2023 Annual Water Quality Report

Coal Combustion Residue (CCR) Landfill

Muscatine Power and Water

February 14, 2024

The Power of Commitment

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The Power of Commitment

Certification

2023 Annual Groundwater Monitoring Quality Report

Muscatine Power and Water

CCR Landfill

Permit No. #70-SDP-06-82P

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

LICENSED PROFESSIONAL ENGINEER MICHAEL J. ALOWITZ 18160 IOWA	**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: 2/14/24 **License Number:** 18160 **My license renewal date is:** December 31, 2024 **Pages or sheets covered by this seal:** Entire Document

Executive Summary

This Annual Water Quality Report (AWQR) was prepared by GHD on behalf of Muscatine Power and Water (MPW) for the MPW Coal Combustion Residue (CCR) landfill located in Muscatine County. This facility is regulated under Iowa Department of Natural resources (DNR) Sanitary Disposal Project Permit No. 70-SDP-06-82P issued on August 10, 2020 (Doc #98816). This permit expires August 10, 2030. This AWQR is submitted to comply with requirements of MPW's landfill permit and Iowa Administrative Code (IAC) 567, Paragraph 103.1 (4) e.

This report documents groundwater monitoring and leachate management in 2023. The CCR Landfill is in active use. Portions of the CCR Landfill are under final closure and portions are under interim cover.

There are no actions on requests pending in this AWQR and no changes to the monitoring system plan are recommended. This AWQR for 2023 adopts groundwater standards from the federal CCR rule for cobalt and molybdenum that are higher than the Iowa Statewide Standard for protected groundwater used previously for comparison.

The landfill has been sampled semi-annually under assessment monitoring since October 2016. The Hydrologic Monitoring System Plan (HMSP) consists of 18 groundwater monitoring points. Four upgradient monitoring wells, six downgradient monitoring wells, two groundwater cutoff drains, three assessment monitoring points, and three monitoring points used solely for groundwater level measurements. There are also three surface water sampling points, one upstream, and two downstream. Groundwater samples were analyzed for constituents under the approved permit list containing arsenic, aluminum, barium, beryllium, boron, calcium, chloride, cobalt, copper, fluoride, iron, lead, magnesium, manganese, molybdenum, selenium, strontium, sulfate, and zinc.

The predominant site-wide flow direction is from the west and east toward the center of the Site before flowing southward toward the Farm Pond.

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Abbreviations

AWQR	Annual Water Quality Report
CCR	Coal Combustion Residue
cm/sec	centimeter per second
DNR	Department of Natural Resources
EPA	Environmental Protection Agency
GES	Green Environmental Services
HAL	Health Advisory Level
HMSP	Hydrologic Monitoring System Plan
i	Average horizontal hydraulic gradient
IAC	Iowa Administrative Code
K	Hydraulic Conductivity
LCSP	Leachate Collection System Performance Evaluation
m/d	meters per day
MCL	Maximum Contaminant Level
mg/L	milligram(s) per liter
MPW	Muscatine Power and Water
n	Effective porosity
NPDES	National Pollutant Discharge Elimination System
PGW	Protected Groundwater
SDWR	Secondary Drinking Water Regulations
SSI	Statistically Significant Increases
SWS	Statewide Standards
V	linear velocity

1. Introduction

This Annual Water Quality Report (AWQR) for the Muscatine Power and Water (MPW) Coal Combustion Residue (CCR) landfill was prepared by GHD on behalf MPW. The landfill is used for disposal of CCR from the MPW coal-fired plant located at 1700 Dick Drake Way in Muscatine, Iowa. The approximate 80-acre landfill is located 7.5 miles west of the power plant in the SW ¼ of Section 16 Township 76N, Range 3W in Muscatine County. The site location is shown on Figure 1.

The landfill has been in continuous operation since 1985. The CCR includes a mixture of gypsum, fly ash, bottom ash, and slag materials. The landfill consists of four separate phases encompassing approximately 34 acres shown on Figure 2. Phases I and II are currently permitted and under development while phases III and IV are designated for future development. This facility is regulated under Iowa Department of Natural Resources (IDNR) Sanitary Disposal Project Permit No. 70-SDP-06-82P reissued on August 8, 2020 (Doc# 98816). The permit expires August 8, 2030.

Water discharge from this facility is regulated under IDNR National Pollutant Discharge Elimination System (NPDES) Permit No. 7000109 issued on January 19, 2010, and expired on January 18, 2015. An application for permit renewal was submitted to the DNR on July 18, 2014, and ruling on this application is still pending. Under the pending permit renewal, MPW is authorized to discharge from the farm pond. Quarterly monitoring of the designated Farm Pond outfall and quarterly reporting are completed by MPW in accordance with this permit.

In accordance with State of Iowa [567] IAC Chapter 103.1(4)e and Special Provision X.3.g of the landfill permit, this AWQR summarizes the effects of the landfill on groundwater and surface water quality and includes the results of the annual measurements and analyses conducted at the monitoring points. This AWQR assesses sampling events conducted in April and September 2023.

The following list is milestone landfill development, plans and specifications, and reports.

Date	Title
State Reporting and Documentation	
11/01/91	Closure/Post Closure Plan. Original date 11/01/91, revised January 1996 and December 2009
11/21/91	Supporting Development and Operations Plan (DOPS)
01/29/93	Supplemental Plan Sheet 16.
2008-2010	Supplemental information dated 10/02/08, 12/17/09, and 03/30/10.
1/17/12	CCR Landfill Cell Development – Phase II Drawings
10/3/18	Unstable Areas Determination
4/3/19	CCR Landfill Cover Improvements - Drawings
10/16/20	Construction Documentation Report, CCR Landfill Cover Improvements
Various	Annual Water Quality Report, AWQR (this report)
Various	Annual Leachate Control System Performance Evaluation Report, LCSPER (Included as part of AWQR)
Federal Reporting and Documentation	
10/19/15	CCR Fugitive Dust Prevention and Control Plan; updated 12/5/18
05/18/16	Groundwater Monitoring System and Sampling and Analysis Program; updated 5/2/17
10/17/21	Run-on and Run-off Control System Plan
10/17/16	Closure and Post-Closure Plan
Various	Annual CCR Fugitive Dust Control Report
Various	Annual Inspection Report
Various	Annual Groundwater Monitoring and Corrective Action Report

2. Sampling Protocol

2.1 Hydrologic Monitoring System Plan

The approved Hydrologic Monitoring System Plan (HMSP) (Doc# 39761) includes twelve groundwater monitoring points, which consisting of four upgradient monitoring wells (MW-8, MW-10, MW-22, and MW-23), six downgradient monitoring wells (MW-4A/4B, MW-5B, MW-6A, MW-14A, MW-15A, MW-21), and two groundwater cutoff drains (SW-24 and SW-25). There are also three surface water points, one upstream (SW-22) and two downstream (SW-23 and SW-26). Surface water samples were not collected in September 2023 due to insufficient water levels.

There are also three assessment monitoring points, one upgradient (MW-24) and two downgradient (MW-26 and MW-27). The assessment points are sampled the same time and parameter list as the HMSP points, but may be included as part of the HMSP, abandoned, or simply used for water levels based on further assessment.

The role and monitoring location for HMSP monitoring points are identified in Table 1 and are routinely sampled for parameters specified in IAC Chapter 103.1(2)f and by the landfill permit outlined in Table 2. These parameters are: arsenic, aluminum, barium, beryllium, boron, calcium, chloride, cobalt, copper, fluoride, iron, lead, magnesium, manganese, molybdenum, selenium, strontium, sulfate, and zinc. These samples are used to assess potential impacts of the CCR landfill on surrounding ground and surface water. Table 3 provides the past and future monitoring well maintenance and performance evaluation schedule.

The HMSP and assessment wells were used for measurement of groundwater levels during each 2023 sampling event along with three monitoring wells used solely for gauging (MW-9, MW-11, and MW-12) to assess trends and horizontal groundwater flow paths. Several monitoring well pairs are also used to assess vertical hydraulic gradient, including MW-8/9, MW-10/11, and MW-11/12. Vertical hydraulic gradients were not calculated for 2023 due to lack of data from well pairs. Data collection for well pairs will resume in 2024. Additionally, the water level is monitored at one piezometer (PZ-05), which was dry during both monitoring events in 2023. A summary of 2023 groundwater level measurements is presented in Table 4.

2.2 Monitoring Well Inspection

An annual review of well performance is conducted to confirm that HMSP wells continue to function as viable monitoring points. A schedule of these reviews is included in Table 3. A summary of the well information and measurements is included in Table 4. Water levels and measurements were recorded and are summarized in Table 4 . The depth of each HMSP well is also measured annually. The information is used to assess changes in horizontal and vertical groundwater flow gradients and flow paths, and for potential well deterioration. Groundwater contours generated from the April and September 2023 sampling event are displayed in Figures 4 and 5, respectively.

This review indicates that groundwater horizontal flow gradients appear stable, and wells remain viable sampling points and are physically intact, void of excessive turbidity, and provide the anticipated recharge during sampling. Based on this review, no changes to the HMSP wells, with respect to existing monitoring well performance, are recommended. The monitoring evaluation schedule is included in Table 2.

2.3 Sample Collection

Sampling was conducted via low-flow methods. Samples are placed in laboratory-provided containers and preserved on ice. They are then submitted to Eurofins Environmental Testing in Cedar Falls, Iowa for analysis.

Prior to sample collection, the temperature, conductivity, pH, oxidation-reduction potential, dissolved oxygen, and turbidity of the purge water are measured and recorded. Copies of the groundwater sampling records for the 2023 monitoring events are attached in Appendix A. During the 2023 monitoring events, field duplicate samples were

collected from monitoring wells MW-4B and MW-22 in the spring, and from monitoring wells MW-10 and MW-26 in the fall, for quality assurance/quality control purposes.

3. Groundwater Flow Conditions

3.1 Hydrology

Surface water enters the site via an intermittent stream originating in agricultural land in the SE¼ of Section 16. The stream enters the site near the northeast corner of the inactive, final covered and vegetated portion of the Phase I fill area. The entry point at the property boundary represents the upstream surface water quality monitored by SW-22. The stream is then routed through a constructed bypass ditch which diverts collected off-site and on-site non-fill surface drainage around the landfill and eventually to a farm pond at the southern boundary of MPW property. This bypass ditch runs along the north and west perimeters of the landfill and sediment runoff control pond before it connects back into the original stream bed location southwest of the landfill. The downstream quality of the bypass ditch is monitored by SW-23. The stream then flows south to the Farm Pond, which is monitored at its overflow point SW 26 (farm pond overflow) corresponding to the NPDES permit's outfall #001.

Runoff originating from the Phase I and II area is managed differently depending on whether it has been in contact with CCR or not. The landfill is managed to minimize storm water contact with the CCR. The general stormwater management approach includes:

- Where possible, runoff from areas that have received final cover is routed off the landfill in a manner that bypasses the site Sediment Runoff Pond.
- In the active area where runoff originating on CCR is generated, the runoff is routed to landfill surface drains and directed to a sediment runoff pond forebay located west of Phase II. The forebay is intended to capture sediment prior to discharge to the Sediment Runoff Pond.
- Portions of the active landfill where final cover is not present and is not intended to receive CCR within a reasonable period are graded and temporarily covered with soil to prevent generation of contact water. This non-contact runoff is routed directly to the Sediment Runoff Pond. As these areas transition to active CCR filling, runoff will be diverted to the Sediment Runoff Pond forebay as described above to the extent practical.

The water level in the Sediment Runoff Pond is controlled by MPW staff through operation of a siphon outlet to the bypass ditch/stream confluence area. Eventually, all the runoff generated from this site flows to the farm pond and discharges at the NPDES outfall as described above.

A groundwater cutoff drain runs along the east side of the landfill and empties south of the Sediment Runoff Pond to flow to the Farm Pond. The upstream end of the cutoff drain is monitored via SW-25. The conditions at the outlet end are represented by SW-24.

3.2 Hydrogeology

Green Environmental Services completed a Hydrogeologic Evaluation of the CCR landfill site in October 1991 (GES, 1991, Doc# 28831) in compliance with the then current requirements of Chapters 103 and 110 of the Iowa Administrative Code. The 1991 evaluation of the hydrogeologic conditions of the site is the basis upon which the Hydrologic Monitoring System Plan was developed.

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, 2017).

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).

3.3 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, 2017). 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, the average linear groundwater velocity at the shallow alluvial aquifer (based on flow between MW-8 and MW-14A) was estimated at 0.002 m/day (approximately 2 feet per year) for both 2023 monitoring events.

3.4 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.

4. Groundwater Monitoring

4.1 Data Collection

The HMSP-approved semi-annual monitoring events were performed in the spring (April 2023) and fall (September 2023). The events included monitoring points and parameters as described in Section I.A above and in accordance with the current DNR-approved HMSP.

Sampling documentation and analytical reports are included in Appendix A and Appendix B, respectively. Groundwater measurements and a history of analytical results are included in Table 4 and Table 8, respectively.

4.2 Comparison to Background and Regulatory Standards

Statistical methods were employed to assess the control limits and findings of the analytical results. Statistical calculations were performed by Groundwater Stats Consulting. The statistical report dated November 14, 2023 (Appendix C), incorporates data collected through 2023 and the corresponding statistical analyses, including narrative, control limits, prediction limits, statistically significant increases (SSIs), and trend tests.

Analytical results were also evaluated against published standards. For constituents with a maximum contaminant level (MCL) established by the Environmental Protection Agency (EPA) results are compared to MCLs. The federal CCR rule 40 CFR §257.95(h)(2) provides comparison standards for cobalt, lead, and molybdenum where an MCL is not established. For lead, EPA established an action level which is often treated like an MCL. The EPA action

level for lead of 0.015 mg/L is equivalent to the federal CCR rule and thus the lead standard is identified an MCL in this report. For cobalt and molybdenum, the federal CCR rule values are considered equal to MCLs for evaluating data and are used as the standards for evaluation in this report.

Where no MCL exists, results are compared to the Health Advisory Level (HAL) or secondary drinking water regulations (SDWR) value. Where an MCL (or federal CCR rule value), HAL, or SDWR value does not exist, data are compared to the Iowa Statewide Standards (SWS) for protected groundwater. Previous AWQRs used the Iowa SWS for comparison rather than the federal CCR rule values.

The resulting 2023 control limits and regulatory standards are summarized in Table 5.

4.3 2023 Water Quality Results

Sample collection records are provided in Appendix A and laboratory analytical reports are provided in Appendix B. Groundwater Stats Consulting evaluated the analytical data as reported in Appendix C. Appendix D provides graphs of analytical results over time for the monitoring network. Background concentrations are identified in Appendix C and Table 5. Table 6 identifies locations where an exceedance of the background value was reported for the most recent sample event (September 2023) but not previously identified for 2022. Table 7 provides a summary of locations and constituents with new or ongoing exceedances of control limits. Table 8 summarizes historical sample results from each sampling event from 2016 through 2023. Table 9 summarizes findings since 2016 where exceedances above the control limit, action level (MCL), or other standards (SDWR, HAL, SWS) have occurred.

4.4 Groundwater Results

The background analytical results of MW-8, MW-10, MW-22, MW-23, and SW-22 in 2023 and the statistical report (Appendix C) were used to develop an inter-well control limits for comparison to results from downgradient monitoring wells. These control limits are listed in Table 5; locations and constituents reported above these limits during at least one sampling event in 2023 are summarized in Table 7 and are listed below:

- Barium and chloride at MW-5B
- Boron, calcium, magnesium, and sulfate at MW-14A
- Boron and magnesium at MW-15A
- Boron and selenium at MW-21
- Boron at MW-27

Trend tests on the exceedances above and background wells were performed to determine if concentrations are increasing, decreasing, or stabilizing over time through the April and September 2023 sampling events. The Sen's Slope/Mann-Kendall tests were performed at a 99% confidence level. Decreasing trends were more prevalent in the groundwater data and the only increasing trends were noted at upgradient monitoring well locations. Statistically significant trends were identified for the following monitoring points:

- Barium is increasing at upgradient monitoring wells MW-10 and MW-22
- Sulfate is increasing at upgradient monitoring well MW-22
- Boron is decreasing at downgradient monitoring well MW-15A
- Calcium is decreasing at upgradient monitoring well MW-08
- Chloride is decreasing at upgradient monitoring well MW-22 and downgradient monitoring well MW-5B
- Selenium is decreasing at downgradient monitoring well MW-21
- Sulfate is decreasing at upgradient monitoring well MW-08

4.5 Surface Water Results

All surface water locations contained insufficient flow to collect samples in September 2023. The only data for evaluation from 2023 are from the April 2023 sampling event. Background values to establish control limits are based on upgradient surface water monitoring point SW-22. Surface water monitoring data were subjected to the same statistical analyses as groundwater data. The following constituent and surface water locations exceeded the background prediction limits.

- Molybdenum at SW-23
- Boron, magnesium, strontium, and sulfate at SW-24
- Arsenic and molybdenum at SW-26

No increasing trends were noted and decreasing trend was identified for boron on SW-24.

Surface water monitoring point SW-26 is the outlet of the Farm Pond also identified at Outfall 001 in the NPDES permit for the facility. The 2023 results were below the MCL for arsenic and the federal CCR rule comparison value for molybdenum in groundwater although the results exceeded the background value. The arsenic result at SW-26 did exceed the arsenic MCL in at least one sample each previous year since 2019 and may be due to naturally occurring arsenic.

4.6 Comparison to Published Standards

Groundwater and surface water data are also compared to the published groundwater standards presented in Table 5. Each monitoring constituent is evaluated below relative to these standards.

- The upper bound of the aluminum SDWR value of 0.05 – 0.2 mg/L was exceeded at upgradient monitoring well MW-23 and downgradient supplemental monitoring location MW-27 once in 2023.
- The arsenic MCL of 0.01 mg/L was not exceeded in the 2023 monitoring event. Arsenic was reported at three background groundwater monitoring locations and two downgradient surface water monitoring locations.
- Barium was reported at every monitoring location during 2023 but no results exceeded the MCL of 2 mg/L.
- Beryllium was not reported at any monitoring location during 2023. The reporting limit of 0.001 mg/L is below the MCL of 0.004.
- Boron has a HAL of 6 mg/L. This value was exceeded at downgradient monitoring wells MW-14A (twice) and MW-15A (once) in 2023. The HAL was also exceeded at surface water monitoring point SW-24.
- There is no published standard for calcium. Calcium was reported at each monitored location in 2023.
- The chloride SDWR value is 250 mg/L. Chloride was reported at each monitored location at least once in 2023 at concentrations below the SDWR value.
- The standard for cobalt established by the federal CCR rule is 0.6 mg/L. Cobalt was detected at concentrations below the standard at two background monitoring wells and one downgradient well in 2023.
- Copper has an MCL of 1.3 mg/L. The only reported detection of copper in 2023 was at supplemental downgradient monitoring well MW-26 in April 2023 at a concentration below the MCL.
- Fluoride has an MCL of 4 mg/L. Fluoride was not reported at any monitored location in 2023. The reporting limit for fluoride increased to 1.0 mg/L in 2023 relative to 0.5 mg/L for most of the monitoring history.
- Iron has an SDWR value of 0.3 mg/L. This value was exceeded at two upgradient monitoring locations (MW-8 and MW-10) and 5 downgradient monitoring locations (MW-4B, MW-5B, MW-6B, MW-26, and MW-27) at least once in 2023.
- Lead has an MCL of 0.015 mg/L. This value was not exceeded at any monitored location in 2023.
- There is no published standard for magnesium. Magnesium was reported at each monitored location in 2023.
- Manganese has an SDWR value of 0.05 mg/L and a HAL of 0.3 mg/L. The SDWR value was exceeded at three background monitoring wells (MW-8, MW-10, MW-22), four downgradient monitoring wells (MW-4B, MW-5B,

MW-6A, and MW-26), background surface monitoring point SW-22 and two downgradient surface monitoring points (SW-23 and SW-26). Of these locations, the HAL was also exceeded at least once in 2023 at MW-8, MW-10, MW-22, MW-4B, MW-5B, and SW-26.

- Molybdenum has a standard of 0.1 mg/L established by the federal CCR rule. The standard was not exceeded at any monitored location in 2023.
- Selenium has an MCL of 0.05 mg/L. Selenium was only detected at one location in 2023 (MW-21) at a concentration below the MCL.
- Strontium has a HAL of 4 mg/L. Strontium was detected at each monitored location in 2023 at concentrations below the HAL.
- Sulfate has an SDWR value of 250 mg/L. Sulfate was reported at each monitored location in 2023 with concentrations above the SDWR value at downgradient monitoring wells MW-14A, MW-15A, and MW-26. Downgradient surface water locations SW-24 and SW-25 also had results exceeding the SDWR value.
- Zinc has a HAL of 2 mg/L and an SDWR value of 5 mg/L. Zinc was not detected at any monitored location in 2023 with a reporting limit of 0.02 mg/L.

5. Leachate Collection System Performance Evaluation

This Leachate Collection System Performance Evaluation Report (LCSPER) is included in this AWQR as required in Special Provision 6.e of the current landfill SDP permit dated August 10, 2020, and amended October 29, 2020.

The leachate collection system is located in the Phase I and Phase II areas of the developed portions of the landfill. The system consists of three perforated leachate pipes running north-south that tie into an east-west leachate header line. Two of the perforated pipes are located under the west portion of Phase I, while the third is located under Phase II. The east-west header line is also paralleled by a perforated pipe which collects leachate off the north end of Phase II and east into Phase I. All collected leachate in the existing system gravity drains into Lift Station A located along the haul road north of the sediment runoff pond.

5.1 Phase I Leachate Collection System

The two leachate collection pipes on the west side of Phase I were installed in the early 1990s and consist of six-inch diameter schedule 80 perforated pipe that was trenched into the native low permeability landfill base (clay till), backfilled with pea gravel, and covered by geotextile fabric and a sand berm directly over the pipe. Leachate collected in the perforated pipe flows north to the header system (GES, 1991). Leachate collection in Phase I is limited to the west side of that Phase as a majority of the initial CCR landfill development to the east and north had occurred prior to that time.

Historically leachate levels in the CCR had been measured with four piezometers (PZ-1, PZ-2, PZ-3, and PZ-4). These piezometers were abandoned in 2019 to facilitate landfill cover construction activities. The last measurements were documented in the 2019 AWQR. Leachate levels exceeding one foot had been present and persistent in all these piezometers throughout their existence.

5.2 Phase II Leachate Collection System

The Phase II lined cell was constructed in 2012 and includes a contemporary leachate collection design. The base of the landfill in this area consists of a four-feet thick, low permeability clay liner sloped to the center, with an overlying porous aggregate drainage layer over the entire cell. The drainage layer facilitates the flow of leachate along the sloped liner where it drains to a perforated pipe. The leachate then flows north to the header system (HR Green,

August 2012). Leachate head on the Phase II liner is monitored with one piezometer (PZ-5). During the fall 2023 HMSP monitoring event, measurement of PZ-5 was dry. Throughout the period of record, head measurements have been less than one foot.

5.3 Leachate Management

The leachate from the collection header drains to Lift Station A. Leachate is then pumped from the lift station to the clay lined forebay. The lift station pump operates continuously at a rate of 434 gallons per hour for a conservative estimated pumped volume of 3,800,000 gallons per year (HR Green, 2022). The water level in the forebay is controlled at a consistent level by a riser structure that regulates flow out to the Sediment Runoff Control Pond. Water in the Sediment Runoff Pond is managed under the site's NPDES permit.

A sample taken per IDNR's request was analyzed for constituents of concern in November 2023, with the following detections:

- Boron: 66.7 mg/L
- Calcium: 404 mg/L
- Chloride: 56.7 mg/L
- Fluoride: 4.03 mg/L
- Magnesium: 33.6 mg/L
- Manganese: 0.569 mg/L
- Strontium: 3.19 mg/L
- Sulfate: 4,680 mg/L

5.4 LCSPE Conclusions

The presence and variability of leachate levels in Phase I based on historical measurements is typical of heterogeneous CCR fill deposits where a complete underdrain collection system is not present. Given this, the most feasible way to achieve the lowest possible leachate is by minimizing the amount infiltration into the fill by application of final and temporary soil cover. This was the main focus of the 2019-2020 landfill cover construction activities. Leachate levels in Phase I are expected to stabilize over time. However, it is unlikely that the older Phase I leachate collection system will achieve the standard of a contemporary system of less than 12 inches of leachate head. The Phase I system removes leachate proximate to the collection pipes but was not designed to meet a standard applied to leachate piezometers throughout the cell.

In Phase II, where a contemporary leachate collection system with complete granular underdrain is installed, leachate head on the engineered liner has historically been maintained at less than one foot. This is considered acceptable for a modern collection system.

6. Conclusions and Recommendations

This AWQR documents groundwater and surface water monitoring conducted at MPW CCR landfill during the 2023 monitoring period. Two sample events were conducted in April and September of 2023.

The groundwater flow was consistent through the spring and fall 2023 monitoring events, with flow direction generally toward the middle of the site and southward toward the lower-lying farm pond. The groundwater contour maps (Figures 4 and 5) indicate the monitoring network is sufficient and has appropriately located background and downgradient well locations.

Samples collected during the monitoring period were analyzed under the approved permit list, with the following exceedances above the established control limits were noted:

- Barium and chloride at MW-5B
- Boron, calcium, magnesium, and sulfate at MW-14A
- Boron and magnesium at MW-15A
- Boron and selenium at MW-21
- Boron, sulfate, and magnesium at MW-26
- Boron at MW-27
- Molybdenum at SW-23
- Boron, Magnesium, strontium, and sulfate at SW-24
- Arsenic and molybdenum at SW-26

Exceedances of published standards were primarily SDWR values. No constituents exceeded an MCL. Exceedances of published standards are summarized below.

- Boron (HAL) at two locations
- Iron (SDWR) at seven locations
- Manganese (SDWR) at ten locations
- Manganese (HAL) at eight locations
- Sulfate (SDWR) at five locations

6.1 Recommendations

Based on the evaluation findings, the MPW site should continue groundwater monitoring as outlined in Table 2 and in accordance with Permit No. 70-SDP-06-82P. No changes to the monitoring network or sampling procedures are necessary.

7. References

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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), 2015. Published in Federal Register Volume 80, No. 74 published on April 17, 2015, *Final Rule 40 CFR Part 257 Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities*; and *Technical Amendments* (correcting the effective date) published in Federal Register Volume 80, No. 127 on July 2, 2015.

Tables

Table 1
Monitoring Program Summary
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Monitoring Location	Monitored Unit	Current Monitoring Program	Change for next sampling event	2023 Control Limit Exceedances	Total # of Samples in each monitoring program since January 1, 2020		
					Routine	Supplemental	Remedial Action
MW-4B	Uppermost Aquifer	Routine	No change	None	8	0	0
MW-5B	Uppermost Aquifer	Routine	No change	Barium, Chloride	8	0	0
MW-6A	Uppermost Aquifer	Routine	No change	None	8	0	0
MW-8	Uppermost Aquifer	Background	No change	None	8	0	0
MW-10	Uppermost Aquifer	Background	No change	None	8	0	0
MW-14A	Uppermost Aquifer	Routine	No change	Boron, Calcium, Magnesium, Sulfate	8	0	0
MW-15A	Uppermost Aquifer	Routine	No change	Boron, Magnesium,	8	0	0
MW-21	Uppermost Aquifer	Routine	No change	Boron, Selenium	8	0	0
MW-22	Uppermost Aquifer	Background	No change	None	8	0	0
MW-23	Uppermost Aquifer	Background	No change	None	8	0	0
SW-24	Cutoff Drain - South	Routine	No change	Boron, Magnesium, Strontium, Sulfate	7	0	0
SW-25	Cutoff Drain - East	Routine	No change	None	7	0	0
SW-22	Surface Water	Background	No change	None	7	0	0
SW-23	Surface Water	Routine	No change	Molybdenum	7	0	0
SW-26	Surface Water - Pond	Routine	No change	Arsenic, Molybdenum	7	0	0
Other monitoring points							
PZ-5	CCR	Leachate Level	No change	NA	5	0	0
MW-9	Uppermost Aquifer	Water Level	No change	NA	5	0	0
MW-11	Uppermost Aquifer	Water Level	No change	NA	5	0	0
MW-12	Lower Confining Unit	Water Level	No change	NA	5	0	0
MW-24	Uppermost Aquifer	Assessment	No change	None	7	0	0
MW-26	Uppermost Aquifer	Assessment	No change	Boron, Sulfate, Magnesium	6	0	0
MW-27	Uppermost Aquifer	Assessment	No change	Boron	6	0	0

Table 2
Monitoring Program Implementation Schedule
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Monitoring Location	Recent Sampling Dates and Constituents				Upcoming Sampling Dates and Constituents	
	April 2022	September 2022	April 2023	September 2023	Spring 2024	Fall 2024
MW-4B	Permit List	Permit List	Permit List	Permit List	Permit List	Permit List
MW-5B	Permit List	Permit List	Permit List	Permit List	Permit List	Permit List
MW-6A	Permit List	Permit List	Permit List	Permit List	Permit List	Permit List
MW-8	Permit List	Permit List	Permit List	Permit List	Permit List	Permit List
MW-10	Permit List	Permit List	Permit List	Permit List	Permit List	Permit List
MW-14A	Permit List	Permit List	Permit List	Permit List	Permit List	Permit List
MW-15A	Permit List	Permit List	Permit List	Permit List	Permit List	Permit List
MW-21	Permit List	Permit List	Permit List	Permit List	Permit List	Permit List
MW-22	Permit List	Permit List	Permit List	Permit List	Permit List	Permit List
MW-23	Permit List	Permit List	Permit List	Permit List	Permit List	Permit List
SW-24	Permit List	Permit List	Permit List	-	Permit List	Permit List
SW-25	Permit List	Permit List	Permit List	-	Permit List	Permit List
SW-22	Permit List	-	Permit List	-	Permit List	Permit List
SW-23	Permit List	-	Permit List	-	Permit List	Permit List
SW-26	Permit List	Permit List	Permit List	-	Permit List	Permit List
MW-24	Permit List	Permit List	Permit List	Permit List	Permit List	Permit List
MW-26	Permit List	Permit List	Permit List	Permit List	Permit List	Permit List
MW-27	Permit List	Permit List	Permit List	Permit List	Permit List	Permit List

Permit List: Arsenic, barium, beryllium, cobalt, copper, iron, lead, magnesium, manganese, selenium, zinc, chloride, sulfate, aluminum, calcium, boron, fluoride, molybdenum, and strontium

- could not sample due to insufficient flow

Table 3
Monitoring Well Maintenance and Performance Evaluation Schedule
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Compliance with:	Monitoring Calendar Years						
	2018	2019	2020	2021	2022	2023	2024
567 IAC 114.21(2)"a" high and low water levels	Completed		Completed		Completed		Scheduled
567 IAC 114.21(2)"b" changes in the hydrologic setting and flow paths	Completed		Completed		Completed		Scheduled
567 IAC 114.21(2)"c" well depths	Completed	Completed	Completed	Completed	Completed	Completed	Scheduled

Table 4
Monitoring Well Maintenance and Performance Summary
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
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Well	Top of Casing (ft, amsl)	Top of Screen (ft, amsl)	Total Depth (ft)		Date of Measurements		Vertical Gradient (1)	Water Levels (ft amsl)		Maximum Depth
					4/12/2023	9/20/2023		Low	High	Discrepancy (ft)
MW-4B	715.87	697.04	25	Groundwater Level (ft)	6.82	8.82	-	705.73	710.01	4.28
				Groundwater Elevation (ft amsl)	709.05	707.05				
				Measured Well Depth (ft)	20.72	20.87				
				Submerged screen	Y	Y				
MW-5B	709.1	691.73	25	Groundwater Level (ft)	1.37	2.35	-	704.07	708.36	2.07
				Groundwater Elevation (ft amsl)	707.73	706.75				
				Measured Well Depth (ft)	25.3	22.93				
				Submerged screen	Y	Y				
MW-6A	708.92	691.49	25	Groundwater Level (ft)	2.18	3.08	-	704.47	706.82	2.08
				Groundwater Elevation (ft amsl)	706.74	705.84				
				Measured Well Depth (ft)	22.92	22.92				
				Submerged screen	Y	Y				
MW-8	747.36	711.33	43.04	Groundwater Level (ft)	14.15	19.86		728.06	737.74	3.08
				Groundwater Elevation (ft amsl)	733.21	727.5				
				Measured Well Depth (ft)	39.96	39.96				
				Submerged screen	Y	Y				
MW-9	747.12	695.66	58.74	Groundwater Level (ft)	-	-	-	721.96	729.75	-
				Groundwater Elevation (ft amsl)	-	-				
				Measured Well Depth (ft)	-	-				
				Submerged screen	-	-				
MW-10	718.51	706.33	19.99	Groundwater Level (ft)	3.59	6.49	Not Calculated	710.89	715.1	1.86
				Groundwater Elevation (ft amsl)	714.92	712.02				
				Measured Well Depth (ft)	18.13	18.13				
				Submerged screen	Y	Y				
MW-11	718.34	670.03	55.97	Groundwater Level (ft)	-	4.68	Not Calculated	712.92	718.34	-
				Groundwater Elevation (ft amsl)	-	713.66				
				Measured Well Depth (ft)	-	-				
				Submerged screen	-	Y				
MW-12	717.75	633.98	86.42	Groundwater Level (ft)	-	3.78	-	713.13	717.75	-
				Groundwater Elevation (ft amsl)	-	713.97				
				Measured Well Depth (ft)	-	-				
				Submerged screen	-	Y				
MW-14A	729	716.19	20	Groundwater Level (ft)	9.04	12.89	-	712.59	719.55	2.31
				Groundwater Elevation (ft amsl)	719.96	716.11				
				Measured Well Depth (ft)	17.69	17.69				
				Submerged screen	Y	N				
MW-15A	729.99	717.12	20	Groundwater Level (ft)	7.59	13.04	-	713.83	721.17	2.37
				Groundwater Elevation (ft amsl)	722.4	716.95				
				Measured Well Depth (ft)	17.63	17.63				
				Submerged screen	Y	N				
MW-21	725.75	710.9	21.91	Groundwater Level (ft)	9.03	11.21	-	713.16	721.01	2.65
				Groundwater Elevation (ft amsl)	716.72	714.54				
				Measured Well Depth (ft)	19.26	19.26				
				Submerged screen	Y	Y				
MW-22	744.27	710	41	Groundwater Level (ft)	14.29	17.24	-	727.43	731.18	0.00
				Groundwater Elevation (ft amsl)	729.98	727.03				
				Measured Well Depth (ft)	41	41				
				Submerged screen	Y	Y				
MW-23	726.9	708.73	25	Groundwater Level (ft)	5.28	8.43	-	719.37	723.02	1
				Groundwater Elevation (ft amsl)	721.62	718.47				
				Measured Well Depth (ft)	24	24				
				Submerged screen	Y	Y				
MW-24	735.32	722.1	20	Groundwater Level (ft)	13.32	19.21	-	717.54	725.83	1
				Groundwater Elevation (ft amsl)	722	716.11				
				Measured Well Depth (ft)	19	19				
				Submerged screen	N	N				
MW-26	731.08	702.35	35	Groundwater Level (ft)	21.4	20.56	-	710.35	712.91	0.46
				Groundwater Elevation (ft amsl)	709.68	710.52				
				Measured Well Depth (ft)	34.54	34.54				
				Submerged screen	Y	Y				
MW-27	730.26	721.26	15	Groundwater Level (ft)	13.5	15.33	-	714.47	718.43	-0.44
				Groundwater Elevation (ft amsl)	716.76	714.93				
				Measured Well Depth (ft)	15.44	15.44				
				Submerged screen	N	N				

(1) Negative value is a discharge gradient; positive values is a recharge gradient. Well clusters are MW-8/MW-9 and MW-10/MW-11/MW-12
Note: Well depth and measured well depth reported from ground surface
ft amsl - feet above mean sea level

Table 5
Background Summary
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Interwell Background/Control Limit (MW-8, MW-10, MW-22, and MW-23)

Constituent	Units	Background Level/Control Limit	Action Level	Source
Aluminum	mg/L	0.552	0.05 - 0.2	SDWR
Arsenic	mg/L	0.00367	0.01	MCL
Barium	mg/L	0.256	2	MCL
Beryllium	mg/L	0.001*	0.004	SWS
Boron	mg/L	0.322	6	HAL
Calcium	mg/L	152	-	-
Chloride	mg/L	30	250	SDWR
Cobalt	mg/L	0.00558	0.006	40CFR§257.95(h)(2)
Copper	mg/L	0.005	1.3	MCL
Fluoride	mg/L	1	4	MCL
Iron	mg/L	4.38	0.3	SDWR
Lead	mg/L	0.00204	0.015	MCL
Magnesium	mg/L	44.12	-	-
Manganese	mg/L	1.221	0.05 / 0.3	SDWR / HAL
Molybdenum	mg/L	0.00822	0.1	40CFR§257.95(h)(2)
Selenium	mg/L	0.005	0.05	MCL
Strontium	mg/L	0.3046	4	HAL
Sulfate	mg/L	366	250	SDWR
Zinc	mg/L	0.02*	5 / 2	SDWR / HAL

Table 5
Background Summary
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Interwell Background/Control Limit (MW-8, MW-10, MW-22, and MW-23)

Constituent	Units	Background Level/Control Limit	Action Level	Source
Interwell Background/Control Limit (SW-22)				
Aluminum	mg/L	3.96	0.05 - 0.2	SDWR
Arsenic	mg/L	0.00367	0.01	MCL
Barium	mg/L	0.2154	2	MCL
Beryllium	mg/L	0.001*	0.004	SWS
Boron	mg/L	6.67	6	HAL
Calcium	mg/L	221	-	-
Chloride	mg/L	21.33	250	SDWR
Cobalt	mg/L	0.00116	0.006	40CFR§257.95(h)(2)
Copper	mg/L	0.005	1.3	MCL
Fluoride	mg/L	1	4	MCL
Iron	mg/L	2.16	0.3	SDWR
Lead	mg/L	0.00258	0.015	MCL
Magnesium	mg/L	73.3	-	-
Manganese	mg/L	0.9788	0.05 / 0.3	SDWR / HAL
Molybdenum	mg/L	0.00637	0.1	40CFR§257.95(h)(2)
Selenium	mg/L	0.005*	0.05	MCL
Strontium	mg/L	0.285	4	HAL
Sulfate	mg/L	554	250	SDWR
Zinc	mg/L	0.0312	5 / 2	SDWR / HAL

* 100% non detects during background sampling, control limit not calculated
Background level developed as specified in Groundwater Stats Consulting report dated 11/9/2023
mg/L - milligram per liter
MCL - Maximium contaminant level
HAL - Health Advisory Level
SDWR - Secondary Drinking Water Regulation
SWS - Statewide Standard for Protected Groundwater

Table 6
Summary of Well/Detected Constituent Pairs With No Immediately Preceding Control Limit Exceedances
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
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Table 6 information can be observed through Tables 7, 8, and 9. The vast majority of well-constituent pairs did not have an immediately preceeding control limit exceedance.

