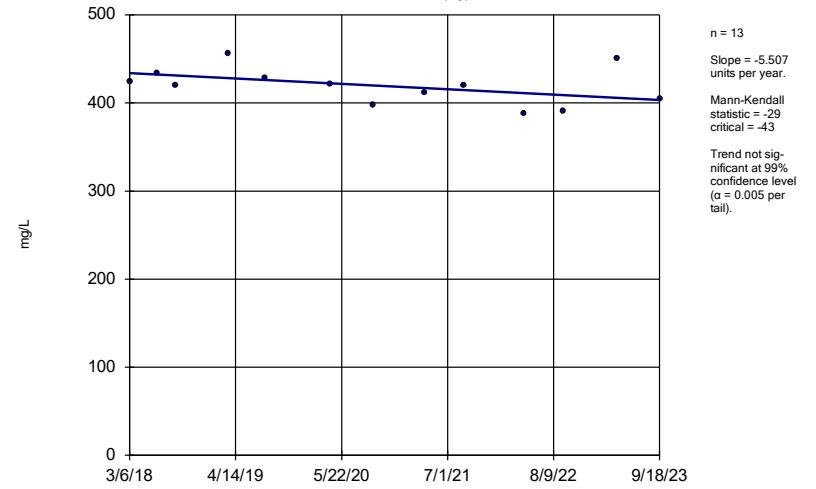
MW-15A



Constituent: Total Dissolved Solids Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

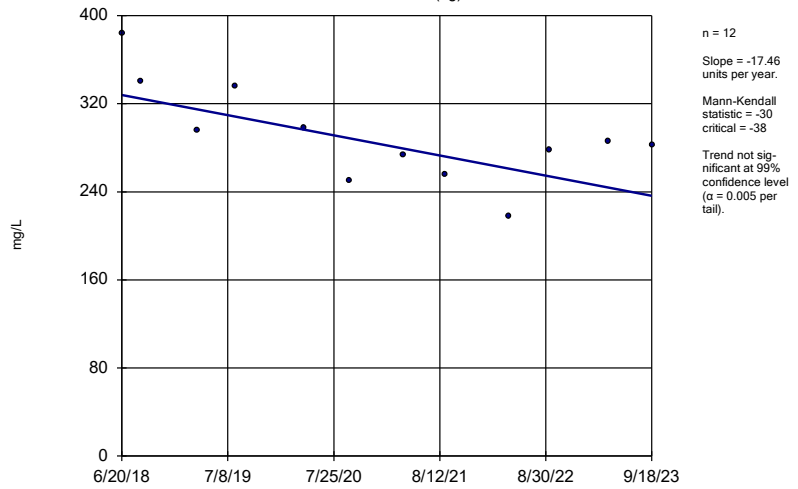
MW-22 (bg)



Constituent: Total Dissolved Solids Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sen's Slope Estimator

MW-23 (bg)



Constituent: Total Dissolved Solids Analysis Run 11/9/2023 7:52 AM View: Federal Trend Tests
 Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

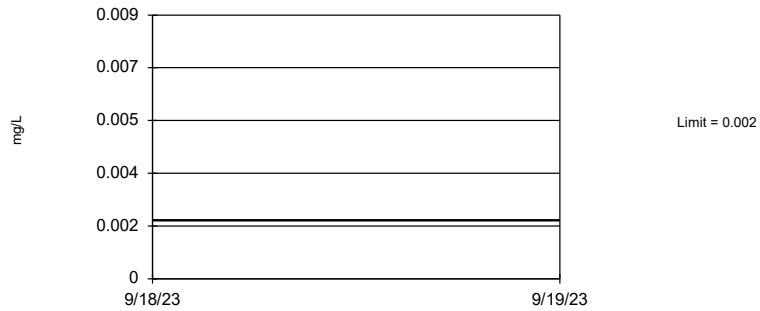
FIGURE G.

Upper Tolerance Limits Summary Table

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/8/2023, 8:12 PM

<u>Constituent</u>	<u>Upper Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</u>	<u>Bg N</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Antimony (mg/L)	0.002	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)
Arsenic (mg/L)	0.00784	n/a	n/a	n/a	67	n/a	n/a	58.21	n/a	n/a	0.03217	NP Inter(NDs)
Barium (mg/L)	0.256	n/a	n/a	n/a	67	n/a	n/a	0	n/a	n/a	0.03217	NP Inter(normality)
Beryllium (mg/L)	0.001	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)
Cadmium (mg/L)	0.0002	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)
Chromium (mg/L)	0.005	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)
Cobalt (mg/L)	0.00558	n/a	n/a	n/a	68	n/a	n/a	38.24	n/a	n/a	0.03056	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	1.289	n/a	n/a	n/a	53	0.5306	0.3703	0	None	No	0.05	Inter
Fluoride (mg/L)	1	n/a	n/a	n/a	68	n/a	n/a	88.24	n/a	n/a	0.03056	NP Inter(NDs)
Lead (mg/L)	0.00204	n/a	n/a	n/a	67	n/a	n/a	89.55	n/a	n/a	0.03217	NP Inter(NDs)
Lithium (mg/L)	0.01	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)
Mercury (mg/L)	0.0002	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)
Molybdenum (mg/L)	0.00822	n/a	n/a	n/a	69	n/a	n/a	66.67	n/a	n/a	0.02904	NP Inter(NDs)
Selenium (mg/L)	0.005	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)
Thallium (mg/L)	0.001	n/a	n/a	n/a	67	n/a	n/a	100	n/a	n/a	0.03217	NP Inter(NDs)

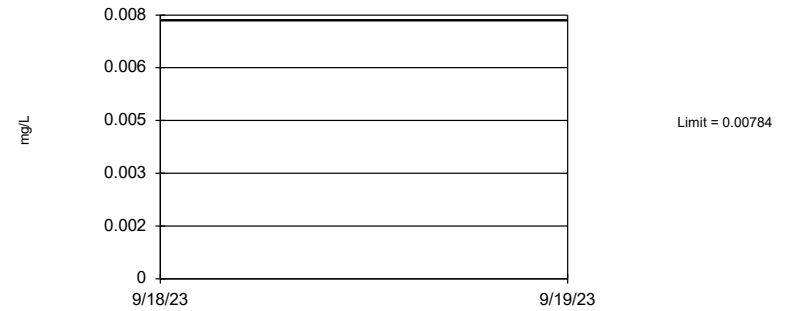
Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. All background values were censored; limit is most recent reporting limit. 93.16% coverage at alpha=0.01; 95.51% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.03217.

Constituent: Antimony Analysis Run 11/8/2023 8:11 PM View: Federal Tolerance Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 67 background values. 58.21% NDs. 93.16% coverage at alpha=0.01; 95.51% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.03217.

Constituent: Arsenic Analysis Run 11/8/2023 8:11 PM View: Federal Tolerance Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

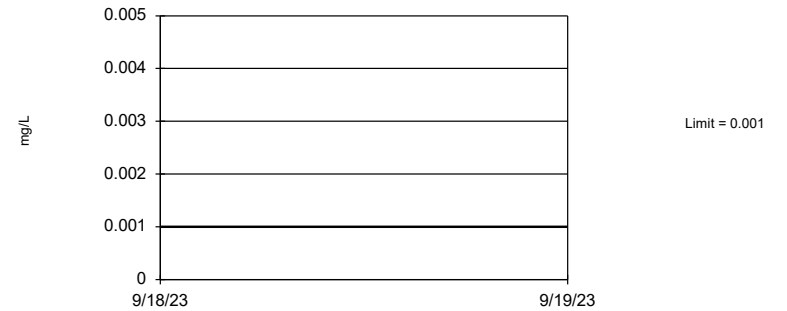
Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 67 background values. 93.16% coverage at alpha=0.01; 95.51% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.03217.

Constituent: Barium Analysis Run 11/8/2023 8:11 PM View: Federal Tolerance Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

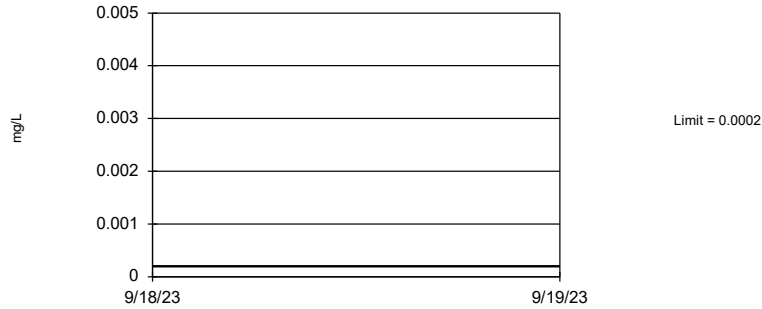
Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. All background values were censored; limit is most recent reporting limit. 93.16% coverage at alpha=0.01; 95.51% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.03217.

Constituent: Beryllium Analysis Run 11/8/2023 8:11 PM View: Federal Tolerance Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. All background values were censored; limit is most recent reporting limit. 93.16% coverage at alpha=0.01; 95.51% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.03217.

Constituent: Cadmium Analysis Run 11/8/2023 8:11 PM View: Federal Tolerance Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

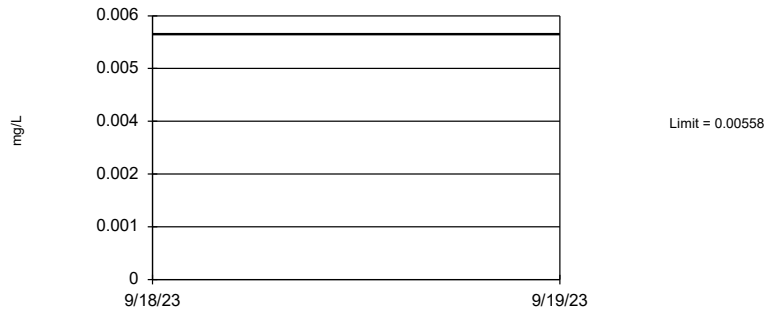
Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. All background values were censored; limit is most recent reporting limit. 93.16% coverage at alpha=0.01; 95.51% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.03217.

Constituent: Chromium Analysis Run 11/8/2023 8:11 PM View: Federal Tolerance Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

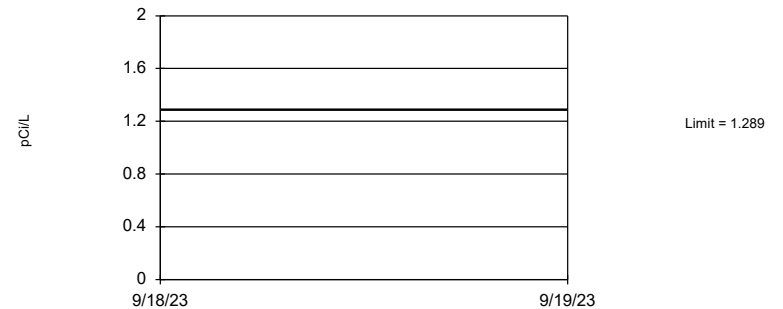
Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 68 background values. 38.24% NDs. 93.55% coverage at alpha=0.01; 95.51% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.03056.

Constituent: Cobalt Analysis Run 11/8/2023 8:11 PM View: Federal Tolerance Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Tolerance Limit Interwell Parametric



95% coverage. Background Data Summary: Mean=0.5306, Std. Dev.=0.3703, n=53. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9433, critical = 0.938. Report alpha = 0.05.