Table 7
Summary of Ongoing and Newly Identified Control Limit Exceedances
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Well	Constituent	Units	2023 Results		Control Limit Fall 2023	Action Level/ Standard*
			April	September		
MW-5B	Barium	mg/l	0.237	0.274	0.256	**2**
	Chloride	mg/l	38.7	41.8	30	250
MW-14A	Boron	mg/l	14.8	18.1	0.322	6
	Calcium	mg/l	318	291	152	-
	Magnesium	mg/l	122	122	44.12	-
	Sulfate	mg/l	1150	1440	366	250
MW-15A	Boron	mg/l	5.8	9.28	0.322	6
	Magnesium	mg/l	48.7	54.0	44.12	-
MW-21	Boron	mg/l	3.35	4.42	0.322	6
	Selenium	mg/l	<0.005	0.0053	0.005	**0.05**
MW-26	Boron	mg/l	2.26	3.08	0.322	6
	Sulfate	mg/l	72.5	380	366	250
	Magnesium	mg/l	52.3	48.9	44.12	-
MW-27	Boron	mg/l	0.741	1	0.322	6
SW-23	Molybdenum	mg/l	0.0281	-	0.00637	**0.1**
SW-24	Boron	mg/l	7.97	-	6.67	6
	Magnesium	mg/l	86.1	-	73.3	-
	Strontium	mg/l	0.339	-	0.285	4
	Sulfate	mg/l	622	-	554	250
SW-26	Arsenic	mg/l	0.00664	-	0.00367	**0.01**
	Boron	mg/l	1.54	-	0.322	6
	Molybdenum	mg/l	0.0149	-	0.00637	**0.1**

* Bold identifies Maxmimum Contaminant Levels or Federal CCR Regulation comparison values

Table 8
Analytical Data Summary
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Constituent (CAS #)	Sample Date	Units	MW-8 Bkgrnd	MW-10 Bkgrnd	MW-22 Bkgrnd	MW-23 Bkgrnd	MW-4B DwnGrad	MW-5B DwnGrad	MW-6A DwnGrad	MW-13 Abandoned	MW-14A DwnGrad	MW-15A DwnGrad	MW-18 Abandoned	MW-21 DwnGrad	SW-24 U-Drain	SW-25 U-Drain	SW-22 UpStrm	SW-23 DwnStrm	SW-26 DwnStrm	MW-24 Assess	MW-25 Abandoned	MW-26 Delin	MW-27 Delin
Aluminum (Total) (7429-90-5)	10/10/2016	mg/l	<0.05	**0.0826**			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05									
SDWR = 0.05 - 0.2	8/7/2017	mg/l	<0.05	<0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05									
	3/6/2018	mg/l	<0.05	<0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	**0.0832**									
	8/27/2018	mg/l	<0.05	<0.05			<0.05	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5									
	3/18/2019	mg/l	<0.05	<0.05	<0.05	**0.644**	<0.05	<0.05	<0.05		<0.05	<0.05		<0.05	<0.05	<0.05	**0.153**	**0.0744**	<0.05	**0.169**	<0.2		
	8/6/2019	mg/l	<0.05	<0.05	<0.05	**0.253**	<0.05	<0.05	<0.05		<0.05	<0.05		<0.05	<0.05	<0.05	**0.194**	**0.0761**	<0.05	**0.0649**	<0.05		
	4/10/2020	mg/l	<0.05	<0.05	<0.05	**0.552**	<0.05	<0.05	<0.05		<0.05	<0.05		<0.05	<0.05	<0.05	**0.0821**	**0.0578**	<0.05	**0.134**			
	9/18/2020	mg/l	<0.05	<0.05	<0.05	<0.05	**0.475**	<0.05	<0.05		<0.05	<0.05		<0.05	<0.05	<0.05	**1.28**	**0.44**	<0.05	<0.05		<0.05	<0.05
	4/6/2021	mg/l	<0.05	<0.05	<0.05	**0.39**	<0.05	<0.05	<0.05		<0.05	<0.05		<0.05	<0.05	<0.05	**0.191**	**0.19**	**0.432**	<0.05		<0.05	<0.05
	9/1/2021	mg/l	<0.05	<0.05	<0.05	**0.135**	<0.05	<0.05	<0.05		<0.05	<0.05		<0.05	<0.05	**0.858**	**0.982**	**0.65**	**0.0654**	<0.05		<0.05	**0.112**
	4/20/2022	mg/l	<0.05	<0.05	<0.05	**0.478**	<0.05	<0.05	<0.05		**0.111**	<0.05		<0.05	<0.20	<0.20	<0.05	<0.05	<0.05	<0.05		<0.05	**0.270**
	9/14/2022	mg/l	<0.05	<0.05	<0.05	**0.142**	<0.05	<0.05	<0.05		**0.119**	<0.05		<0.05	<0.05	<0.05			<0.05	<0.05		<0.05	**0.558**
	4/12/2023	mg/l	<0.05	<0.05	<0.05	**0.233**	<0.05	<0.05	<0.05		<0.05	<0.05		<0.05	<0.05	<0.05	**0.0782**	<0.05	<0.05	<0.05		**0.0884**	**0.394**
	9/20/2023	mg/l	<0.05	<0.05	<0.05	**0.105**	<0.05	<0.05	<0.05		<0.05	<0.05		<0.05						<0.05		<0.05	**0.0737**
Arsenic (Total) (7440-38-2)	10/10/2016	mg/l	<0.002	**0.00328**			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002									
MCL = 0.01	8/7/2017	mg/l	<0.002	**0.00317**			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002									
	3/6/2018	mg/l	<0.002	<0.002			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	**0.00265**	<0.002									
	8/27/2018	mg/l	<0.002	**0.0036**			<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002									
	3/18/2019	mg/l	<0.002	**0.0056**	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		
	8/6/2019	mg/l	<0.002	**0.00784**	<0.002	<0.002	<0.002	<0.002	<0.002		<0.008	<0.002		<0.002	<0.002	<0.002	**0.00342**	**0.00378**	**0.0347**	<0.002	<0.008		
	4/10/2020	mg/l	<0.002	**0.00697**	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	**0.00368**	<0.002			
	9/18/2020	mg/l	<0.002	**0.00748**	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002	**0.00217**	**0.00236**	**0.187**	<0.002		<0.002	<0.002
	4/6/2021	mg/l	<0.002	**0.00393**	**0.00289**	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	**0.0268**	<0.002		<0.002	<0.002
	9/1/2021	mg/l	<0.002	**0.00781**	**0.00267**	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002	**0.00367**	**0.00332**	**0.0262**	<0.002		<0.002	<0.002
	4/20/2022	mg/l	<0.002	**0.00371**	**0.00340**	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.008	<0.008	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002
	9/14/2022	mg/l	<0.002	**0.00497**	**0.00285**	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002			**0.0151**	<0.002		<0.002	<0.002
	4/12/2023	mg/l	**0.00247**	**0.00224**	**0.00421**	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	**0.00221**	**0.00664**	<0.002		<0.002	<0.002
	9/20/2023	mg/l	<0.002	**0.00501**	**0.00421**	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002						<0.002		<0.002	<0.002
Barium (Total) (7440-39-3)	10/10/2016	mg/l	**0.0706**	**0.163**			**0.131**	**0.304**	**0.196**	**0.0477**	**0.0391**	**0.0426**	**0.0381**	**0.0606**									
MCL = 2	8/7/2017	mg/l	**0.0596**	**0.157**			**0.133**	**0.3**	**0.190**	**0.0857**	**0.031**	**0.0338**	**0.0329**	**0.0499**									
	3/6/2018	mg/l	**0.0617**	**0.129**			**0.117**	**0.341**	**0.206**	**0.132**	**0.0285**	**0.0352**	**0.0281**	**0.0148**									
	8/27/2018	mg/l	**0.0649**	**0.216**			**0.149**	**0.357**	**0.206**	**0.122**	**0.0344**	**0.0335**	**0.036**	**0.0622**									
	3/18/2019	mg/l	**0.0751**	**0.185**	**0.209**	**0.0922**	**0.161**	**0.326**	**0.2**		**0.0328**	**0.037**		**0.0511**	**0.0278**	**0.056**	**0.0996**	**0.079**	**0.0793**	**0.0889**	**0.0342**		
	8/6/2019	mg/l	**0.0733**	**0.215**	**0.215**	**0.0635**	**0.147**	**0.301**	**0.211**		**0.0398**	**0.047**		**0.0624**	**0.0272**	**0.0648**	**0.168**	**0.171**	**0.048**	**0.128**	**0.0448**		
	4/10/2020	mg/l	**0.0613**	**0.199**	**0.222**	**0.0654**	**0.156**	**0.25**	**0.216**		**0.0266**	**0.0389**		**0.0352**	**0.0254**	**0.0548**	**0.0967**	**0.0806**	**0.078**	**0.084**			
	9/18/2020	mg/l	**0.0549**	**0.227**	**0.222**	**0.0491**	**0.147**	**0.239**	**0.231**		**0.0328**	**0.0416**		**0.0407**	**0.0257**	**0.0648**	**0.168**	**0.113**	**0.0772**	**0.0969**		**0.114**	**0.0738**
	4/6/2021	mg/l	**0.0596**	**0.196**	**0.242**	**0.0608**	**0.169**	**0.252**	**0.245**		**0.0355**	**0.0365**		**0.0309**	**0.0285**	**0.0594**	**0.112**	**0.103**	**0.102**	**0.0936**		**0.0989**	**0.0534**
	9/1/2021	mg/l	**0.0623**	**0.233**	**0.247**	**0.0497**	**0.186**	**0.241**	**0.248**		**0.0345**	**0.0355**		**0.0434**	**0.0259**	**0.0941**	**0.181**	**0.109**	**0.0455**	**0.0922**		**0.0889**	**0.0862**
	4/20/2022	mg/l	**0.0631**	**0.208**	**0.239**	**0.0572**	**0.191**	**0.258**	**0.249**		**0.0327**	**0.0443**		**0.036**	**0.0222**	**0.0407**	**0.1**	**0.0689**	**0.0503**	**0.0826**		**0.0802**	**0.0498**
	9/14/2022	mg/l	**0.0703**	**0.223**	**0.243**	**0.0507**	**0.188**	**0.253**	**0.229**		**0.0340**	**0.0327**		**0.0447**	**0.0288**	**0.0580**			**0.0656**	**0.0887**		**0.0876**	**0.0594**
	4/12/2023	mg/l	**0.0700**	**0.190**	**0.227**	**0.0518**	**0.173**	**0.237**	**0.246**		**0.0320**	**0.0299**		**0.0310**	**0.0253**	**0.0510**	**0.101**	**0.0922**	**0.0536**	**0.0863**		**0.0815**	**0.0508**
	9/20/2023	mg/l	**0.0782**	**0.233**	**0.256**	**0.0533**	**0.181**	**0.274**	**0.222**		**0.0348**	**0.0338**		**0.0559**						**0.0698**		**0.0755**	**0.053**

Table 8
Analytical Data Summary
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Constituent (CAS #)	Sample Date	Units	MW-8 Bkgrnd	MW-10 Bkgrnd	MW-22 Bkgrnd	MW-23 Bkgrnd	MW-4B DwnGrad	MW-5B DwnGrad	MW-6A DwnGrad	MW-13 Abandoned	MW-14A DwnGrad	MW-15A DwnGrad	MW-18 Abandoned	MW-21 DwnGrad	SW-24 U-Drain	SW-25 U-Drain	SW-22 UpStrm	SW-23 DwnStrm	SW-26 DwnStrm	MW-24 Assess	MW-25 Abandoned	MW-26 Delin	MW-27 Delin
Beryllium (Total) (7440-41-7)	10/10/2016	mg/l	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001									
MCL = 0.004	8/7/2017	mg/l	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001									
	3/6/2018	mg/l	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001									
	8/27/2018	mg/l	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001									
	3/18/2019	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004		
	8/6/2019	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.004	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004		
	4/10/2020	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			
	9/18/2020	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001
	4/6/2021	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001
	9/1/2021	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001
	4/20/2022	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	<0.004	<0.004	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001
	9/14/2022	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	<0.001	<0.001			<0.001	<0.001		<0.001	<0.001
	4/12/2023	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001
	9/20/2023	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001						<0.001		<0.001	<0.001
Boron (Total) (7440-42-8)	10/10/2016	mg/l	<0.2	<0.2			<0.2	<0.2	<0.2	**74.8**	**19.3**	**17.9**	**14.3**	**8.45**									
HAL = 6	8/7/2017	mg/l	<0.2	<0.2			<0.2	<0.2	<0.2	**2.72**	**13**	**14.7**	**10.8**	**7.05**									
	3/6/2018	mg/l	<0.2	<0.2			**0.66**	<0.2	<0.2	**21.7**	**11**	**9.8**	**8.81**	**0.885**									
	8/27/2018	mg/l	<0.2	<0.2			<0.2	<0.2	<0.2	**1.45**	**14**	**14.6**	**10.5**	**1.36**									
	3/18/2019	mg/l	<0.2	<0.2	**0.299**	<0.2	<0.2	<0.2	<0.2		**15.5**	**8.35**		**6.95**	**9.36**	**2.9**	<0.2	**0.693**	**0.486**	<0.2	**14.5**		
	8/6/2019	mg/l	**0.205**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		**17.6**	**7.56**		**8.46**	**10.4**	**8.03**	<0.2	**2.66**	**1**	<0.2	**11.5**		
	4/10/2020	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		**17.4**	**10.6**		**6.76**	**8.58**	**3.8**	<0.2	**0.898**	**0.745**	<0.2			
	9/18/2020	mg/l	<0.1	<0.1	**0.263**	**0.15**	<0.1	<0.1	<0.1		**19.5**	**14.5**		**6.82**	**9.39**	**6.36**	**0.206**	**2.72**	**11.3**	**0.109**		**2.5**	**3.25**
	4/6/2021	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		**17.2**	**10.3**		**5.24**	**6.55**	**2.11**	<0.1	**0.32**	**1.52**	<0.1		**2.33**	**0.17**
	9/1/2021	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		**17.1**	**11.1**		**5.88**	**8.55**	**0.528**	<0.1	**0.704**	**0.941**	<0.1		**2.49**	**3.82**
	4/20/2022	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		**15.2**	**6.98**		**3.57**	**8.12**	**5**	<0.1	**1.43**	**0.855**	<0.1		**2.07**	**0.549**
	9/14/2022	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		**15.1**	**10.4**		**3.69**	**9.05**	**5.86**	<0.1		**0.892**	**0.134**		**1.97**	**1.41**
	4/12/2023	mg/l	<0.1	<0.1	**0.247**	**0.145**	<0.1	<0.1	<0.1		**14.8**	**5.80**		**3.35**	**7.97**	**4.20**	<0.1	**2.17**	**1.54**	**0.114**		**2.26**	**0.741**
	9/20/2023	mg/l	<0.1	<0.1	**0.207**	**0.128**	<0.1	<0.1	<0.1		**18.1**	**9.28**		**4.42**						<0.1		**3.08**	**1**
Calcium (Total) (7440-70-2)	10/10/2016	mg/l	**118**	**83.3**			**89.3**	**140**	**75.7**	**276**	**308**	**203**	**280**	**185**									
MCL = NA	8/7/2017	mg/l	**91.3**	**85.5**			**89.7**	**139**	**71.2**	**95.4**	**296**	**206**	**258**	**163**									
	3/6/2018	mg/l	**74.7**	**77.3**			**95.8**	**134**	**74.1**	**149**	**278**	**229**	**191**	**25.1**									
	8/27/2018	mg/l	**83.6**	**85.4**			**91.3**	**146**	**73.3**	**93.1**	**309**	**155**	**223**	**78.7**									
	3/18/2019	mg/l	**97.6**	**76.3**	**91.6**	**59.7**	**99.7**	**134**	**73.2**		**290**	**118**		**142**	**263**	**147**	**51.8**	**60.1**	**52.4**	**75**	**157**		
	8/6/2019	mg/l	**132**	**78.9**	**83.8**	**59.5**	**93.8**	**139**	**80.9**		**255**	**111**		**145**	**240**	**223**	**47.4**	**115**	**43.6**	**103**	**160**		
	4/10/2020	mg/l	**92.4**	**75.4**	**80.9**	**61**	**89.6**	**117**	**85.1**		**245**	**163**		**104**	**242**	**168**	**59.6**	**68.6**	**65.5**	**94.3**			
	9/18/2020	mg/l	**77.7**	**74.2**	**75.5**	**52.1**	**89**	**108**	**87.9**		**244**	**134**		**101**	**238**	**203**	**55.1**	**114**	**123**	**69.6**		**134**	**61**
	4/6/2021	mg/l	**81.2**	**78.8**	**78.4**	**56.3**	**94.1**	**104**	**87.6**		**259**	**128**		**79.5**	**221**	**125**	**42.4**	**48.7**	**44.5**	**74.6**		**130**	**57.6**
	9/1/2021	mg/l	**78.3**	**80**	**79.4**	**56.1**	**95.1**	**108**	**90.6**		**270**	**125**		**93.5**	**229**	**80.5**	**58.1**	**77.3**	**48.3**	**69**		**134**	**68.4**
	4/20/2022	mg/l	**69.6**	**90.4**	**80.2**	**54**	**106**	**117**	**96.5**		**289**	**127**		**97.5**	**201**	**154**	**58.6**	**71.7**	**57.4**	**62.8**		**121**	**29.6**
	9/14/2022	mg/l	**76.8**	**82**	**79.6**	**54.5**	**92.3**	**117**	**89**		**301**	**132**		**88.2**	**232**	**182**			**59.4**	**66.8**		**133**	**38.7**
	4/12/2023	mg/l	**78.2**	**83.7**	**80.4**	**55.3**	**91.3**	**107**	**95.4**		**318**	**110**		**76.0**	**213**	**149**	**57.6**	**87.6**	**70.0**	**78.6**		**141**	**26.8**
	9/20/2023	mg/l	**79.4**	**84.7**	**79**	**56**	**90.4**	**115**	**82.1**		**291**	**126**		**96**						**70.5**		**127**	**33.4**

Table 8
Analytical Data Summary
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Constituent (CAS #)	Sample Date	Units	MW-8 Bkgrnd	MW-10 Bkgrnd	MW-22 Bkgrnd	MW-23 Bkgrnd	MW-4B DwnGrad	MW-5B DwnGrad	MW-6A DwnGrad	MW-13 Abandoned	MW-14A DwnGrad	MW-15A DwnGrad	MW-18 Abandoned	MW-21 DwnGrad	SW-24 U-Drain	SW-25 U-Drain	SW-22 UpStrm	SW-23 DwnStrm	SW-26 DwnStrm	MW-24 Assess	MW-25 Abandoned	MW-26 Delin	MW-27 Delin
Chloride (16887-00-6)	10/10/2016	mg/l	**16.2**	<5			**13.6**	**66**	<5	**29.8**	**37**	**17.6**	**35.3**	**24.4**									
SDWR = 250	8/7/2017	mg/l	**14**	<5			**13.2**	**64**	<5	**9.62**	**32.9**	**15.4**	**27**	**16.1**									
	3/6/2018	mg/l	**14.5**	<5			**8.81**	**68.2**	**5.33**	**19.9**	**37.4**	**24.2**	**27.1**	<5									
	8/27/2018	mg/l	**15.6**	<5			**19.4**	**70.8**	<5	**7.24**	**33.1**	**10.1**	**26.9**	<5									
	3/18/2019	mg/l	**16.1**	<5	**27.6**	**10.5**	**16**	**55**	<5		**25.8**	**8.54**		**8.3**	**13.3**	**12.4**	**12.9**	**12.4**	**11**	**17.3**	**11.4**		
	8/6/2019	mg/l	**17.1**	<5	**26.9**	**13.8**	**15.6**	**64.1**	<5		**22.1**	**9.91**		**14**	**15.1**	**15**	**12.3**	**17**	**16.7**	**22.4**	**11.6**		
	4/10/2020	mg/l	**17.2**	<5	**24.8**	**15.7**	**14.8**	**44**	**12.2**		**22.5**	**13**		**8.05**	**17.1**	**17.1**	**14.5**	**15.6**	**15.8**	**24.8**			
	9/18/2020	mg/l	**14.7**	<5	**23.2**	**14.4**	**15.1**	**41**	**15.6**		**22.8**	**8.63**		**7.21**	**16.4**	**17.2**	**13.3**	**16.4**	**16.9**	**19.5**		**19.7**	**13.6**
	4/6/2021	mg/l	**22.3**	<5	**28.1**	**21.4**	**22.9**	**42.7**	**19.3**		**27.1**	**15**		**5.14**	**16**	**12.6**	**14.9**	**14.7**	**12.6**	**28.9**		**21.1**	**10.4**
	9/1/2021	mg/l	**16.3**	<5	**20**	**15.2**	**16.7**	**37.6**	**17.4**		**23.2**	**8.86**		**6.58**	**17.4**	**20.7**	**13.7**	**16.8**	**14**	**21.9**		**19.3**	**15**
	4/20/2022	mg/l	**15.8**	<5	**20.2**	**16.9**	**20.8**	**38.1**	**14.2**		**25.5**	**7.71**		**7.19**	**16.9**	**20.1**	**16.3**	**17.7**	**16**	**19.9**		**19.9**	**19.1**
	9/14/2022	mg/l	**16.7**	<5	**7.04**	**16.2**	**16.8**	**39**	**13.3**		**22.4**	**8.29**		**18**	**17**	**16.5**			**9.4**	**19.9**		**18.4**	**19**
	4/12/2023	mg/l	**17.9**	**5.86**	**18.2**	**17.7**	**18**	**38.7**	**15.4**		**20.3**	**7.3**		**5.93**	**16.1**	**17.7**	**18.0**	**19.1**	**20.2**	**23.4**		**3.83**	**2.45**
	9/20/2023	mg/l	**19.9**	<5.00	**18.4**	**19.2**	**17.4**	**41.8**	**12.2**		**20.9**	**8.41**		**8.23**						**22.8**		**18.8**	**28.9**
Cobalt (Total) (7440-48-4)	10/10/2016	mg/l	<0.0005	**0.000520**			<0.0005	<0.0005	<0.0005	**0.00179**	<0.0005	<0.0005	<0.0005	<0.0005									
40CFR§257.95(h)(2) = 0.006	8/7/2017	mg/l	**0.00051**	**0.0007**			<0.0005	<0.0005	<0.0005	**0.000686**	<0.0005	<0.0005	<0.0005	<0.0005									
	3/6/2018	mg/l	<0.0005	**0.00063**			<0.0005	<0.0005	<0.0005	**0.000964**	<0.0005	<0.0005	<0.0005	<0.0005									
	8/27/2018	mg/l	<0.0005	**0.00088**			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005									
	3/18/2019	mg/l	**0.00177**	**0.00078**	<0.0005	**0.00176**	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002		
	8/6/2019	mg/l	**0.00558**	**0.000572**	<0.0005	< 0.0005	<0.0005	<0.0005	<0.0005		<0.002	<0.0005		<0.0005	<0.002	<0.002	**0.000833**	<0.0005	**0.00061**	<0.0005	<0.002		
	4/10/2020	mg/l	**0.000517**	**0.000581**	<0.0005	**0.000817**	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005			
	9/18/2020	mg/l	**0.000738**	**0.000751**	<0.0005	< 0.0005	**0.00147**	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	<0.0005	**0.00116**	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005
	4/6/2021	mg/l	**0.000839**	**0.000752**	<0.0005	0.000517	**0.00132**	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	**0.00134**	<0.0005		<0.0005	<0.0005
	9/1/2021	mg/l	**0.001270**	**0.000576**	<0.0005	<0.0005	**0.00335**	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	**0.0**	**0.00105**	**0.000529**	<0.0005	<0.0005		<0.0005	<0.0005
	4/20/2022	mg/l	**0.001430**	**0.001040**	<0.0005	**0.000561**	**0.00135**	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.002	<0.002	**0.000713**	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005
	9/14/2022	mg/l	**0.00164**	**0.00109**	<0.0005	<0.0005	**0.00459**	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	<0.0005			<0.0005	<0.0005		<0.0005	<0.0005
	4/12/2023	mg/l	**0.001400**	**0.001420**	<0.0005	<0.0005	**0.00271**	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005
	9/20/2023	mg/l	**0.00126**	**0.000995**	<0.0005	<0.0005	**0.00374**	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005						<0.0005		<0.0005	<0.0005
Copper (Total) (7440-50-8)	10/10/2016	mg/l	<0.005	<0.005			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005									
MCL = 1.3	8/7/2017	mg/l	<0.005	<0.005			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005									
	3/6/2018	mg/l	<0.005	<0.005			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005									
	8/27/2018	mg/l	<0.005	<0.005			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005									
	3/18/2019	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02		
	8/6/2019	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.02	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02		
	4/10/2020	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			
	9/18/2020	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	**0.0719**	<0.05	<0.005		<0.005	<0.005
	4/6/2021	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005
	9/1/2021	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		<0.005	<0.005	<0.005	**0.0358**	<0.005	<0.005	<0.005		<0.005	<0.005
	4/20/2022	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		<0.005	<0.002	<0.002	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005
	9/14/2022	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		<0.005	<0.005	<0.005			<0.005	<0.005		<0.005	<0.005
	4/12/2023	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		**0.00512**	<0.005
	9/20/2023	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		<0.005						<0.005		<0.005	<0.005

Table 8
Analytical Data Summary
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Constituent (CAS #)	Sample Date	Units	MW-8 Bkgrnd	MW-10 Bkgrnd	MW-22 Bkgrnd	MW-23 Bkgrnd	MW-4B DwnGrad	MW-5B DwnGrad	MW-6A DwnGrad	MW-13 Abandoned	MW-14A DwnGrad	MW-15A DwnGrad	MW-18 Abandoned	MW-21 DwnGrad	SW-24 U-Drain	SW-25 U-Drain	SW-22 UpStrm	SW-23 DwnStrm	SW-26 DwnStrm	MW-24 Assess	MW-25 Abandoned	MW-26 Delin	MW-27 Delin
Fluoride (16984-48-8)	10/10/2016	mg/l	<0.5	<0.5			<0.5	<0.5	<0.5	**3.25**	**0.867**	<0.5	**0.791**	<0.5									
MCL = 4	8/7/2017	mg/l	<0.05	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5									
	3/6/2018	mg/l	<0.05	<0.5			<0.5	<0.5	<0.5	**2.08**	<0.5	<0.5	<0.5	<0.5									
	8/27/2018	mg/l	<0.05	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5									
	3/18/2019	mg/l	<0.05	<0.5	<0.5	<0.5	**0.771**	<0.5	<0.5		<0.5	**0.523**		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
	8/6/2019	mg/l	**0.643**	**0.596**	**0.507**	<0.5	**0.525**	<0.5	**0.535**		<0.5	**0.625**		<0.5	<0.5	<0.5	<0.5	<0.5	**0.512**	<0.5	<0.5		
	4/10/2020	mg/l	**0.864**	<0.5	<0.5	<0.5	<0.5	<0.5	**0.652**		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	**0.597**	<0.5	<0.5			
	9/18/2020	mg/l	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5
	4/6/2021	mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	**0.5**		<0.5	<0.5	<0.5	**0.6**	<0.5	<0.5	<0.5		<0.5	<0.5
	9/1/2021	mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5
	4/20/2022	mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5
	9/14/2022	mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<0.5			<0.5	<0.5		<0.5	<0.5
	4/12/2023	mg/l	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00		<1.00	<1.00	<1.00	<1.0	<1.0	<1.0	<1.00		<0.200	<0.200
	9/20/2023	mg/l	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00		<1.00	<1.00		<1.00						<1.00		<1.00	<1.00
Iron (Total) (7439-89-6)	10/10/2016	mg/l	<0.1	**1.8**			**1.5**	**2.49**	**3.12**	<0.1	<0.1	<0.1	<0.1	<0.1									
SDWR = 0.3	8/7/2017	mg/l	<0.1	**1.58**			**1.68**	**2.51**	**3.09**	**0.408**	<0.1	<0.1	<0.1	<0.1									
	3/6/2018	mg/l	<0.1	**0.177**			**0.267**	**2.43**	**3.05**	**0.263**	<0.1	<0.1	<0.1	<0.1									
	8/27/2018	mg/l	<0.1	**1.75**			**1.63**	**2.6**	**3.13**	**0.86**	<0.1	**0.102**	**0.144**	<0.1									
	3/18/2019	mg/l	<0.1	**2.75**	<0.1	**0.674**	**1.97**	**3.08**	**3.07**		<0.1	<0.1		<0.1	**0.705**	**0.104**	**0.66**	**0.176**	**0.345**	**0.115**	<0.4		
	8/6/2019	mg/l	<0.1	**3.33**	<0.1	**0.231**	**1.61**	**2.6**	**3.39**		<0.4	<0.4		<0.1	**0.137**	<0.1	**0.408**	**0.332**	**0.227**	<0.1	<0.4		
	4/10/2020	mg/l	<0.1	**3.36**	<0.1	**0.485**	**5.55**	**1.88**	**3.47**		<0.1	<0.1		<0.1	<0.1	<0.1	**0.363**	**0.275**	**0.439**	<0.1			
	9/18/2020	mg/l	<0.1	**4.38**	<0.1	<0.1	**0.895**	**1.86**	**3.45**		<0.1	<0.1		<0.1	<0.1	<0.1	**1.25**	**0.827**	<1.00	<0.1		<0.1	<0.1
	4/6/2021	mg/l	**0.2**	**2.08**	<0.1	**0.3**	<0.1	**1.85**	**3.57**		<0.1	<0.1		<0.1	<0.1	<0.1	**0.21**	**0.228**	**0.439**	<0.1		<0.1	<0.1
	9/1/2021	mg/l	**0.1**	**4.37**	<0.1	**0.1**	<0.1	**2.21**	**3.83**		<0.1	<0.1		<0.1	<0.1	**1.2**	**1.34**	**0.967**	**0.169**	<0.1		<0.1	**0.11**
	4/20/2022	mg/l	**0.565**	**2.49**	<0.1	**0.492**	<0.1	**1.99**	**3.61**		**0.165**	<0.1		<0.1	<0.4	<0.4	**0.123**	<0.1	**0.157**	<0.1		<0.1	**0.281**
	9/14/2022	mg/l	**0.609**	**2.70**	<0.1	**0.117**	**0.250**	**2.03**	**3.43**		<0.1	<0.1		<0.1	<0.1	<0.1			**0.116**	<0.1		<0.1	**0.594**
	4/12/2023	mg/l	**0.708**	**1.09**	<0.1	**0.210**	**0.423**	**1.83**	**3.43**		<0.1	<0.1		<0.1	<0.1	<0.1	**0.240**	**0.117**	**0.286**	<0.1		**0.456**	**0.338**
	9/20/2023	mg/l	**0.451**	**2.45**	<0.1	<0.1	**0.559**	**2.18**	**3.09**		<0.1	<0.1		<0.1						<0.1		<0.1	<0.1
Lead (Total) (7439-92-1)	10/10/2016	mg/l	<0.0005	<0.0005			<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005									
MCL = 0.015	8/7/2017	mg/l	<0.0005	<0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005									
	3/6/2018	mg/l	<0.0005	<0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005									
	8/27/2018	mg/l	<0.0005	<0.0005			<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005									
	3/18/2019	mg/l	<0.0005	<0.0005	<0.0005	**0.00204**	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
	8/6/2019	mg/l	<0.0005	<0.0005	<0.0005	**0.000663**	<0.0005	<0.0005	<0.0005		<0.002	<0.0005		<0.0005	<0.002	<0.002	**0.000623**	<0.0005	<0.0005	<0.0005	<0.002		
	4/10/2020	mg/l	<0.0005	<0.0005	<0.0005	**0.00116**	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005			
	9/18/2020	mg/l	<0.0005	<0.0005	<0.0005	<0.0005	**0.000532**	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	<0.0005	**0.000829**	**0.000549**	<0.0005	<0.0005		<0.0005	<0.0005
	4/6/2021	mg/l	<0.0005	<0.0005	<0.0005	**0.000624**	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	**0.00101**	<0.0005		<0.0005	<0.0005
	9/1/2021	mg/l	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	<0.0005	**0.00258**	**0.000726**	<0.0005	<0.0005		<0.0005	<0.0005
	4/20/2022	mg/l	<0.0005	<0.0005	<0.0005	**0.000596**	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.002	<0.002	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005
	9/14/2022	mg/l	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	<0.0005			<0.0005	<0.0005		<0.0005	**0.000536**
	4/12/2023	mg/l	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	**0.000528**
	9/20/2023	mg/l	<0.0005	<0.0005	<0.0005	<0.0005	**0.000576**	**0.000627**	<0.0005		<0.0005	<0.0005		<0.0005						<0.0005		<0.0005	<0.0005

Table 8
Analytical Data Summary
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Constituent (CAS #)	Sample Date	Units	MW-8 Bkgrnd	MW-10 Bkgrnd	MW-22 Bkgrnd	MW-23 Bkgrnd	MW-4B DwnGrad	MW-5B DwnGrad	MW-6A DwnGrad	MW-13 Abandoned	MW-14A DwnGrad	MW-15A DwnGrad	MW-18 Abandoned	MW-21 DwnGrad	SW-24 U-Drain	SW-25 U-Drain	SW-22 UpStrm	SW-23 DwnStrm	SW-26 DwnStrm	MW-24 Assess	MW-25 Abandoned	MW-26 Delin	MW-27 Delin
Magnesium (Total) (7439-95-4)	10/10/2016	mg/l	44.1	33.8			31.4	42	23.5	88	122	79.3	107	76.6									
MCL = NA	8/7/2017	mg/l	36.4	37.8			33.4	43.8	24.7	34.9	124	86	99.6	72.1									
	3/6/2018	mg/l	28.5	35.1			36.9	40.3	23.6	55.9	120	92	71.3	11.3									
	8/27/2018	mg/l	31.8	33.4			32.6	44.6	23.6	33	145	63.4	81.5	34.1									
	3/18/2019	mg/l	37.4	31.7	34.9	18.4	35.6	43.1	24.2		103	48.5		60.1	83.9	44.7	22.6	24.3	19.2	32.1	54.8		
	8/6/2019	mg/l	50.1	30.0	33.0	24.7	34	42.8	25.4		103	46.9		62.5	99.9	77.3	20.9	44.6	25.8	44.2	57.4		
	4/10/2020	mg/l	37.1	31.4	34.5	28.5	34	39.6	29.4		102	71		46.9	88.1	53	26.4	28.5	28.2	43			
	9/18/2020	mg/l	31.8	31.9	31.1	24.3	33.2	36.6	28.5		104	59		45.6	89.2	64.5	22.9	36.2	30.5	32		53.4	29.2
	4/6/2021	mg/l	31.8	32.2	31.0	25.3	34.3	35.7	28.8		116	55.4		34.9	84	32.4	17.2	19	14.8	33		49.5	10.7
	9/1/2021	mg/l	31.0	31.3	31.4	24.8	35.6	35.2	29.6		119	54		40.8	87.6	33.8	25.8	29.4	23.8	30.3		50.8	28.4
	4/20/2022	mg/l	27.7	35.0	29.6	23.3	35.1	35.0	28.6		120.0	56.0		40.2	74.4	47.3	23.6	27.2	25.4	28.3		46.4	12.9
	9/14/2022	mg/l	30.1	33.3	31.8	24.6	33.6	36.8	29.4		122	56.1		39.1	87.1	56.4			18.3	29.1		49.9	17.3
	4/12/2023	mg/l	31.1	34.5	31.5	24.4	33.9	34.8	31.2		122.0	48.7		33.0	86.1	538	25.1	34.0	33.0	34.7		52.3	11.9
	9/20/2023	mg/l	31.5	34.7	32	25.4	33.6	37.6	27.2		122	54		42.8						29.9		48.9	15.5
Manganese (Total) (7439-95-5)	10/10/2016	mg/l	0.28	0.151			0.133	0.69	0.0818	0.509	<0.01	<0.01	<0.01	<0.01									
SDWR = 0.05 / HAL = 0.3	8/7/2017	mg/l	0.237	0.166			0.132	0.689	0.0802	0.286	<0.01	<0.01	<0.01	<0.01									
	3/6/2018	mg/l	0.201	0.0706			0.208	0.692	0.0866	0.512	<0.01	<0.01	<0.01	<0.01									
	8/27/2018	mg/l	0.325	0.239			0.131	0.717	0.0805	0.305	<0.01	<0.01	0.0142	<0.01									
	3/18/2019	mg/l	0.455	0.163	0.256	0.134	0.15	0.576	0.0839		<0.01	<0.01		<0.01	0.0179	0.0184	0.196	0.164	0.172	0.0216	0.0369		
	8/6/2019	mg/l	0.758	0.177	1.74	0.0443	0.145	0.784	0.0941		<0.04	<0.01		<0.01	0.0304	0.0387	0.694	0.52	0.993	0.0223	<0.04		
	4/10/2020	mg/l	0.119	0.184	0.0896	0.0718	0.13	0.492	0.103		<0.01	<0.01		<0.01	<0.01	0.0156	0.217	0.14	0.241	0.0156			
	9/18/2020	mg/l	0.652	0.251	1.36	0.0127	0.686	0.546	0.113		<0.01	<0.01		<0.01	<0.01	0.0311	0.492	0.335	0.271	<0.01		0.0501	0.0345
	4/6/2021	mg/l	0.185	0.199	0.18	0.0634	1.39	0.467	0.109		<0.01	<0.01		<0.01	<0.01	<0.01	0.0882	0.0311	0.114	<0.01		0.0395	0.0278
	9/1/2021	mg/l	0.663	0.221	1.27	0.0444	1.39	0.512	0.117		<0.01	<0.01		<0.01	<0.01	0.054	0.539	0.578	0.29	0.0126		0.0629	0.0375
	4/20/2022	mg/l	0.411	0.231	0.106	0.0588	0.91	0.454	0.112		0.0264	<0.01		<0.01	<0.04	<0.04	0.125	0.0426	0.0422	<0.01		0.0190	0.0722
	9/14/2022	mg/l	0.749	0.31	0.795	0.0222	0.871	0.532	0.112		<0.01	<0.01		<0.01	<0.01	0.026			0.131	<0.01		0.0917	0.0406
	4/12/2023	mg/l	0.309	0.396	0.0633	0.0372	0.510	0.453	0.113		<0.01	<0.01		<0.01	<0.01	0.0169	0.204	0.115	0.728	0.0144		0.0983	0.0378
	9/20/2023	mg/l	0.37	0.266	0.767	0.0169	0.612	0.594	0.0995		<0.01	<0.01		<0.01						0.0183		0.111	0.0231
Molybdenum (Total) (7439-98-7)	10/10/2016	mg/l	<0.002	<0.002			<0.002	<0.002	<0.002	0.0176	<0.002	<0.002	<0.002	<0.002									
40CFR§257.95(h)(2) = 0.1	8/7/2017	mg/l	<0.002	<0.002			<0.002	<0.002	<0.002	0.00329	<0.002	<0.002	<0.002	<0.002									
	3/6/2018	mg/l	0.0022	<0.02			<0.002	<0.002	<0.002	0.00732	<0.002	<0.002	<0.002	<0.002									
	8/27/2018	mg/l	0.00224	0.0022			<0.002	<0.002	<0.002	0.00278	<0.002	<0.002	<0.002	<0.002									
	3/18/2019	mg/l	<0.002	0.00341	0.00263	<0.002	<0.002	0.00212	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	0.00291	<0.002	<0.002		
	8/6/2019	mg/l	<0.002	0.00219	0.00574	<0.002	<0.002	<0.002	<0.002		<0.008	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	0.00379	<0.002	<0.008		
	4/10/2020	mg/l	<0.002	0.00215	0.00297	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			
	9/18/2020	mg/l	<0.002	<0.002	0.00529	<0.002	0.00296	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002	0.00256	<0.002	<0.002	0.0876	<0.002		<0.002	<0.002
	4/6/2021	mg/l	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	<0.002	0.011	<0.002		0.00239	<0.002
	9/1/2021	mg/l	0.00218	0.0	0.00558	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002	0.00637	0.00252	0.00925	<0.002		<0.002	<0.002
	4/20/2022	mg/l	<0.002	<0.002	0.0042	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.008	<0.008	<0.002	<0.002	0.00202	<0.002		<0.002	<0.002
	9/14/2022	mg/l	<0.002	<0.002	0.00446	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002			0.00514	<0.002		<0.002	<0.002
	4/12/2023	mg/l	<0.002	<0.002	0.00364	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002	<0.002	0.0281	0.0149	<0.002		<0.002	<0.002
	9/20/2023	mg/l	<0.002	<0.002	0.00661	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002						<0.002		<0.002	<0.002

Table 8
Analytical Data Summary
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Constituent (CAS #)	Sample Date	Units	MW-8 Bkgrnd	MW-10 Bkgrnd	MW-22 Bkgrnd	MW-23 Bkgrnd	MW-4B DwnGrad	MW-5B DwnGrad	MW-6A DwnGrad	MW-13 Abandoned	MW-14A DwnGrad	MW-15A DwnGrad	MW-18 Abandoned	MW-21 DwnGrad	SW-24 U-Drain	SW-25 U-Drain	SW-22 UpStrm	SW-23 DwnStrm	SW-26 DwnStrm	MW-24 Assess	MW-25 Abandoned	MW-26 Delin	MW-27 Delin
Selenium (Total) (7782-49-2)	10/10/2016	mg/l	<0.005	<0.005			<0.005	<0.005	<0.005	**0.0364**	**0.00821**	<0.005	<0.005	**0.0137**									
MCL = 0.05	8/7/2017	mg/l	<0.005	<0.005			<0.005	<0.005	<0.005	<0.005	**0.00759**	<0.005	<0.005	**0.0109**									
	3/6/2018	mg/l	<0.005	<0.005			<0.005	<0.005	<0.005	**0.0195**	<0.005	**0.00502**	<0.005	<0.005									
	8/27/2018	mg/l	<0.005	<0.005			<0.005	<0.005	<0.005	<0.005	**0.00827**	<0.005	<0.005	<0.005									
	3/18/2019	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		**0.00569**	<0.005		**0.0102**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02		
	8/6/2019	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.02	<0.005		**0.0108**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		
	4/10/2020	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		**0.00632**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			
	9/18/2020	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		**0.00762**	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005		<0.005	<0.005
	4/6/2021	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005
	9/1/2021	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		**0.00617**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005
	4/20/2022	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		**0.00634**	<0.02	<0.02	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005
	9/14/2022	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		<0.005	<0.005	<0.005			<0.005	<0.005		<0.005	<0.005
	4/12/2023	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005
	9/20/2023	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005		**0.0053**						<0.005		<0.005	<0.005
Strontium (Total) (7440-24-6)	10/10/2016	mg/l	**0.338**	**0.156**			**0.103**	**0.193**	**0.156**	**0.342**	**0.279**	**0.185**	**0.325**	**0.291**									
HAL = 4	8/7/2017	mg/l	**0.243**	**0.165**			**0.11**	**0.197**	**0.161**	**0.135**	**0.257**	**0.178**	**0.287**	**0.256**									
	3/6/2018	mg/l	**0.209**	**0.159**			**0.137**	**0.2**	**0.172**	**0.243**	**0.241**	**0.191**	**0.225**	**0.0425**									
	8/27/2018	mg/l	**0.198**	**0.197**			**0.107**	**0.212**	**0.161**	**0.139**	**0.266**	**0.14**	**0.257**	**0.133**									
	3/18/2019	mg/l	**0.236**	**0.181**	**0.151**	**0.123**	**0.12**	**0.214**	**0.176**		**0.275**	**0.126**		**0.254**	**0.541**	**0.322**	**0.12**	**0.131**	**0.123**	**0.0937**	**0.0953**		
	8/6/2019	mg/l	**0.323**	**0.199**	**0.133**	**0.0872**	**0.115**	**0.208**	**0.178**		**0.274**	**0.134**		**0.263**	**0.444**	**0.346**	**0.129**	**0.264**	**0.158**	**0.123**	**0.106**		
	4/10/2020	mg/l	**0.233**	**0.19**	**0.129**	**0.0661**	**0.103**	**0.166**	**0.173**		**0.246**	**0.154**		**0.175**	**0.358**	**0.315**	**0.128**	**0.141**	**0.156**	**0.109**			
	9/18/2020	mg/l	**0.176**	**0.19**	**0.108**	**0.0602**	**0.146**	**0.167**	**0.187**		**0.259**	**0.153**		**0.184**	**0.335**	**0.288**	**0.125**	**0.23**	**0.759**	**0.0824**		**0.174**	**0.106**
	4/6/2021	mg/l	**0.188**	**0.18**	**0.130**	**0.0639**	**0.129**	**0.163**	**0.188**		**0.261**	**0.133**		**0.148**	**0.388**	**0.312**	**0.12**	**0.137**	**0.17**	**0.0899**		**0.159**	**0.0986**
	9/1/2021	mg/l	**0.172**	**0.23**	**0.115**	**0.068**	**0.14**	**0.17**	**0.204**		**0.282**	**0.136**		**0.178**	**0.347**	**0.101**	**0.147**	**0.19**	**0.174**	**0.085**		**0.159**	**0.128**
	4/20/2022	mg/l	**0.164**	**0.173**	**0.127**	**0.0595**	**0.122**	**0.168**	**0.194**		**0.247**	**0.149**		**0.169**	**0.301**	**0.245**	**0.125**	**0.148**	**0.146**	**0.0802**		**0.145**	**0.0575**
	9/14/2022	mg/l	**0.16**	**0.191**	**0.111**	**0.0592**	**0.101**	**0.167**	**0.184**		**0.266**	**0.127**		**0.155**	**0.326**	**0.218**			**0.156**	**0.0746**		**0.145**	**0.0659**
	4/12/2023	mg/l	**0.148**	**0.178**	**0.137**	**0.0526**	**0.0910**	**0.149**	**0.194**		**0.293**	**0.0985**		**0.153**	**0.339**	**0.257**	**0.111**	**0.229**	**0.203**	**0.0795**		**0.133**	**0.0512**
	9/20/2023	mg/l	**0.151**	**0.207**	**0.101**	**0.0601**	**0.0958**	**0.163**	**0.165**		**0.282**	**0.113**		**0.164**						**0.0768**		**0.135**	**0.0752**
Sulfate (14808-79-8)	10/10/2016	mg/l	**187**	**36.4**			**27.2**	**105**	<5	**1170**	**1010**	**607**	**855**	**603**									
SDWR = 250	8/7/2017	mg/l	**119**	**39**			**35.3**	**114**	<5	**99.4**	**1110**	**664**	**801**	**590**									
	3/6/2018	mg/l	**87.3**	**51.4**			**162**	**122**	<5	**506**	**1110**	**824**	**624**	**53.7**									
	8/27/2018	mg/l	**94.7**	**34.3**			**52.2**	**120**	<5	**72.7**	**1070**	**400**	**675**	**96.6**									
	3/18/2019	mg/l	**223**	**42.8**	**134**	**26.2**	**48**	**85**	<5		**1050**	**351**		**442**	**832**	**313**	**20.4**	**42.2**	**33.7**	**90.8**	**360**		
	8/6/2019	mg/l	**276**	**28.8**	**139**	**29.7**	**47**	**112**	<5		**837**	**327**		**529**	**694**	**618**	**10.1**	**175**	**46.3**	**169**	**325**		
	4/10/2020	mg/l	**123**	**18.6**	**143**	**25.5**	**41.5**	**58.9**	**13.6**		**888**	**496**		**373**	**572**	**322**	**16.3**	**41.5**	**45.9**	**164**			
	9/18/2020	mg/l	**100**	**36.5**	**151**	**25.8**	**46.9**	**61.9**	**19.1**		**924**	**403**		**356**	**583**	**456**	**21**	**218**	**828**	**81**		**376**	**119**
	4/6/2021	mg/l	**100**	**27.6**	**154**	**35.5**	**60.1**	**57.4**	**27.3**		**952**	**338**		**237**	**607**	**127**	**13.9**	**23.6**	**86.4**	**91.2**		**341**	**7.63**
	9/1/2021	mg/l	**83**	**32.3**	**154**	**25.8**	**50.2**	**53.7**	**22.7**		**1010**	**333**		**303**	**533**	**222**	**14.3**	**54.3**	**85.9**	**59.3**		**358**	**111**
	4/20/2022	mg/l	**72.8**	**48.3**	**158**	**25.4**	**58.4**	**44.7**	**18.9**		**1030**	**297**		**293**	**575**	**357**	**15.7**	**58.4**	**57.3**	**48.5**		**322**	**30.70**
	9/14/2022	mg/l	**67.1**	**31.2**	**220**	**23**	**49.5**	**49.9**	**16.4**		**978**	**319**		**151**	**588**	**387**			**81.4**	**44.5**		**313**	**38.2**
	4/12/2023	mg/l	**72.2**	**39.8**	**147**	**25.0**	**54.0**	**45.8**	**20.5**		**1150**	**254**		**215**	**622**	**299**	**15.7**	**182**	**121**	**87.8**		**72.5**	**5.13**
	9/20/2023	mg/l	**94.2**	**57.4**	**208**	**28.6**	**53.1**	**53.4**	**10.1**		**1440**	**365**		**303**						**62.9**		**380**	**27**

Table 8
Analytical Data Summary
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Constituent (CAS #)	Sample Date	Units	MW-8 Bkgrnd	MW-10 Bkgrnd	MW-22 Bkgrnd	MW-23 Bkgrnd	MW-4B DwnGrad	MW-5B DwnGrad	MW-6A DwnGrad	MW-13 Abandoned	MW-14A DwnGrad	MW-15A DwnGrad	MW-18 Abandoned	MW-21 DwnGrad	SW-24 U-Drain	SW-25 U-Drain	SW-22 UpStrm	SW-23 DwnStrm	SW-26 DwnStrm	MW-24 Assess	MW-25 Abandoned	MW-26 Delin	MW-27 Delin
Zinc (Total) (7440-66-6)	10/10/2016	mg/l	<0.01	<0.01			<0.01	<0.01	<0.01	**0.0197**	<0.01	<0.01	<0.01	<0.01									
HAL = 2 / SDWR = 5	8/7/2017	mg/l	<0.02	<0.02			<0.02	<0.02	<0.02	<0.002	<0.02	<0.02	<0.02	<0.02									
	3/6/2018	mg/l	<0.02	<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02									
	8/27/2018	mg/l	<0.02	<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02									
	3/18/2019	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.08		
	8/6/2019	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.08	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.08		
	4/10/2020	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			
	9/18/2020	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02
	4/6/2021	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	**0.0314**	<0.02		<0.02	<0.02
	9/1/2021	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02		<0.02	<0.02	<0.02	**0.0312**	<0.02	<0.02	<0.02		<0.02	<0.02
	4/20/2022	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02		<0.02	<0.08	<0.08	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02
	9/14/2022	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02		<0.02	<0.02	<0.02			<0.02	<0.02	<0.02	<0.02	<0.02
	4/12/2023	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02
	9/20/2023	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02		<0.02						<0.02	<0.02	<0.02	<0.02

Notes.
Bold indicates reported detection
MCL = USEPA Maximum Contaminant Level
HAL = Health Advisory Level

NS - Not Sampled
SS = Iowa Statewide Standards
SDWR = Secondary Drinking Water Regulations (also known as Secondary MCL)

Table 9
Historic Control Limit & Action Level Exceedances
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Key: gray = CL; black =action level (MCL); X= other standard (SDWR, HAL, SWS)		Spring 2019	Fall 2019	Spring 2020	Fall 2020	Spring 2021	Fall 2021	Spring 2022	Fall 2022	Spring 2023	Fall 2023
Well	**Constituent**										
MW-4B	Aluminum				X						
	Molybdenum						X				
	Iron	X	X	X	X					X	X
	Manganese	X	X	X	X	X	X	X	X	X	X
MW-5B	Barium										
	Chloride										
	Iron	X	X	X	X	X	X	X	X	X	X
	Manganese	X	X	X	X	X	X	X	X	X	X
MW-6A	Barium										
	Iron	X	X	X	X	X	X	X	X	X	X
	Manganese	X	X	X	X	X	X	X	X	X	X
MW-8	Iron							X	X	X	X
	Molybdenum		X								
	Magnesium										
	Manganese	X	X	X	X	X	X	X	X	X	X
	Sulfate										
MW-10	Iron	X	X	X	X	X	X	X	X	X	X
	Manganese	X	X	X	X	X	X	X	X	X	X
MW-14A	Boron	X	X	X	X	X	X	X	X	X	X
	Calcium										
	Magnesium										
	Selenium										
	Sulfate	X	X	X	X	X	X	X	X	X	X
MW-15A	Boron	X	X	X	X	X	X	X	X		X
	Calcium										
	Magnesium										
	Sulfate	X	X	X	X	X	X	X	X	X	X
MW-21	Boron	X	X	X	X						
	Magnesium										
	Selenium										
	Sulfate	X	X	X	X		X	X			X
MW-22	Manganese	X	X	X	X	X	X	X	X	X	X
MW-23	Aluminum	X	X	X		X	X	X		X	
	Iron	X		X		X		X			
	Manganese	X		X		X		X			

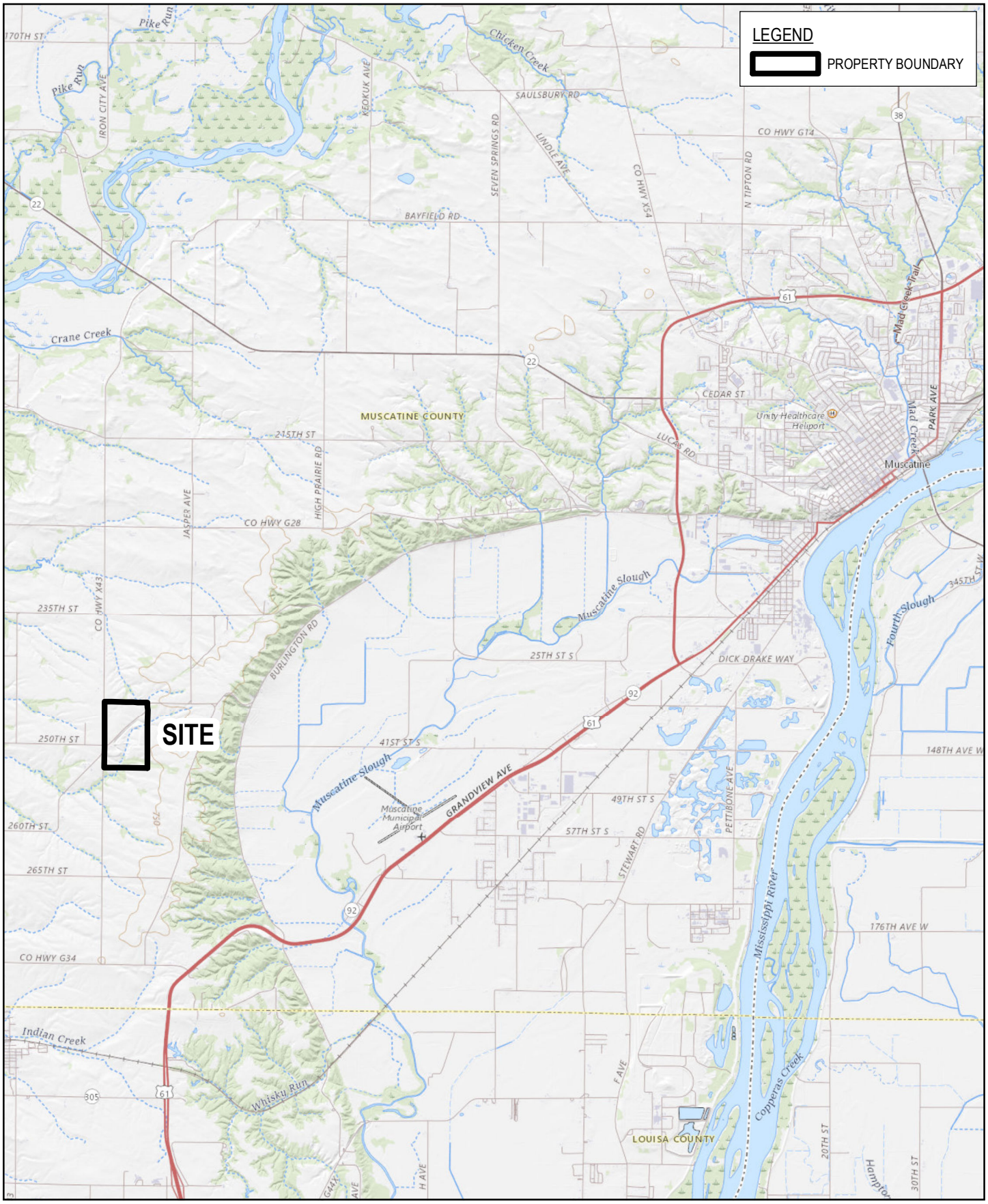
Table 9
Historic Control Limit & Action Level Exceedances
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Key: gray = CL; black =action level (MCL); X= other standard (SDWR, HAL, SWS)		Spring 2019	Fall 2019	Spring 2020	Fall 2020	Spring 2021	Fall 2021	Spring 2022	Fall 2022	Spring 2023	Fall 2023
Well	**Constituent**										
MW-24	Aluminum	X	X	X							
SW-24	Boron	X	X	X	X	X	X	X	X	X	
	Calcium										
	Iron	X									
	Magnesium										
	Strontium										
	Sulfate	X	X	X	X	X	X	X	X		
SW-25	Aluminum						X				
	Boron		X			X					
	Calcium										
	Iron						X				
	Magnesium										
	Manganese						X				
	Sulfate	X	X	X	X			X	X	X	
MW-26	Boron										
	Iron									X	
	Magnesium										
	Manganese				X		X		X	X	X
	Sulfate				X	X	X	X	X		X
MW-27	Aluminum						X	X	X	X	
	Boron										
	Iron								X	X	
	Manganese							X			
SW-22	Aluminum	X	X	X	X	X	X				
	Iron	X	X	X	X		X				
	Manganese	X	X	X	X	X	X	X			
	Zinc										
SW-23	Aluminum	X	X	X	X	X	X				
	Arsenic										
	Copper										
	Iron		X		X		X				
	Manganese	X	X	X	X		X				
	Molybdenum										
SW-26	Aluminum					X	X				
	Arsenic										
	Boron				X						
	Iron	X		X		X					
	Manganese	X	X	X	X	X	X		X		
	Molybdenum				X						
	Zinc										

Table 10
Groundwater Quality Assessment - Trend Analysis
2023 Annual Water Quality Report
Muscatine Power & Water - CCR
Permit No. 70-SDP-06-82P

Well	Current SSL	Trend (Fall 2023)
MW-5B	Chloride	decreasing
MW-8	Calcium	decreasing
	Sulfate	decreasing
MW-10	Barium	increasing
MW-15A	Boron	decreasing
MW-21	Selenium	decreasing
MW-22	Barium	increasing
	Chloride	decreasing
	Sulfate	increasing
SW-24	Boron	decreasing

Figures



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Miles

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

N

GHD

MUSCATINE POWER AND WATER
CCR LANDFILL
MUSCATINE, IOWA

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

SITE LOCATION

FIGURE 1

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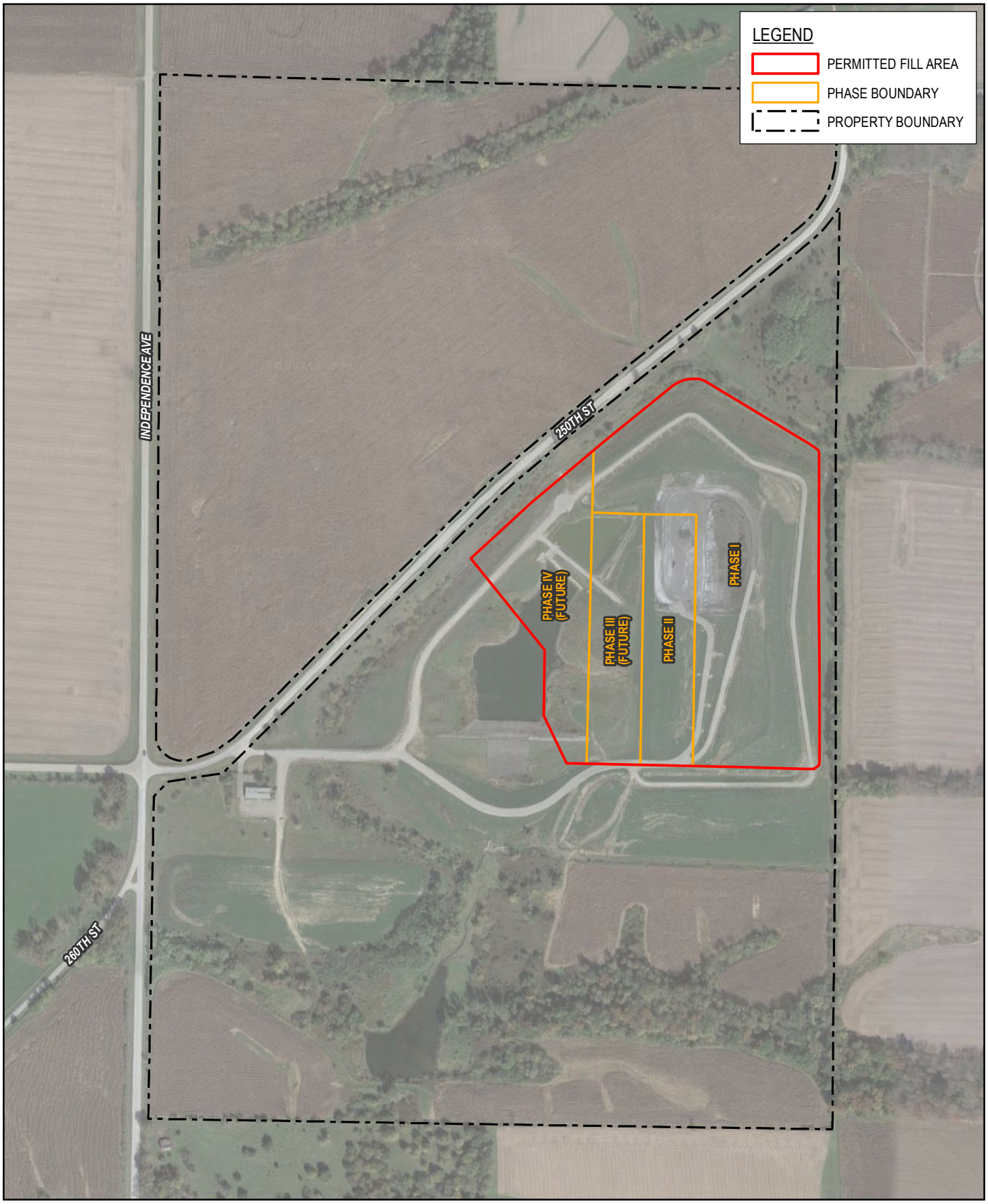
Data source: USGS The National Map. Created by: rjcoy