Constituent: Combined Radium 226 + 228 Analysis Run 11/8/2023 8:11 PM View: Federal Tolerance Limit
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

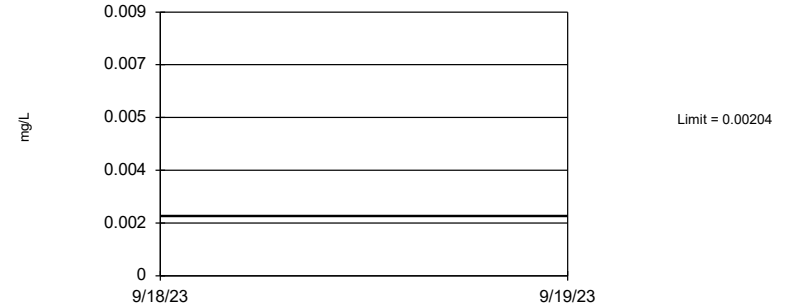
Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 68 background values. 88.24% NDs. 93.55% coverage at alpha=0.01; 95.51% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.03056.

Constituent: Fluoride Analysis Run 11/8/2023 8:11 PM View: Federal Tolerance Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 67 background values. 89.55% NDs. 93.16% coverage at alpha=0.01; 95.51% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.03217.

Constituent: Lead Analysis Run 11/8/2023 8:11 PM View: Federal Tolerance Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

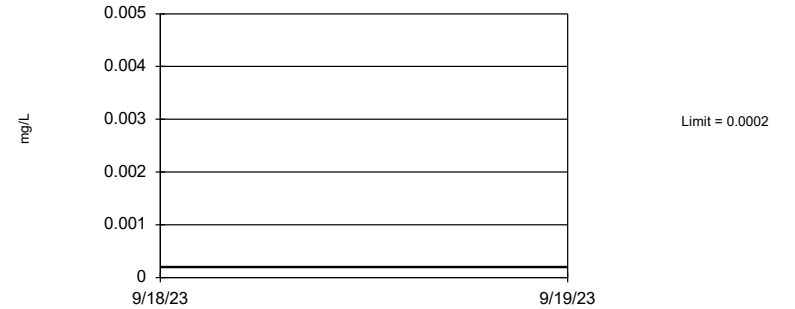
Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. All background values were censored; limit is most recent reporting limit. 93.16% coverage at alpha=0.01; 95.51% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.03217.

Constituent: Lithium Analysis Run 11/8/2023 8:11 PM View: Federal Tolerance Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

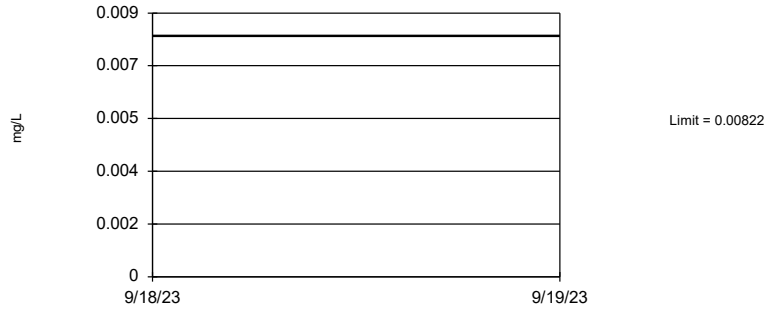
Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. All background values were censored; limit is most recent reporting limit. 93.16% coverage at alpha=0.01; 95.51% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.03217.

Constituent: Mercury Analysis Run 11/8/2023 8:11 PM View: Federal Tolerance Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 69 background values. 66.67% NDs. 93.55% coverage at alpha=0.01; 95.9% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.02904.

Constituent: Molybdenum Analysis Run 11/8/2023 8:11 PM View: Federal Tolerance Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. All background values were censored; limit is most recent reporting limit. 93.16% coverage at alpha=0.01; 95.51% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.03217.

Constituent: Selenium Analysis Run 11/8/2023 8:11 PM View: Federal Tolerance Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. All background values were censored; limit is most recent reporting limit. 93.16% coverage at alpha=0.01; 95.51% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.03217.

Constituent: Thallium Analysis Run 11/8/2023 8:11 PM View: Federal Tolerance Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

FIGURE H.

MUSCATINE POWER & WATER GWPS				
Constituent Name	MCL	CCR Rule-Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.002	0.006
Arsenic, Total (mg/L)	0.01		0.0078	0.01
Barium, Total (mg/L)	2		0.26	2
Beryllium, Total (mg/L)	0.004		0.001	0.004
Cadmium, Total (mg/L)	0.005		0.0002	0.005
Chromium, Total (mg/L)	0.1		0.005	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.0056	0.006
Combined Radium, Total (pCi/L)	5		1.29	5
Fluoride, Total (mg/L)	4		1	4
Lead, Total (mg/L)	0.015		0.002	0.015
Lithium, Total (mg/L)	n/a	0.04	0.01	0.04
Mercury, Total (mg/L)	0.002		0.0002	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.0082	0.1
Selenium, Total (mg/L)	0.05		0.005	0.05
Thallium, Total (mg/L)	0.002		0.001	0.002

*MCL = Maximum Contaminant Level

*CCR = Coal Combustion Residual

*GWPS = Groundwater Protection Standard

FIGURE I.

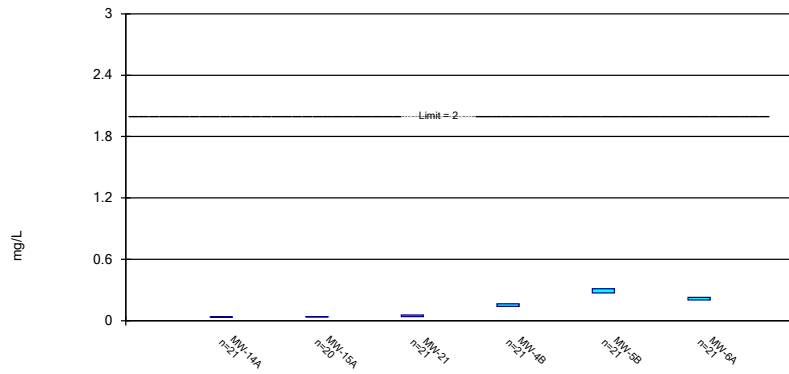
Confidence Intervals - All Results (No Significant)

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 7:54 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	ND Adj.	Transform	Alpha	Method
Barium (mg/L)	MW-14A	0.03663	0.03205	2	No	21	0	None	No	0.01	Param.
Barium (mg/L)	MW-15A	0.04015	0.03485	2	No	20	0	None	No	0.01	Param.
Barium (mg/L)	MW-21	0.05447	0.03953	2	No	21	0	None	No	0.01	Param.
Barium (mg/L)	MW-4B	0.164	0.1386	2	No	21	0	None	No	0.01	Param.
Barium (mg/L)	MW-5B	0.3126	0.2714	2	No	21	0	None	No	0.01	Param.
Barium (mg/L)	MW-6A	0.2266	0.2008	2	No	21	0	None	No	0.01	Param.
Cadmium (mg/L)	MW-4B	0.000285	0.0002	0.005	No	21	95.24	None	No	0.01	NP (NDs)
Cadmium (mg/L)	MW-5B	0.000255	0.0002	0.005	No	21	95.24	None	No	0.01	NP (NDs)
Chromium (mg/L)	MW-21	0.006434	0.005579	0.1	No	21	19.05	Kaplan-Meier	No	0.01	Param.
Cobalt (mg/L)	MW-4B	0.00147	0.0005	0.006	No	21	61.9	None	No	0.01	NP (NDs)
Combined Radium 226 + 228 (pCi/L)	MW-14A	0.4407	0.1611	5	No	17	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-15A	0.3808	0.1154	5	No	17	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-21	0.5112	0.1814	5	No	17	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-4B	0.7247	0.4121	5	No	17	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-5B	1.018	0.6673	5	No	17	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-6A	0.7934	0.4838	5	No	17	0	None	No	0.01	Param.
Fluoride (mg/L)	MW-14A	1	0.867	4	No	21	90.48	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-15A	1	0.625	4	No	21	80.95	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-21	1	0.993	4	No	22	90.91	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-4B	1	0.801	4	No	22	81.82	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-5B	1.88	0.627	4	No	22	86.36	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-6A	1.89	0.814	4	No	22	77.27	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-21	0.000633	0.0005	0.015	No	21	95.24	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-4B	0.000532	0.0005	0.015	No	20	90	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-5B	0.000627	0.0005	0.015	No	21	95.24	None	No	0.01	NP (NDs)
Lithium (mg/L)	MW-21	0.0213	0.01	0.04	No	21	47.62	None	No	0.01	NP (normality)
Mercury (mg/L)	MW-5B	0.000813	0.0002	0.002	No	21	95.24	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-21	0.00383	0.002	0.1	No	21	95.24	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-4B	0.00296	0.002	0.1	No	21	95.24	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-5B	0.00212	0.002	0.1	No	21	95.24	None	No	0.01	NP (NDs)
Selenium (mg/L)	MW-14A	0.00821	0.005	0.05	No	21	47.62	None	No	0.01	NP (normality)
Selenium (mg/L)	MW-15A	0.00502	0.005	0.05	No	21	95.24	None	No	0.01	NP (NDs)
Selenium (mg/L)	MW-21	0.01011	0.006573	0.05	No	21	23.81	Kaplan-Meier	No	0.01	Param.
Thallium (mg/L)	MW-4B	0.00288	0.001	0.002	No	21	90.48	None	No	0.01	NP (NDs)
Thallium (mg/L)	MW-5B	0.00393	0.001	0.002	No	21	90.48	None	No	0.01	NP (NDs)

Parametric Confidence Interval

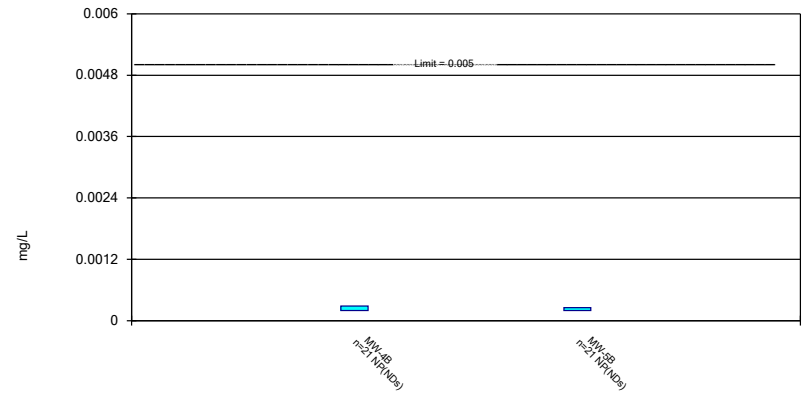
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Non-Parametric Confidence Interval

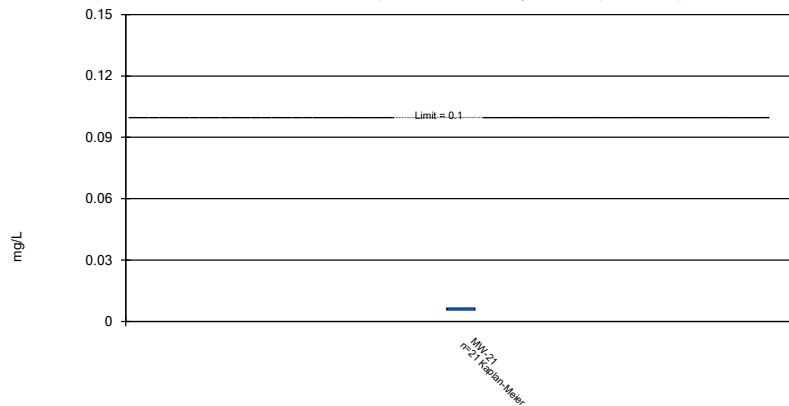
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Cadmium Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Parametric Confidence Interval