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

N

GHD

MUSCATINE POWER AND WATER
CCR LANDFILL
MUSCATINE, IOWA

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

SITE OVERVIEW

FIGURE 2

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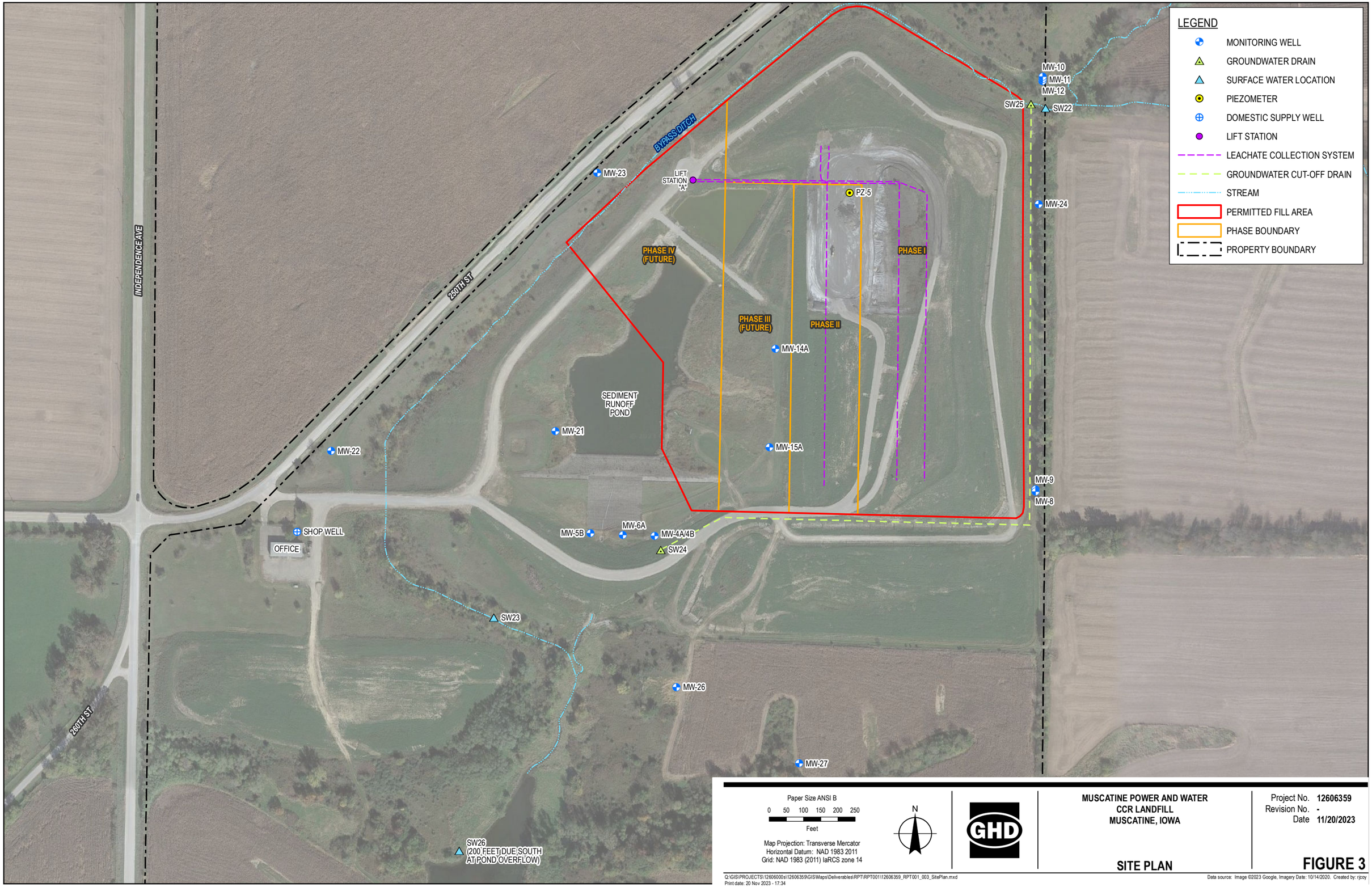
Print date: 16 Jan 2024 - 10:07

Data source: Image ©2023 Google, Imagery Date: 10/14/2020. Created by: rjcoy



Paper Size ANSI B

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Feet

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

N

GHD

MUSCATINE POWER AND WATER
CCR LANDFILL
MUSCATINE, IOWA

SITE PLAN

Project No. **12606359**
Revision No. **-**
Date **11/20/2023**

FIGURE 3

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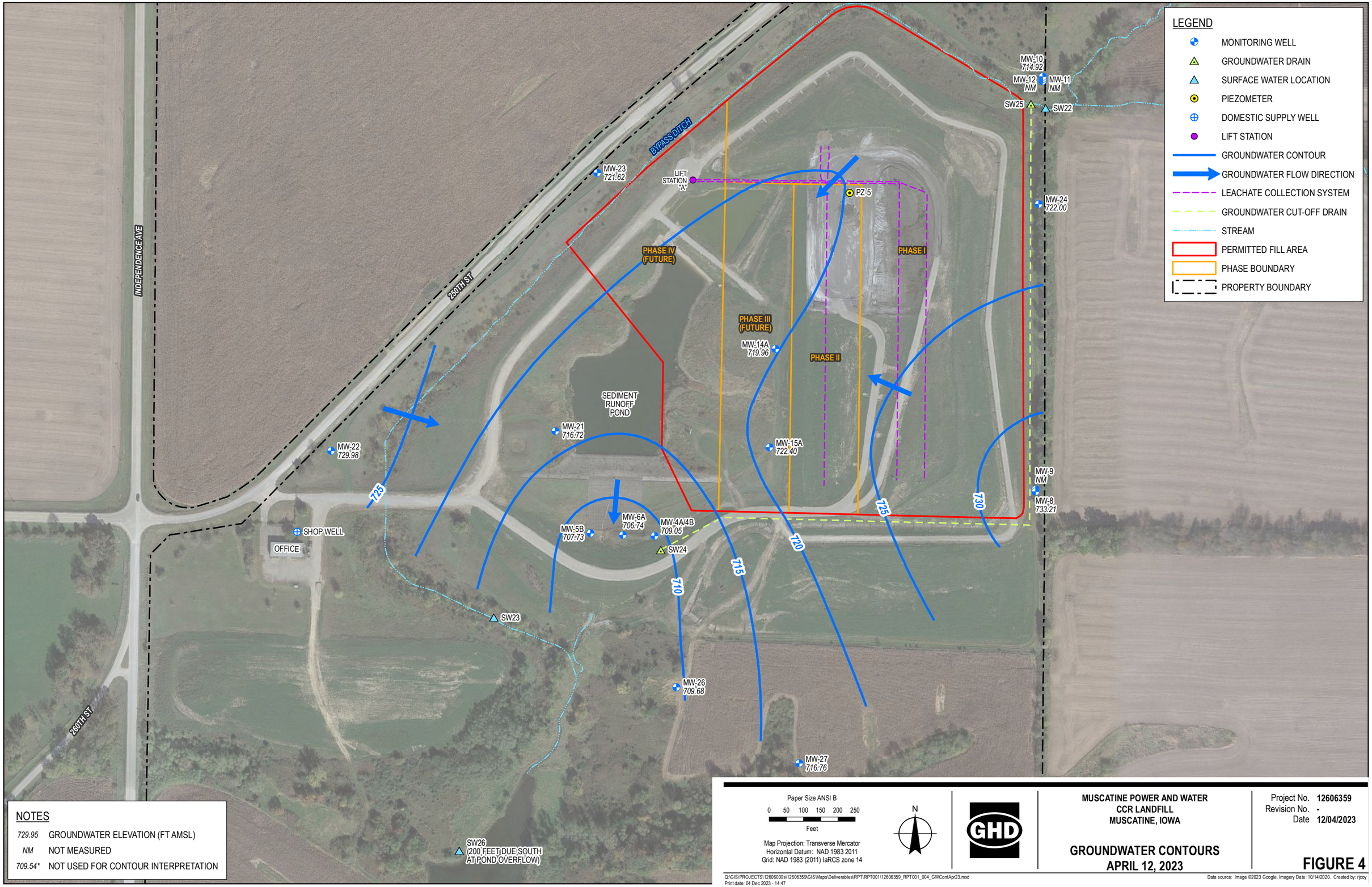
LEGEND
MONITORING WELL
GROUNDWATER DRAIN
SURFACE WATER LOCATION
PIEZOMETER
DOMESTIC SUPPLY WELL
LIFT STATION
GROUNDWATER CONTOUR
GROUNDWATER FLOW DIRECTION
LEACHATE COLLECTION SYSTEM
GROUNDWATER CUT-OFF DRAIN
STREAM
PERMITTED FILL AREA
PHASE BOUNDARY
PROPERTY BOUNDARY
INDEPENDENCE AVE
250TH ST
280TH ST
BYPASS DITCH
PHASE IV (FUTURE)
PHASE III (FUTURE)
PHASE II
PHASE I
SEDIMENT RUNOFF POND
LIFT STATION "A"
SHOP WELL
OFFICE
MW-10 714.92
MW-12 NM
MW-11 NM
SW25
SW22
MW-23 721.62
PZ-5
MW-24 722.00
MW-14A 719.96
MW-21 716.72
MW-22 729.98
MW-15A 722.40
MW-9 NM
MW-8 733.21
MW-5B 707.73
MW-6A 706.74
MW-4A/4B 709.05
SW24
SW23
MW-26 709.68
MW-27 716.76
SW26 (200 FEET DUE SOUTH AT POND OVERFLOW)
725
720
715
710
725
730
NOTES
729.95 GROUNDWATER ELEVATION (FT AMSL)
NM 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) IaRCS zone 14
N
GHD
MUSCATINE POWER AND WATER
CCR LANDFILL
MUSCATINE, IOWA
GROUNDWATER CONTOURS
APRIL 12, 2023
Project No. 12606359
Revision No. -
Date 12/04/2023
FIGURE 4
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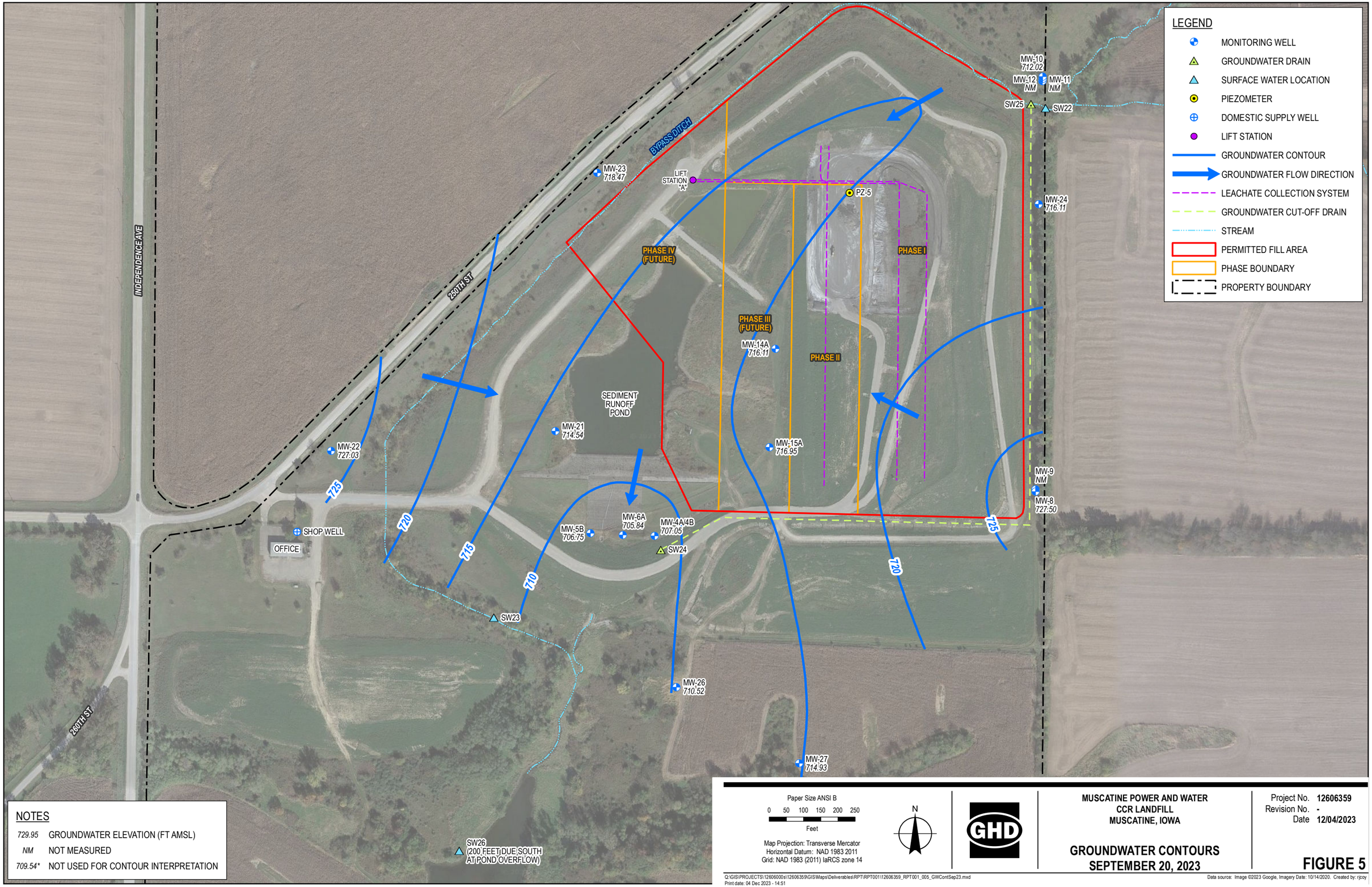
LEGEND
MONITORING WELL
GROUNDWATER DRAIN
SURFACE WATER LOCATION
PIEZOMETER
DOMESTIC SUPPLY WELL
LIFT STATION
GROUNDWATER CONTOUR
GROUNDWATER FLOW DIRECTION
LEACHATE COLLECTION SYSTEM
GROUNDWATER CUT-OFF DRAIN
STREAM
PERMITTED FILL AREA
PHASE BOUNDARY
PROPERTY BOUNDARY
INDEPENDENCE AVE
250TH ST
280TH ST
BYPASS DITCH
PHASE IV (FUTURE)
PHASE III (FUTURE)
PHASE II
PHASE I
SEDIMENT RUNOFF POND
LIFT STATION "A"
SHOP WELL
OFFICE
MW-10 712.02
MW-12 NM
MW-11 NM
SW25
SW22
MW-23 718.47
PZ-5
MW-24 716.11
MW-14A 716.11
MW-21 714.54
MW-22 727.03
MW-15A 716.95
MW-9 NM
MW-8 727.50
MW-6A 705.84
MW-5B 706.75
MW-4A/4B 707.05
SW24
SW23
MW-26 710.52
MW-27 714.93
SW26 (200 FEET DUE SOUTH AT POND OVERFLOW)
725
720
715
710
NOTES
729.95 GROUNDWATER ELEVATION (FT AMSL)
NM NOT MEASURED
709.54* NOT USED FOR CONTOUR INTERPRETATION
Paper Size ANSI B
0 50 100 150 200 250
Feet
Map Projection: Transverse Mercator
Horizontal Datum: NAD 1983 2011
Grid: NAD 1983 (2011) IaRCS zone 14
N
GHD
MUSCATINE POWER AND WATER
CCR LANDFILL
MUSCATINE, IOWA
GROUNDWATER CONTOURS
SEPTEMBER 20, 2023
Project No. 12606359
Revision No. -
Date 12/04/2023
FIGURE 5
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Print date: 04 Dec 2023 - 14:51
Data source: Image ©2023 Google, Imagery Date: 10/14/2020. Created by: rjcoy

Appendices

Appendix A

Sample Collection Records

A1 March 2023 Sample Collection Records
A2 September 2023 Sample Collection Records

A1
March 2023 Sample Collection Records

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** X
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 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 N Hoskins		**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.

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** X
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 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 (± 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 Neil Hoskins		**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.

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-6A	
Upgradient	**Downgradient** X
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 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	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 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 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)	☒ **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 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 (± 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 Koger		**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.
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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)	☒ **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 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 (± 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	

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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 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.		

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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** X
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 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	

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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 N Hoskins		**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.

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-15A	
Upgradient	**Downgradient** X
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 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 (± 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	

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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 N Hoskins		**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.

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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** 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	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 _____

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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 [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.

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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 _____

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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

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

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

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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 X **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

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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

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Signature [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.

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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 X **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

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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

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Signature [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.

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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 X **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

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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

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Signature [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.

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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 X **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

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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 [signature] **Date** 1-11-25

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

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A2
September 2023 Sample Collection Records

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** X
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 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	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 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 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** X
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 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 (± 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	

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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 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.

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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)	☒ **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 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	

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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 Nina Koger		**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 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)	☒ **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 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 (± 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	

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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 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.

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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-10	
Upgradient X	**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 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 (± 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	

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*D. FIELD MEASUREMENT	
Weather Conditions 65dF, Clear and Calm	
Field Measurements (after stabilization):	
Temperature 16.30	**Units** C
Equipment Used Horiba U-50	
pH 6.86	
Equipment Used Horiba U-50	
Specific Conductance 0.677	**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.

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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** X
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 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	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	

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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 Neil Hoskins		**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.

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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)	☒ **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 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 (± 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	

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*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 ½" x 11" site plan showing locations of all surface and groundwater monitoring points. One map per sampling round.		

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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 _____

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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 [illegible] **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.

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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 _____

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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 [illegible] **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.

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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 X **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

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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

CERTIFICATION

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

Signature [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.

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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 X **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 [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-26

Upgradient X **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

CERTIFICATION

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

Signature [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-27

Upgradient X **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 [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

Appendix B

Analytical Reports

B1 March 2023 Groundwater Analytical Data
B2 September 2023 Groundwater Analytical Data
B3 April 2023 Surface Water Analytical Data
B4 2023 Leachate Analytical Data

B1
March 2023 Groundwater Analytical Data

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

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

Generated 6/7/2023 9:58:24 AM

JOB DESCRIPTION

Muscatine Power & Water CCR Landfill

JOB NUMBER

310-253602-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

my EOL

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 9:58:24 AM

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

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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.

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
310-253602-11	MW-24	Ground Water	04/11/23 14:55	04/14/23 08:30
310-253602-12	MW-26	Ground Water	04/12/23 11:55	04/14/23 08:30
310-253602-13	MW-27	Ground Water	04/12/23 11:10	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

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
Iron	0.423		0.100		mg/L	1		6020B	Total/NA
Magnesium	33.9		0.500		mg/L	1		6020B	Total/NA
Manganese	0.510		0.0100		mg/L	1		6020B	Total/NA
Nickel	0.00510		0.00500		mg/L	1		6020B	Total/NA
Strontium	0.0910		0.00100		mg/L	1		6020B	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
Iron	1.83		0.100		mg/L	1		6020B	Total/NA
Magnesium	34.8		0.500		mg/L	1		6020B	Total/NA
Manganese	0.453		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.149		0.00100		mg/L	1		6020B	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
Iron	3.43		0.100		mg/L	1		6020B	Total/NA
Magnesium	31.2		0.500		mg/L	1		6020B	Total/NA
Manganese	0.113		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.194		0.00100		mg/L	1		6020B	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
Iron	0.708		0.100		mg/L	1		6020B	Total/NA
Magnesium	31.1		0.500		mg/L	1		6020B	Total/NA
Manganese	0.309		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.148		0.00100		mg/L	1		6020B	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

This Detection Summary does not include radiochemical test results.

Detection Summary

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

Job ID: 310-253602-1

Client Sample ID: MW-10 (Continued) — Lab Sample ID: 310-253602-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
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
Iron	1.09		0.100		mg/L	1		6020B	Total/NA
Magnesium	34.5		0.500		mg/L	1		6020B	Total/NA
Manganese	0.396		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.178		0.00100		mg/L	1		6020B	Total/NA

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
Magnesium	122		2.00		mg/L	4		6020B	Total/NA
Strontium	0.293		0.00100		mg/L	1		6020B	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
Magnesium	48.7		0.500		mg/L	1		6020B	Total/NA
Strontium	0.0985		0.00100		mg/L	1		6020B	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
Magnesium	33.0		0.500		mg/L	1		6020B	Total/NA
Strontium	0.153		0.00100		mg/L	1		6020B	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
Magnesium	31.5		0.500		mg/L	1		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

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

Job ID: 310-253602-1

Client Sample ID: MW-22 (Continued) — Lab Sample ID: 310-253602-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	0.0633		0.0100		mg/L	1		6020B	Total/NA
Molybdenum	0.00364		0.00200		mg/L	1		6020B	Total/NA
Strontium	0.137		0.00100		mg/L	1		6020B	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
Aluminum	0.233		0.0500		mg/L	1		6020B	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
Iron	0.210		0.100		mg/L	1		6020B	Total/NA
Magnesium	24.4		0.500		mg/L	1		6020B	Total/NA
Manganese	0.0372		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.0526		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: MW-24 — Lab Sample ID: 310-253602-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	23.4		5.00		mg/L	5		9056A	Total/NA
Sulfate	87.8		5.00		mg/L	5		9056A	Total/NA
Barium	0.0863		0.00200		mg/L	1		6020B	Total/NA
Boron	0.114		0.100		mg/L	1		6020B	Total/NA
Calcium	78.6		0.500		mg/L	1		6020B	Total/NA
Magnesium	34.7		0.500		mg/L	1		6020B	Total/NA
Manganese	0.0144		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.0795		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: MW-26 — Lab Sample ID: 310-253602-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	3.83		1.00		mg/L	1		9056A	Total/NA
Sulfate	72.5		1.00		mg/L	1		9056A	Total/NA
Aluminum	0.0884		0.0500		mg/L	1		6020B	Total/NA
Barium	0.0815		0.00200		mg/L	1		6020B	Total/NA
Boron	2.26		0.100		mg/L	1		6020B	Total/NA
Calcium	141		0.500		mg/L	1		6020B	Total/NA
Copper	0.00512		0.00500		mg/L	1		6020B	Total/NA
Iron	0.456		0.100		mg/L	1		6020B	Total/NA
Magnesium	52.3		0.500		mg/L	1		6020B	Total/NA
Manganese	0.0983		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.133		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: MW-27 — Lab Sample ID: 310-253602-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	2.45		1.00		mg/L	1		9056A	Total/NA
Sulfate	5.13		1.00		mg/L	1		9056A	Total/NA
Aluminum	0.394		0.0500		mg/L	1		6020B	Total/NA
Barium	0.0508		0.00200		mg/L	1		6020B	Total/NA
Boron	0.741		0.100		mg/L	1		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

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

Job ID: 310-253602-1

Client Sample ID: MW-27 (Continued) — Lab Sample ID: 310-253602-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	26.8		0.500		mg/L	1		6020B	Total/NA
Iron	0.338		0.100		mg/L	1		6020B	Total/NA
Lead	0.000528		0.000500		mg/L	1		6020B	Total/NA
Magnesium	11.9		0.500		mg/L	1		6020B	Total/NA
Manganese	0.0378		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.0512		0.00100		mg/L	1		6020B	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
Magnesium	31.1		0.500		mg/L	1		6020B	Total/NA
Manganese	0.0863		0.0100		mg/L	1		6020B	Total/NA
Molybdenum	0.00375		0.00200		mg/L	1		6020B	Total/NA
Strontium	0.135		0.00100		mg/L	1		6020B	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
Iron	0.354		0.100		mg/L	1		6020B	Total/NA
Magnesium	36.0		0.500		mg/L	1		6020B	Total/NA
Manganese	0.591		0.0100		mg/L	1		6020B	Total/NA
Nickel	0.00521		0.00500		mg/L	1		6020B	Total/NA
Strontium	0.0951		0.00100		mg/L	1		6020B	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
Aluminum	<0.0500		0.0500		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
Calcium	**91.3**		0.500		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
Copper	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 20:51	1
Iron	**0.423**		0.100		mg/L		04/17/23 09:40	04/24/23 17:56	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 20:51	1
Magnesium	**33.9**		0.500		mg/L		04/17/23 09:40	04/23/23 20:51	1
Manganese	**0.510**		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
Nickel	**0.00510**		0.00500		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
Strontium	**0.0910**		0.00100		mg/L		04/17/23 09:40	04/23/23 20:51	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 20:51	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 20:51	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

Date Collected: 04/12/23 16:15
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-2

Matrix: Ground Water

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
Aluminum	<0.0500		0.0500		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
Calcium	**107**		0.500		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
Copper	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:05	1
Iron	**1.83**		0.100		mg/L		04/17/23 09:40	04/24/23 18:04	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:05	1
Magnesium	**34.8**		0.500		mg/L		04/17/23 09:40	04/23/23 21:05	1
Manganese	**0.453**		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
Nickel	<0.00500		0.00500		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
Strontium	**0.149**		0.00100		mg/L		04/17/23 09:40	04/23/23 21:05	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:05	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 21:05	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
Aluminum	<0.0500		0.0500		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
Calcium	**95.4**		0.500		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
Copper	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:08	1
Iron	**3.43**		0.100		mg/L		04/17/23 09:40	04/24/23 18:06	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:08	1
Magnesium	**31.2**		0.500		mg/L		04/17/23 09:40	04/23/23 21:08	1
Manganese	**0.113**		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
Nickel	<0.00500		0.00500		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
Strontium	**0.194**		0.00100		mg/L		04/17/23 09:40	04/23/23 21:08	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:08	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 21:08	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
Aluminum	<0.0500		0.0500		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
Calcium	**78.2**		0.500		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
Copper	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:10	1
Iron	**0.708**		0.100		mg/L		04/17/23 09:40	04/24/23 18:09	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:10	1
Magnesium	**31.1**		0.500		mg/L		04/17/23 09:40	04/23/23 21:10	1
Manganese	**0.309**		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
Nickel	<0.00500		0.00500		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
Strontium	**0.148**		0.00100		mg/L		04/17/23 09:40	04/23/23 21:10	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:10	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 21:10	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
Aluminum	<0.0500		0.0500		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
Calcium	**83.7**		0.500		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
Copper	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:28	1
Iron	**1.09**		0.100		mg/L		04/17/23 09:40	04/24/23 18:12	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:28	1
Magnesium	**34.5**		0.500		mg/L		04/17/23 09:40	04/23/23 21:28	1
Manganese	**0.396**		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
Nickel	<0.00500		0.00500		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
Strontium	**0.178**		0.00100		mg/L		04/17/23 09:40	04/23/23 21:28	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:28	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 21:28	1

Client Sample Results

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

Job ID: 310-253602-1

Client Sample ID: MW-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
Aluminum	<0.0500		0.0500		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
Calcium	**318**		0.500		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
Copper	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:30	1
Iron	<0.100		0.100		mg/L		04/17/23 09:40	04/24/23 18:32	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:30	1
Magnesium	**122**		2.00		mg/L		04/17/23 09:40	04/24/23 18:15	4
Manganese	<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
Nickel	<0.00500		0.00500		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
Strontium	**0.293**		0.00100		mg/L		04/17/23 09:40	04/23/23 21:30	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:30	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 21:30	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

Date Collected: 04/11/23 13:35
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-7

Matrix: Ground Water

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
Aluminum	<0.0500		0.0500		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
Calcium	**110**		0.500		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
Copper	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:33	1
Iron	<0.100		0.100		mg/L		04/17/23 09:40	04/24/23 18:36	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:33	1
Magnesium	**48.7**		0.500		mg/L		04/17/23 09:40	04/23/23 21:33	1
Manganese	<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
Nickel	<0.00500		0.00500		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
Strontium	**0.0985**		0.00100		mg/L		04/17/23 09:40	04/23/23 21:33	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:33	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 21:33	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
Aluminum	<0.0500		0.0500		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
Calcium	**76.0**		0.500		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
Copper	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:36	1
Iron	<0.100		0.100		mg/L		04/17/23 09:40	04/24/23 18:38	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:36	1
Magnesium	**33.0**		0.500		mg/L		04/17/23 09:40	04/23/23 21:36	1
Manganese	<0.0100		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
Nickel	<0.00500		0.00500		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
Strontium	**0.153**		0.00100		mg/L		04/17/23 09:40	04/23/23 21:36	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:36	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 21:36	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
Aluminum	<0.0500		0.0500		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
Calcium	**80.4**		0.500		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
Copper	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:39	1
Iron	<0.100		0.100		mg/L		04/17/23 09:40	04/24/23 18:41	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:39	1
Magnesium	**31.5**		0.500		mg/L		04/17/23 09:40	04/23/23 21:39	1
Manganese	**0.0633**		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
Nickel	<0.00500		0.00500		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
Strontium	**0.137**		0.00100		mg/L		04/17/23 09:40	04/23/23 21:39	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:39	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 21:39	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
Aluminum	**0.233**		0.0500		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
Calcium	**55.3**		0.500		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
Copper	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:42	1
Iron	**0.210**		0.100		mg/L		04/17/23 09:40	04/24/23 18:44	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:42	1
Magnesium	**24.4**		0.500		mg/L		04/17/23 09:40	04/23/23 21:42	1
Manganese	**0.0372**		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
Nickel	<0.00500		0.00500		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
Strontium	**0.0526**		0.00100		mg/L		04/17/23 09:40	04/23/23 21:42	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:42	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 21:42	1

Client Sample Results

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

Job ID: 310-253602-1

Client Sample ID: MW-24

Date Collected: 04/11/23 14:55
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-11

Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**23.4**		5.00		mg/L			04/22/23 14:26	5
Fluoride	<1.00		1.00		mg/L			04/22/23 14:26	5
Sulfate	**87.8**		5.00		mg/L			04/22/23 14:26	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/17/23 09:40	04/23/23 21:45	1
Arsenic	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:45	1
Barium	**0.0863**		0.00200		mg/L		04/17/23 09:40	04/23/23 21:45	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:45	1
Boron	**0.114**		0.100		mg/L		04/17/23 09:40	04/24/23 18:47	1
Calcium	**78.6**		0.500		mg/L		04/17/23 09:40	04/23/23 21:45	1
Cobalt	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:45	1
Copper	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:45	1
Iron	<0.100		0.100		mg/L		04/17/23 09:40	04/24/23 18:47	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:45	1
Magnesium	**34.7**		0.500		mg/L		04/17/23 09:40	04/23/23 21:45	1
Manganese	**0.0144**		0.0100		mg/L		04/17/23 09:40	04/23/23 21:45	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:45	1
Nickel	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:45	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:45	1
Strontium	**0.0795**		0.00100		mg/L		04/17/23 09:40	04/23/23 21:45	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:45	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 21:45	1

Client Sample Results

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

Job ID: 310-253602-1

Client Sample ID: MW-26

Date Collected: 04/12/23 11:55
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-12

Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**3.83**		1.00		mg/L			04/22/23 14:57	1
Fluoride	<0.200		0.200		mg/L			04/22/23 14:57	1
Sulfate	**72.5**		1.00		mg/L			04/22/23 14:57	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0884**		0.0500		mg/L		04/17/23 09:40	04/23/23 21:51	1
Arsenic	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:51	1
Barium	**0.0815**		0.00200		mg/L		04/17/23 09:40	04/23/23 21:51	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:51	1
Boron	**2.26**		0.100		mg/L		04/17/23 09:40	04/24/23 18:53	1
Calcium	**141**		0.500		mg/L		04/17/23 09:40	04/23/23 21:51	1
Cobalt	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:51	1
Copper	**0.00512**		0.00500		mg/L		04/17/23 09:40	04/23/23 21:51	1
Iron	**0.456**		0.100		mg/L		04/17/23 09:40	04/24/23 18:53	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:51	1
Magnesium	**52.3**		0.500		mg/L		04/17/23 09:40	04/23/23 21:51	1
Manganese	**0.0983**		0.0100		mg/L		04/17/23 09:40	04/23/23 21:51	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:51	1
Nickel	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:51	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:51	1
Strontium	**0.133**		0.00100		mg/L		04/17/23 09:40	04/23/23 21:51	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:51	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 21:51	1

Client Sample Results

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

Job ID: 310-253602-1

Client Sample ID: MW-27

Date Collected: 04/12/23 11:10
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-13

Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**2.45**		1.00		mg/L			04/22/23 15:13	1
Fluoride	<0.200		0.200		mg/L			04/22/23 15:13	1
Sulfate	**5.13**		1.00		mg/L			04/22/23 15:13	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.394**		0.0500		mg/L		04/17/23 09:40	04/23/23 21:53	1
Arsenic	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:53	1
Barium	**0.0508**		0.00200		mg/L		04/17/23 09:40	04/23/23 21:53	1
Beryllium	<0.00100		0.00100		mg/L		04/17/23 09:40	04/23/23 21:53	1
Boron	**0.741**		0.100		mg/L		04/17/23 09:40	04/24/23 18:56	1
Calcium	**26.8**		0.500		mg/L		04/17/23 09:40	04/23/23 21:53	1
Cobalt	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 21:53	1
Copper	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:53	1
Iron	**0.338**		0.100		mg/L		04/17/23 09:40	04/24/23 18:56	1
Lead	**0.000528**		0.000500		mg/L		04/17/23 09:40	04/23/23 21:53	1
Magnesium	**11.9**		0.500		mg/L		04/17/23 09:40	04/23/23 21:53	1
Manganese	**0.0378**		0.0100		mg/L		04/17/23 09:40	04/23/23 21:53	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/23 09:40	04/23/23 21:53	1
Nickel	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:53	1
Selenium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:53	1
Strontium	**0.0512**		0.00100		mg/L		04/17/23 09:40	04/23/23 21:53	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 21:53	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 21:53	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
Aluminum	<0.0500		0.0500		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
Calcium	**80.4**		0.500		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
Copper	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 22:11	1
Iron	<0.100		0.100		mg/L		04/17/23 09:40	04/24/23 18:59	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 22:11	1
Magnesium	**31.1**		0.500		mg/L		04/17/23 09:40	04/23/23 22:11	1
Manganese	**0.0863**		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
Nickel	<0.00500		0.00500		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
Strontium	**0.135**		0.00100		mg/L		04/17/23 09:40	04/23/23 22:11	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 22:11	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 22:11	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

Date Collected: 04/12/23 12:00
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-15

Matrix: Ground Water

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
Aluminum	<0.0500		0.0500		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
Calcium	**98.0**		0.500		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
Copper	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 22:14	1
Iron	**0.354**		0.100		mg/L		04/17/23 09:40	04/24/23 19:31	1
Lead	<0.000500		0.000500		mg/L		04/17/23 09:40	04/23/23 22:14	1
Magnesium	**36.0**		0.500		mg/L		04/17/23 09:40	04/23/23 22:14	1
Manganese	**0.591**		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
Nickel	**0.00521**		0.00500		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
Strontium	**0.0951**		0.00100		mg/L		04/17/23 09:40	04/23/23 22:14	1
Vanadium	<0.00500		0.00500		mg/L		04/17/23 09:40	04/23/23 22:14	1
Zinc	<0.0200		0.0200		mg/L		04/17/23 09:40	04/23/23 22:14	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.
E	Result exceeded calibration range.
F1	MS and/or MSD recovery exceeds control limits.

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
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
Calcium	<0.500		0.500		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
Lead	<0.000500		0.000500		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

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

Lab Sample ID: MB 310-384386/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 385267 — **Prep Batch: 384386**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
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
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 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 385267 — **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 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 385390 — **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

Lab Sample ID: 310-253602-1 MS — **Client Sample ID: MW-4B**
Matrix: Ground Water — **Prep Type: Total/NA**
Analysis Batch: 385267 — **Prep Batch: 384386**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
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

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 Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
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 Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
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 Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
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
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

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

Lab Sample ID: 310-253602-1 MSD — **Client Sample ID: MW-4B**
Matrix: Ground Water — **Prep Type: Total/NA**
Analysis Batch: 385267 — **Prep Batch: 384386**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
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 — **Client Sample ID: MW-4B**
Matrix: Ground Water — **Prep Type: Total/NA**
Analysis Batch: 385390 — **Prep Batch: 384386**

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

Lab Sample ID: 310-253602-11 DU — **Client Sample ID: MW-24**
Matrix: Ground Water — **Prep Type: Total/NA**
Analysis Batch: 385267 — **Prep Batch: 384386**

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Aluminum	<0.0500			<0.0500		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
Calcium	78.6			77.80		mg/L				1	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
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
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 — **Client Sample ID: MW-24**
Matrix: Ground Water — **Prep Type: Total/NA**
Analysis Batch: 385390 — **Prep Batch: 384386**

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Boron	0.114			<0.100		mg/L				NC	20
Iron	<0.100			<0.100		mg/L				NC	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	
310-253602-11	MW-24	Total/NA	Ground Water	9056A	
310-253602-12	MW-26	Total/NA	Ground Water	9056A	
310-253602-13	MW-27	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	
MB 310-385567/3	Method Blank	Total/NA	Water	9056A	
LCS 310-385567/4	Lab Control Sample	Total/NA	Water	9056A	
310-253602-1 MS	MW-4B	Total/NA	Ground Water	9056A	
310-253602-1 MSD	MW-4B	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	
310-253602-11	MW-24	Total/NA	Ground Water	3005A	
310-253602-12	MW-26	Total/NA	Ground Water	3005A	
310-253602-13	MW-27	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	
MB 310-384386/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-384386/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-253602-1 MS	MW-4B	Total/NA	Ground Water	3005A	
310-253602-1 MSD	MW-4B	Total/NA	Ground Water	3005A	
310-253602-11 DU	MW-24	Total/NA	Ground Water	3005A	

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

Metals (Continued)

Analysis Batch: 385267 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
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
310-253602-11	MW-24	Total/NA	Ground Water	6020B	384386
310-253602-12	MW-26	Total/NA	Ground Water	6020B	384386
310-253602-13	MW-27	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
MB 310-384386/1-A	Method Blank	Total/NA	Water	6020B	384386
LCS 310-384386/2-A	Lab Control Sample	Total/NA	Water	6020B	384386
310-253602-1 MS	MW-4B	Total/NA	Ground Water	6020B	384386
310-253602-1 MSD	MW-4B	Total/NA	Ground Water	6020B	384386
310-253602-11 DU	MW-24	Total/NA	Ground Water	6020B	384386

Analysis Batch: 385390

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
310-253602-6	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
310-253602-11	MW-24	Total/NA	Ground Water	6020B	384386
310-253602-12	MW-26	Total/NA	Ground Water	6020B	384386
310-253602-13	MW-27	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
LCS 310-384386/2-A	Lab Control Sample	Total/NA	Water	6020B	384386
310-253602-1 MS	MW-4B	Total/NA	Ground Water	6020B	384386
310-253602-1 MSD	MW-4B	Total/NA	Ground Water	6020B	384386
310-253602-11 DU	MW-24	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

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	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	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385390	ZRI4	EET CF	04/24/23 17:56

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	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	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385390	ZRI4	EET CF	04/24/23 18:04

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	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	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385390	ZRI4	EET CF	04/24/23 18:06

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	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	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385390	ZRI4	EET CF	04/24/23 18:09

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	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385567	QTZ5	EET CF	04/22/23 12:06

Lab Chronicle

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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
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

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	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	3005A			384386	DHM5	EET CF	04/17/23 09:40
Total/NA	Analysis	6020B		1	385390	ZRI4	EET CF	04/24/23 18:32

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	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		1	385390	ZRI4	EET CF	04/24/23 18:36
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

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	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

Lab Chronicle

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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	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

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	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
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

Client Sample ID: MW-24
Date Collected: 04/11/23 14:55
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-11
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385567	QTZ5	EET CF	04/22/23 14:26
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 21:45
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 18:47

Client Sample ID: MW-26
Date Collected: 04/12/23 11:55
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-12
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	385567	QTZ5	EET CF	04/22/23 14:57
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 21:51
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 18:53

Client Sample ID: MW-27
Date Collected: 04/12/23 11:10
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-13
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	385567	QTZ5	EET CF	04/22/23 15:13

Lab Chronicle

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

Job ID: 310-253602-1

Client Sample ID: MW-27
Date Collected: 04/12/23 11:10
Date Received: 04/14/23 08:30

Lab Sample ID: 310-253602-13
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
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 21:53
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 18:56

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	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

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	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

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
Job ID: 310-253602-1
Project/Site: Muscatine Power & Water CCR Landfill

Laboratory: Eurofins Cedar Falls

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

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

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
3005A	Preparation, Total Metals	SW846	EET CF

Protocol References:

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

Laboratory References:

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

eurofins | Environment Testing America

310-253602 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: Muscatine Power + Water

City/State: CITY | STATE IA | Project:

Receipt Information

Date/Time Received: DATE 4/14/23 | TIME 0830 | Received By: N

Delivery Type: ☒ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☒ Yes ☐ No *If yes:* Cooler # 1 of 3

Cooler Custody Seals Present? ☒ Yes ☐ No *If yes:* Cooler custody seals intact? ☒ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☒ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: T | Correction Factor (°C): +0.1

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

Uncorrected Temp (°C): 1.3 | Corrected Temp (°C): 1.4

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

eurofins | Environment Testing America

Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: Muscatine Power & Water

City/State: CITY | STATE IA | Project:

Receipt Information

Date/Time Received: DATE 4/14/23 | TIME 0830 | Received By: R

Delivery Type: ☒ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☒ Yes ☐ No *If yes:* Cooler # 2 of 3

Cooler Custody Seals Present? ☒ Yes ☐ No *If yes:* Cooler custody seals intact? ☒ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☒ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: T | Correction Factor (°C): +0.1

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

Uncorrected Temp (°C): 1.4 | Corrected Temp (°C): 1.5

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE. If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

eurofins | Environment Testing America

Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: Muscatine Power + Water

City/State: CITY | STATE | Project:

Receipt Information

Date/Time Received: DATE 4/14/23 | TIME 0830 | Received By: R

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☒ Yes ☐ No *If yes:* Cooler # 3 of 3

Cooler Custody Seals Present? ☒ Yes ☐ No *If yes:* Cooler custody seals intact? ☐ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☒ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☐ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: T | Correction Factor (°C): +0.1

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

Uncorrected Temp (°C): 0.1 | Corrected Temp (°C): 0.2

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

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

Chain of Custody Record

Client Information	Sampler: Sam Bennett	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				Job #:
Address: 1700 Dick Drake Way	Due Date Requested:			
City: Muscatine	TAT Requested (days):			
State, Zip: IA, 52761				
Phone:	PO #: 231623			
Email: sbennett@mpw.org and neil.hoskins@mpw.org	WO #:			
Project Name: Muscatine Power & Water CCR Landfill	TestAmerica Project #:			
Site: Iowa	Event: Spring 2023 Sampling			

Analysis Requested

Preservation Codes

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

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020A CCR List, 7470A Mercury	2540C TDS, SM4500_H+ pH	9056A Chloride, Fluoride, Sulfate	Radium-226	Radium-228	Total Number of containers	Special Instructions/Note:
			Preservation Code.				D	N	N				
MW-4B	4/12/23	1340	G	GW			X	X	X	X	X		
MW-5B	4/12/23	1615	G	GW			X	X	X	X	X		
MW-6A	4/12/23	1500	G	GW			X	X	X	X	X		
MW-8	4/11/23	1550	G	GW			X	X	X	X	X		
MW-10	4/12/23	0845	G	GW			X	X	X	X	X		
MW-14A	4/11/23	1045	G	GW			X	X	X	X	X		
MW-15A	4/11/23	1335	G	GW			X	X	X	X	X		
MW-21	4/11/23	1150	G	GW			X	X	X	X	X		
MW-22	4/10/23	1255	G	GW			X	X	X	X	X		
MW-23	4/12/23	1015	G	GW			X	X	X	X	X		
MW-24	4/11/23	1455	G	GW			X	X	X	X	X		

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

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

Deliverable Requested I II III IV Other (specify)

Special Instructions/QC Requirements

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

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Neil Hoskins	4/13/23 9:15	MPW			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
				4/14/23 0830	

Custody Seals Intact: Δ Yes Δ No | 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	Sampler: Sam Bennett	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				Job #:
Address: 1700 Dick Drake Way	Due Date Requested			
City: Muscatine	TAT Requested (days)			
State Zip: IA 52761				
Phone:	PO #: 231623			
Email: sbennett@mpw org and neil hoskins@mpw org	WO #:			
Project Name: Muscatine Power & Water CCR Landfill	TestAmerica Project #:			
Site: Iowa	Event: Spring 2023 Sampling			

Analysis Requested

Preservation Codes.

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

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020A CCR List, 7470A Mercury	2540C TDS, SM4500_H+ pH	9056A Chloride, Fluoride, Sulfate	Radium-226	Radium-228								Total Number of containers	Special Instructions/Note.
			Preservation Code:				D	N	N											
MW-26	4/12/23	1155	G	GW			X	X	X	X	X									
MW-27	4/12/23	1110	G	GW			X	X	X	X	X									
Dup-1	4/10/23	1330	G	GW			X	X	X	X	X									
Dup-2	4/12/23	1200	G	GW			X	X	X	X	X									

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

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

Deliverable Requested I II III IV Other (specify)

Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date	Time	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[illegible]	4/13/23 9:15	MPW			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by: [illegible]	Date/Time: 4/14/23 0830	Company

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

Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-253602-1

Login Number: 253602
List Number: 1
Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

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

B2
September 2023 Groundwater Analytical Data

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

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

Generated 10/11/2023 3:24:43 PM

JOB DESCRIPTION

Muscatine Power & Water CCR Landfill

JOB NUMBER

310-265406-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

my EOL

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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10/11/2023 3:24:43 PM

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

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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), MW-24 (310-265406-11), DUP-1 (310-265406-12), MW-26 (310-265406-13), MW-27 (310-265406-14) 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.

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
310-265406-11	MW-24	Ground Water	09/19/23 09:00	09/22/23 08:35
310-265406-12	DUP-1	Ground Water	09/18/23 12:00	09/22/23 08:35
310-265406-13	MW-26	Ground Water	09/20/23 12:35	09/22/23 08:35
310-265406-14	MW-27	Ground Water	09/20/23 13:35	09/22/23 08:35
310-265406-15	DUP-2	Ground Water	09/20/23 12:00	09/22/23 08:35

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
Calcium	90.4		0.500		mg/L	1		6020B	Total/NA
Cobalt	0.00374		0.000500		mg/L	1		6020B	Total/NA
Iron	0.559		0.100		mg/L	1		6020B	Total/NA
Lead	0.000576		0.000500		mg/L	1		6020B	Total/NA
Magnesium	33.6		0.500		mg/L	1		6020B	Total/NA
Manganese	0.612		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.0958		0.00100		mg/L	1		6020B	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
Calcium	115		0.500		mg/L	1		6020B	Total/NA
Iron	2.18		0.100		mg/L	1		6020B	Total/NA
Lead	0.000627		0.000500		mg/L	1		6020B	Total/NA
Magnesium	37.6		0.500		mg/L	1		6020B	Total/NA
Manganese	0.594		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.163		0.00100		mg/L	1		6020B	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
Iron	3.09		0.100		mg/L	1		6020B	Total/NA
Magnesium	27.2		0.500		mg/L	1		6020B	Total/NA
Manganese	0.0995		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.165		0.00100		mg/L	1		6020B	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
Iron	0.451		0.100		mg/L	1		6020B	Total/NA
Magnesium	31.5		0.500		mg/L	1		6020B	Total/NA
Manganese	0.370		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.151		0.00100		mg/L	1		6020B	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

This Detection Summary does not include radiochemical test results.

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
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
Iron	2.45		0.100		mg/L	1		6020B	Total/NA
Magnesium	34.7		0.500		mg/L	1		6020B	Total/NA
Manganese	0.266		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.207		0.00100		mg/L	1		6020B	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
Magnesium	122		5.00		mg/L	10		6020B	Total/NA
Strontium	0.282		0.00100		mg/L	1		6020B	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
Magnesium	54.0		0.500		mg/L	1		6020B	Total/NA
Strontium	0.113		0.00100		mg/L	1		6020B	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
Magnesium	42.8		0.500		mg/L	1		6020B	Total/NA
Selenium	0.00530		0.00500		mg/L	1		6020B	Total/NA
Strontium	0.164		0.00100		mg/L	1		6020B	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
Magnesium	32.0		0.500		mg/L	1		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-22 (Continued) — Lab Sample ID: 310-265406-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	0.767		0.0100		mg/L	1		6020B	Total/NA
Molybdenum	0.00661		0.00200		mg/L	1		6020B	Total/NA
Strontium	0.101		0.00100		mg/L	1		6020B	Total/NA

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
Aluminum	0.105		0.0500		mg/L	1		6020B	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
Magnesium	25.4		0.500		mg/L	1		6020B	Total/NA
Manganese	0.0169		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.0601		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: MW-24 — Lab Sample ID: 310-265406-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	22.8		5.00		mg/L	5		9056A	Total/NA
Sulfate	62.9		5.00		mg/L	5		9056A	Total/NA
Barium	0.0698		0.00200		mg/L	1		6020B	Total/NA
Calcium	70.5		0.500		mg/L	1		6020B	Total/NA
Magnesium	29.9		0.500		mg/L	1		6020B	Total/NA
Manganese	0.0183		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.0768		0.00100		mg/L	1		6020B	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
Iron	2.41		0.100		mg/L	1		6020B	Total/NA
Magnesium	36.0		0.500		mg/L	1		6020B	Total/NA
Manganese	0.272		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.208		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: MW-26 — Lab Sample ID: 310-265406-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	18.8		5.00		mg/L	5		9056A	Total/NA
Sulfate	380		5.00		mg/L	5		9056A	Total/NA
Barium	0.0755		0.00200		mg/L	1		6020B	Total/NA
Boron	3.08		0.100		mg/L	1		6020B	Total/NA
Calcium	127		0.500		mg/L	1		6020B	Total/NA
Lithium	0.0117		0.0100		mg/L	1		6020B	Total/NA
Magnesium	48.9		0.500		mg/L	1		6020B	Total/NA
Manganese	0.111		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.135		0.00100		mg/L	1		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

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

Job ID: 310-265406-1

Client Sample ID: MW-27 — Lab Sample ID: 310-265406-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	28.9		5.00		mg/L	5		9056A	Total/NA
Sulfate	27.0		5.00		mg/L	5		9056A	Total/NA
Aluminum	0.0737		0.0500		mg/L	1		6020B	Total/NA
Barium	0.0530		0.00200		mg/L	1		6020B	Total/NA
Boron	1.00		0.100		mg/L	1		6020B	Total/NA
Calcium	33.4		0.500		mg/L	1		6020B	Total/NA
Magnesium	15.5		0.500		mg/L	1		6020B	Total/NA
Manganese	0.0231		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.0752		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: DUP-2 — Lab Sample ID: 310-265406-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	19.0		5.00		mg/L	5		9056A	Total/NA
Sulfate	386		5.00		mg/L	5		9056A	Total/NA
Barium	0.0749		0.00200		mg/L	1		6020B	Total/NA
Boron	3.06		0.100		mg/L	1		6020B	Total/NA
Calcium	127		0.500		mg/L	1		6020B	Total/NA
Lithium	0.0119		0.0100		mg/L	1		6020B	Total/NA
Magnesium	48.2		0.500		mg/L	1		6020B	Total/NA
Manganese	0.120		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.129		0.00100		mg/L	1		6020B	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: 310-265406-1

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
Aluminum	<0.0500		0.0500		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
Calcium	**90.4**		0.500		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
Copper	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 11:57	1
Iron	**0.559**		0.100		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
Magnesium	**33.6**		0.500		mg/L		09/25/23 09:35	10/11/23 11:57	1
Manganese	**0.612**		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
Nickel	<0.00500		0.00500		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
Strontium	**0.0958**		0.00100		mg/L		09/25/23 09:35	10/11/23 11:57	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 11:57	1
Zinc	<0.0200		0.0200		mg/L		09/25/23 09:35	10/11/23 11:57	1

Client Sample Results

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

Job ID: 310-265406-1

Client Sample ID: MW-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 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
Aluminum	<0.0500		0.0500		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
Calcium	**115**		0.500		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
Copper	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:09	1
Iron	**2.18**		0.100		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
Magnesium	**37.6**		0.500		mg/L		09/25/23 09:35	10/11/23 12:09	1
Manganese	**0.594**		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
Nickel	<0.00500		0.00500		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
Strontium	**0.163**		0.00100		mg/L		09/25/23 09:35	10/11/23 12:09	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:09	1
Zinc	<0.0200		0.0200		mg/L		09/25/23 09:35	10/11/23 12:09	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
Aluminum	<0.0500		0.0500		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
Calcium	**82.1**		0.500		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
Copper	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:12	1
Iron	**3.09**		0.100		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
Magnesium	**27.2**		0.500		mg/L		09/25/23 09:35	10/11/23 12:12	1
Manganese	**0.0995**		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
Nickel	<0.00500		0.00500		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
Strontium	**0.165**		0.00100		mg/L		09/25/23 09:35	10/11/23 12:12	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:12	1
Zinc	<0.0200		0.0200		mg/L		09/25/23 09:35	10/11/23 12:12	1

Client Sample Results

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

Job ID: 310-265406-1

Client Sample ID: MW-8

Date Collected: 09/19/23 09:50
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-4

Matrix: Ground Water

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
Aluminum	<0.0500		0.0500		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
Calcium	**79.4**		0.500		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
Copper	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:14	1
Iron	**0.451**		0.100		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
Magnesium	**31.5**		0.500		mg/L		09/25/23 09:35	10/11/23 12:14	1
Manganese	**0.370**		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
Nickel	<0.00500		0.00500		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
Strontium	**0.151**		0.00100		mg/L		09/25/23 09:35	10/11/23 12:14	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:14	1
Zinc	<0.0200		0.0200		mg/L		09/25/23 09:35	10/11/23 12:14	1

Client Sample Results

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

Job ID: 310-265406-1

Client Sample ID: MW-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
Aluminum	<0.0500		0.0500		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
Calcium	**84.7**		0.500		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
Copper	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:36	1
Iron	**2.45**		0.100		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
Magnesium	**34.7**		0.500		mg/L		09/25/23 09:35	10/11/23 12:36	1
Manganese	**0.266**		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
Nickel	<0.00500		0.00500		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
Strontium	**0.207**		0.00100		mg/L		09/25/23 09:35	10/11/23 12:36	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:36	1
Zinc	<0.0200		0.0200		mg/L		09/25/23 09:35	10/11/23 12:36	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

Date Collected: 09/19/23 11:50
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-6

Matrix: Ground Water

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
Aluminum	<0.0500		0.0500		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
Calcium	**291**		0.500		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
Copper	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:38	1
Iron	<0.100		0.100		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
Magnesium	**122**		5.00		mg/L		09/25/23 09:35	10/11/23 13:19	10
Manganese	<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
Nickel	<0.00500		0.00500		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
Strontium	**0.282**		0.00100		mg/L		09/25/23 09:35	10/11/23 12:38	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:38	1
Zinc	<0.0200		0.0200		mg/L		09/25/23 09:35	10/11/23 12:38	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

Date Collected: 09/19/23 13:00
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-7

Matrix: Ground Water

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
Aluminum	<0.0500		0.0500		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
Calcium	**126**		0.500		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
Copper	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:40	1
Iron	<0.100		0.100		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
Magnesium	**54.0**		0.500		mg/L		09/25/23 09:35	10/11/23 12:40	1
Manganese	<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
Nickel	<0.00500		0.00500		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
Strontium	**0.113**		0.00100		mg/L		09/25/23 09:35	10/11/23 12:40	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:40	1
Zinc	<0.0200		0.0200		mg/L		09/25/23 09:35	10/11/23 12:40	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

Date Collected: 09/19/23 10:50
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-8

Matrix: Ground Water

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
Aluminum	<0.0500		0.0500		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
Calcium	**96.0**		0.500		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
Copper	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:43	1
Iron	<0.100		0.100		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
Magnesium	**42.8**		0.500		mg/L		09/25/23 09:35	10/11/23 12:43	1
Manganese	<0.0100		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
Nickel	<0.00500		0.00500		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
Strontium	**0.164**		0.00100		mg/L		09/25/23 09:35	10/11/23 12:43	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:43	1
Zinc	<0.0200		0.0200		mg/L		09/25/23 09:35	10/11/23 12:43	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
Aluminum	<0.0500		0.0500		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
Calcium	**79.0**		0.500		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
Copper	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:45	1
Iron	<0.100		0.100		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
Magnesium	**32.0**		0.500		mg/L		09/25/23 09:35	10/11/23 12:45	1
Manganese	**0.767**		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
Nickel	<0.00500		0.00500		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
Strontium	**0.101**		0.00100		mg/L		09/25/23 09:35	10/11/23 12:45	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:45	1
Zinc	<0.0200		0.0200		mg/L		09/25/23 09:35	10/11/23 12:45	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
Aluminum	**0.105**		0.0500		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
Calcium	**56.0**		0.500		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
Copper	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:47	1
Iron	<0.100		0.100		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
Magnesium	**25.4**		0.500		mg/L		09/25/23 09:35	10/11/23 12:47	1
Manganese	**0.0169**		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
Nickel	<0.00500		0.00500		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
Strontium	**0.0601**		0.00100		mg/L		09/25/23 09:35	10/11/23 12:47	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:47	1
Zinc	<0.0200		0.0200		mg/L		09/25/23 09:35	10/11/23 12:47	1

Client Sample Results

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

Job ID: 310-265406-1

Client Sample ID: MW-24

Date Collected: 09/19/23 09:00
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-11

Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**22.8**		5.00		mg/L			09/28/23 18:21	5
Fluoride	<1.00		1.00		mg/L			09/28/23 18:21	5
Sulfate	**62.9**		5.00		mg/L			09/28/23 18:21	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		09/25/23 09:35	10/11/23 12:49	1
Arsenic	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:49	1
Barium	**0.0698**		0.00200		mg/L		09/25/23 09:35	10/11/23 12:49	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 12:49	1
Boron	<0.100		0.100		mg/L		09/25/23 09:35	10/11/23 12:49	1
Calcium	**70.5**		0.500		mg/L		09/25/23 09:35	10/11/23 12:49	1
Cobalt	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:49	1
Copper	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:49	1
Iron	<0.100		0.100		mg/L		09/25/23 09:35	10/11/23 12:49	1
Lead	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 12:49	1
Lithium	<0.0100		0.0100		mg/L		09/25/23 09:35	10/11/23 12:49	1
Magnesium	**29.9**		0.500		mg/L		09/25/23 09:35	10/11/23 12:49	1
Manganese	**0.0183**		0.0100		mg/L		09/25/23 09:35	10/11/23 12:49	1
Molybdenum	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 12:49	1
Nickel	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:49	1
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:49	1
Strontium	**0.0768**		0.00100		mg/L		09/25/23 09:35	10/11/23 12:49	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 12:49	1
Zinc	<0.0200		0.0200		mg/L		09/25/23 09:35	10/11/23 12:49	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
Aluminum	<0.0500		0.0500		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
Calcium	**87.6**		0.500		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
Copper	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:01	1
Iron	**2.41**		0.100		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
Magnesium	**36.0**		0.500		mg/L		09/25/23 09:35	10/11/23 13:01	1
Manganese	**0.272**		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
Nickel	<0.00500		0.00500		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
Strontium	**0.208**		0.00100		mg/L		09/25/23 09:35	10/11/23 13:01	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:01	1
Zinc	<0.0200		0.0200		mg/L		09/25/23 09:35	10/11/23 13:01	1

Client Sample Results

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

Job ID: 310-265406-1

Client Sample ID: MW-26

Date Collected: 09/20/23 12:35
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-13

Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**18.8**		5.00		mg/L			09/28/23 18:52	5
Fluoride	<1.00		1.00		mg/L			09/28/23 18:52	5
Sulfate	**380**		5.00		mg/L			09/28/23 18:52	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		09/25/23 09:35	10/11/23 13:03	1
Arsenic	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 13:03	1
Barium	**0.0755**		0.00200		mg/L		09/25/23 09:35	10/11/23 13:03	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 13:03	1
Boron	**3.08**		0.100		mg/L		09/25/23 09:35	10/11/23 13:03	1
Calcium	**127**		0.500		mg/L		09/25/23 09:35	10/11/23 13:03	1
Cobalt	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 13:03	1
Copper	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:03	1
Iron	<0.100		0.100		mg/L		09/25/23 09:35	10/11/23 13:03	1
Lead	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 13:03	1
Lithium	**0.0117**		0.0100		mg/L		09/25/23 09:35	10/11/23 13:03	1
Magnesium	**48.9**		0.500		mg/L		09/25/23 09:35	10/11/23 13:03	1
Manganese	**0.111**		0.0100		mg/L		09/25/23 09:35	10/11/23 13:03	1
Molybdenum	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 13:03	1
Nickel	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:03	1
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:03	1
Strontium	**0.135**		0.00100		mg/L		09/25/23 09:35	10/11/23 13:03	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:03	1
Zinc	<0.0200		0.0200		mg/L		09/25/23 09:35	10/11/23 13:03	1

Client Sample Results

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

Job ID: 310-265406-1

Client Sample ID: MW-27

Date Collected: 09/20/23 13:35
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-14

Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**28.9**		5.00		mg/L			09/28/23 19:39	5
Fluoride	<1.00		1.00		mg/L			09/28/23 19:39	5
Sulfate	**27.0**		5.00		mg/L			09/28/23 19:39	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0737**		0.0500		mg/L		09/25/23 09:35	10/11/23 13:05	1
Arsenic	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 13:05	1
Barium	**0.0530**		0.00200		mg/L		09/25/23 09:35	10/11/23 13:05	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 13:05	1
Boron	**1.00**		0.100		mg/L		09/25/23 09:35	10/11/23 13:05	1
Calcium	**33.4**		0.500		mg/L		09/25/23 09:35	10/11/23 13:05	1
Cobalt	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 13:05	1
Copper	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:05	1
Iron	<0.100		0.100		mg/L		09/25/23 09:35	10/11/23 13:05	1
Lead	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 13:05	1
Lithium	<0.0100		0.0100		mg/L		09/25/23 09:35	10/11/23 13:05	1
Magnesium	**15.5**		0.500		mg/L		09/25/23 09:35	10/11/23 13:05	1
Manganese	**0.0231**		0.0100		mg/L		09/25/23 09:35	10/11/23 13:05	1
Molybdenum	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 13:05	1
Nickel	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:05	1
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:05	1
Strontium	**0.0752**		0.00100		mg/L		09/25/23 09:35	10/11/23 13:05	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:05	1
Zinc	<0.0200		0.0200		mg/L		09/25/23 09:35	10/11/23 13:05	1

Client Sample Results

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

Job ID: 310-265406-1

Client Sample ID: DUP-2

Date Collected: 09/20/23 12:00
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-15

Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**19.0**		5.00		mg/L			09/28/23 19:55	5
Fluoride	<1.00		1.00		mg/L			09/28/23 19:55	5
Sulfate	**386**		5.00		mg/L			09/28/23 19:55	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		09/25/23 09:35	10/11/23 13:08	1
Arsenic	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 13:08	1
Barium	**0.0749**		0.00200		mg/L		09/25/23 09:35	10/11/23 13:08	1
Beryllium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 13:08	1
Boron	**3.06**		0.100		mg/L		09/25/23 09:35	10/11/23 13:08	1
Calcium	**127**		0.500		mg/L		09/25/23 09:35	10/11/23 13:08	1
Cobalt	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 13:08	1
Copper	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:08	1
Iron	<0.100		0.100		mg/L		09/25/23 09:35	10/11/23 13:08	1
Lead	<0.000500		0.000500		mg/L		09/25/23 09:35	10/11/23 13:08	1
Lithium	**0.0119**		0.0100		mg/L		09/25/23 09:35	10/11/23 13:08	1
Magnesium	**48.2**		0.500		mg/L		09/25/23 09:35	10/11/23 13:08	1
Manganese	**0.120**		0.0100		mg/L		09/25/23 09:35	10/11/23 13:08	1
Molybdenum	<0.00200		0.00200		mg/L		09/25/23 09:35	10/11/23 13:08	1
Nickel	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:08	1
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:08	1
Strontium	**0.129**		0.00100		mg/L		09/25/23 09:35	10/11/23 13:08	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 13:08	1
Zinc	<0.0200		0.0200		mg/L		09/25/23 09:35	10/11/23 13:08	1

Qualifiers

Metals

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

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: 310-265406-1

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
Aluminum	<0.0500		0.0500		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
Calcium	<0.500		0.500		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
Copper	<0.00500		0.00500		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
Iron	<0.100		0.100		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
Magnesium	<0.500		0.500		mg/L		09/25/23 09:35	10/11/23 11:53	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
Manganese	<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
Nickel	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 11:53	1
Selenium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 11:53	1
Strontium	<0.00100		0.00100		mg/L		09/25/23 09:35	10/11/23 11:53	1
Vanadium	<0.00500		0.00500		mg/L		09/25/23 09:35	10/11/23 11:53	1
Zinc	<0.0200		0.0200		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
Aluminum	0.200	0.2056		mg/L		103	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
Calcium	2.00	1.684		mg/L		84	80 - 120
Cobalt	0.100	0.1036		mg/L		104	80 - 120
Copper	0.200	0.2050		mg/L		102	80 - 120
Lithium	0.200	0.2089		mg/L		104	80 - 120
Iron	0.200	0.2018		mg/L		101	80 - 120
Lead	0.200	0.2200		mg/L		110	80 - 120
Magnesium	2.00	1.907		mg/L		95	80 - 120
Manganese	0.100	0.09680		mg/L		97	80 - 120
Molybdenum	0.200	0.2043		mg/L		102	80 - 120
Nickel	0.200	0.2099		mg/L		105	80 - 120
Selenium	0.400	0.4151		mg/L		104	80 - 120
Strontium	0.200	0.2234		mg/L		112	80 - 120
Vanadium	0.100	0.1053		mg/L		105	80 - 120
Zinc	0.200	0.2025		mg/L		101	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
Aluminum	<0.0500		0.200	0.2052		mg/L		103	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
Calcium	90.4		2.00	93.15	4	mg/L		138	75 - 125
Cobalt	0.00374		0.100	0.1042		mg/L		100	75 - 125
Copper	<0.00500		0.200	0.2105		mg/L		105	75 - 125
Lithium	<0.0100		0.200	0.2230		mg/L		109	75 - 125
Iron	0.559		0.200	0.7612		mg/L		101	75 - 125
Lead	0.000576		0.200	0.2128		mg/L		106	75 - 125

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

Lab Sample ID: 310-265406-1 MS — **Client Sample ID: MW-4A**
Matrix: Ground Water — **Prep Type: Total/NA**
Analysis Batch: 402213 — **Prep Batch: 400452**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Magnesium	33.6		2.00	35.92	4	mg/L		118	75 - 125
Manganese	0.612		0.100	0.7316	4	mg/L		120	75 - 125
Molybdenum	<0.00200		0.200	0.2137		mg/L		106	75 - 125
Nickel	<0.00500		0.200	0.2197		mg/L		107	75 - 125
Selenium	<0.00500		0.400	0.4127		mg/L		103	75 - 125
Strontium	0.0958		0.200	0.3208		mg/L		113	75 - 125
Vanadium	<0.00500		0.100	0.1053		mg/L		105	75 - 125
Zinc	<0.0200		0.200	0.2112		mg/L		106	75 - 125

Lab Sample ID: 310-265406-1 MSD — **Client Sample ID: MW-4A**
Matrix: Ground Water — **Prep Type: Total/NA**
Analysis Batch: 402213 — **Prep Batch: 400452**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum	<0.0500		0.200	0.2075		mg/L		104	75 - 125	1	20
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
Calcium	90.4		2.00	92.49	4	mg/L		105	75 - 125	1	20
Cobalt	0.00374		0.100	0.1044		mg/L		101	75 - 125	0	20
Copper	<0.00500		0.200	0.2082		mg/L		104	75 - 125	1	20
Lithium	<0.0100		0.200	0.2205		mg/L		108	75 - 125	1	20
Iron	0.559		0.200	0.7664		mg/L		104	75 - 125	1	20
Lead	0.000576		0.200	0.2125		mg/L		106	75 - 125	0	20
Magnesium	33.6		2.00	35.64	4	mg/L		104	75 - 125	1	20
Manganese	0.612		0.100	0.7167	4	mg/L		105	75 - 125	2	20
Molybdenum	<0.00200		0.200	0.2124		mg/L		105	75 - 125	1	20
Nickel	<0.00500		0.200	0.2157		mg/L		105	75 - 125	2	20
Selenium	<0.00500		0.400	0.4172		mg/L		104	75 - 125	1	20
Strontium	0.0958		0.200	0.3184		mg/L		111	75 - 125	1	20
Vanadium	<0.00500		0.100	0.1061		mg/L		106	75 - 125	1	20
Zinc	<0.0200		0.200	0.2110		mg/L		105	75 - 125	0	20

Lab Sample ID: 310-265406-11 DU — **Client Sample ID: MW-24**
Matrix: Ground Water — **Prep Type: Total/NA**
Analysis Batch: 402213 — **Prep Batch: 400452**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	<0.0500		<0.0500		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
Calcium	70.5		70.95		mg/L		0.7	20
Cobalt	<0.000500		<0.000500		mg/L		NC	20
Copper	<0.00500		<0.00500		mg/L		NC	20
Lithium	<0.0100		<0.0100		mg/L		NC	20
Iron	<0.100		<0.100		mg/L		NC	20

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

Lab Sample ID: 310-265406-11 DU
Matrix: Ground Water
Analysis Batch: 402213

Client Sample ID: MW-24
Prep Type: Total/NA
Prep Batch: 400452

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Lead	<0.000500			<0.000500		mg/L				NC	20
Magnesium	29.9			29.75		mg/L				0.5	20
Manganese	0.0183			0.01827		mg/L				0.2	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	0.0768			0.07727		mg/L				0.6	20
Vanadium	<0.00500			<0.00500		mg/L				NC	20
Zinc	<0.0200			<0.0200		mg/L				NC	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	
310-265406-11	MW-24	Total/NA	Ground Water	9056A	
310-265406-12	DUP-1	Total/NA	Ground Water	9056A	
310-265406-13	MW-26	Total/NA	Ground Water	9056A	
310-265406-14	MW-27	Total/NA	Ground Water	9056A	
310-265406-15	DUP-2	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	
310-265406-11	MW-24	Total/NA	Ground Water	3005A	
310-265406-12	DUP-1	Total/NA	Ground Water	3005A	
310-265406-13	MW-26	Total/NA	Ground Water	3005A	
310-265406-14	MW-27	Total/NA	Ground Water	3005A	
310-265406-15	DUP-2	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	
310-265406-11 DU	MW-24	Total/NA	Ground Water	3005A	

QC Association Summary

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

Job ID: 310-265406-1

Metals

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
310-265406-11	MW-24	Total/NA	Ground Water	6020B	400452
310-265406-12	DUP-1	Total/NA	Ground Water	6020B	400452
310-265406-13	MW-26	Total/NA	Ground Water	6020B	400452
310-265406-14	MW-27	Total/NA	Ground Water	6020B	400452
310-265406-15	DUP-2	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
310-265406-11 DU	MW-24	Total/NA	Ground Water	6020B	400452

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	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

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	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

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	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

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	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

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	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

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	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	401079	QTZ5	EET CF	09/28/23 17:02

Lab Chronicle

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

Job ID: 310-265406-1

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	Analyst	Lab	Prepared or Analyzed
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

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	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

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	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

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	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

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	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

Lab Chronicle

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

Job ID: 310-265406-1

Client Sample ID: MW-24
Date Collected: 09/19/23 09:00
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-11
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	401079	QTZ5	EET CF	09/28/23 18:21
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 12:49

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

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
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

Client Sample ID: MW-26
Date Collected: 09/20/23 12:35
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-13
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	401079	QTZ5	EET CF	09/28/23 18:52
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 13:03

Client Sample ID: MW-27
Date Collected: 09/20/23 13:35
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-14
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	401079	QTZ5	EET CF	09/28/23 19:39
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 13:05

Client Sample ID: DUP-2
Date Collected: 09/20/23 12:00
Date Received: 09/22/23 08:35

Lab Sample ID: 310-265406-15
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	401079	QTZ5	EET CF	09/28/23 19:55
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 13:08

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
Job ID: 310-265406-1
Project/Site: Muscatine Power & Water CCR Landfill

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

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
3005A	Preparation, Total Metals	SW846	EET CF

Protocol References:

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

Laboratory References:

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

eurofins | Environment Testing America

310-265406 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: Muscatine Power + Water

City/State: CITY | STATE IA | Project:

Receipt Information

Date/Time Received: DATE 9/22/23 | TIME 0835 | Received By: r

Delivery Type: ☒ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler?	☒ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☒ Yes	☐ No	*If yes:* Cooler # 1 of 3
Cooler Custody Seals Present?	☒ Yes	☐ No	*If yes:* Cooler custody seals intact? ☒ Yes ☐ No
Sample Custody Seals Present?	☐ Yes	☒ No	*If yes:* Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?	☐ Yes	☒ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: T | Correction Factor (°C): +0.0

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

Uncorrected Temp (°C): 4.7 | Corrected Temp (°C): 4.7

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE. If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

eurofins | Environment Testing America

Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: Muscatine Power & Water

City/State: CITY | STATE IA | Project:

Receipt Information

Date/Time Received: DATE 9/22/23 | TIME 0835 | Received By: [illegible]

Delivery Type: ☒ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☒ Yes ☐ No *If yes:* Cooler # 2 of 3

Cooler Custody Seals Present? ☒ Yes ☐ No *If yes:* Cooler custody seals intact? ☒ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☒ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: T | Correction Factor (°C): +0.0

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

Uncorrected Temp (°C): 3.3 | Corrected Temp (°C): 3.3

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

eurofins | Environment Testing America

Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: Muscatine Power & Water

City/State. CITY | STATE | Project:

Receipt Information

Date/Time Received: DATE 9/22/23 | TIME 0835 | Received By: [illegible]

Delivery Type: ☒ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☒ Yes ☐ No *If yes:* Cooler # 3 of 3

Cooler Custody Seals Present? ☒ Yes ☐ No *If yes:* Cooler custody seals intact? ☐ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☒ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: T | Correction Factor (°C): +0.0

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

Uncorrected Temp (°C): 2.5 | Corrected Temp (°C): 2.5

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

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

Chain of Custody Record

Client Information	Sampler: Sam Bennett	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: 1
Company: Muscatine Power & Water				Job #:

Address: 1700 Dick Drake Way	Due Date Requested:
City: Muscatine	TAT Requested (days)
State, Zip: IA, 52761	
Phone:	PO #: 234488
Email: sbennett@mpw.org	WO #:
Project Name: Muscatine Power & Water State Landfill	TestAmerica Project #:
Site: Iowa	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, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020A State Metals List	9056A Chloride, Fluoride, Sulfate	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	N		
MW-4B	9/20/23	0800	G	GW			X	X		
MW-5B	9/20/23	1055	G	GW			X	X		
MW-6A	9/20/23	915	G	GW			X	X		
MW-8	9/19/23	950	G	GW			X	X		
MW-10	9/18/23	1145	G	GW			X	X		
MW-14A	9/19/23	1150	G	GW			X	X		
MW-15A	9/19/23	1300	G	GW			X	X		
MW-21	9/19/23	1050	G	GW			X	X		
MW-22	9/18/23	1430	G	GW			X	X		
MW-23	9/18/23	1305	G	GW			X	X		
MW-24	9/19/23	0900	G	GW			X	X		

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

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

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

Special Instructions/QC Requirements.