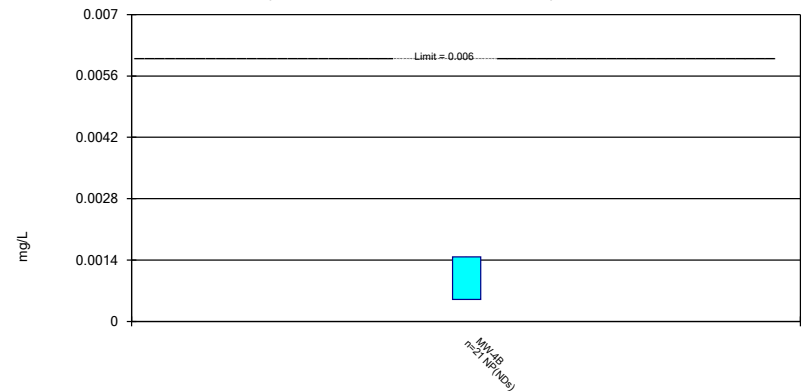
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Non-Parametric Confidence Interval

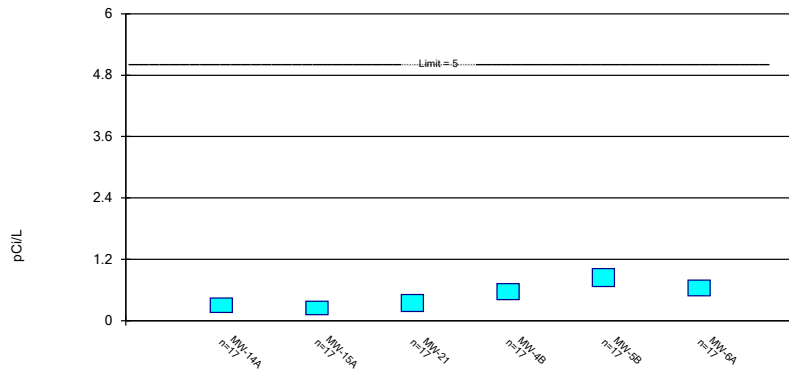
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Cobalt Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Int
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Non-Parametric Confidence Interval

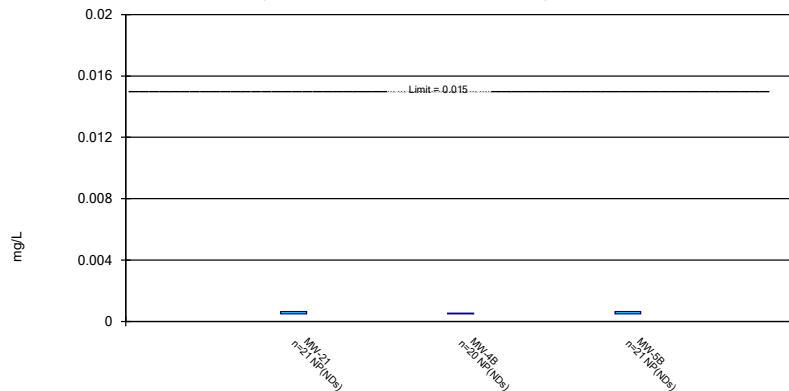
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Fluoride Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Non-Parametric Confidence Interval

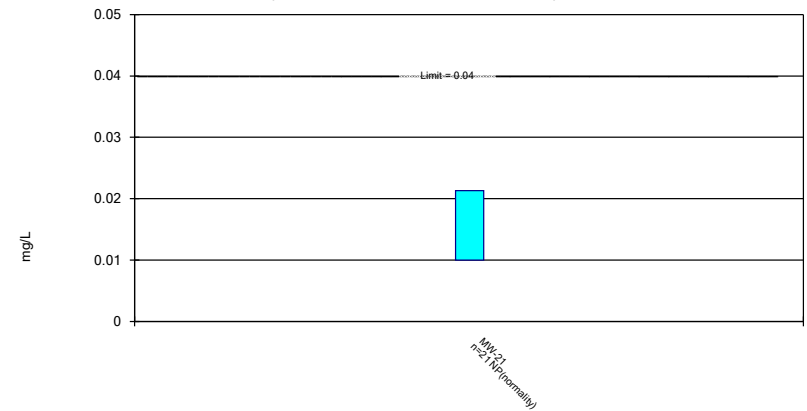
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Non-Parametric Confidence Interval

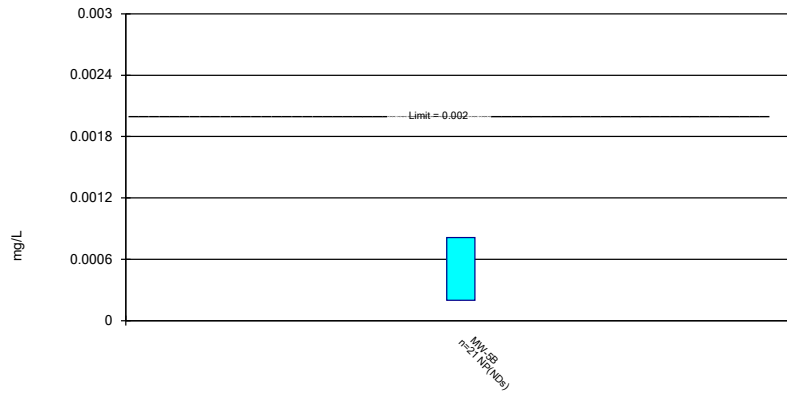
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lithium Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Non-Parametric Confidence Interval

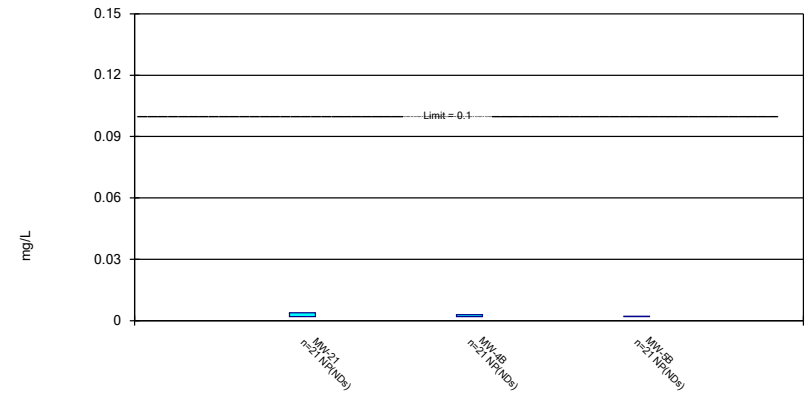
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Mercury Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Non-Parametric Confidence Interval

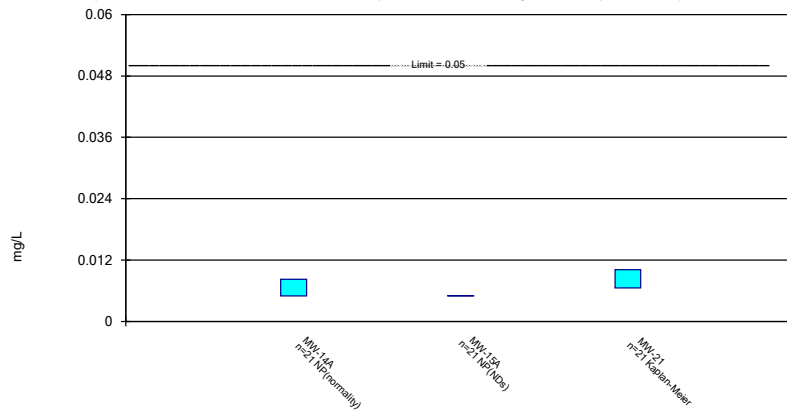
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Molybdenum Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Parametric and Non-Parametric (NP) Confidence Interval

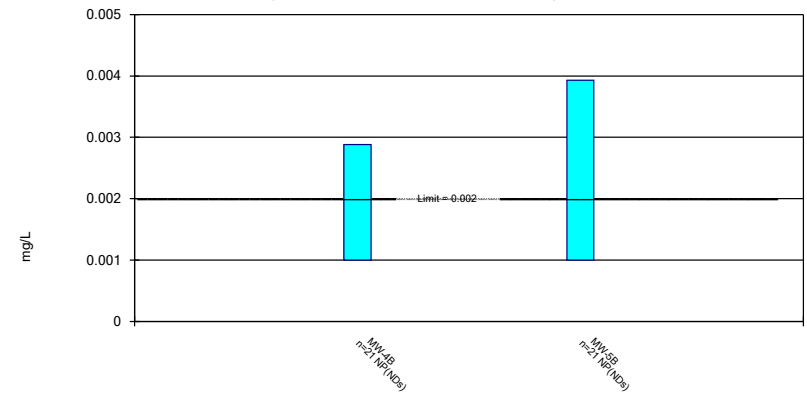
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Thallium Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Confidence Interval

Constituent: Barium (mg/L) Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-14A	MW-15A	MW-21	MW-4B	MW-5B	MW-6A
6/6/2016		2.13 (o)				
6/7/2016				0.15	0.331	0.209
6/8/2016	0.0443		0.0573			
8/15/2016	0.0402	0.044	0.0482			
8/16/2016				0.128	0.295	0.199
10/10/2016			0.0606			
10/11/2016	0.0391	0.0426		0.131	0.304	0.196
12/12/2016			0.056	0.139	0.315	0.216
12/14/2016	0.0383	0.0406				
2/17/2017	0.0306	0.0402		0.143		
2/21/2017			0.0735		0.316	0.197
4/17/2017	0.0341	0.0364		0.111	0.296	0.152
4/18/2017			0.0356			
6/20/2017			0.0461	0.133	0.31	
6/21/2017	0.0338	0.0327				0.197
8/7/2017				0.133		
8/8/2017	0.031	0.0338	0.0499		0.3	0.19
3/6/2018			0.0148	0.117	0.341	0.206
3/7/2018	0.0285	0.0352				
6/19/2018			0.0515			
6/20/2018	0.0314	0.0338				
6/21/2018				0.144	0.336	0.222
8/28/2018			0.0622	0.149		
8/29/2018	0.0344	0.0335			0.357	0.206
3/19/2019				0.161	0.326	0.2
3/20/2019	0.0328	0.037	0.0511			
8/7/2019	0.0398	0.047	0.0624	0.147	0.301	0.211
4/7/2020	0.0266	0.0389	0.0352	0.156	0.25	0.216
9/18/2020	0.0328	0.0416	0.0407	0.147	0.239	0.231
4/5/2021	0.0355	0.0365	0.0309	0.169	0.252	0.245
9/1/2021	0.0345	0.0355	0.0434	0.186	0.241	0.248
4/20/2022	0.0327	0.0443	0.036	0.191	0.258	0.249
9/14/2022	0.034	0.0327	0.0447	0.188	0.253	0.229
4/11/2023	0.032	0.0299	0.031			
4/12/2023				0.173	0.237	0.246
9/19/2023	0.0348	0.0338	0.0559			
9/20/2023				0.181	0.274	0.222
Mean	0.03434	0.0375	0.047	0.1513	0.292	0.2137
Std. Dev.	0.00415	0.004663	0.01355	0.02308	0.03727	0.02337
Upper Lim.	0.03663	0.04015	0.05447	0.164	0.3126	0.2266
Lower Lim.	0.03205	0.03485	0.03953	0.1386	0.2714	0.2008