Empty Kit Relinquished by:	Date	Time	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[illegible]	9/21/23 0900	MPW			
			[illegible]	9/22/23 0835	

Custody Seals Intact: Δ Yes Δ No	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	Sampler: Sam Bennett	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: 1
Company: Muscatine Power & Water				Job #:
Address: 1700 Dick Drake Way	Due Date Requested			
City: Muscatine	TAT Requested (days):			
State Zip: IA, 52761				
Phone:	PO #: 234488			
Email: sbennett@mpw.org	WO #:			
Project Name: Muscatine Power & Water CCR Landfill	TestAmerica Project #: 31007856			
Site: Iowa	Event: Fall 2023 Sample			

Analysis Requested

Preservation Codes:

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

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020A CCR List, 7470A Mercury	2540C TDS, SM4500_H+ pH	9056A Chloride, Fluoride, Sulfate	Radium-226	Radium-228								Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	N	N											
MW-4B	9/20/23	0800	G	GW			X	X	X	X	X									
MW-5B	9/20/23	1055	G	GW			X	X	X	X	X									
MW-6A	9/20/23	915	G	GW			X	X	X	X	X									
MW-8	9/19/23	950	G	GW			X	X	X	X	X									
MW-10	9/18/23	1145	G	GW			X	X	X	X	X									
MW-14A	9/19/23	1150	G	GW			X	X	X	X	X									
MW-15A	9/19/23	1300	G	GW			X	X	X	X	X									
MW-21	9/19/23	1050	G	GW			X	X	X	X	X									
MW-22	9/18/23	1430	G	GW			X	X	X	X	X									
MW-23	9/18/23	1305	G	GW			X	X	X	X	X									
Duplicate-1	9/18/23	1200	G	GW			X	X	X	X	X									

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

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

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

Special Instructions/QC Requirements:

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

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
[illegible]	9/2/23 0900	MPW			
				9/22/23 0835	

Custody Seals Intact: Δ Yes Δ No	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	Sampler: Sam Bennett	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: 2
Company: Muscatine Power & Water				Job #:
Address: 1700 Dick Drake Way	Due Date Requested			
City: Muscatine	TAT Requested (days)			
State, Zip: IA, 52761				
Phone:	PO #: 234488			
Email: sbennett@mpw.org	WO #:			
Project Name: Muscatine Power & Water State Landfill	TestAmerica Project #:			
Site: Iowa	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, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020A State Metals List	9056A Chloride, Fluoride, Sulfate	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	N		
MW-26	9/20/23	1235	G	GW			X	X		
MW-27	9/20/23	1335	G	GW			X	X		
Duplicate-1	9/18/23	1200	G	GW			X	X		
Duplicate-2	9/20/23	1200	G	GW			X	X		

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

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

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

Special Instructions/QC Requirements.

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

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
[signature]	9/21/23 0900	MPW			
			[signature]	9/22/23 0835	

Custody Seals Intact: Δ Yes Δ No

Custody Seal 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 Number: 1
Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	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	

B3
April 2023 Surface Water Analytical Data

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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 4/28/2023 10:03:17 PM

JOB DESCRIPTION

Muscatine Power & Water State Parameters

JOB NUMBER

310-253970-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

my EOL

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
4/28/2023 10:03:17 PM

Authorized for release by
Brian Graettinger, Business Unit Manager
Brian.Graettinger@et.eurofinsus.com
Designee for
Shirley Thompson, Client Service Manager
Shirley.Thompson@et.eurofinsus.com
(319)277-2401

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Job ID: 310-253970-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-253970-1

Receipt
The samples were received on 4/20/2023 9:00 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.3°C

HPLC/IC
Method 9056A_ORGFM_28D: The following samples were diluted due to the nature of the sample matrix: SW-22 (310-253970-1), SW-23 (310-253970-2), SW-24 (310-253970-3), SW-25 (310-253970-4) and SW-26 (310-253970-5). Elevated reporting limits (RLs) are provided.

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

Metals
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 State Parameters

Job ID: 310-253970-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-253970-1	SW-22	Stormwater	04/19/23 13:15	04/20/23 09:00
310-253970-2	SW-23	Stormwater	04/19/23 12:30	04/20/23 09:00
310-253970-3	SW-24	Stormwater	04/19/23 12:50	04/20/23 09:00
310-253970-4	SW-25	Stormwater	04/19/23 13:10	04/20/23 09:00
310-253970-5	SW-26	Stormwater	04/19/23 11:15	04/20/23 09:00

Detection Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water State Parameters

Job ID: 310-253970-1

Client Sample ID: SW-22 — Lab Sample ID: 310-253970-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	18.0		5.00		mg/L	5		9056A	Total/NA
Sulfate	15.7		5.00		mg/L	5		9056A	Total/NA
Aluminum	0.0782		0.0500		mg/L	1		6020B	Total/NA
Barium	0.101		0.00200		mg/L	1		6020B	Total/NA
Calcium	57.6		0.500		mg/L	1		6020B	Total/NA
Iron	0.240		0.100		mg/L	1		6020B	Total/NA
Magnesium	25.1		0.500		mg/L	1		6020B	Total/NA
Manganese	0.204		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.111		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: SW-23 — Lab Sample ID: 310-253970-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	19.1		5.00		mg/L	5		9056A	Total/NA
Sulfate	182		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00221		0.00200		mg/L	1		6020B	Total/NA
Barium	0.0922		0.00200		mg/L	1		6020B	Total/NA
Boron	2.17		0.100		mg/L	1		6020B	Total/NA
Calcium	87.6		0.500		mg/L	1		6020B	Total/NA
Iron	0.117		0.100		mg/L	1		6020B	Total/NA
Magnesium	34.0		0.500		mg/L	1		6020B	Total/NA
Manganese	0.115		0.0100		mg/L	1		6020B	Total/NA
Molybdenum	0.0281		0.00200		mg/L	1		6020B	Total/NA
Strontium	0.229		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: SW-24 — Lab Sample ID: 310-253970-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	16.1		5.00		mg/L	5		9056A	Total/NA
Sulfate	622		10.0		mg/L	10		9056A	Total/NA
Barium	0.0253		0.00200		mg/L	1		6020B	Total/NA
Boron	7.97		0.400		mg/L	4		6020B	Total/NA
Calcium	213		0.500		mg/L	1		6020B	Total/NA
Magnesium	86.1		2.00		mg/L	4		6020B	Total/NA
Strontium	0.339		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: SW-25 — Lab Sample ID: 310-253970-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	17.7		5.00		mg/L	5		9056A	Total/NA
Sulfate	299		5.00		mg/L	5		9056A	Total/NA
Barium	0.0510		0.00200		mg/L	1		6020B	Total/NA
Boron	4.20		0.100		mg/L	1		6020B	Total/NA
Calcium	149		0.500		mg/L	1		6020B	Total/NA
Magnesium	53.8		0.500		mg/L	1		6020B	Total/NA
Manganese	0.0169		0.0100		mg/L	1		6020B	Total/NA
Strontium	0.257		0.00100		mg/L	1		6020B	Total/NA

Client Sample ID: SW-26 — Lab Sample ID: 310-253970-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	20.2		5.00		mg/L	5		9056A	Total/NA
Sulfate	121		5.00		mg/L	5		9056A	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Muscatine Power & Water
Job ID: 310-253970-1
Project/Site: Muscatine Power & Water State Parameters

Client Sample ID: SW-26 (Continued)
Lab Sample ID: 310-253970-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.00664		0.00200		mg/L	1		6020B	Total/NA
Barium	0.0536		0.00200		mg/L	1		6020B	Total/NA
Boron	1.54		0.100		mg/L	1		6020B	Total/NA
Calcium	70.0		0.500		mg/L	1		6020B	Total/NA
Iron	0.286		0.100		mg/L	1		6020B	Total/NA
Magnesium	33.0		0.500		mg/L	1		6020B	Total/NA
Manganese	0.728		0.0100		mg/L	1		6020B	Total/NA
Molybdenum	0.0149		0.00200		mg/L	1		6020B	Total/NA
Strontium	0.203		0.00100		mg/L	1		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water State Parameters

Job ID: 310-253970-1

Client Sample ID: SW-22

Date Collected: 04/19/23 13:15
Date Received: 04/20/23 09:00

Lab Sample ID: 310-253970-1

Matrix: Stormwater

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**18.0**		5.00		mg/L			04/26/23 18:47	5
Fluoride	<1.00		1.00		mg/L			04/26/23 18:47	5
Sulfate	**15.7**		5.00		mg/L			04/26/23 18:47	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0782**		0.0500		mg/L		04/21/23 08:40	04/23/23 18:14	1
Arsenic	<0.00200		0.00200		mg/L		04/21/23 08:40	04/23/23 18:14	1
Barium	**0.101**		0.00200		mg/L		04/21/23 08:40	04/23/23 18:14	1
Beryllium	<0.00100		0.00100		mg/L		04/21/23 08:40	04/23/23 18:14	1
Boron	<0.100		0.100		mg/L		04/21/23 08:40	04/23/23 18:14	1
Calcium	**57.6**		0.500		mg/L		04/21/23 08:40	04/23/23 18:14	1
Cobalt	<0.000500		0.000500		mg/L		04/21/23 08:40	04/23/23 18:14	1
Copper	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:14	1
Iron	**0.240**		0.100		mg/L		04/21/23 08:40	04/23/23 18:14	1
Lead	<0.000500		0.000500		mg/L		04/21/23 08:40	04/23/23 18:14	1
Magnesium	**25.1**		0.500		mg/L		04/21/23 08:40	04/23/23 18:14	1
Manganese	**0.204**		0.0100		mg/L		04/21/23 08:40	04/23/23 18:14	1
Molybdenum	<0.00200		0.00200		mg/L		04/21/23 08:40	04/23/23 18:14	1
Nickel	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:14	1
Selenium	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:14	1
Strontium	**0.111**		0.00100		mg/L		04/21/23 08:40	04/23/23 18:14	1
Vanadium	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:14	1
Zinc	<0.0200		0.0200		mg/L		04/21/23 08:40	04/23/23 18:14	1

Client Sample Results

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water State Parameters

Job ID: 310-253970-1

Client Sample ID: SW-23

Date Collected: 04/19/23 12:30
Date Received: 04/20/23 09:00

Lab Sample ID: 310-253970-2

Matrix: Stormwater

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**19.1**		5.00		mg/L			04/26/23 19:03	5
Fluoride	<1.00		1.00		mg/L			04/26/23 19:03	5
Sulfate	**182**		5.00		mg/L			04/26/23 19:03	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/21/23 08:40	04/23/23 18:31	1
Arsenic	**0.00221**		0.00200		mg/L		04/21/23 08:40	04/23/23 18:31	1
Barium	**0.0922**		0.00200		mg/L		04/21/23 08:40	04/23/23 18:31	1
Beryllium	<0.00100		0.00100		mg/L		04/21/23 08:40	04/23/23 18:31	1
Boron	**2.17**		0.100		mg/L		04/21/23 08:40	04/23/23 18:31	1
Calcium	**87.6**		0.500		mg/L		04/21/23 08:40	04/23/23 18:31	1
Cobalt	<0.000500		0.000500		mg/L		04/21/23 08:40	04/23/23 18:31	1
Copper	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:31	1
Iron	**0.117**		0.100		mg/L		04/21/23 08:40	04/23/23 18:31	1
Lead	<0.000500		0.000500		mg/L		04/21/23 08:40	04/23/23 18:31	1
Magnesium	**34.0**		0.500		mg/L		04/21/23 08:40	04/23/23 18:31	1
Manganese	**0.115**		0.0100		mg/L		04/21/23 08:40	04/23/23 18:31	1
Molybdenum	**0.0281**		0.00200		mg/L		04/21/23 08:40	04/23/23 18:31	1
Nickel	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:31	1
Selenium	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:31	1
Strontium	**0.229**		0.00100		mg/L		04/21/23 08:40	04/23/23 18:31	1
Vanadium	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:31	1
Zinc	<0.0200		0.0200		mg/L		04/21/23 08:40	04/23/23 18:31	1

Client Sample Results

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water State Parameters

Job ID: 310-253970-1

Client Sample ID: SW-24

Date Collected: 04/19/23 12:50
Date Received: 04/20/23 09:00

Lab Sample ID: 310-253970-3

Matrix: Stormwater

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**16.1**		5.00		mg/L			04/26/23 19:18	5
Fluoride	<1.00		1.00		mg/L			04/26/23 19:18	5
Sulfate	**622**		10.0		mg/L			04/27/23 10:50	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/21/23 08:40	04/23/23 18:34	1
Arsenic	<0.00200		0.00200		mg/L		04/21/23 08:40	04/23/23 18:34	1
Barium	**0.0253**		0.00200		mg/L		04/21/23 08:40	04/23/23 18:34	1
Beryllium	<0.00100		0.00100		mg/L		04/21/23 08:40	04/23/23 18:34	1
Boron	**7.97**		0.400		mg/L		04/21/23 08:40	04/24/23 15:40	4
Calcium	**213**		0.500		mg/L		04/21/23 08:40	04/23/23 18:34	1
Cobalt	<0.000500		0.000500		mg/L		04/21/23 08:40	04/23/23 18:34	1
Copper	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:34	1
Iron	<0.100		0.100		mg/L		04/21/23 08:40	04/23/23 18:34	1
Lead	<0.000500		0.000500		mg/L		04/21/23 08:40	04/23/23 18:34	1
Magnesium	**86.1**		2.00		mg/L		04/21/23 08:40	04/24/23 15:40	4
Manganese	<0.0100		0.0100		mg/L		04/21/23 08:40	04/23/23 18:34	1
Molybdenum	<0.00200		0.00200		mg/L		04/21/23 08:40	04/23/23 18:34	1
Nickel	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:34	1
Selenium	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:34	1
Strontium	**0.339**		0.00100		mg/L		04/21/23 08:40	04/23/23 18:34	1
Vanadium	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:34	1
Zinc	<0.0200		0.0200		mg/L		04/21/23 08:40	04/23/23 18:34	1

Client Sample Results

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water State Parameters

Job ID: 310-253970-1

Client Sample ID: SW-25

Lab Sample ID: 310-253970-4

Date Collected: 04/19/23 13:10
Date Received: 04/20/23 09:00

Matrix: Stormwater

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**17.7**		5.00		mg/L			04/26/23 19:34	5
Fluoride	<1.00		1.00		mg/L			04/26/23 19:34	5
Sulfate	**299**		5.00		mg/L			04/26/23 19:34	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/21/23 08:40	04/23/23 18:37	1
Arsenic	<0.00200		0.00200		mg/L		04/21/23 08:40	04/23/23 18:37	1
Barium	**0.0510**		0.00200		mg/L		04/21/23 08:40	04/23/23 18:37	1
Beryllium	<0.00100		0.00100		mg/L		04/21/23 08:40	04/23/23 18:37	1
Boron	**4.20**		0.100		mg/L		04/21/23 08:40	04/23/23 18:37	1
Calcium	**149**		0.500		mg/L		04/21/23 08:40	04/23/23 18:37	1
Cobalt	<0.000500		0.000500		mg/L		04/21/23 08:40	04/23/23 18:37	1
Copper	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:37	1
Iron	<0.100		0.100		mg/L		04/21/23 08:40	04/23/23 18:37	1
Lead	<0.000500		0.000500		mg/L		04/21/23 08:40	04/23/23 18:37	1
Magnesium	**53.8**		0.500		mg/L		04/21/23 08:40	04/23/23 18:37	1
Manganese	**0.0169**		0.0100		mg/L		04/21/23 08:40	04/23/23 18:37	1
Molybdenum	<0.00200		0.00200		mg/L		04/21/23 08:40	04/23/23 18:37	1
Nickel	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:37	1
Selenium	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:37	1
Strontium	**0.257**		0.00100		mg/L		04/21/23 08:40	04/23/23 18:37	1
Vanadium	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:37	1
Zinc	<0.0200		0.0200		mg/L		04/21/23 08:40	04/23/23 18:37	1

Client Sample Results

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water State Parameters

Job ID: 310-253970-1

Client Sample ID: SW-26

Date Collected: 04/19/23 11:15
Date Received: 04/20/23 09:00

Lab Sample ID: 310-253970-5

Matrix: Stormwater

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**20.2**		5.00		mg/L			04/26/23 19:49	5
Fluoride	<1.00		1.00		mg/L			04/26/23 19:49	5
Sulfate	**121**		5.00		mg/L			04/26/23 19:49	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/21/23 08:40	04/23/23 18:40	1
Arsenic	**0.00664**		0.00200		mg/L		04/21/23 08:40	04/23/23 18:40	1
Barium	**0.0536**		0.00200		mg/L		04/21/23 08:40	04/23/23 18:40	1
Beryllium	<0.00100		0.00100		mg/L		04/21/23 08:40	04/23/23 18:40	1
Boron	**1.54**		0.100		mg/L		04/21/23 08:40	04/23/23 18:40	1
Calcium	**70.0**		0.500		mg/L		04/21/23 08:40	04/23/23 18:40	1
Cobalt	<0.000500		0.000500		mg/L		04/21/23 08:40	04/23/23 18:40	1
Copper	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:40	1
Iron	**0.286**		0.100		mg/L		04/21/23 08:40	04/23/23 18:40	1
Lead	<0.000500		0.000500		mg/L		04/21/23 08:40	04/23/23 18:40	1
Magnesium	**33.0**		0.500		mg/L		04/21/23 08:40	04/23/23 18:40	1
Manganese	**0.728**		0.0100		mg/L		04/21/23 08:40	04/23/23 18:40	1
Molybdenum	**0.0149**		0.00200		mg/L		04/21/23 08:40	04/23/23 18:40	1
Nickel	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:40	1
Selenium	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:40	1
Strontium	**0.203**		0.00100		mg/L		04/21/23 08:40	04/23/23 18:40	1
Vanadium	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 18:40	1
Zinc	<0.0200		0.0200		mg/L		04/21/23 08:40	04/23/23 18:40	1

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 State Parameters

Job ID: 310-253970-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-385722/3
Matrix: Water
Analysis Batch: 385722

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			04/26/23 17:29	1
Fluoride	<0.200		0.200		mg/L			04/26/23 17:29	1
Sulfate	<1.00		1.00		mg/L			04/26/23 17:29	1

Lab Sample ID: LCS 310-385722/4
Matrix: Water
Analysis Batch: 385722

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	10.25		mg/L		103	90 - 110
Fluoride	2.00	2.100		mg/L		105	90 - 110
Sulfate	10.0	10.64		mg/L		106	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-385018/1-A
Matrix: Water
Analysis Batch: 385266

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 385018

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/21/23 08:40	04/23/23 16:44	1
Arsenic	<0.00200		0.00200		mg/L		04/21/23 08:40	04/23/23 16:44	1
Barium	<0.00200		0.00200		mg/L		04/21/23 08:40	04/23/23 16:44	1
Beryllium	<0.00100		0.00100		mg/L		04/21/23 08:40	04/23/23 16:44	1
Boron	<0.100		0.100		mg/L		04/21/23 08:40	04/23/23 16:44	1
Calcium	<0.500		0.500		mg/L		04/21/23 08:40	04/23/23 16:44	1
Cobalt	<0.000500		0.000500		mg/L		04/21/23 08:40	04/23/23 16:44	1
Copper	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 16:44	1
Iron	<0.100		0.100		mg/L		04/21/23 08:40	04/23/23 16:44	1
Lead	<0.000500		0.000500		mg/L		04/21/23 08:40	04/23/23 16:44	1
Magnesium	<0.500		0.500		mg/L		04/21/23 08:40	04/23/23 16:44	1
Manganese	<0.0100		0.0100		mg/L		04/21/23 08:40	04/23/23 16:44	1
Molybdenum	<0.00200		0.00200		mg/L		04/21/23 08:40	04/23/23 16:44	1
Nickel	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 16:44	1
Selenium	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 16:44	1
Strontium	<0.00100		0.00100		mg/L		04/21/23 08:40	04/23/23 16:44	1
Vanadium	<0.00500		0.00500		mg/L		04/21/23 08:40	04/23/23 16:44	1
Zinc	<0.0200		0.0200		mg/L		04/21/23 08:40	04/23/23 16:44	1

Lab Sample ID: LCS 310-385018/2-A
Matrix: Water
Analysis Batch: 385266

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 385018

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	0.200	0.2275		mg/L		114	80 - 120
Arsenic	0.200	0.2106		mg/L		105	80 - 120
Barium	0.100	0.1071		mg/L		107	80 - 120
Beryllium	0.100	0.1116		mg/L		112	80 - 120
Boron	0.200	0.2132		mg/L		107	80 - 120

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

Lab Sample ID: LCS 310-385018/2-A
Client Sample ID: Lab Control Sample
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 385266
Prep Batch: 385018

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Calcium	2.00	2.317		mg/L		116	80 - 120
Cobalt	0.100	0.1071		mg/L		107	80 - 120
Copper	0.200	0.2279		mg/L		114	80 - 120
Iron	0.200	0.2314		mg/L		116	80 - 120
Lead	0.200	0.2172		mg/L		109	80 - 120
Magnesium	2.00	2.214		mg/L		111	80 - 120
Manganese	0.100	0.09979		mg/L		100	80 - 120
Molybdenum	0.200	0.2142		mg/L		107	80 - 120
Nickel	0.200	0.2220		mg/L		111	80 - 120
Selenium	0.400	0.4193		mg/L		105	80 - 120
Strontium	0.200	0.2177		mg/L		109	80 - 120
Vanadium	0.100	0.1009		mg/L		101	80 - 120
Zinc	0.200	0.2065		mg/L		103	80 - 120

QC Association Summary

Client: Muscatine Power & Water
Job ID: 310-253970-1
Project/Site: Muscatine Power & Water State Parameters

HPLC/IC

Analysis Batch: 385722

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253970-1	SW-22	Total/NA	Stormwater	9056A	
310-253970-2	SW-23	Total/NA	Stormwater	9056A	
310-253970-3	SW-24	Total/NA	Stormwater	9056A	
310-253970-3	SW-24	Total/NA	Stormwater	9056A	
310-253970-4	SW-25	Total/NA	Stormwater	9056A	
310-253970-5	SW-26	Total/NA	Stormwater	9056A	
MB 310-385722/3	Method Blank	Total/NA	Water	9056A	
LCS 310-385722/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 385018

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253970-1	SW-22	Total/NA	Stormwater	3005A	
310-253970-2	SW-23	Total/NA	Stormwater	3005A	
310-253970-3	SW-24	Total/NA	Stormwater	3005A	
310-253970-4	SW-25	Total/NA	Stormwater	3005A	
310-253970-5	SW-26	Total/NA	Stormwater	3005A	
MB 310-385018/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-385018/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 385266

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253970-1	SW-22	Total/NA	Stormwater	6020B	385018
310-253970-2	SW-23	Total/NA	Stormwater	6020B	385018
310-253970-3	SW-24	Total/NA	Stormwater	6020B	385018
310-253970-4	SW-25	Total/NA	Stormwater	6020B	385018
310-253970-5	SW-26	Total/NA	Stormwater	6020B	385018
MB 310-385018/1-A	Method Blank	Total/NA	Water	6020B	385018
LCS 310-385018/2-A	Lab Control Sample	Total/NA	Water	6020B	385018

Analysis Batch: 385390

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253970-3	SW-24	Total/NA	Stormwater	6020B	385018

Lab Chronicle

Client: Muscatine Power & Water
Job ID: 310-253970-1
Project/Site: Muscatine Power & Water State Parameters

Client Sample ID: SW-22
Lab Sample ID: 310-253970-1
Date Collected: 04/19/23 13:15
Matrix: Stormwater
Date Received: 04/20/23 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385722	QTZ5	EET CF	04/26/23 18:47
Total/NA	Prep	3005A			385018	DHM5	EET CF	04/21/23 08:40
Total/NA	Analysis	6020B		1	385266	ZRI4	EET CF	04/23/23 18:14

Client Sample ID: SW-23
Lab Sample ID: 310-253970-2
Date Collected: 04/19/23 12:30
Matrix: Stormwater
Date Received: 04/20/23 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385722	QTZ5	EET CF	04/26/23 19:03
Total/NA	Prep	3005A			385018	DHM5	EET CF	04/21/23 08:40
Total/NA	Analysis	6020B		1	385266	ZRI4	EET CF	04/23/23 18:31

Client Sample ID: SW-24
Lab Sample ID: 310-253970-3
Date Collected: 04/19/23 12:50
Matrix: Stormwater
Date Received: 04/20/23 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385722	QTZ5	EET CF	04/26/23 19:18
Total/NA	Analysis	9056A		10	385722	QTZ5	EET CF	04/27/23 10:50
Total/NA	Prep	3005A			385018	DHM5	EET CF	04/21/23 08:40
Total/NA	Analysis	6020B		1	385266	ZRI4	EET CF	04/23/23 18:34
Total/NA	Prep	3005A			385018	DHM5	EET CF	04/21/23 08:40
Total/NA	Analysis	6020B		4	385390	ZRI4	EET CF	04/24/23 15:40

Client Sample ID: SW-25
Lab Sample ID: 310-253970-4
Date Collected: 04/19/23 13:10
Matrix: Stormwater
Date Received: 04/20/23 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385722	QTZ5	EET CF	04/26/23 19:34
Total/NA	Prep	3005A			385018	DHM5	EET CF	04/21/23 08:40
Total/NA	Analysis	6020B		1	385266	ZRI4	EET CF	04/23/23 18:37

Client Sample ID: SW-26
Lab Sample ID: 310-253970-5
Date Collected: 04/19/23 11:15
Matrix: Stormwater
Date Received: 04/20/23 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	385722	QTZ5	EET CF	04/26/23 19:49
Total/NA	Prep	3005A			385018	DHM5	EET CF	04/21/23 08:40
Total/NA	Analysis	6020B		1	385266	ZRI4	EET CF	04/23/23 18:40

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
Job ID: 310-253970-1
Project/Site: Muscatine Power & Water State Parameters

Laboratory: Eurofins Cedar Falls

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

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

Method Summary

Client: Muscatine Power & Water
Project/Site: Muscatine Power & Water State Parameters

Job ID: 310-253970-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
3005A	Preparation, Total Metals	SW846	EET CF

Protocol References:

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

Laboratory References:

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

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310-253970 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: Muscatine Power

City/State: CITY | STATE IA | Project:

Receipt Information

Date/Time Received: DATE 4/20/23 | TIME 0940 | Received By: ST

Delivery Type: ☑ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler? ☑ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☐ Yes ☑ No *If yes:* Cooler # _____ of _____

Cooler Custody Seals Present? ☑ Yes ☐ No *If yes:* Cooler custody seals intact? ☑ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☑ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☑ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☑ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: R | Correction Factor (°C): +0.2

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

Uncorrected Temp (°C): 1.1 | Corrected Temp (°C): 1.3

• ***Sample Container Temperature***

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE. If yes, contact PM before proceeding If no, proceed with login

Additional Comments

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

Chain of Custody Record

Client Information	Sampler: Sam Bennett	Lab PM: Shirley Thompson	Carrier Tracking No(s):	COC No
Client Contact: Sam Bennett MP&W	Phone: 563-262-3583	E-Mail: Shirley.Thompson@et.eurofinsus.com		Page:
Company: Muscatine Power & Water				Job #:

Address: 1700 Dick Drake Way	Due Date Requested: Original
City: Muscatine	TAT Requested (days): 1
State, Zip: IA, 52761	
Phone:	PO #: 231623
Email: sbennett@mpw.org	WO #:
Project Name: Muscatine Power & Water State Parameters	TestAmerica Project #:
Site: Iowa	Event:

Analysis Requested

Preservation Codes.

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

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020A State Metals List	9056A Chloride, Fluoride, Sulfate	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	N		
SW-22	4/19/23	1315	G	SW			X	X		
SW-23	4/19/23	1230	G	SW			X	X		
SW-24	4/19/23	1250	G	SW			X	X		
SW-25	4/19/23	1310	G	SW			X	X		
SW-26	4/19/23	1115	G	SW			X	X		

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

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

Deliverable Requested I II III IV Other (specify)

Special Instructions/QC Requirements.

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

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Sam Bennett	4-19-23 / 0815	MPW	[illegible]	4/20/23 0900	

Custody Seals Intact: Δ Yes Δ No

Custody Seal No

Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-253970-1

Login Number: 253970

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Tucker, Sarah L

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	

B4
2023 Leachate Analytical Data

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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 1/4/2024 2:43:02 PM

JOB DESCRIPTION

Muscatine Power & Water CCR Landfill

JOB NUMBER

310-270009-2

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

my EOL

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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1/4/2024 2:43:02 PM

Authorized for release by
Matthew Hummel, Project Manager I
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Job Narrative
310-270009-2

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 sample was received on 11/21/2023 8:55 AM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 2.4°C

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

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

Sample Summary

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

Job ID: 310-270009-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-270009-1	Leachate	Leachate	11/16/23 09:30	11/21/23 08:55

Detection Summary

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

Job ID: 310-270009-2

Client Sample ID: Leachate

Lab Sample ID: 310-270009-1

No Detections.

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: 310-270009-2

Client Sample ID: Leachate

Date Collected: 11/16/23 09:30
Date Received: 11/21/23 08:55

Lab Sample ID: 310-270009-1

Matrix: Leachate

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0234	U	0.0744	0.0744	1.00	0.169	pCi/L	12/01/23 10:02	01/03/24 11:52	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*106*		*30 - 110*	*12/01/23 10:02*	*01/03/24 11:52*	*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	-0.524	U	0.379	0.382	1.00	0.893	pCi/L	12/01/23 10:05	12/14/23 11:30	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*106*		*30 - 110*	*12/01/23 10:05*	*12/14/23 11:30*	*1*
Y Carrier	*80.7*		*30 - 110*	*12/01/23 10:05*	*12/14/23 11:30*	*1*

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	-0.548	U	0.386	0.389	5.00	0.893	pCi/L		01/04/24 15:33	1

Definitions/Glossary

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

Job ID: 310-270009-2

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.
¤	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: 310-270009-2

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-639129/1-A
Matrix: Water
Analysis Batch: 642759

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 639129

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.01630	U	0.0434	0.0434	1.00	0.0816	pCi/L	12/01/23 10:02	01/03/24 11:40	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*100*		*30 - 110*	*12/01/23 10:02*	*01/03/24 11:40*	*1*

Lab Sample ID: LCS 160-639129/2-A
Matrix: Water
Analysis Batch: 642759

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 639129

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-226			11.3	9.916		1.04	1.00	0.0866	pCi/L	88	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*82.3*		*30 - 110*

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-639130/1-A
Matrix: Water
Analysis Batch: 640663

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 639130

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.5455		0.317	0.321	1.00	0.455	pCi/L	12/01/23 10:05	12/14/23 11:29	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*100*		*30 - 110*	*12/01/23 10:05*	*12/14/23 11:29*	*1*
Y Carrier	*83.4*		*30 - 110*	*12/01/23 10:05*	*12/14/23 11:29*	*1*

Lab Sample ID: LCS 160-639130/2-A
Matrix: Water
Analysis Batch: 640663

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 639130

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-228			9.40	8.871		1.25	1.00	0.525	pCi/L	94	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*82.3*		*30 - 110*
Y Carrier	*85.6*		*30 - 110*

QC Association Summary

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

Job ID: 310-270009-2

Rad

Prep Batch: 639129

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-270009-1	Leachate	Total/NA	Leachate	PrecSep-21	
MB 160-639129/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-639129/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	

Prep Batch: 639130

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-270009-1	Leachate	Total/NA	Leachate	PrecSep_0	
MB 160-639130/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-639130/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	

Lab Chronicle

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

Job ID: 310-270009-2

Client Sample ID: Leachate

Date Collected: 11/16/23 09:30
Date Received: 11/21/23 08:55

Lab Sample ID: 310-270009-1

Matrix: Leachate

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			639129	KAC	EET SL	12/01/23 10:02
Total/NA	Analysis	9315		1	642780	FLC	EET SL	01/03/24 11:52
Total/NA	Prep	PrecSep_0			639130	KAC	EET SL	12/01/23 10:05
Total/NA	Analysis	9320		1	640663	FLC	EET SL	12/14/23 11:30
Total/NA	Analysis	Ra226_Ra228		1	642926	EMH	EET SL	01/04/24 15:33

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
Job ID: 310-270009-2
Project/Site: Muscatine Power & Water CCR Landfill

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	Leachate	Radium-226
9320	PrecSep_0	Leachate	Radium-228
Ra226_Ra228		Leachate	Combined Radium 226 + 228

Method Summary

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

Job ID: 310-270009-2

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

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

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Hummel, Matthew R	Carrier Tracking No(s):	COC No: 310-67864.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Matthew.Hummel@et.eurofinsus.com	State of Origin: Iowa	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State - Iowa		Job #: 310-270009-2
Address: 13715 Rider Trail North, ,	Due Date Requested: 1/8/2024			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Muscatine Power & Water CCR Landfill	Project #: 31007856			
Site:	SSOW#:			

Analysis Requested

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

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9315_Ra226/PrecSep_21 Radium-226	9320_Ra228/PrecSep_0 Standard Target List	Ra226Ra228_GFPC/ (MOD) Local Method	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
Leachate (310-270009-1)	11/16/23	09:30 Central		Water			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/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.

Possible Hazard Identification *Unconfirmed*	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*** ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by:	Date/Time: 1/12/23 1200	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by: M. Pinette	Date/Time: NOV 30 2023 0915	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		

Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-270009-2

Login Number: 270009

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Muehling, Angela C

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	lab received Rad containers - not checked on COC
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: 310-270009-2

Login Number: 270009
List Number: 2
Creator: Pinette, Meadow L

List Source: Eurofins St. Louis
List Creation: 11/30/23 01:47 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: 310-270009-2

Method: 9315 - Radium-226 (GFPC)

Matrix: Leachate **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(30-110)
310-270009-1	Leachate	106

Tracer/Carrier Legend

Ba = Ba Carrier

Method: 9315 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(30-110)
LCS 160-639129/2-A	Lab Control Sample	82.3
MB 160-639129/1-A	Method Blank	100

Tracer/Carrier Legend

Ba = Ba Carrier

Method: 9320 - Radium-228 (GFPC)

Matrix: Leachate **Prep Type: Total/NA**

		Percent Yield (Acceptance Limits)	
		Ba	Y
Lab Sample ID	Client Sample ID	(30-110)	(30-110)
310-270009-1	Leachate	106	80.7

Tracer/Carrier Legend

Ba = Ba Carrier

Y = Y Carrier

Method: 9320 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
		Ba	Y
Lab Sample ID	Client Sample ID	(30-110)	(30-110)
LCS 160-639130/2-A	Lab Control Sample	82.3	85.6
MB 160-639130/1-A	Method Blank	100	83.4

Tracer/Carrier Legend

Ba = Ba Carrier

Y = Y Carrier

Appendix C

Statistical Analysis

GROUNDWATER STATS
CONSULTING

November 14, 2023

GHD
Attn: Mr. Michael Alowitz
11228 Aurora Avenue
Des Moines Iowa 50322-7904

Re: Muscatine Power & Water – State April 2023 & September 2023 Analysis

Dear Ms. Amundson,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the statistical analyses of the groundwater data for the April 2023 and September 2023 sample events for Muscatine Power & Water for the State groundwater program regulated by the Iowa Department of Natural Resources.

The monitoring well network at Muscatine Power & Water consists of the following:

- **Upgradient wells:** MW-08, MW-10, MW-22 and MW-23
- **Downgradient wells:** MW-4B, MW-5B, MW-6A, MW-14A, MW-15A, MW-21, MW-24, MW-26, and MW-27

Surface water locations include the following:

- **Upstream well:** SW-22
- **Downstream wells:** SW-23, SW-24, SW-25, and SW-26

Sampling began for the Iowa State groundwater monitoring program in October 2016 and at least 8 sample events have been completed at most wells and surface water locations. Upgradient wells MW-22 and MW-23 have sufficient samples to be included in constructing interwell statistical limits. However, downgradient wells MW-26 and MW-27 currently have insufficient samples for all constituents. Therefore, the data from newer downgradient well/constituent pairs with less than 8 samples are included on time series and box plots, but do not yet require formal statistics.

Note that during this analysis, surface water locations were not sampled during the September 2023 event; therefore, these wells were only evaluated for the April 2023 event. Since upstream well SW-22 is located upgradient of the facility representing water quality conditions independent of the facility, all available data from this location was used to construct interwell statistical limits.

Interwell prediction limits were constructed from upgradient wells and upstream locations for the following constituents: aluminum, arsenic, barium, beryllium, boron, calcium, chloride, cobalt, copper, fluoride, iron, lead, magnesium, manganese, molybdenum, nickel, selenium, strontium, sulfate, vanadium, and zinc. Figures for monitoring wells and surface water locations are provided in separate sections of this report.

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.

Time series plots for constituents at all wells are provided for the purpose of visualizing data at these wells and surface water locations (Figure A). Additionally, a separate section of box plots is included for all constituents at upgradient and downgradient wells as well as surface water locations (Figure B). The time series plots were used to initially screen for suspected outliers and trends primarily in upgradient wells for the purposes of maintaining interwell statistical limits that were conservative from a regulatory perspective. The box plots provide visual representation of variation within individual wells and between all wells, and among surface water locations. Values in background which have been flagged as outliers may be seen in a lighter font and as a disconnected symbol on the graphs. A summary of flagged outliers follows this report (Figure C).

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, along with constituents for well MW-24 that have less than 8 samples for the April 2022 report, follows this letter.

Summary of Background Screening Conducted in December 2018

Background data were originally screened in December 2018 as described below for all parameters at each upgradient location.

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 were included for all wells and surface water locations to provide visual representation of variation within individual wells and between wells. Upgradient data were formally tested using Tukey's box plot method. No values were identified as outliers by Tukey's test. However, due to the transformation to data that were applied in some cases, the resulting upper limits were significantly higher than the reported measurements. Therefore, a few values were flagged as outliers to construct limits that are lower and more conservative from a regulatory perspective. When outliers are confirmed, these values are flagged in the computer database with "o" in order to deselect prior to construction of statistical limits. A summary of those values follows this letter as mentioned above (Figure C).

Seasonality

No seasonal patterns were visually apparent in the limited amount of 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 Tests

No suspected trending data were observed during the screening; therefore, no formal tests were conducted due to limited data. For meaningful results, a minimum of 6 values is needed. When future background updates are conducted, the Sen's Slope/Mann Kendall trend test will be used to evaluate all proposed background data 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 statistical 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.

Natural systems continuously evolve due to physical changes made to the environment and unrelated to the site. To accommodate these types of changes, background data are updated during each analysis to include all upgradient well data for construction of interwell prediction limits after careful screening for new outliers. Improved sample size in background data sets results in statistical limits that provide better representation of the true background population. Data are evaluated to determine whether newer measurements are representative of earlier measurements in which case they may be incorporated into background.

Evaluation of Compliance Samples – April 2023 and September 2023

Monitoring Wells

Interwell prediction limits are used to construct background limits for comparison of compliance well data at this site. In previous analyses, 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. Time series plots were reviewed for any newly suspected outliers in upgradient wells during this analysis. No additional suspected outliers were found.

The time series plots were also used to determine whether upgradient well data are stable, or whether increasing or decreasing trending patterns are observed. No additional values were flagged as outliers during this analysis. It was noted that concentrations of arsenic and iron in upgradient well MW-10 have slightly increased compared to earlier reported measurements in this well, indicating that groundwater quality may be changing over time. It was also noted that upgradient well MW-23 exhibits fluctuation for reported concentrations of aluminum and manganese, which is assumed to represent variation in groundwater quality upgradient of the facility.

Interwell Prediction Limits

Interwell prediction limits were constructed as recommended in the EPA Unified Guidance (2009), based on a 1-of-2 resample plan using pooled upgradient well data for all parameters through April 2023 and September 2023 (Figures D and E, respectively). In the event of an initial exceedance of compliance well data, the 1-of-2 resample plan allows for collection of a resample to determine whether the initial exceedance is confirmed, in which case a statistically significant increase (SSI) is identified. If the resample falls within the statistical limit, the initial exceedance is considered to be a false positive result and,

therefore, no further action is necessary. If no resample is collected, the exceedance is considered to be confirmed.

Parametric interwell prediction limits were constructed when background data followed a normal or transformed-normal distribution. Non-parametric interwell 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. Downgradient measurements were compared to these background limits and significant exceedances were identified for the following well/constituent pairs:

April 2023 Sample Event:

- Boron: MW-14A, MW-15A, and MW-21
- Calcium: MW-14A
- Chloride: MW-5B
- Magnesium: MW-14A and MW-15A
- Sulfate: MW-14A

September 2023 Sample Event:

- Barium: MW-5B
- Boron: MW-14A, MW-15A, and MW-21
- Calcium: MW-14A
- Chloride: MW-5B
- Magnesium: MW-14A and MW-15A
- Selenium: MW-21
- Sulfate: MW-14A

Further research would be required to determine whether these exceedances reflect natural variation in groundwater quality or are a result of practices at the facility. That study is beyond the scope of this analysis provided by Groundwater Stats Consulting. Prediction limits results and summary tables of well/constituent pairs found to exceed their respective limits follow this letter.

Trend Tests

The Sen's Slope/Mann Kendall trend test was performed at the 99% confidence level on exceedances mentioned above to determine whether concentrations are increasing, decreasing or stabilizing over time through April 2023 and September 2023 (Figure F). Upgradient wells were included to establish whether similar patterns may be seen upgradient of the facility. A summary of the trend tests follows this report and statistically significant trends were identified for the following well/constituent pairs:

Increasing:

- Barium: MW-10 and MW-22 (both upgradient)
- Sulfate: MW-22 (upgradient)

Decreasing:

- Boron: MW-15A
- Calcium: MW-08 (upgradient)
- Chloride: MW-22 (upgradient) and MW-5B
- Selenium: MW-21
- Sulfate: MW-08 (upgradient)

Surface Water Locations

Interwell prediction limits are used to construct background limits for comparison of surface water data at this site.

Time series plots were reviewed for any suspected outliers and trending data in the upstream location, and none were identified in the limited data available. Additionally, a separate section of box plots is included for all constituents at upgradient and downgradient surface water locations. No additional values were flagged as outliers during this analysis.

During previous analyses, higher concentrations were noted for the August 2017 event for boron, calcium, magnesium, and sulfate and for the September 2020 sample event for aluminum, cobalt, iron, lead in upstream well SW-22; however, due to the limited scope of the data, the measurements were not flagged as outliers. These measurements will continue to be re-evaluated during future analyses.

A high value for copper was previously flagged at upstream well SW-22 in order to construct statistical limits that are conservative from a regulatory perspective since it was an order of magnitude higher than any other observations upgradient of the facility for this constituent. A list of flagged outliers follows this report.

Interwell Prediction Limits

Interwell prediction limits were constructed as recommended in the EPA Unified Guidance (2009), based on a 1-of-2 resample plan using data from upstream well SW-22 for all parameters through April 2023 (Figure G). As mentioned above, surface water locations were not sampled during the September 2023 event. In the event of an initial exceedance of compliance well data, the 1-of-2 resample plan allows for collection of an additional

sample to determine whether the initial exceedance is confirmed, in which case a statistically significant increase (SSI) is identified. If the resample falls within the statistical limit, the initial exceedance is considered to be a false positive result and, therefore, no further action is necessary. If no resample is collected, it is considered a confirmed exceedance.

Parametric interwell prediction limits were constructed when background data followed a normal or transformed-normal distribution. Non-parametric interwell 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. Summary tables of these prediction limits results follow this letter. Downgradient measurements were compared to these background and exceedances were noted for the following well/constituent pairs:

- Arsenic: SW-26
- Boron: SW-24
- Magnesium: SW-24
- Molybdenum: SW-23 and SW-26
- Strontium: SW-24
- Sulfate: SW-24

<u>Trend Tests</u>

The Sen's Slope/Mann Kendall trend test was performed at the 99% confidence level on exceedances mentioned above to determine whether concentrations are increasing, decreasing or stabilizing over time through April 2023 (Figure H). Upstream well SW-22 was included to establish whether similar patterns may be seen upgradient of the facility. Statistically significant trends were identified for the following well/constituent pair:

Increasing
- None

Decreasing
- Boron: SW-24

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 Collins
Project Manager

Kristina L. Rayner
Senior Statistician

100% Non-Detects: Monitoring Wells

Analysis Run 11/9/2023 9:12 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Aluminum (mg/L)
MW-15A, MW-21, MW-24, MW-5B, MW-6A

Arsenic (mg/L)
MW-14A, MW-15A, MW-21, MW-24, MW-4B, MW-5B, MW-6A

Beryllium (mg/L)
MW-14A, MW-15A, MW-21, MW-24, MW-4B, MW-5B, MW-6A

Boron (mg/L)
MW-5B, MW-6A

Cobalt (mg/L)
MW-14A, MW-15A, MW-21, MW-24, MW-5B, MW-6A

Copper (mg/L)
MW-14A, MW-15A, MW-21, MW-24, MW-4B, MW-5B, MW-6A

Iron (mg/L)
MW-15A, MW-21, MW-24

Lead (mg/L)
MW-14A, MW-15A, MW-24, MW-6A

Manganese (mg/L)
MW-15A, MW-21

Molybdenum (mg/L)
MW-14A, MW-15A, MW-6A

Nickel (mg/L)
MW-14A, MW-15A, MW-24, MW-5B, MW-6A

Selenium (mg/L)
MW-24, MW-4B, MW-5B, MW-6A

Vanadium (mg/L)
MW-14A, MW-15A, MW-21, MW-24, MW-4B, MW-5B, MW-6A

Zinc (mg/L)
MW-14A, MW-15A, MW-21, MW-24, MW-4B, MW-5B, MW-6A

Sanitas™ v.10.0.13b Software licensed to . UG

100% Non-Detects: Surface Water

Analysis Run 11/9/2023 9:50 AM View: State Surface Water Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Aluminum (mg/L)
SW-24

Arsenic (mg/L)
SW-24, SW-25

Beryllium (mg/L)
SW-23, SW-24, SW-25, SW-26

Cobalt (mg/L)
SW-24

Copper (mg/L)
SW-24, SW-25, SW-26

Fluoride (mg/L)
SW-25

Lead (mg/L)
SW-24

Molybdenum (mg/L)
SW-24

Nickel (mg/L)
SW-23, SW-24, SW-25, SW-26

Selenium (mg/L)
SW-23, SW-24, SW-25, SW-26

Vanadium (mg/L)
SW-23, SW-24, SW-25, SW-26

Zinc (mg/L)
SW-23, SW-24, SW-25

Interwell Prediction Limits - Monitoring Wells (April 2023) - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:16 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**	**0.0004535**	**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**	**0.0004535**	**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**	**0.0004535**	**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**	**0.0004535**	**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**	**0.0004535**	**NP Inter (normality) 1 of 2**
Magnesium (mg/L)	**MW-14A**	**44.46**	**n/a**	**4/11/2023**	**122**	**Yes**	**36**	**5.599**	**0.4658**	**0**	**None**	**sqrt(x)**	**0.0003583**	**Param Inter 1 of 2**
Magnesium (mg/L)	**MW-15A**	**44.46**	**n/a**	**4/11/2023**	**48.7**	**Yes**	**36**	**5.599**	**0.4658**	**0**	**None**	**sqrt(x)**	**0.0003583**	**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**	**0.0004535**	**NP Inter (normality) 1 of 2**

Interwell Prediction Limits - Monitoring Wells (April 2023) - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:16 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Aluminum (mg/L)	MW-14A	0.552	n/a	4/11/2023	0.05ND	No	36	n/a	n/a	77.78	n/a	n/a	0.001377	NP Inter (NDs) 1 of 2
Aluminum (mg/L)	MW-4B	0.552	n/a	4/12/2023	0.05ND	No	36	n/a	n/a	77.78	n/a	n/a	0.001377	NP Inter (NDs) 1 of 2
Barium (mg/L)	MW-14A	0.247	n/a	4/11/2023	0.032	No	63	n/a	n/a	0	n/a	n/a	0.0004803	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-15A	0.247	n/a	4/11/2023	0.0299	No	63	n/a	n/a	0	n/a	n/a	0.0004803	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-21	0.247	n/a	4/11/2023	0.031	No	63	n/a	n/a	0	n/a	n/a	0.0004803	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-24	0.247	n/a	4/11/2023	0.0863	No	63	n/a	n/a	0	n/a	n/a	0.0004803	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-4B	0.247	n/a	4/12/2023	0.173	No	63	n/a	n/a	0	n/a	n/a	0.0004803	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-5B	0.247	n/a	4/12/2023	0.237	No	63	n/a	n/a	0	n/a	n/a	0.0004803	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-6A	0.247	n/a	4/12/2023	0.246	No	63	n/a	n/a	0	n/a	n/a	0.0004803	NP Inter (normality) 1 of 2
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**	**0.0004535**	**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**	**0.0004535**	**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**	**0.0004535**	**NP Inter (NDs) 1 of 2**
Boron (mg/L)	MW-24	0.322	n/a	4/11/2023	0.114	No	65	n/a	n/a	87.69	n/a	n/a	0.0004535	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	0.0004535	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**	**0.0004535**	**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	0.0004535	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	0.0004535	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-24	152	n/a	4/11/2023	78.6	No	65	n/a	n/a	0	n/a	n/a	0.0004535	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	0.0004535	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	0.0004535	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	0.0004535	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	0.0004535	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	0.0004535	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	0.0004535	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-24	30	n/a	4/11/2023	23.4	No	65	n/a	n/a	29.23	n/a	n/a	0.0004535	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	0.0004535	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**	**0.0004535**	**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	0.0004535	NP Inter (normality) 1 of 2
Cobalt (mg/L)	MW-4B	0.00558	n/a	4/12/2023	0.00271	No	64	n/a	n/a	37.5	n/a	n/a	0.0004669	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	0.0004669	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	0.0004669	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	0.0004669	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-24	1	n/a	4/11/2023	1ND	No	64	n/a	n/a	87.5	n/a	n/a	0.0004669	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	0.0004669	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	0.0004669	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	0.0004669	NP Inter (NDs) 1 of 2
Iron (mg/L)	MW-14A	4.38	n/a	4/11/2023	0.1ND	No	36	n/a	n/a	38.89	n/a	n/a	0.001377	NP Inter (normality) 1 of 2
Iron (mg/L)	MW-4B	4.38	n/a	4/12/2023	0.423	No	36	n/a	n/a	38.89	n/a	n/a	0.001377	NP Inter (normality) 1 of 2
Iron (mg/L)	MW-5B	4.38	n/a	4/12/2023	1.83	No	36	n/a	n/a	38.89	n/a	n/a	0.001377	NP Inter (normality) 1 of 2
Iron (mg/L)	MW-6A	4.38	n/a	4/12/2023	3.43	No	36	n/a	n/a	38.89	n/a	n/a	0.001377	NP Inter (normality) 1 of 2
Lead (mg/L)	MW-21	0.00204	n/a	4/11/2023	0.0005ND	No	63	n/a	n/a	88.89	n/a	n/a	0.0004803	NP Inter (NDs) 1 of 2
Lead (mg/L)	MW-4B	0.00204	n/a	4/12/2023	0.0005ND	No	63	n/a	n/a	88.89	n/a	n/a	0.0004803	NP Inter (NDs) 1 of 2
Lead (mg/L)	MW-5B	0.00204	n/a	4/12/2023	0.0005ND	No	63	n/a	n/a	88.89	n/a	n/a	0.0004803	NP Inter (NDs) 1 of 2
Magnesium (mg/L)	**MW-14A**	**44.46**	**n/a**	**4/11/2023**	**122**	**Yes**	**36**	**5.599**	**0.4658**	**0**	**None**	**sqrt(x)**	**0.0003583**	**Param Inter 1 of 2**
Magnesium (mg/L)	**MW-15A**	**44.46**	**n/a**	**4/11/2023**	**48.7**	**Yes**	**36**	**5.599**	**0.4658**	**0**	**None**	**sqrt(x)**	**0.0003583**	**Param Inter 1 of 2**
Magnesium (mg/L)	MW-21	44.46	n/a	4/11/2023	33	No	36	5.599	0.4658	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-24	44.46	n/a	4/11/2023	34.7	No	36	5.599	0.4658	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-4B	44.46	n/a	4/12/2023	33.9	No	36	5.599	0.4658	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-5B	44.46	n/a	4/12/2023	34.8	No	36	5.599	0.4658	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-6A	44.46	n/a	4/12/2023	31.2	No	36	5.599	0.4658	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-14A	1.219	n/a	4/11/2023	0.005ND	No	35	0.4912	0.2666	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-24	1.219	n/a	4/11/2023	0.0144	No	35	0.4912	0.2666	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-4B	1.219	n/a	4/12/2023	0.51	No	35	0.4912	0.2666	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-5B	1.219	n/a	4/12/2023	0.453	No	35	0.4912	0.2666	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-6A	1.219	n/a	4/12/2023	0.113	No	35	0.4912	0.2666	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2

Interwell Prediction Limits - Monitoring Wells (April 2023) - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:16 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Molybdenum (mg/L)	MW-21	0.00822	n/a	4/11/2023	0.002ND	No	65	n/a	n/a	66.15	n/a	n/a	0.0004535	NP Inter (NDs) 1 of 2
Molybdenum (mg/L)	MW-24	0.00822	n/a	4/11/2023	0.002ND	No	65	n/a	n/a	66.15	n/a	n/a	0.0004535	NP Inter (NDs) 1 of 2
Molybdenum (mg/L)	MW-4B	0.00822	n/a	4/12/2023	0.002ND	No	65	n/a	n/a	66.15	n/a	n/a	0.0004535	NP Inter (NDs) 1 of 2
Molybdenum (mg/L)	MW-5B	0.00822	n/a	4/12/2023	0.002ND	No	65	n/a	n/a	66.15	n/a	n/a	0.0004535	NP Inter (NDs) 1 of 2
Nickel (mg/L)	MW-21	0.00628	n/a	4/11/2023	0.005ND	No	36	n/a	n/a	97.22	n/a	n/a	0.001377	NP Inter (NDs) 1 of 2
Nickel (mg/L)	MW-4B	0.00628	n/a	4/12/2023	0.0051	No	36	n/a	n/a	97.22	n/a	n/a	0.001377	NP Inter (NDs) 1 of 2
Selenium (mg/L)	MW-14A	0.005	n/a	4/11/2023	0.005ND	No	63	n/a	n/a	100	n/a	n/a	0.0004803	NP Inter (NDs) 1 of 2
Selenium (mg/L)	MW-15A	0.005	n/a	4/11/2023	0.005ND	No	63	n/a	n/a	100	n/a	n/a	0.0004803	NP Inter (NDs) 1 of 2
Selenium (mg/L)	MW-21	0.005	n/a	4/11/2023	0.005ND	No	63	n/a	n/a	100	n/a	n/a	0.0004803	NP Inter (NDs) 1 of 2
Strontium (mg/L)	MW-14A	0.3101	n/a	4/11/2023	0.293	No	36	0.1528	0.06856	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-15A	0.3101	n/a	4/11/2023	0.0985	No	36	0.1528	0.06856	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-21	0.3101	n/a	4/11/2023	0.153	No	36	0.1528	0.06856	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-24	0.3101	n/a	4/11/2023	0.0795	No	36	0.1528	0.06856	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-4B	0.3101	n/a	4/12/2023	0.091	No	36	0.1528	0.06856	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-5B	0.3101	n/a	4/12/2023	0.149	No	36	0.1528	0.06856	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-6A	0.3101	n/a	4/12/2023	0.194	No	36	0.1528	0.06856	0	None	No	0.0003583	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**	**0.0004535**	**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	0.0004535	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	0.0004535	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-24	366	n/a	4/11/2023	87.8	No	65	n/a	n/a	0	n/a	n/a	0.0004535	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	0.0004535	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	0.0004535	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	0.0004535	NP Inter (normality) 1 of 2

Interwell Prediction Limits - Monitoring Wells (September 2023) - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:23 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Barium (mg/L)	**MW-5B**	**0.256**	**n/a**	**9/20/2023**	**0.274**	**Yes**	**67**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.0004267**	**NP Inter (normality) 1 of 2**
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**	**0.0004**	**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**	**0.0004**	**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**	**0.0004**	**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**	**0.0004**	**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**	**0.0004**	**NP Inter (normality) 1 of 2**
Magnesium (mg/L)	**MW-14A**	**44.12**	**n/a**	**9/19/2023**	**122**	**Yes**	**40**	**3.149**	**0.1687**	**0**	**None**	**x^(1/3)**	**0.0003583**	**Param Inter 1 of 2**
Magnesium (mg/L)	**MW-15A**	**44.12**	**n/a**	**9/19/2023**	**54**	**Yes**	**40**	**3.149**	**0.1687**	**0**	**None**	**x^(1/3)**	**0.0003583**	**Param Inter 1 of 2**
Selenium (mg/L)	**MW-21**	**0.005**	**n/a**	**9/19/2023**	**0.0053**	**Yes**	**67**	**n/a**	**n/a**	**100**	**n/a**	**n/a**	**0.0004267**	**NP Inter (NDs) 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**	**0.0004**	**NP Inter (normality) 1 of 2**

Interwell Prediction Limits - Monitoring Wells (September 2023) - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:23 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Aluminum (mg/L)	MW-14A	0.552	n/a	9/19/2023	0.05ND	No	40	n/a	n/a	77.5	n/a	n/a	0.001124	NP Inter (NDs) 1 of 2
Aluminum (mg/L)	MW-4B	0.552	n/a	9/20/2023	0.05ND	No	40	n/a	n/a	77.5	n/a	n/a	0.001124	NP Inter (NDs) 1 of 2
Barium (mg/L)	MW-14A	0.256	n/a	9/19/2023	0.0348	No	67	n/a	n/a	0	n/a	n/a	0.0004267	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-15A	0.256	n/a	9/19/2023	0.0338	No	67	n/a	n/a	0	n/a	n/a	0.0004267	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-21	0.256	n/a	9/19/2023	0.0559	No	67	n/a	n/a	0	n/a	n/a	0.0004267	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-24	0.256	n/a	9/19/2023	0.0698	No	67	n/a	n/a	0	n/a	n/a	0.0004267	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-4B	0.256	n/a	9/20/2023	0.181	No	67	n/a	n/a	0	n/a	n/a	0.0004267	NP Inter (normality) 1 of 2
Barium (mg/L)	**MW-5B**	**0.256**	**n/a**	**9/20/2023**	**0.274**	**Yes**	**67**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.0004267**	**NP Inter (normality) 1 of 2**
Barium (mg/L)	MW-6A	0.256	n/a	9/20/2023	0.222	No	67	n/a	n/a	0	n/a	n/a	0.0004267	NP Inter (normality) 1 of 2
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**	**0.0004**	**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**	**0.0004**	**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**	**0.0004**	**NP Inter (NDs) 1 of 2**
Boron (mg/L)	MW-24	0.322	n/a	9/19/2023	0.1ND	No	69	n/a	n/a	85.51	n/a	n/a	0.0004	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	0.0004	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**	**0.0004**	**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	0.0004	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	0.0004	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-24	152	n/a	9/19/2023	70.5	No	69	n/a	n/a	0	n/a	n/a	0.0004	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	0.0004	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	0.0004	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	0.0004	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	0.0004	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	0.0004	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	0.0004	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-24	30	n/a	9/19/2023	22.8	No	69	n/a	n/a	28.99	n/a	n/a	0.0004	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	0.0004	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**	**0.0004**	**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	0.0004	NP Inter (normality) 1 of 2
Cobalt (mg/L)	MW-4B	0.00558	n/a	9/20/2023	0.00374	No	68	n/a	n/a	38.24	n/a	n/a	0.0004134	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	0.0004134	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	0.0004134	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	0.0004134	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-24	1	n/a	9/19/2023	1ND	No	68	n/a	n/a	88.24	n/a	n/a	0.0004134	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	0.0004134	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	0.0004134	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	0.0004134	NP Inter (NDs) 1 of 2
Iron (mg/L)	MW-14A	4.38	n/a	9/19/2023	0.1ND	No	40	n/a	n/a	40	n/a	n/a	0.001124	NP Inter (normality) 1 of 2
Iron (mg/L)	MW-4B	4.38	n/a	9/20/2023	0.559	No	40	n/a	n/a	40	n/a	n/a	0.001124	NP Inter (normality) 1 of 2
Iron (mg/L)	MW-5B	4.38	n/a	9/20/2023	2.18	No	40	n/a	n/a	40	n/a	n/a	0.001124	NP Inter (normality) 1 of 2
Iron (mg/L)	MW-6A	4.38	n/a	9/20/2023	3.09	No	40	n/a	n/a	40	n/a	n/a	0.001124	NP Inter (normality) 1 of 2
Lead (mg/L)	MW-21	0.00204	n/a	9/19/2023	0.0005ND	No	67	n/a	n/a	89.55	n/a	n/a	0.0004267	NP Inter (NDs) 1 of 2
Lead (mg/L)	MW-4B	0.00204	n/a	9/20/2023	0.000576	No	67	n/a	n/a	89.55	n/a	n/a	0.0004267	NP Inter (NDs) 1 of 2
Lead (mg/L)	MW-5B	0.00204	n/a	9/20/2023	0.000627	No	67	n/a	n/a	89.55	n/a	n/a	0.0004267	NP Inter (NDs) 1 of 2
Magnesium (mg/L)	**MW-14A**	**44.12**	**n/a**	**9/19/2023**	**122**	**Yes**	**40**	**3.149**	**0.1687**	**0**	**None**	**x^(1/3)**	**0.0003583**	**Param Inter 1 of 2**
Magnesium (mg/L)	**MW-15A**	**44.12**	**n/a**	**9/19/2023**	**54**	**Yes**	**40**	**3.149**	**0.1687**	**0**	**None**	**x^(1/3)**	**0.0003583**	**Param Inter 1 of 2**
Magnesium (mg/L)	MW-21	44.12	n/a	9/19/2023	42.8	No	40	3.149	0.1687	0	None	x^(1/3)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-24	44.12	n/a	9/19/2023	29.9	No	40	3.149	0.1687	0	None	x^(1/3)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-4B	44.12	n/a	9/20/2023	33.6	No	40	3.149	0.1687	0	None	x^(1/3)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-5B	44.12	n/a	9/20/2023	37.6	No	40	3.149	0.1687	0	None	x^(1/3)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-6A	44.12	n/a	9/20/2023	27.2	No	40	3.149	0.1687	0	None	x^(1/3)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-14A	1.221	n/a	9/19/2023	0.005ND	No	39	0.4955	0.267	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-24	1.221	n/a	9/19/2023	0.0183	No	39	0.4955	0.267	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-4B	1.221	n/a	9/20/2023	0.612	No	39	0.4955	0.267	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-5B	1.221	n/a	9/20/2023	0.594	No	39	0.4955	0.267	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-6A	1.221	n/a	9/20/2023	0.0995	No	39	0.4955	0.267	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2

Interwell Prediction Limits - Monitoring Wells (September 2023) - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:23 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Molybdenum (mg/L)	MW-21	0.00822	n/a	9/19/2023	0.002ND	No	69	n/a	n/a	66.67	n/a	n/a	0.0004	NP Inter (NDs) 1 of 2
Molybdenum (mg/L)	MW-24	0.00822	n/a	9/19/2023	0.002ND	No	69	n/a	n/a	66.67	n/a	n/a	0.0004	NP Inter (NDs) 1 of 2
Molybdenum (mg/L)	MW-4B	0.00822	n/a	9/20/2023	0.002ND	No	69	n/a	n/a	66.67	n/a	n/a	0.0004	NP Inter (NDs) 1 of 2
Molybdenum (mg/L)	MW-5B	0.00822	n/a	9/20/2023	0.002ND	No	69	n/a	n/a	66.67	n/a	n/a	0.0004	NP Inter (NDs) 1 of 2
Nickel (mg/L)	MW-21	0.00628	n/a	9/19/2023	0.005ND	No	40	n/a	n/a	97.5	n/a	n/a	0.001124	NP Inter (NDs) 1 of 2
Nickel (mg/L)	MW-4B	0.00628	n/a	9/20/2023	0.005ND	No	40	n/a	n/a	97.5	n/a	n/a	0.001124	NP Inter (NDs) 1 of 2
Selenium (mg/L)	MW-14A	0.005	n/a	9/19/2023	0.005ND	No	67	n/a	n/a	100	n/a	n/a	0.0004267	NP Inter (NDs) 1 of 2
Selenium (mg/L)	MW-15A	0.005	n/a	9/19/2023	0.005ND	No	67	n/a	n/a	100	n/a	n/a	0.0004267	NP Inter (NDs) 1 of 2
Selenium (mg/L)	**MW-21**	**0.005**	**n/a**	**9/19/2023**	**0.0053**	**Yes**	**67**	**n/a**	**n/a**	**100**	**n/a**	**n/a**	**0.0004267**	**NP Inter (NDs) 1 of 2**
Strontium (mg/L)	MW-14A	0.3046	n/a	9/19/2023	0.282	No	40	0.1505	0.06765	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-15A	0.3046	n/a	9/19/2023	0.113	No	40	0.1505	0.06765	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-21	0.3046	n/a	9/19/2023	0.164	No	40	0.1505	0.06765	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-24	0.3046	n/a	9/19/2023	0.0768	No	40	0.1505	0.06765	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-4B	0.3046	n/a	9/20/2023	0.0958	No	40	0.1505	0.06765	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-5B	0.3046	n/a	9/20/2023	0.163	No	40	0.1505	0.06765	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-6A	0.3046	n/a	9/20/2023	0.165	No	40	0.1505	0.06765	0	None	No	0.0003583	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**	**0.0004**	**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	0.0004	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	0.0004	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-24	366	n/a	9/19/2023	62.9	No	69	n/a	n/a	0	n/a	n/a	0.0004	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	0.0004	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	0.0004	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	0.0004	NP Inter (normality) 1 of 2