Confidence Interval

Constituent: Cadmium (mg/L) Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-4B	MW-5B
6/7/2016	<0.0002	<0.0002
8/16/2016	<0.0002	<0.0002
10/11/2016	<0.0002	<0.0002
12/12/2016	<0.0002	<0.0002
2/17/2017	<0.0002	
2/21/2017		<0.0002
4/17/2017	<0.0002	<0.0002
6/20/2017	<0.0002	<0.0002
8/7/2017	<0.0002	
8/8/2017		<0.0002
3/6/2018	<0.0002	<0.0002
6/21/2018	<0.0002	<0.0002
8/28/2018	<0.0002	
8/29/2018		<0.0002
3/19/2019	<0.0002	<0.0002
8/7/2019	<0.0002	<0.0002
4/7/2020	<0.0002	<0.0002
9/18/2020	<0.0002	<0.0002
4/5/2021	<0.0002	<0.0002
9/1/2021	<0.0002	<0.0002
4/20/2022	<0.0002	<0.0002
9/14/2022	<0.0002	<0.0002
4/12/2023	<0.0002	<0.0002
9/20/2023	0.000285	0.000255
Mean	0.000204	0.0002026
Std. Dev.	1.855E-05	1.2E-05
Upper Lim.	0.000285	0.000255
Lower Lim.	0.0002	0.0002

Confidence Interval

Constituent: Chromium (mg/L) Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-21
6/8/2016	0.00694
8/15/2016	0.00538
10/10/2016	0.00582
12/12/2016	0.00561
2/21/2017	<0.005
4/18/2017	<0.005
6/20/2017	0.00586
8/8/2017	0.00572
3/6/2018	<0.005
6/19/2018	0.00726
8/28/2018	<0.005
3/20/2019	0.00647
8/7/2019	0.00637
4/7/2020	0.00644
9/18/2020	0.00589
4/5/2021	0.00708
9/1/2021	0.00659
4/20/2022	0.00636
9/14/2022	0.00505
4/11/2023	0.00577
9/19/2023	0.00752
Mean	0.006006
Std. Dev.	0.0007941
Upper Lim.	0.006434
Lower Lim.	0.005579

Confidence Interval

Constituent: Cobalt (mg/L) Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-4B
6/7/2016	0.000681
8/16/2016	<0.0005
10/11/2016	<0.0005
12/12/2016	<0.0005
2/17/2017	<0.0005
4/17/2017	<0.0005
6/20/2017	<0.0005
8/7/2017	<0.0005
3/6/2018	<0.0005
6/21/2018	<0.0005
8/28/2018	<0.0005
3/19/2019	<0.0005
8/7/2019	<0.0005
4/7/2020	<0.0005
9/18/2020	0.00147
4/5/2021	0.00132
9/1/2021	0.00335
4/20/2022	0.00135
9/14/2022	0.00459
4/12/2023	0.00271
9/20/2023	0.00374
Mean	0.001224
Std. Dev.	0.001257
Upper Lim.	0.00147
Lower Lim.	0.0005

Confidence Interval

Constituent: Combined Radium 226 + 228 (pCi/L) Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-14A	MW-15A	MW-21	MW-4B	MW-5B	MW-6A
6/6/2016		0.31 (U)				
6/7/2016				0.711 (U)	0.665	0.405
6/8/2016	0.145 (U)		0.253 (U)			
8/15/2016	0.202 (U)	0.251 (U)	0.159 (U)			
8/16/2016				0.938 (U)	0.854	0.876
10/10/2016			0.817			
10/11/2016	0.523	0.286 (U)		0.674	0.428 (U)	0.512
12/12/2016			0.306 (U)	0.672	1.05	0.894
12/14/2016	0.26 (U)	0.251 (U)				
2/17/2017	0.293 (U)	0.103 (U)		0.528		
2/21/2017			-0.000573 (U)		0.85	0.314 (U)
4/17/2017	0.48	0.0966 (U)		0.309 (U)	1.02	0.298 (U)
4/18/2017			0.0953 (U)			
6/20/2017			0.545	0.368	0.973	
6/21/2017	0.0131 (U)	0.221 (U)				0.44
8/7/2017				0.443		
8/8/2017	0.456	0.244 (U)	0.814		0.507	0.333 (U)
3/6/2018			0.358	0.45	0.959	0.618
3/7/2018	0.258 (U)	0.123 (U)				
3/19/2019				0.436	0.568	0.481
3/20/2019	0.0223 (U)	0.391 (U)	0.287 (U)			
4/7/2020	0.397 (U)	0.645	0.305 (U)	0.354 (U)	1.2	0.787
4/5/2021	0.614	0.219 (U)	0.182 (U)	0.0519 (U)	0.982	0.667
9/1/2021	0.684	0.362 (U)	0.499	1.08	1.29	1.12
4/20/2022	0.0486 (U)	0.0289 (U)	0.171 (U)	0.55 (U)	0.913	0.901
9/14/2022	0.0843 (U)	-0.159 (U)	-0.0783 (U)	0.836	0.363 (U)	0.599
4/11/2023	0.0651 (U)	0.727	0.678			
4/12/2023				0.687	0.556	0.695
9/19/2023	0.57	0.118 (U)	0.497 (U)			
9/20/2023				0.575 (U)	1.15	0.916
Mean	0.3009	0.2481	0.3463	0.5684	0.8428	0.6386
Std. Dev.	0.2231	0.2118	0.2631	0.2495	0.2801	0.2471
Upper Lim.	0.4407	0.3808	0.5112	0.7247	1.018	0.7934
Lower Lim.	0.1611	0.1154	0.1814	0.4121	0.6673	0.4838

Confidence Interval

Constituent: Fluoride (mg/L) Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-14A	MW-15A	MW-21	MW-4B	MW-5B	MW-6A
6/6/2016		<1				
6/7/2016				<1	<1	<1
6/8/2016	<1		<1			
8/15/2016	<1	0.549	<1			
8/16/2016				<1	<1	<1
10/10/2016			<1			
10/11/2016	0.867	<1		<1	<1	<1
12/12/2016			<1	<1	1.88	2.02
12/14/2016	<1	<1				
2/17/2017	<1	<1		0.664		
2/21/2017			0.993		2.14	1.89
4/17/2017	1.93 (o)	6.7 (o)		0.801	0.627	0.814
4/18/2017			0.768			
6/20/2017			<1	<1	<1	
6/21/2017	<1	<1				<1
8/7/2017				<1		
8/8/2017	<1	<1	<1		<1	<1
10/16/2017			<1	<1		
10/17/2017	<1	<1			<1	<1
3/6/2018			<1	<1	<1	<1
3/7/2018	<1	<1				
6/19/2018			<1			
6/20/2018	0.684	<1				
6/21/2018				<1	<1	<1
8/28/2018			<1	<1		
8/29/2018	<1	<1			<1	<1
3/19/2019				0.771	<1	<1
3/20/2019	<1	0.523	<1			
8/7/2019	<1	0.625	<1	0.525	<1	0.535
4/7/2020	<1	<1	<1	<1	<1	0.652
9/18/2020	<1	<1	<1	<1	<1	<1
4/5/2021	<1	0.516	<1	<1	<1	<1
9/1/2021	<1	<1	<1	<1	<1	<1
4/20/2022	<1	<1	<1	<1	<1	<1
9/14/2022	<1	<1	<1	<1	<1	<1
4/11/2023	<1	<1	<1			
4/12/2023				<1	<1	<1
9/19/2023	<1	<1	<1			
9/20/2023				<1	<1	<1
Mean	0.9786	0.9149	0.9891	0.9437	1.075	1.041
Std. Dev.	0.07347	0.1808	0.04941	0.1311	0.3155	0.3212
Upper Lim.	1	1	1	1	1.88	1.89
Lower Lim.	0.867	0.625	0.993	0.801	0.627	0.814

Confidence Interval

Constituent: Lead (mg/L) Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-21	MW-4B	MW-5B
6/7/2016		0.00147 (o)	<0.0005
6/8/2016	<0.0005		
8/15/2016	<0.0005		
8/16/2016		<0.0005	<0.0005
10/10/2016	<0.0005		
10/11/2016		<0.0005	<0.0005
12/12/2016	<0.0005	<0.0005	<0.0005
2/17/2017		<0.0005	
2/21/2017	<0.0005		<0.0005
4/17/2017		<0.0005	<0.0005
4/18/2017	<0.0005		
6/20/2017	<0.0005	<0.0005	<0.0005
8/7/2017		<0.0005	
8/8/2017	<0.0005		<0.0005
3/6/2018	<0.0005	<0.0005	<0.0005
6/19/2018	0.000633		
6/21/2018		<0.0005	<0.0005
8/28/2018	<0.0005	<0.0005	
8/29/2018			<0.0005
3/19/2019		<0.0005	<0.0005
3/20/2019	<0.0005		
8/7/2019	<0.0005	<0.0005	<0.0005
4/7/2020	<0.0005	<0.0005	<0.0005
9/18/2020	<0.0005	0.000532	<0.0005
4/5/2021	<0.0005	<0.0005	<0.0005
9/1/2021	<0.0005	<0.0005	<0.0005
4/20/2022	<0.0005	<0.0005	<0.0005
9/14/2022	<0.0005	<0.0005	<0.0005
4/11/2023	<0.0005		
4/12/2023		<0.0005	<0.0005
9/19/2023	<0.0005		
9/20/2023		0.000576	0.000627
Mean	0.0005063	0.0005054	0.000506
Std. Dev.	2.902E-05	1.809E-05	2.771E-05
Upper Lim.	0.000633	0.000532	0.000627
Lower Lim.	0.0005	0.0005	0.0005

Confidence Interval

Constituent: Lithium (mg/L) Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-21
6/8/2016	<0.01
8/15/2016	<0.01
10/10/2016	<0.01
12/12/2016	<0.01
2/21/2017	<0.01
4/18/2017	<0.01
6/20/2017	<0.01
8/8/2017	<0.01
3/6/2018	<0.01
6/19/2018	0.0189
8/28/2018	<0.01
3/20/2019	0.0277
8/7/2019	0.0279
4/7/2020	0.0213
9/18/2020	0.0225
4/5/2021	0.0198
9/1/2021	0.0233
4/20/2022	0.0162
9/14/2022	0.018
4/11/2023	0.0143
9/19/2023	0.0205
Mean	0.01573
Std. Dev.	0.006367
Upper Lim.	0.0213
Lower Lim.	0.01

Confidence Interval

Constituent: Mercury (mg/L) Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-5B
6/7/2016	<0.0002
8/16/2016	<0.0002
10/11/2016	<0.0002
12/12/2016	<0.0002
2/21/2017	<0.0002
4/17/2017	<0.0002
6/20/2017	<0.0002
8/8/2017	<0.0002
3/6/2018	<0.0002
6/21/2018	<0.0002
8/29/2018	<0.0002
3/19/2019	<0.0002
8/7/2019	<0.0002
4/7/2020	<0.0002
9/18/2020	<0.0002
4/5/2021	<0.0002
9/1/2021	<0.0002
4/20/2022	<0.0002
9/14/2022	0.000813
4/12/2023	<0.0002
9/20/2023	<0.0002
Mean	0.0002292
Std. Dev.	0.0001338
Upper Lim.	0.000813
Lower Lim.	0.0002

Confidence Interval

Constituent: Molybdenum (mg/L) Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-21	MW-4B	MW-5B
6/7/2016		<0.002	<0.002
6/8/2016	<0.002		
8/15/2016	<0.002		
8/16/2016		<0.002	<0.002
10/10/2016	<0.002		
10/11/2016		<0.002	<0.002
12/12/2016	<0.002	<0.002	<0.002
2/17/2017		<0.002	
2/21/2017	<0.002		<0.002
4/17/2017		<0.002	<0.002
4/18/2017	<0.002		
6/20/2017	<0.002	<0.002	<0.002
8/7/2017		<0.002	
8/8/2017	<0.002		<0.002
3/6/2018	<0.002	<0.002	<0.002
6/19/2018	0.00383		
6/21/2018		<0.002	<0.002
8/28/2018	<0.002	<0.002	
8/29/2018			<0.002
3/19/2019		<0.002	0.00212
3/20/2019	<0.002		
8/7/2019	<0.002	<0.002	<0.002
4/7/2020	<0.002	<0.002	<0.002
9/18/2020	<0.002	0.00296	<0.002
4/5/2021	<0.002	<0.002	<0.002
9/1/2021	<0.002	<0.002	<0.002
4/20/2022	<0.002	<0.002	<0.002
9/14/2022	<0.002	<0.002	<0.002
4/11/2023	<0.002		
4/12/2023		<0.002	<0.002
9/19/2023	<0.002		
9/20/2023		<0.002	<0.002
Mean	0.002087	0.002046	0.002006
Std. Dev.	0.0003993	0.0002095	2.619E-05
Upper Lim.	0.00383	0.00296	0.00212
Lower Lim.	0.002	0.002	0.002

Confidence Interval

Constituent: Selenium (mg/L) Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-14A	MW-15A	MW-21
6/6/2016		<0.005	
6/8/2016	0.0071		0.0165
8/15/2016	0.00811	<0.005	0.0103
10/10/2016			0.0137
10/11/2016	0.00821	<0.005	
12/12/2016			0.0119
12/14/2016	0.00834	<0.005	
2/17/2017	0.00752	<0.005	
2/21/2017			0.0074
4/17/2017	0.00823	<0.005	
4/18/2017			0.00674
6/20/2017			0.0106
6/21/2017	0.00829	<0.005	
8/8/2017	0.00759	<0.005	0.0109
3/6/2018			<0.005
3/7/2018	<0.005	0.00502	
6/19/2018			0.00939
6/20/2018	0.00739	<0.005	
8/28/2018			<0.005
8/29/2018	0.00827	<0.005	
3/20/2019	0.00569	<0.005	0.0102
8/7/2019	<0.005	<0.005	0.0108
4/7/2020	<0.005	<0.005	0.00632
9/18/2020	<0.005	<0.005	0.00762
4/5/2021	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	0.00617
4/20/2022	<0.005	<0.005	0.00634
9/14/2022	<0.005	<0.005	<0.005
4/11/2023	<0.005	<0.005	<0.005
9/19/2023	<0.005	<0.005	0.0053
Mean	0.006416	0.005001	0.008342
Std. Dev.	0.001494	4.364E-06	0.003285
Upper Lim.	0.00821	0.00502	0.01011
Lower Lim.	0.005	0.005	0.006573

Confidence Interval

Constituent: Thallium (mg/L) Analysis Run 11/9/2023 7:54 AM View: Federal Confidence Intervals

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-4B	MW-5B
6/7/2016	<0.001	<0.001
8/16/2016	<0.001	<0.001
10/11/2016	<0.001	<0.001
12/12/2016	<0.001	<0.001
2/17/2017	<0.001	
2/21/2017		<0.001
4/17/2017	<0.001	<0.001
6/20/2017	<0.001	<0.001
8/7/2017	<0.001	
8/8/2017		<0.001
3/6/2018	<0.001	<0.001
6/21/2018	<0.001	<0.001
8/28/2018	<0.001	
8/29/2018		<0.001
3/19/2019	<0.001	<0.001
8/7/2019	<0.001	<0.001
4/7/2020	<0.001	<0.001
9/18/2020	<0.001	<0.001
4/5/2021	<0.001	<0.001
9/1/2021	<0.001	<0.001
4/20/2022	<0.001	<0.001
9/14/2022	<0.001	<0.001
4/12/2023	0.00288	0.00393
9/20/2023	0.003	0.00442
Mean	0.001185	0.001302
Std. Dev.	0.0005838	0.0009582
Upper Lim.	0.00288	0.00393
Lower Lim.	0.001	0.001

Appendix D

Current and Historical Analytical Results

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	April-23	September-23	
MW-4A/MW-4B Downgradient																									
Appendix III Parameters:																									
Boron	mg/L	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2		0.66	< .2	< .2	< .2	< .2	< .2	< .1	< .1	< .1	< .1	<0.100	<0.100	<0.100	<0.100
Calcium	mg/L	98.1	88.8	89.3	94.5	86.8	85.9	88.7	89.7	85.3		95.8	91.4	91.3	99.7	93.8	89.6	89	94.1	95.1	106	92.3	91.3	90.4	
Chloride	mg/L	12.6	13.2	13.6	13.5	15.1	12.5	13.2	13.2	14.7		8.81	15.3	19.4	16	15.6	14.8	15.1	22.9	16.7	20.8	16.8	18	17.4	
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.664	0.801	< .5	< .5	< .5		< .5	< .5	< .5	0.771	0.525	< .5	< .5	< .5	< .5	<0.500	<0.500	<1.00	<1.00	
pH	SU	8.9	7.3	7.38		7.42	7.33	8.16	6.53	7.49		7.36	7.53	7.44	7.26	7.22	7.46	7.93	7.49	7.75	7.04	7.52	7.23	7.03	
Sulfate	mg/L	32.2	28.4	27.2	32.7	36	39.5	33	35.3	45.4		162	51.3	52.2	48	47	41.5	46.9	60.1	50.2	58.4	49.5	54	53.1	
Total Dissolved Solids	mg/L	507	426	450	450	460	442	452	420	466		586	440	420	398	422	366	360	380	370	370	358	396	364	
Appendix IV Parameters:																									
Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200	
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200	
Barium	mg/L	0.15	0.128	0.131	0.139	0.143	0.111	0.133	0.133			0.117	0.144	0.149	0.161	0.147	0.156	0.147	0.169	0.186	0.191	0.188	0.173	0.181	
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100	
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	<0.000100	<0.000100	<0.000200	0.000285
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500
Cobalt	mg/L	< .000681	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	0.00147	0.00132	0.00335	0.00135	0.00459	0.00271	0.00374	
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.664	0.801	< .5	< .5			< .5	< .5	< .5	0.771	0.525	< .5	< .5	< .5	< .5	< .5	<0.500	<0.500	<1.00	<1.00
Lead	mg/L	< .00147	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	0.000532	< .0005	< .0005	<0.000500	<0.000500	<0.000500	0.000576	
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05			< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	<0.0100	<0.0100	<0.0100	<0.0100
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	<0.000200	<0.000200	<0.000200	<0.000200
Molybdenum	mg/L	< .002	< .002	M .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002	< .002	< .002	< .002	0.00296	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200	
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	0.00288	0.00300
Radium-226	mg/L	0.54	0.326	0.285	0.585	0.215	0.0818	0.177	0.255			0.111			0.218	0.13			0.101 U	0.19 U	0.0562 U	0.0958 U	0.154 U	0.109 U	
Radium-228	mg/L	0.171	0.612	0.388	0.0872	0.313	0.227	0.192	0.188			0.339			<218	0.224			-0.049 U	0.895	0.494 U	0.740 U	0.534 U	0.466 U	
Combined Radium 226 + 228	mg/L	0.711	0.938	0.674	0.672	0.528	0.309	0.368	0.443			0.45			0.436	0.354			0.0519 U	1.08	0.550 U	0.836	0.687	0.575 U	

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	April-23	September-23	
MW-5B Downgradient																									
Appendix III Parameters:																									
Boron	mg/L	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2		< .2	< .2	< .2	< .2	< .2	< .2	< .1	< .1	< .1	<0.100	<0.100	<0.100	<0.100	
Calcium	mg/L	147	< .0005	140	147	126	130	140	139	136		134	147	146	134	139	117	108	104	108	117	117	107	115	
Chloride	mg/L	67	65.9	66	67	70.4	62.1	63.4	64	73	67.8	68.2	65	70.8	55	64.1	44	41	42.7	37.6	38.1	39	38.7	41.8	
Fluoride	mg/L	< .5	< .5	< .5	1.88	2.14	0.627	< .5	< .5	< .5		< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	<0.500	<0.500	<1.00	<1.00	
pH	SU	8.49	7.08	7.1		6.05	7	7.89	6.95	7.08	7	7.23	7.3	7.14	7.05	7.02	7.24	7.33	7.31	7.22	7.37	7.37	6.96	6.42	
Sulfate	mg/L	109	109	105	109	111	108	108	114	135		122	119	120	85	112	58.9	61.9	57.4	53.7	44.7	49.9	45.8	53.4	
Total Dissolved Solids	mg/L	920	672	646	636	684	680	656	734	688		620	828	622	562	596	494	436	434	448	428	484	478	476	
Appendix IV Parameters:																									
Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200	
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200	
Barium	mg/L	0.331	0.295	0.304	0.315	0.316	0.296	0.31	0.300			0.341	0.336	0.357	0.326	0.301	0.25	0.239	0.252	0.241	0.258	0.253	0.237	0.274	
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100	
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	<0.000100	<0.000100	<0.000200	0.000255
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500
Cobalt	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500	<0.000500	<0.000500
Fluoride	mg/L	< .5	< .5	< .5	1.88	2.14	0.627	< .5	< .5			< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500	<0.000500	0.000627
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05			< .01	< .01	< .0005	< .0005	< .0005	< .01	< .01	< .01	< .01	< .01	<0.0100	<0.0100	<0.0100	<0.0100
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	<0.000200	0.000813	<0.000200	<0.000200
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002	0.00212	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	0.00393	0.00442
Radium-226	mg/L	0.365	0.449	0.598	0.509	0.464	0.357	0.433	0.213			0.349			0.196	0.293			0.231	0.257 U	0.195	0.274	0.229	0.374	
Radium-228	mg/L	0.3	0.405	-0.169	0.541	0.386	0.664	0.54	0.294			0.61			0.372	0.908			0.751	1.03	0.718	0.0895 U	0.327 U	0.775	
Combined Radium 226 + 228	mg/L	0.665	0.854	0.428	1.05	0.85	1.02	0.973	0.507			0.959			0.568	1.2			0.982	1.29	0.913	0.363 U	0.556	1.15	

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	April-23	September-23
MW-6A Downgradient																								
Appendix III Parameters:																								
Boron	mg/L	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2		< .2	< .2	< .2	< .2	< .2	< .2	< .1	< .1	< .1	<0.100	<0.100	<0.100	<0.100
Calcium	mg/L	81.4	75.4	75.7	85.6	68.8	56.3	72.9	71.2	71.9		74.1	80.1	73.3	73.2	80.9	85.1	87.9	87.6	90.6	96.5	89	95.4	82.1
Chloride	mg/L	5.97	< 5	< 5	9.08	9.93	< 5	< 5	< 5	< 5		5.33	< 5	< 5	< 5	< 5	12.2	15.6	19.3	17.4	14.2	13.3	15.4	12.2
Fluoride	mg/L	< .5	< .5	< .5	2.02	1.89	0.814	< .5	< .5	< .5		< .5	< .5	< .5	< .5	0.535	0.652	< .5	< .5	< .5	<0.500	<0.500	<1.00	<1.00
pH	SU	8.71	6.79	7.21		7.2	7.14	7.7	6.73	7.58		7.4	7.58	7.18	7.15	7.12	7.3	7.24	7.59	7.61	7.35	7.38	7.08	6.88
Sulfate	mg/L	< 5	< 5	< 5	< 5	5.94	< 5	< 5	< 5	< 5		< 5	< 5	< 5	< 5	< 5	13.6	19.1	27.3	22.7	18.9	16.4	20.5	10.1
Total Dissolved Solids	mg/L	440	340	370	368	336	402	486	364	424		292	368	298	320	308	336	374	330	350	336	334	428	332
Appendix IV Parameters:																								
Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200
Barium	mg/L	0.209	0.199	0.196	0.216	0.197	0.152	0.197	0.19			0.206	0.222	0.206	0.2	0.211	0.216	0.231	0.245	0.248	0.249	0.229	0.246	0.222
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	< .0001	<0.000100	<0.000100	<0.000200	<0.000200
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500
Cobalt	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500	<0.000500	<0.000500
Fluoride	mg/L	< .5	< .5	< .5	2.02	1.89	0.814	< .5	< .5			< .5	< .5	< .5	< .5	0.535	0.652	< .5	< .5	< .5	<0.500	<0.500	<1.00	<1.00
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500	<0.000500	<0.000500
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05			< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	<0.0100	<0.0100	<0.0100	<0.0100
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	<0.000200	<0.000200	<0.000200	<0.000200
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100
Radium-226	mg/L	0.226	0.278	0.202	0.462	0.166	0.116	0.21	0.136			0.179			0.22		0.154		0.179	0.336	0.521	0.244	0.318	0.237
Radium-228	mg/L	0.178	0.599	0.311	0.432	0.148	0.182	0.23	0.197			0.439			<.26		0.633		0.488	0.784	0.380 U	0.355 U	0.377 U	0.679
Combined Radium 226 + 228	mg/L	0.405	0.876	0.512	0.894	0.314	0.298	0.44	0.333			0.618			0.481		0.787		0.667	1.12	0.901	0.599	0.695	0.916

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	April-23	September-23
MW-08 Upgradient																								
Appendix III Parameters:																								
Boron	mg/L	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2		< .2	< .2	< .2	< .2	0.205	< .2	< .1	< .1	< .1	<0.100	<0.100	<0.100	<0.100
Calcium	mg/L	152	117	118	109	89.9	96.5	113	91.3	77		74.7	115	83.6	97.6	132	92.4	77.7	81.2	78.3	69.6	76.8	78.2	79.4
Chloride	mg/L	19.8	17.8	16.2	17.2	15.4	17.1	14.1	14	14.4		14.5	14.9	15.6	16.1	17.1	17.2	14.7	22.3	16.3	15.8	16.7	17.9	19.9
Fluoride	mg/L	<.5	<.5	<.5	0.72	<.5	1.69	<.5	<.5	<.5		<.5	0.826	<.5	<.5	0.643	0.864	<.5	<0.5	<.5	<0.500	<0.500	<1.00	<1.00
pH	SU	8.26	6.82	7.03		7.03	7.05	7.59	6.77	7.24		7.3	7.56	7.2	7.08	6.64	7.21	7.4	7.63	7.45	7.35	7.43	7.24	6.81
Sulfate	mg/L	366	187	187	149	145	145	190	119	106		87.3	136	94.7	223	276	123	100	99.7	82.7	72.8	67.1	72.2	94.2
Total Dissolved Solids	mg/L	836	664	708	634	578	624	656	488	470		376	502	414	612	702	418	350	382	342	322	350	2390	260
Appendix IV Parameters:																								
Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	0.001	< .001	< .001	< .001	< .001	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	0.002	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200	0.00247	<0.00200
Barium	mg/L	0.0861	0.0671	0.0706	0.0645	0.0594	0.0636	0.076	0.0596			0.0617	0.0761	0.0649	0.0751	0.0733	0.0613	0.0549	0.0596	0.0623	0.0631	0.0703	0.07	0.0782
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	0.001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	< .0001	<0.000100	<0.000100	<0.000200	<0.000200
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500
Cobalt	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	0.000601	0.00051			< .0005	< .0005	< .0005	0.00177	0.00558	0.000517	0.000738	0.000839	0.00127	0.00143	0.00164	0.0014	0.00126
Fluoride	mg/L	< .5	< .5	< .5	0.72	< .5	1.69	< .5	< .5			< .5	0.826	< .5	< .5	0.643	0.864	< .5	< .5	< .5	<0.500	<0.500	<1.00	<1.00
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500	<0.000500	<0.000500
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05			< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	<0.0100	<0.0100	<0.0100	<0.0100
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	<0.000200	<0.000200	<0.000200	<0.000200
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			0.0022	< .002	0.00224	< .002	< .002	< .002	< .002	< .002	0.00218	<0.00200	<0.00200	<0.00200	<0.00200
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100
Radium-226	mg/L	0.152	0.4086	0.0139	0.234	0.0604	0.0229	0.0596	0.087			0.022			<0.0229		0.0645		0.111 U	0.0456 U	0.194	0.0635 U	0.169 U	0.0608 U
Radium-228	mg/L	0.224	0.0663	0.336	0.102	0.161	0.104	0.144	0.249			0.646			<0.194		0.398		0.0974 U	0.25 U	0.123 U	-0.0943 U	0.301 U	0.973
Combined Radium 226 + 228	mg/L	0.375	0.115	0.35	0.336	0.221	0.126	0.204	0.336			0.668			<0.217		0.462		0.208 U	0.296 U	0.316 U	-0.0309 U	0.469 U	1.03

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	April-23	September-23
MW-10 Upgradient																								
Appendix III Parameters:																								
Boron	mg/L	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2		< .2	< .2	< .2	< .2	< .2	< .2	< .1	< .1	< .1	<0.100	<0.100	<0.100	<0.100
Calcium	mg/L	89.3	80.7	83.3	86.5	81.2	79.2	83.6	85.5	83.3		77.3	88.5	85.4	76.3	78.9	75.4	74.2	78.8	80	90.4	82	83.7	84.7
Chloride	mg/L	6.22	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5		< 5	< 5	< 5	< 5	<5	<5	<5	<5	<5	<5.00	<5.00	5.86	<5.00
Fluoride	mg/L	0.731	< .5	< .5	< .5	< .5	0.774	< .5	< .5	< .5		< .5	< .5	< .5	< .5	0.596	< .5	< .5	< .5	< .5	<0.500	<0.500	<1.00	<1.00
pH	SU	8.68	7.12	7.27		7.51	7.18	7.45	6.34	7.18		7.04	7.72	7.23	7.1	7.07	7.26	7.33	7.57	7.59	7.35	7.48	6.96	6.86
Sulfate	mg/L	42.1	7.3	36.4	38.4	47.3	38.3	35.4	39	46.9		51.4	37.3	34.3	42.8	28.8	18.6	36.5	27.6	32.3	48.3	31.2	39.8	57.4
Total Dissolved Solids	mg/L	468	412	444	428	498	538	524	458	414		314	396	392	326	320	316	344	322	314	344	340	410	318
Appendix IV Parameters:																								
Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200
Arsenic	mg/L	0.00298	0.00369	0.00328	0.00312	0.00298	< .002	0.00262	0.00317			< .002	0.00211	0.0036	0.0056	0.00784	0.00697	0.00748	0.00393	0.00781	0.00371	0.00497	0.00224	0.00501
Barium	mg/L	0.168	0.161	0.163	0.15	0.151	0.138	0.154	0.157			0.129	0.162	0.216	0.185	0.215	0.199	0.227	0.196	0.233	0.208	0.223	0.19	0.233
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100
Cadmium	mg/L	89.3	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	< .0001	<0.000100	<0.000100	<0.000200
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.000500
Cobalt	mg/L	0.000555	< .0005	0.000523	0.000638	0.000663	0.000779	0.000621	0.000695			0.000627	0.00107	0.00088	0.000783	0.000572	0.000581	0.000751	0.000752	0.000576	0.00104	0.00109	0.00142	0.000995
Fluoride	mg/L	0.731	< .5	< .5	< .5	< .5	0.774	< .5	< .5			< .5	< .5	< .5	< .5	0.596	< .5	< .5	< .5	< .5	< .5	< .5	<1.00	<1.00
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05			< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	0.0022	0.00341	0.00219	0.00215	< .002	< .002	0.00217	<0.00200	<0.00200	<0.00200	<0.00200
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001
Radium-226	mg/L	0.19	0.413	0.119	0.422	0.199	0.139	0.206	0.273			0.188			0.153		0.284		0.207	0.41	0.25	0.362	0.127 U	0.466
Radium-228	mg/L	0.0326	0.255	0.575	0.377	0.314	0.332	-0.00196	0.558			0.0884			< .178		0.723		0.281 U	0.912	0.443 U	0.759	0.648	1.01
Combined Radium 226 + 228	mg/L	0.223	0.668	0.694	0.799	0.513	0.47	0.204	0.831			0.276			< .331		1.01		0.488	1.32	0.693	1.12	0.775	1.48

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095	June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18
	MW-13 Downgradient												

Appendix III Parameters:

Boron	mg/L	47.2	13.3	74.8	7.03	4.35	5.93	2.77	2.72	50	2.92	21.7	1.34	1.45
Calcium	mg/L	218	112	276	105	87.6	97.5	92.8	95.4	208	93.2	149	89.5	93.1
Chloride	mg/L	22.9	17.1	29.8	12.7	14.8	12.8	9.17	9.62	15.2		19.9	5.84	7.24
Fluoride	mg/L	< .5	1.21	3.25	< .5	< .5	0.997	< .5	< .5	< .5		2.08	0.528	< .5
pH	SU	7.82	7.3	7.1		7.72	7.31	7.76	7.08	7.14	7.04	7.72	8.03	7.37
Sulfate	mg/L	975	197	1170	117	110	174	86.7	99.4	931	102	506	62.1	72.7
Total Dissolved Solids	mg/L	1970	694	2740	616	554	574	502	536	2150	562	1120	472	384

Appendix IV Parameters:

Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002
Barium	mg/L	0.0302	0.0616	477	0.0945	0.0872	0.0559	0.0783	0.0857			0.132	0.118	0.122
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005
Chromium	mg/L	0.0191	< .005	< .005	< .005	< .005	< .005	< .005	0.00658			< .005	< .005	< .005
Cobalt	mg/L	0.00172	0.000637	0.00179	0.000717	0.000727	0.000695	0.000682	0.000686			0.000964	< .0005	< .0005
Fluoride	mg/L	< .5	1.21	3.25	< .5	< .5	0.997	< .5	< .5			2.08	0.528	< .5
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005
Lithium	mg/L	< .100	< .05	< .150	< .05	< .05	< .05	< .05	< .05			0.0122	< .01	< .01
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002
Molybdenum	mg/L	0.0227	0.00867	0.0176	0.00676	0.00416	0.00443	0.00346	0.00329			0.00732	0.00296	0.00278
Selenium	mg/L	< .005	< .005	0.0364	< .005	< .005	< .005	< .005	< .005			0.0195	< .005	< .005
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001
Radium-226	mg/L	0.0909	0.142	0.312	0.0896	0.11	0.103	0.179	0.164			0.12		
Radium-228	mg/L	0.114	0.0795	0.832	0.173	0.241	0.262	0.0132	0.359			0.665		
Combined Radium 226 + 228	mg/L	0.205	0.222	1.14	0.262	0.35	0.365	0.192	0.523			0.785		

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	April-23	September-23	
MW-14A Downgradient																									
Appendix III Parameters:																									
Boron	mg/L	15.8	17.9	19.3	14.7	13.1	11.3	16.3	13	16	13.7	11	15	14	15.5	17.6	17.4	19.5	17.2	17.1	15.2	15.1	14.8	18.1	
Calcium	mg/L	281	311	308	333	268	310	307	296	310	301	278	297	309	290	255	245	244	259	270	289	301	318	291	
Chloride	mg/L	28.7	28.7	37	31.9	33.5	39.4	29.7	32.9	35.4	33.2	37.4	29	33.1	25.8	22.1	22.5	22.8	27.1	23.2	25.5	22.4	20.3	20.9	
Fluoride	mg/L	< .5	< .5	0.867	< .5	< .5	1.93	< .5	< .5	< .5		< .5	0.684	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	<0.500	<0.500	<1.00	
pH	SU	7.88	7.1	7.15	7.52	7.25	7.57	7.15	6.85	6.68	7	7.35	7.26	7.09	6.97	7.09	7.32	7.21	7.09	7.64	7.48	7.13	7.21	6.97	
Sulfate	mg/L	1050	1040	1010	1140	1190	1200	1020	1110	1210	1140	1110	1090	1070	1050	837	888	924	952	1010	1030	978	1150	1440	
Total Dissolved Solids	mg/L	2000	1980	2500	2080	1010	2260	2250	2170	2080	2650	1820	1800	1900	1690	1510	1510	1620	1290	1560	1530	1710	2140	1800	
Appendix IV Parameters:																									
Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .004	< .001	< .001	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200	
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002	< .002	< .008	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200
Barium	mg/L	0.0443	0.0402	0.0391	0.0383	0.0306	0.0341	0.0338	0.031			0.0285	0.0314	0.0344	0.0328	0.0398	0.0266	0.0328	0.0355	0.0345	0.0327	0.034	0.032	0.0348	
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .004	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .002	< .0001	< .0001	< .0001	< .0001	< .0001	<0.000100	<0.000100	<0.000200	<0.000200
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .02	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500
Cobalt	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .002	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500	<0.000500	<0.000500
Fluoride	mg/L	< .5	< .5	0.867	< .5	< .5	1.93	< .5	< .5			< .5	0.684	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .05	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .002	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500	<0.000500	<0.000500
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05			< .01	< .01	< .01	< .01	< .04	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002	< .002	< .008	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002
Selenium	mg/L	0.0071	0.00811	0.00821	0.00834	0.00752	0.00823	0.00829	0.00759			< .005	0.00739	0.00827	0.00569	< .02	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .004	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100
Radium-226	mg/L	0.0496	0.095	0.0604	0.137	0.0624	0.0561	0.0545	0.0506			0.0335			<.0588		0.0647		0.0454 U	0.16 U	0.101 U	0.0533 U	0.114 U	0.132 U	
Radium-228	mg/L	0.0956	0.107	0.462	0.122	0.23	0.424	-0.0414	0.406			0.224			<-.0365		0.332		0.568	0.524	-0.0522 U	0.0310 U	-0.0486 U	0.438 U	
Combined Radium 226 + 228	mg/L	0.145	0.202	0.523	0.26	0.293	0.48	0.0131	0.456			0.258			<.0223		0.397		0.614	0.684	0.0486 U	0.0843 U	0.0651 U	0.570	

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	March-19	April-20	September-20	April-21	September-21	April-22	September-22	April-23	September-23	
MW-15A Downgradient																									
Appendix III Parameters:																									
Boron	mg/L	16.8	20.6	17.9	18.4	14.9	14.7	16.4	14.7	19.2	12.9	11	10.5	14.6	8.35	7.56	10.6	14.5	10.3	11.1	6.98	10.4	5.8	9.28	
Calcium	mg/L	206	199	203	244	233	226	186	206	218	217	278	102	155	118	111	163	134	128	125	127	132	110	126	
Chloride	mg/L	17.1	17.2	17.6	19	21.5	47.4	12.8	15.4	20.5	20.7	37.4	< 5	10.1	8.54	9.91	13	8.63	15	8.86	7.71	8.29	7.3	8.41	
Fluoride	mg/L	< .5	0.549	< .5	< .5	< .5	6.7	< .5	< .5	< .5	< .5	< .5	< .5	0.523	0.625	< .5	< .5	0.516	< .5	<0.500	<0.500	<1.00	<1.00		
pH	SU	7.97	7.16	7.27		7.2	7.31	7.84	6.96	6.94	7	7.35	7.5	7.25	7.76	7.11	7.54	7.28	7.92	7.46	6.83	7.4	7.24	6.97	
Sulfate	mg/L	827	605	607	732	849	853	537	664	835	779	1110	210	400	351	327	496	403	338	333	297	319	254	365	
Total Dissolved Solids	mg/L	1620	1270	1500	1600	1470	1780	1280	1390	1520	1670	1820	676	948	724	786	942	920	738	736	682	796	646	720	
Appendix IV Parameters:																									
Antimony	mg/L	< .05	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200	
Arsenic	mg/L	< .1	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200	
Barium	mg/L	2.13	0.044	0.0426	0.0406	0.0402	0.0364	0.0327	0.0338			0.0285	>0338	0.0335	0.037	0.047	0.0389	0.0416	0.0365	0.0355	0.0443	0.0327	0.0299	0.0338	
Beryllium	mg/L	< .05	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100	
Cadmium	mg/L	< .025	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	< .0001	<0.000100	<0.000100	<0.000200	<0.000200
Chromium	mg/L	< .250	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500	
Cobalt	mg/L	< .025	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500	<0.000500	<0.000500	
Fluoride	mg/L	< .5	0.549	< .5	< .5	< .5	6.7	< .5	< .5			< .5	< .5	< .5	< .5	0.625	< .5	< .5	0.516	< .5	<0.500	<0.500	<1.00	<1.00	
Lead	mg/L	< .025	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500	<0.000500	<0.000500	
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05			< .0005	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	<0.0100	<0.0100	<0.0100	<0.0100	
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	<0.000200	<0.000200	<0.000200	<0.000200	
Molybdenum	mg/L	< .1	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200	
Selenium	mg/L	< .25	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500	
Thallium	mg/L	< .05	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100	
Radium-226	mg/L	0.0942	0.0703	0.164	0.106	0.0814	0.0124	0.100	0.047			0.0518			<.0609				0.0226 U	0.126 U	0.0866 U	-0.0189 U	0.0906 U	0.536 U	
Radium-228	mg/L	0.216	0.18	0.123	0.145	0.0218	0.0842	0.121	0.197			0.0715			<.33				0.197 U	0.236 U	-0.0577 U	-0.140 U	0.637	0.0640 U	
Combined Radium 226 + 228	mg/L	0.31	0.251	0.286	0.251	0.103	0.0966	0.221	0.244			0.123			<.391				0.219 U	0.362 U	0.0289 U	-0.159 U	0.727	0.118 U	

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095 MW-18A Downgradient	June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18
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Appendix III Parameters:

Boron	mg/L	13.7	15.1	14.2	11.8	12.7	10.5	11.5	10.8	13.1	10.7	8.81	13.3	10.5
Calcium	mg/L	294	294	280	291	266	237	255	258	239	232	191	264	223
Chloride	mg/L	30.4	27.6	35.3	29.2	28.1	44.2	27.2	27	29.3	27.4	27.1	25.6	26.9
Fluoride	mg/L	< .5	< .5	0.791	< .5	< .5	3.16	< .5	< .5	< .5		< .5	< .5	< .5
pH	SU	7.88	7.1	7.2		7.18	7.05	7.38	6.96	6.34	7	7.28	7.19	7.12
Sulfate	mg/L	1100	874	855	886	917	863	796	801	808	737	624	709	675
Total Dissolved Solids	mg/L	1750	1720	1850	2320	1800	4160	1970	1530	1420	1430	1150	1890	1330

Appendix IV Parameters:

Antimony	mg/L	< .05	< .001	< .001	< .001	< .001	< .001	< .001	< .001			0.00195	< .001	< .001
Arsenic	mg/L	< .1	< .002	< .002	< .002	< .002	< .002	< .002	< .002			0.00265	< .002	< .002
Barium	mg/L	< .1	0.0391	0.0381	0.0394	0.0403	0.0297	0.0313	0.0329			0.0281	0.0352	0.036
Beryllium	mg/L	< .05	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001
Cadmium	mg/L	< .025	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005
Chromium	mg/L	< .250	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005
Cobalt	mg/L	< .025	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005
Fluoride	mg/L	< .5	< .5	0.791	< .5	< .5	3.16	< .5	< .5			< .5	< .5	< .5
Lead	mg/L	< .025	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05			< .0005	< .01	< .01
Mercury	mg/L	0.000245	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002
Molybdenum	mg/L	< .1	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002
Selenium	mg/L	< .25	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005
Thallium	mg/L	< .05	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001
Radium-226	mg/L	0.0607	-0.00906	0.106	0.226	0.0909	0.0175	-0.000744	0.0546			0.0456		
Radium-228	mg/L	0.344	0.228	0.605	0.407	0.195	0.387	0.185	0.23			0.339		
Combined Radium 226 + 228	mg/L	0.405	0.218	0.711	0.633	0.286	0.405	0.184	0.284			0.384		

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	April-23	September-23
MW-21 Downgradient																								
Appendix III Parameters:																								
Boron	mg/L	< 2	7.23	8.45	6.93	4.87	4.49	7.36	7.05	3.33	2.24	8.81	6.84	1.36	6.95	8.46	6.76	6.82	5.24	5.88	3.57	3.69	3.35	4.42
Calcium	mg/L	37.2	146	185	178	118	110	149	163	62.3		191	159	78.7	142	145	104	101	79.5	93.5	97.5	88.2	76.000	96.0
Chloride	mg/L	27.7	16.6	24.4	19.2	14.2	15.6	15.1	16.1	5.09		27.1	10.9	< 5	8.3	14	8.05	7.21	5.14	6.58	7.19	18	5.93	8.23
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.993	0.768	< .5	< .5	< .5		< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	<0.500	<0.500	<1.00	<1.00
pH	SU	7.56	6.56	6.66		5.9	6.6	7.34	6.77	6.76	6.87	7.28	7.25	7.07	6.41	6.33	6.55	6.8	6.92	7.06	6.69	7.09	7.24	6.55
Sulfate	mg/L	713	520	603	645	415	461	541	590	206		624	489	96.6	442	529	373	356	237	303	293	151	215	303
Total Dissolved Solids	mg/L	1440	1110	1420	1240	1010	1060	1140	1220	514		1150	952	416	872	960	698	738	540	636	558	524	646	626
Appendix IV Parameters:																								
Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			0.00195	< .001	< .001	< .001	< .001	< .001	< .001	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			0.00265	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200
Barium	mg/L	0.0573	0.0482	0.0606	0.056	0.0735	0.0356	0.0461	0.0499			0.0281	0.0515	0.0622	0.0511	0.0624	0.0352	0.0407	0.0309	0.0434	0.036	0.0447	0.0310	0.0559
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	< .0001	<0.000100	<0.000100	<0.000200	<0.000200
Chromium	mg/L	0.00694	0.00538	0.00582	0.00561	< .005	< .005	0.00586	0.00572			< .005	0.00726	< .005	0.00647	0.00637	0.00644	0.00589	0.00708	0.00659	0.00636	0.00505	0.00577	0.00752
Cobalt	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500	<0.000500
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.993	0.768	< .5	< .5			< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	<1.00	<1.00
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	0.000633	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500	<0.000500	<0.000500
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05			< .01	0.0189	< .01	0.0277	0.0279	0.0213	0.0225	0.0198	0.0233	0.0162	0.018	0.0143	0.0205
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	<0.000200	<0.000200	<0.000200	<0.000200
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	0.00383	< .002	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200
Selenium	mg/L	0.0165	0.0103	0.0137	0.0119	0.0074	0.00674	0.0106	0.0109			< .005	0.00939	< .005	0.102	0.0108	0.00632	0.00762	< .005	0.00617	0.00634	<0.00500	<0.00500	0.00530
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100
Radium-226	mg/L	0.299	0.148	0.427	0.128	0.0502	-0.00511	0.0379	0.209			0.0141			0.117		0.0383		0.0282 U	0.0566 U	0.0448 U	0.117	0.0716	0.0898 U
Radium-228	mg/L	-0.0462	0.0116	0.391	0.178	-0.0507	0.1	0.507	0.605			0.344			<.17		0.267		0.154 U	0.443	0.126 U	-0.195 U	0.606	0.407 U
Combined Radium 226 + 228	mg/L	0.253	0.159	0.817	0.306	-0.000573	0.0953	0.545	0.814			0.358			<.287		0.305		0.182 U	0.499	0.171 U	-0.0783 U	0.678	0.497 U

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	April-23	September-23
MW-22 Downgradient														
Appendix III Parameters:														
Boron	mg/L	< .2	< .2	< .2	0.299	<.2	<.2	0.263	< .1	< .1	<0.100	0.322	0.247	0.207
Calcium	mg/L	69.8	91.5	80.7	91.6	83.8	80.9	75.5	78.4	79.4	80.2	79.6	80.4	79
Chloride	mg/L	30	27.2	29.8	27.6	26.9	24.8	23.2	28.1	20	20.2	7.04	18.2	18.4
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.507	< .5	< .5	< .5	< .5	<0.500	<0.500	<1.00	<1.00
pH	SU	7.36	7.9	7.42	7.21	7.12	7.32	7.53	7.7	7.97	7.23	7.58	7.14	7.14
Sulfate	mg/L	123	134	125	134	139	143	151	154	154	158	220	147	208
Total Dissolved Solids	mg/L	424	434	420	456	428	422	398	412	420	388	390	450	404
Appendix IV Parameters:														
Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200
Arsenic	mg/L	< .002	0.00245	0.00261	< .002	< .002	< .002	< .002	0.00289	0.00267	0.0034	0.00285	0.00421	0.00421
Barium	mg/L	0.15	0.184	0.181	0.209	0.215	0.222	0.222	0.242	0.247	0.239	0.243	0.227	0.256
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	< .0001	<0.000100	<0.000100	<0.000200	<0.000200
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500
Cobalt	mg/L	0.00142	0.00129	0.00149	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<0.000500	<0.000500	<0.00500	<0.00500
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.507	< .5	< .5	< .5	< .5	<0.500	<0.500	<1.00	<1.00
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500	<0.000500	<0.000500
Lithium	mg/L	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	<0.0100	<0.0100	<0.0100	<0.0100
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	<0.000200	<0.000200	<0.000200	<0.000200
Molybdenum	mg/L	0.00568	0.00423	0.00424	0.00263	0.00574	0.00297	0.00529	< .002	0.00558	0.0042	0.00446	0.00364	0.00661
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100
Radium-226	mg/L	0.122	0.284		0.116		0.137		0.168	0.235	0.222	0.17	0.117	0.146 U
Radium-228	mg/L	0.135	0.128		<.226		0.303		0.379 U	0.287 U	0.272 U	0.112 U	0.324 U	0.966
Combined Radium 226 + 228	mg/L	0.257	0.412		<.343		0.44		0.547	0.522	0.494	0.283 U	0.442 U	1.11

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	April-23	September-23
MW-23 Downgradient													
Appendix III Parameters:													
Boron	mg/L	< .2	< .2	< .2	< .2	< .2	0.15	< .1	< .1	<0.100	0.204	0.145	0.128
Calcium	mg/L	70.5	63.9	59.7	59.5	61	52.1	56.3	56.1	54	54.5	55.3	56
Chloride	mg/L	15.9	14.2	10.5	13.8	15.7	14.4	21.4	15.2	16.9	16.2	17.7	19.2
Fluoride	mg/L	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	<0.500	<0.500	<1.00	<1.00
pH	SU	7.69	7.55	7.24	6.75	7.33	7.53	7.61	7.89	7.39	7.3	7.24	7.05
Sulfate	mg/L	38.4	31.7	26.2	29.7	25.5	25.8	35.5	25.8	25.4	23	25	28.6
Total Dissolved Solids	mg/L	384	340	296	336	298	250	274	256	218	278	286	282
Appendix IV Parameters:													
Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200
Barium	mg/L	0.106	0.0779	0.0922	0.0635	0.0654	0.0491	0.0608	0.0497	0.0572	0.0507	0.0518	0.0533
Beryllium	mg/L	< .001	< .001	<0.001	<0.001	<0.001	<0.001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	< .0001	<0.000100	<0.000100	<0.00200	<0.00200
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500
Cobalt	mg/L	0.00161	0.00066	0.00176	< .0005	0.000817	< .0005	0.000517	<.0005	0.000561	<0.000500	<0.00500	<0.00500
Fluoride	mg/L	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	<0.500	<0.500	<1.00	<1.00
Lead	mg/L	0.00151	0.000626	0.00204	0.000663	0.00116	< .0005	0.000624	< .0005	0.000596	<0.000500	<0.00500	<0.00500
Lithium	mg/L	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	<0.0100	<0.0100	<0.0100	<0.0100
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	<0.000200	<0.000200	<0.000200	<0.000200
Molybdenum	mg/L	0.00822	0.00617	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200	<0.00200	<0.00200
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	<0.00500	<0.00500
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	<0.00100	<0.00100
Radium-226	mg/L	0.161		0.215		0.0587		0.0292 U	0.0236 U	0.0699 U	0.0309 U	0.195 U	0.0679 U
Radium-228	mg/L	-0.419		0.785		0.517		0.266 U	0.771	1.20 U	-0.225 U	1.13 U G	0.538 U
Combined Radium 226 + 228	mg/L	0.0129		1.00		0.576		0.296 U	0.794	1.27	-0.195 U	1.32	0.606 U

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22
MW-24 Downgradient											
Appendix III Parameters:											
Boron	mg/L	< .2	< .2		< .2	< .2	0.109	< .1	<.1	<0.100	0.134
Calcium	mg/L	88	72.8		103	94.3	69.9	74.6	69	62.8	66.8
Chloride	mg/L	19.9	18.1		22.4	24.8	19.5	28.9	21.9	19.9	19.9
Fluoride	mg/L	0.653	< .5		< .5	< .5	< .5	< .5	< .5		<0.500
pH	SU	7.47	7.39		6.87	7.29	7.47	7.64	7.44	7.49	7.53
Sulfate	mg/L	101	70		169	164	81	91.2	59.3	48.5	44.5
Total Dissolved Solids	mg/L	474	368		542						
Appendix IV Parameters:											
Antimony	mg/L	< .001	< .001		< .001						
Arsenic	mg/L	< .002	< .002		< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200
Barium	mg/L	0.0695	0.0776		0.128	0.084	0.0969	0.0936	0.0922	0.0826	0.0887
Beryllium	mg/L	< .001	< .001		< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100
Cadmium	mg/L	< .0005	< .0005		< .0005						
Chromium	mg/L	< .005	< .005		< .005						
Cobalt	mg/L	< .0005	< .0005		< .0005	< .0005	< .0005	< .0005	<.0005	<0.000500	<0.000500
Fluoride	mg/L	0.653	< .5		< .5	< .5	< .5	< .5	< .5	<0.500	<0.500
Lead	mg/L	< .0005	< .0005		< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500
Lithium	mg/L	< .01	< .01		< .01						
Mercury	mg/L	< .0002	< .0002		< .0002						
Molybdenum	mg/L	0.00447	< .002		< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200
Selenium	mg/L	< .005	< .005		< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500
Thallium	mg/L	< .001	< .001		< .001						
Radium-226	mg/L	-0.0261							0.00873 U		
Radium-228	mg/L	0.19							0.266 U		
Combined Radium 226 + 228	mg/L	0.164							0.275 U		

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22
MW-25 Downgradient											
Appendix III Parameters:											
Boron	mg/L	14	14.4	14.5	11.5						
Calcium	mg/L	171	141	157	160						
Chloride	mg/L	11.4	11.4	11.4	11.6						
Fluoride	mg/L	0.551	< .5	< .5	< .5						
pH	SU	7.96	7.31	7.15	6.91						
Sulfate	mg/L	382	343	360	325						
Total Dissolved Solids	mg/L	962	NC	NC	768						
Appendix IV Parameters:											
Antimony	mg/L	< .001	< .001		< .004						
Arsenic	mg/L	< .002	< .002	< .002	< .008						
Barium	mg/L	0.0828	0.0487	0.0342	0.0448						
Beryllium	mg/L	< .001	< .001	< .004	<.004						
Cadmium	mg/L	< .0005	< .0005		< .002						
Chromium	mg/L	< .005	< .005		< .02						
Cobalt	mg/L	< .0005	< .0005	< .0002	<.002						
Fluoride	mg/L	0.551	< .5	< .5	< .5						
Lead	mg/L	< .0005	< .0005	< .0005	< .002						
Lithium	mg/L	< .01	< .01		< .04						
Mercury	mg/L	< .0002	< .0002		< .0002						
Molybdenum	mg/L	0.00279	< .002	< .002	< .008						
Selenium	mg/L	< .005	< .005	< .005	< .02						
Thallium	mg/L	< .001	< .001		< .004						
Radium-226	mg/L	0.0532									
Radium-228	mg/L	0.635									
Combined Radium 226 + 228	mg/L	0.688									

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		April-20	September-20	April-21	September-21	April-22	September-22
MW-26 Downgradient							
Appendix III Parameters:							
Boron	mg/L		2.5	2.33	2.49	0.058	1.97
Calcium	mg/L		134	130	134	0.19	133
Chloride	mg/L		19.7	21.1	19.3	2.25	18.4
Fluoride	mg/L		< .5	< .5	< .5	0.22	<0.500
pH	SU		7.88	8.12	7.98	7.69	7.71
Sulfate	mg/L		376	341	358	2	313
Total Dissolved Solids	mg/L						
Appendix IV Parameters:							
Antimony	mg/L						
Arsenic	mg/L		< .002	< .002	< .002	0.00075	<0.00200
Barium	mg/L		0.114	0.0989	0.0889	0.00088	0.0876
Beryllium	mg/L		< .001	< .001	< .001	0.00027	<0.00100
Cadmium	mg/L						
Chromium	mg/L						
Cobalt	mg/L		< .005	< .005	<.0005	0.00019	<0.000500
Fluoride	mg/L		< .5	< .5	< .5	0.22	<0.500
Lead	mg/L		< .0005	< .0005	< .0005	0.00024	<0.000500
Lithium	mg/L						
Mercury	mg/L						
Molybdenum	mg/L		< .002	0.00239	< .002	0.0012	<0.00200
Selenium	mg/L		< .005	< .005	< .005	0.00096	<0.00500
Thallium	mg/L						
Radium-226	mg/L						
Radium-228	mg/L						
Combined Radium 226 + 228	mg/L						

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		April-20	September-20	April-21	September-21	April-22	September-22
MW-27 Downgradient							
Appendix III Parameters:							
Boron	mg/L		3.25	0.17	3.82	0.058	1.41
Calcium	mg/L		61	57.6	68.4	0.19	38.7
Chloride	mg/L		13.6	10.4	15	2.25	19
Fluoride	mg/L		< .5	< .5	< .5	0.22	<0.500
pH	SU		6.69	7.56	7.03	6.76	7.71
Sulfate	mg/L		119	7.63	111	2	38.2
Total Dissolved Solids	mg/L						
Appendix IV Parameters:							
Antimony	mg/L						
Arsenic	mg/L		< .002	< .002	< .002	0.00075	<0.00200
Barium	mg/L		0.0738	0.0534	0.0862	0.00088	0.0594
Beryllium	mg/L		< .001	< .001	< .001	0.00027	<0.00100
Cadmium	mg/L						
Chromium	mg/L						
Cobalt	mg/L		< .005	< .0005	<.0005	0.00019	<0.000500
Fluoride	mg/L		< .5	< .5	< .5	0.22	<0.500
Lead	mg/L		< .0005	< .0005	< .0005	0.00024	0.000536
Lithium	mg/L						
Mercury	mg/L						
Molybdenum	mg/L		< .002	< .002	< .002	0.0012	<0.00200
Selenium	mg/L		< .005	< .005	< .005	0.00096	<0.00500
Thallium	mg/L						
Radium-226	mg/L						
Radium-228	mg/L						
Combined Radium 226 + 228	mg/L						