Trend Tests - Prediction Limit Exceedances (Monitoring Wells) - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:38 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Alpha	Method
Barium (mg/L)	**MW-10 (bg)**	**0.01067**	**107**	**87**	**Yes**	**21**	**0**	**n/a**	**0.01**	**NP**
Barium (mg/L)	**MW-22 (bg)**	**0.01381**	**61**	**43**	**Yes**	**13**	**0**	**n/a**	**0.01**	**NP**
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**
Selenium (mg/L)	**MW-21**	**-0.001031**	**-110**	**-87**	**Yes**	**21**	**23.81**	**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**

Trend Tests - Prediction Limit Exceedances (Monitoring Wells) - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:38 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Alpha	Method
Barium (mg/L)	MW-08 (bg)	-0.0002793	-11	-87	No	21	0	n/a	0.01	NP
Barium (mg/L)	**MW-10 (bg)**	**0.01067**	**107**	**87**	**Yes**	**21**	**0**	**n/a**	**0.01**	**NP**
Barium (mg/L)	**MW-22 (bg)**	**0.01381**	**61**	**43**	**Yes**	**13**	**0**	**n/a**	**0.01**	**NP**
Barium (mg/L)	MW-23 (bg)	-0.006292	-36	-38	No	12	0	n/a	0.01	NP
Barium (mg/L)	MW-5B	-0.01098	-78	-87	No	21	0	n/a	0.01	NP
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**
Magnesium (mg/L)	MW-08 (bg)	-1.814	-32	-34	No	11	0	n/a	0.01	NP
Magnesium (mg/L)	MW-10 (bg)	0.7039	13	34	No	11	0	n/a	0.01	NP
Magnesium (mg/L)	MW-14A	2.051	17	34	No	11	0	n/a	0.01	NP
Magnesium (mg/L)	MW-15A	-3.913	-24	-34	No	11	0	n/a	0.01	NP
Magnesium (mg/L)	MW-22 (bg)	-0.2131	-2	-25	No	9	0	n/a	0.01	NP
Magnesium (mg/L)	MW-23 (bg)	-0.1373	-4	-25	No	9	0	n/a	0.01	NP
Selenium (mg/L)	MW-08 (bg)	0	0	87	No	21	100	n/a	0.01	NP
Selenium (mg/L)	MW-10 (bg)	0	0	87	No	21	100	n/a	0.01	NP
Selenium (mg/L)	**MW-21**	**-0.001031**	**-110**	**-87**	**Yes**	**21**	**23.81**	**n/a**	**0.01**	**NP**
Selenium (mg/L)	MW-22 (bg)	0	0	43	No	13	100	n/a	0.01	NP
Selenium (mg/L)	MW-23 (bg)	0	0	38	No	12	100	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

Interwell Prediction Limits - Surface Water (April 2023) - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:54 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Arsenic (mg/L)	**SW-26**	**0.00367**	**n/a**	**4/19/2023**	**0.00664**	**Yes**	**12**	**n/a**	**n/a**	**75**	**n/a**	**n/a**	**0.009707**	**NP Inter (NDs) 1 of 2**
Boron (mg/L)	**SW-24**	**6.67**	**n/a**	**4/19/2023**	**7.97**	**Yes**	**13**	**n/a**	**n/a**	**69.23**	**n/a**	**n/a**	**0.008777**	**NP Inter (NDs) 1 of 2**
Magnesium (mg/L)	**SW-24**	**73.3**	**n/a**	**4/19/2023**	**86.1**	**Yes**	**12**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.009707**	**NP Inter (normality) 1 of 2**
Molybdenum (mg/L)	**SW-23**	**0.00637**	**n/a**	**4/19/2023**	**0.0281**	**Yes**	**12**	**n/a**	**n/a**	**91.67**	**n/a**	**n/a**	**0.009707**	**NP Inter (NDs) 1 of 2**
Molybdenum (mg/L)	**SW-26**	**0.00637**	**n/a**	**4/19/2023**	**0.0149**	**Yes**	**12**	**n/a**	**n/a**	**91.67**	**n/a**	**n/a**	**0.009707**	**NP Inter (NDs) 1 of 2**
Strontium (mg/L)	**SW-24**	**0.285**	**n/a**	**4/19/2023**	**0.339**	**Yes**	**12**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.009707**	**NP Inter (normality) 1 of 2**
Sulfate (mg/L)	**SW-24**	**554**	**n/a**	**4/19/2023**	**622**	**Yes**	**13**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.008777**	**NP Inter (normality) 1 of 2**

Interwell Prediction Limits - Surface Water (April 2023) - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:54 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Aluminum (mg/L)	SW-23	3.96	n/a	4/19/2023	0.05ND	No	12	-1.672	1.135	16.67	Kaplan-Meier	ln(x)	0.0006269	Param Inter 1 of 2
Aluminum (mg/L)	SW-25	3.96	n/a	4/19/2023	0.05ND	No	12	-1.672	1.135	16.67	Kaplan-Meier	ln(x)	0.0006269	Param Inter 1 of 2
Aluminum (mg/L)	SW-26	3.96	n/a	4/19/2023	0.05ND	No	12	-1.672	1.135	16.67	Kaplan-Meier	ln(x)	0.0006269	Param Inter 1 of 2
Arsenic (mg/L)	SW-23	0.00367	n/a	4/19/2023	0.00221	No	12	n/a	n/a	75	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Arsenic (mg/L)	**SW-26**	**0.00367**	**n/a**	**4/19/2023**	**0.00664**	**Yes**	**12**	**n/a**	**n/a**	**75**	**n/a**	**n/a**	**0.009707**	**NP Inter (NDs) 1 of 2**
Barium (mg/L)	SW-23	0.2154	n/a	4/19/2023	0.0922	No	12	0.1155	0.03722	0	None	No	0.0006269	Param Inter 1 of 2
Barium (mg/L)	SW-24	0.2154	n/a	4/19/2023	0.0253	No	12	0.1155	0.03722	0	None	No	0.0006269	Param Inter 1 of 2
Barium (mg/L)	SW-25	0.2154	n/a	4/19/2023	0.051	No	12	0.1155	0.03722	0	None	No	0.0006269	Param Inter 1 of 2
Barium (mg/L)	SW-26	0.2154	n/a	4/19/2023	0.0536	No	12	0.1155	0.03722	0	None	No	0.0006269	Param Inter 1 of 2
Boron (mg/L)	SW-23	6.67	n/a	4/19/2023	2.17	No	13	n/a	n/a	69.23	n/a	n/a	0.008777	NP Inter (NDs) 1 of 2
Boron (mg/L)	**SW-24**	**6.67**	**n/a**	**4/19/2023**	**7.97**	**Yes**	**13**	**n/a**	**n/a**	**69.23**	**n/a**	**n/a**	**0.008777**	**NP Inter (NDs) 1 of 2**
Boron (mg/L)	SW-25	6.67	n/a	4/19/2023	4.2	No	13	n/a	n/a	69.23	n/a	n/a	0.008777	NP Inter (NDs) 1 of 2
Boron (mg/L)	SW-26	6.67	n/a	4/19/2023	1.54	No	13	n/a	n/a	69.23	n/a	n/a	0.008777	NP Inter (NDs) 1 of 2
Calcium (mg/L)	SW-23	221	n/a	4/19/2023	87.6	No	13	n/a	n/a	0	n/a	n/a	0.008777	NP Inter (normality) 1 of 2
Calcium (mg/L)	SW-24	221	n/a	4/19/2023	213	No	13	n/a	n/a	0	n/a	n/a	0.008777	NP Inter (normality) 1 of 2
Calcium (mg/L)	SW-25	221	n/a	4/19/2023	149	No	13	n/a	n/a	0	n/a	n/a	0.008777	NP Inter (normality) 1 of 2
Calcium (mg/L)	SW-26	221	n/a	4/19/2023	70	No	13	n/a	n/a	0	n/a	n/a	0.008777	NP Inter (normality) 1 of 2
Chloride (mg/L)	SW-23	21.33	n/a	4/19/2023	19.1	No	13	14.98	2.412	0	None	No	0.0006269	Param Inter 1 of 2
Chloride (mg/L)	SW-24	21.33	n/a	4/19/2023	16.1	No	13	14.98	2.412	0	None	No	0.0006269	Param Inter 1 of 2
Chloride (mg/L)	SW-25	21.33	n/a	4/19/2023	17.7	No	13	14.98	2.412	0	None	No	0.0006269	Param Inter 1 of 2
Chloride (mg/L)	SW-26	21.33	n/a	4/19/2023	20.2	No	13	14.98	2.412	0	None	No	0.0006269	Param Inter 1 of 2
Cobalt (mg/L)	SW-23	0.00116	n/a	4/19/2023	0.0005ND	No	12	n/a	n/a	66.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Cobalt (mg/L)	SW-25	0.00116	n/a	4/19/2023	0.0005ND	No	12	n/a	n/a	66.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Cobalt (mg/L)	SW-26	0.00116	n/a	4/19/2023	0.0005ND	No	12	n/a	n/a	66.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Copper (mg/L)	SW-23	0.005	n/a	4/19/2023	0.005ND	No	11	n/a	n/a	100	n/a	n/a	0.01131	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	SW-23	1	n/a	4/19/2023	1ND	No	13	n/a	n/a	92.31	n/a	n/a	0.008777	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	SW-24	1	n/a	4/19/2023	1ND	No	13	n/a	n/a	92.31	n/a	n/a	0.008777	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	SW-26	1	n/a	4/19/2023	1ND	No	13	n/a	n/a	92.31	n/a	n/a	0.008777	NP Inter (NDs) 1 of 2
Iron (mg/L)	SW-23	2.16	n/a	4/19/2023	0.117	No	12	0.6675	0.2987	8.333	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Iron (mg/L)	SW-24	2.16	n/a	4/19/2023	0.05ND	No	12	0.6675	0.2987	8.333	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Iron (mg/L)	SW-25	2.16	n/a	4/19/2023	0.05ND	No	12	0.6675	0.2987	8.333	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Iron (mg/L)	SW-26	2.16	n/a	4/19/2023	0.286	No	12	0.6675	0.2987	8.333	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Lead (mg/L)	SW-23	0.00258	n/a	4/19/2023	0.0005ND	No	12	n/a	n/a	66.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Lead (mg/L)	SW-25	0.00258	n/a	4/19/2023	0.0005ND	No	12	n/a	n/a	66.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Lead (mg/L)	SW-26	0.00258	n/a	4/19/2023	0.0005ND	No	12	n/a	n/a	66.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Magnesium (mg/L)	SW-23	73.3	n/a	4/19/2023	34	No	12	n/a	n/a	0	n/a	n/a	0.009707	NP Inter (normality) 1 of 2
Magnesium (mg/L)	**SW-24**	**73.3**	**n/a**	**4/19/2023**	**86.1**	**Yes**	**12**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.009707**	**NP Inter (normality) 1 of 2**
Magnesium (mg/L)	SW-25	73.3	n/a	4/19/2023	53.8	No	12	n/a	n/a	0	n/a	n/a	0.009707	NP Inter (normality) 1 of 2
Magnesium (mg/L)	SW-26	73.3	n/a	4/19/2023	33	No	12	n/a	n/a	0	n/a	n/a	0.009707	NP Inter (normality) 1 of 2
Manganese (mg/L)	SW-23	0.9788	n/a	4/19/2023	0.115	No	12	0.4694	0.1937	0	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Manganese (mg/L)	SW-24	0.9788	n/a	4/19/2023	0.005ND	No	12	0.4694	0.1937	0	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Manganese (mg/L)	SW-25	0.9788	n/a	4/19/2023	0.0169	No	12	0.4694	0.1937	0	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Manganese (mg/L)	SW-26	0.9788	n/a	4/19/2023	0.728	No	12	0.4694	0.1937	0	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Molybdenum (mg/L)	**SW-23**	**0.00637**	**n/a**	**4/19/2023**	**0.0281**	**Yes**	**12**	**n/a**	**n/a**	**91.67**	**n/a**	**n/a**	**0.009707**	**NP Inter (NDs) 1 of 2**
Molybdenum (mg/L)	SW-25	0.00637	n/a	4/19/2023	0.002ND	No	12	n/a	n/a	91.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Molybdenum (mg/L)	**SW-26**	**0.00637**	**n/a**	**4/19/2023**	**0.0149**	**Yes**	**12**	**n/a**	**n/a**	**91.67**	**n/a**	**n/a**	**0.009707**	**NP Inter (NDs) 1 of 2**
Strontium (mg/L)	SW-23	0.285	n/a	4/19/2023	0.229	No	12	n/a	n/a	0	n/a	n/a	0.009707	NP Inter (normality) 1 of 2
Strontium (mg/L)	**SW-24**	**0.285**	**n/a**	**4/19/2023**	**0.339**	**Yes**	**12**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.009707**	**NP Inter (normality) 1 of 2**
Strontium (mg/L)	SW-25	0.285	n/a	4/19/2023	0.257	No	12	n/a	n/a	0	n/a	n/a	0.009707	NP Inter (normality) 1 of 2
Strontium (mg/L)	SW-26	0.285	n/a	4/19/2023	0.203	No	12	n/a	n/a	0	n/a	n/a	0.009707	NP Inter (normality) 1 of 2
Sulfate (mg/L)	SW-23	554	n/a	4/19/2023	182	No	13	n/a	n/a	0	n/a	n/a	0.008777	NP Inter (normality) 1 of 2
Sulfate (mg/L)	**SW-24**	**554**	**n/a**	**4/19/2023**	**622**	**Yes**	**13**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.008777**	**NP Inter (normality) 1 of 2**
Sulfate (mg/L)	SW-25	554	n/a	4/19/2023	299	No	13	n/a	n/a	0	n/a	n/a	0.008777	NP Inter (normality) 1 of 2
Sulfate (mg/L)	SW-26	554	n/a	4/19/2023	121	No	13	n/a	n/a	0	n/a	n/a	0.008777	NP Inter (normality) 1 of 2
Zinc (mg/L)	SW-26	0.0312	n/a	4/19/2023	0.02ND	No	12	n/a	n/a	91.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2

Trend Tests - Prediction Limit Exceedances (Surface Water) - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 10:01 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Alpha	Method
Boron (mg/L)	**SW-24**	**-0.4617**	**-52**	**-48**	**Yes**	**14**	**0**	**n/a**	**0.01**	**NP**

Trend Tests - Prediction Limit Exceedances (Surface Water) - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 10:01 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Alpha	Method
Arsenic (mg/L)	SW-22 (bg)	0	10	38	No	12	75	n/a	0.01	NP
Arsenic (mg/L)	SW-26	-0.001307	-9	-43	No	13	15.38	n/a	0.01	NP
Boron (mg/L)	SW-22 (bg)	0	-26	-43	No	13	69.23	n/a	0.01	NP
Boron (mg/L)	**SW-24**	**-0.4617**	**-52**	**-48**	**Yes**	**14**	**0**	**n/a**	**0.01**	**NP**
Magnesium (mg/L)	SW-22 (bg)	-0.2885	-2	-38	No	12	0	n/a	0.01	NP
Magnesium (mg/L)	SW-24	-1.642	-26	-43	No	13	0	n/a	0.01	NP
Molybdenum (mg/L)	SW-22 (bg)	0	7	38	No	12	91.67	n/a	0.01	NP
Molybdenum (mg/L)	SW-23	0	19	38	No	12	83.33	n/a	0.01	NP
Molybdenum (mg/L)	SW-26	-0.0001566	-2	-43	No	13	7.692	n/a	0.01	NP
Strontium (mg/L)	SW-22 (bg)	-0.001868	-10	-38	No	12	0	n/a	0.01	NP
Strontium (mg/L)	SW-24	-0.0116	-40	-43	No	13	0	n/a	0.01	NP
Sulfate (mg/L)	SW-22 (bg)	-3.2	-29	-43	No	13	0	n/a	0.01	NP
Sulfate (mg/L)	SW-24	-23.14	-35	-48	No	14	0	n/a	0.01	NP

FIGURE A.

Monitoring Wells Time Series

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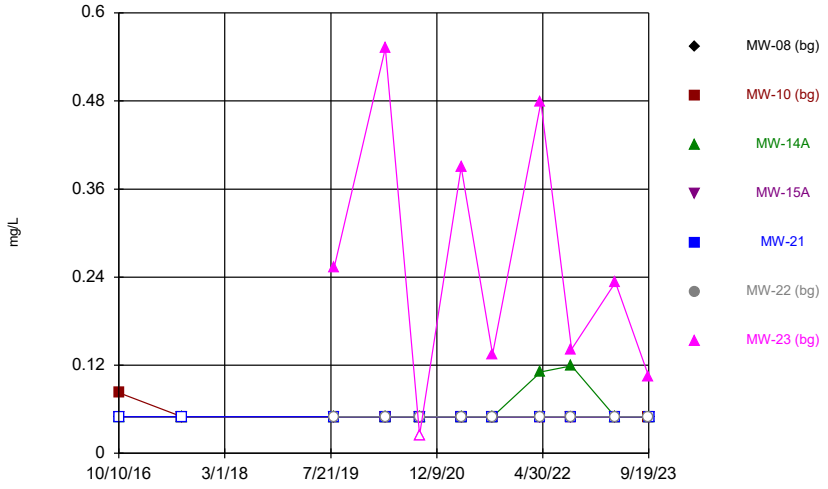
Hollow symbols indicate censored values.

Time Series



Constituent: Aluminum Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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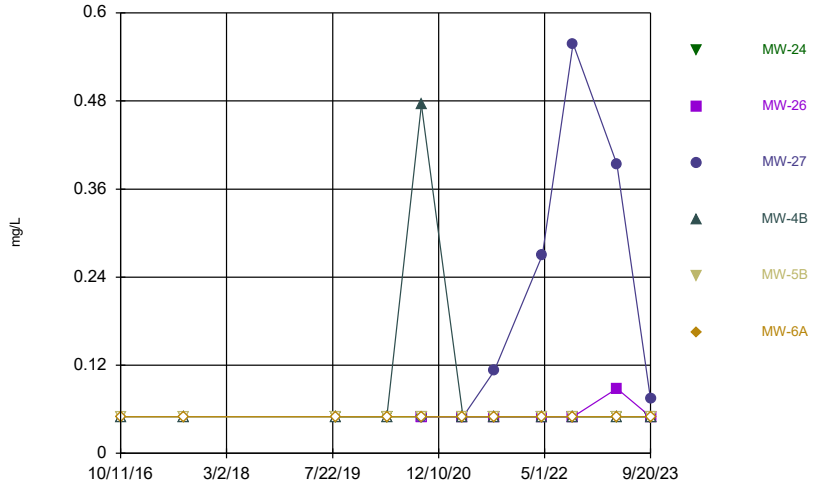
Time Series



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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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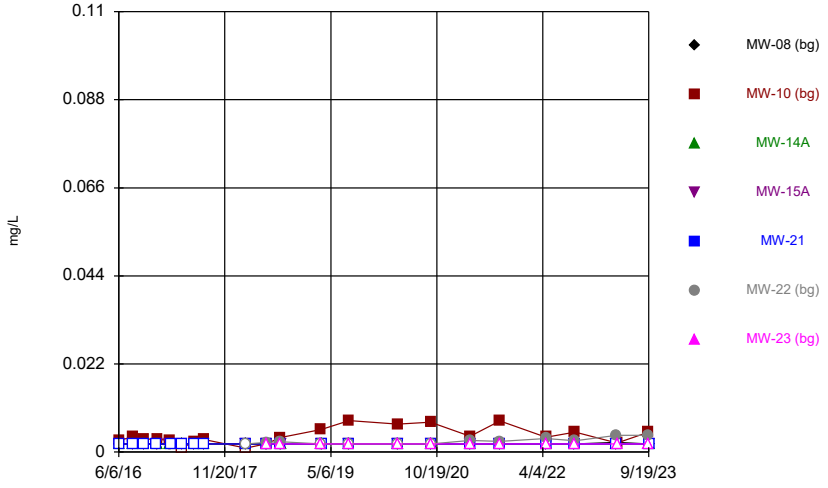

Constituent: Arsenic Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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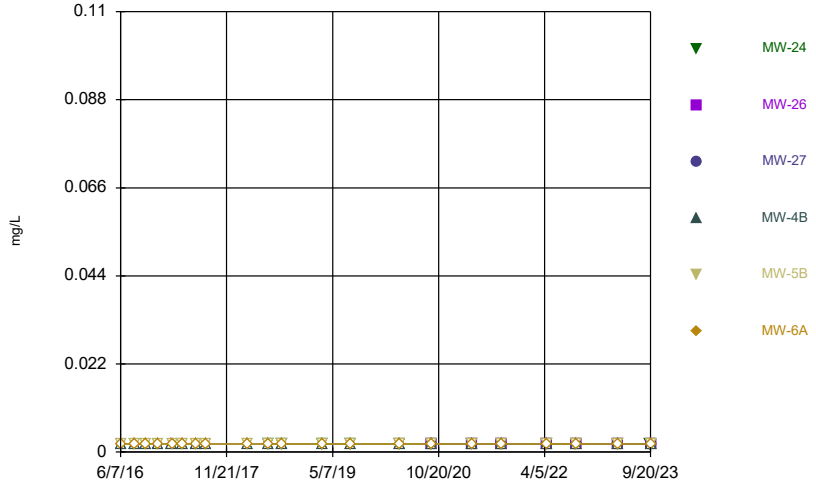
Time Series



Constituent: Arsenic Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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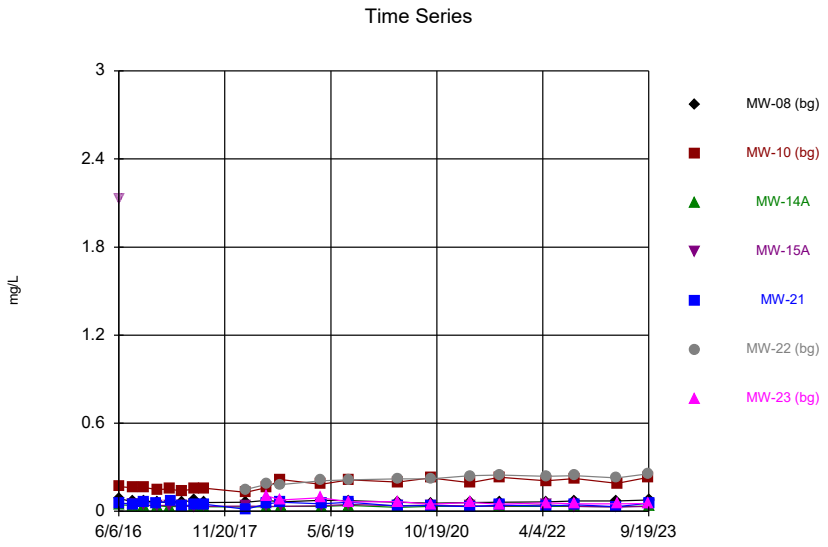

Constituent: Barium Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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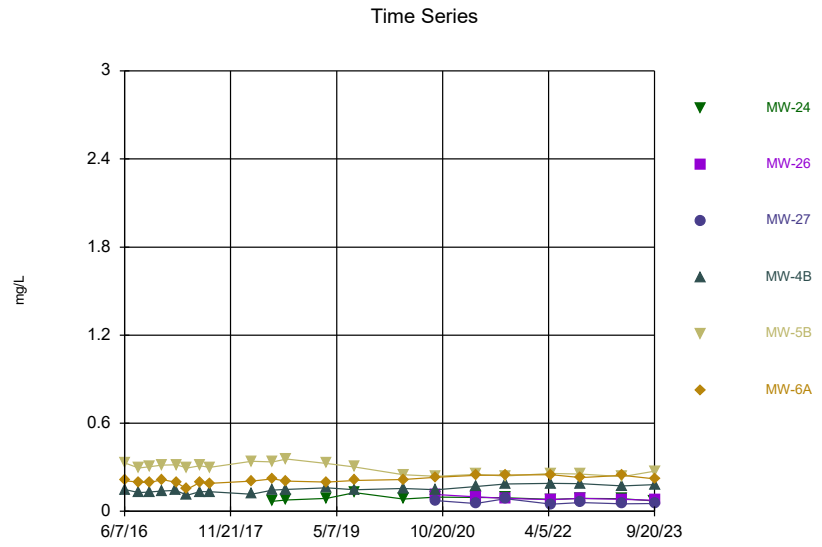

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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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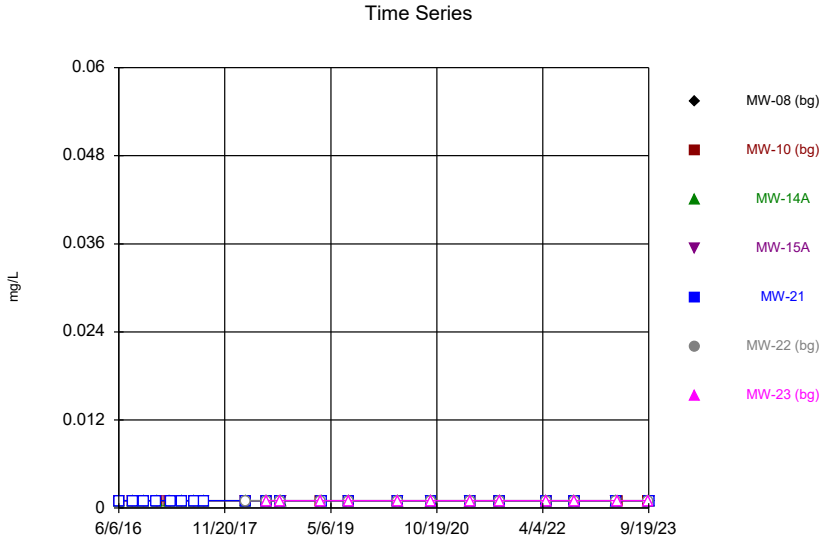

Constituent: Beryllium Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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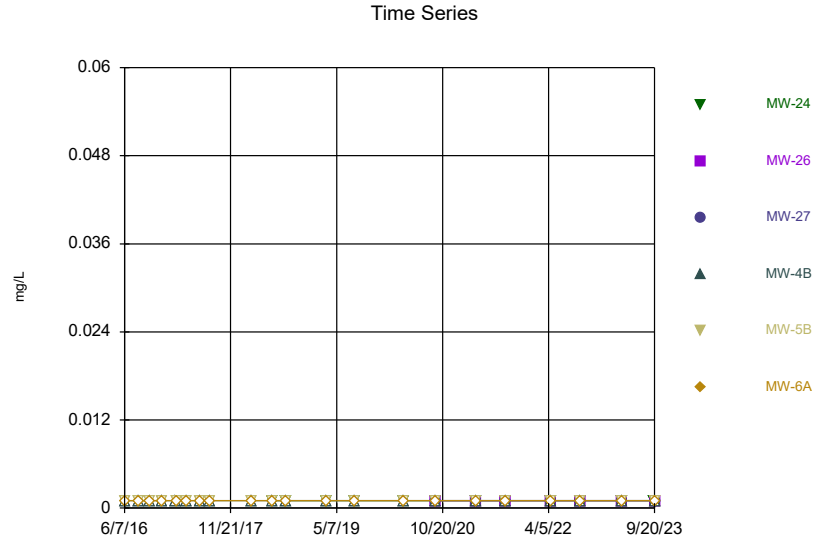

Constituent: Beryllium Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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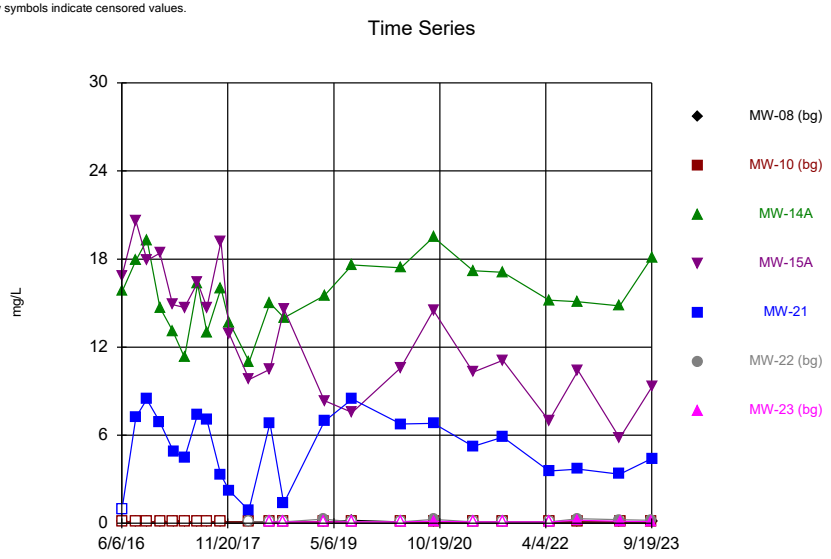

Constituent: Boron Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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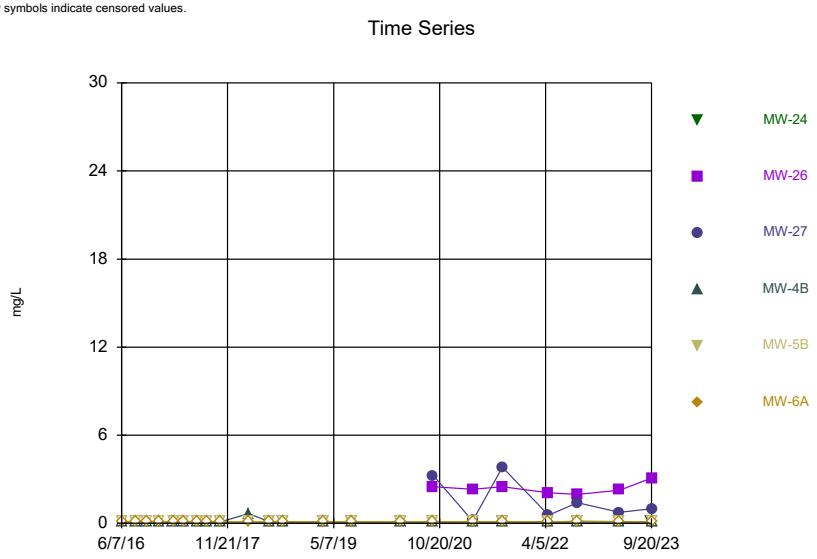

Constituent: Boron Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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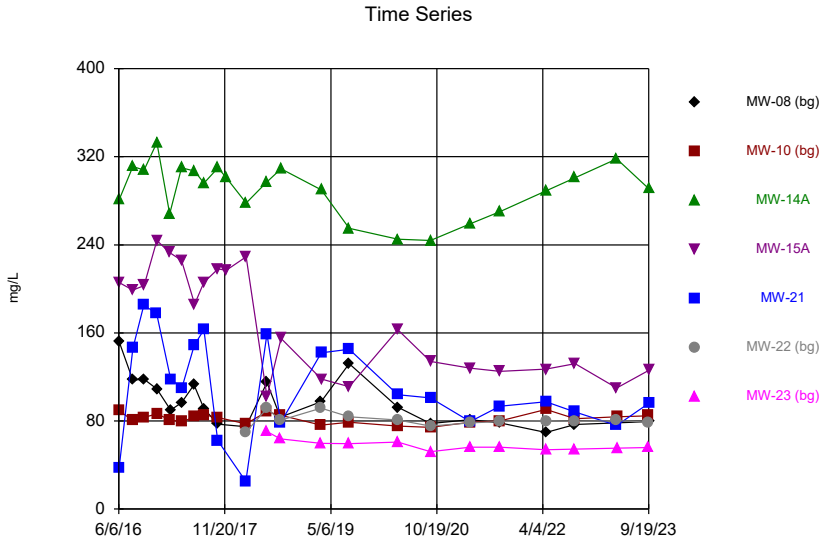

Constituent: Calcium Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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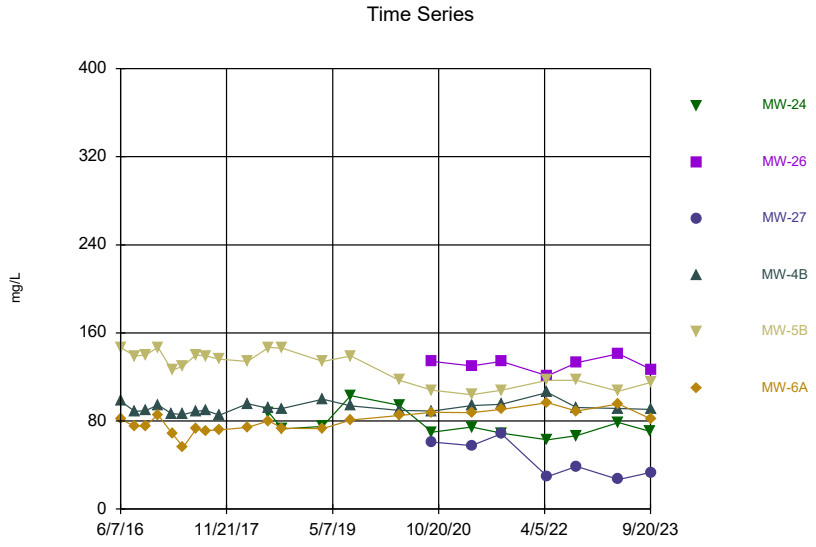
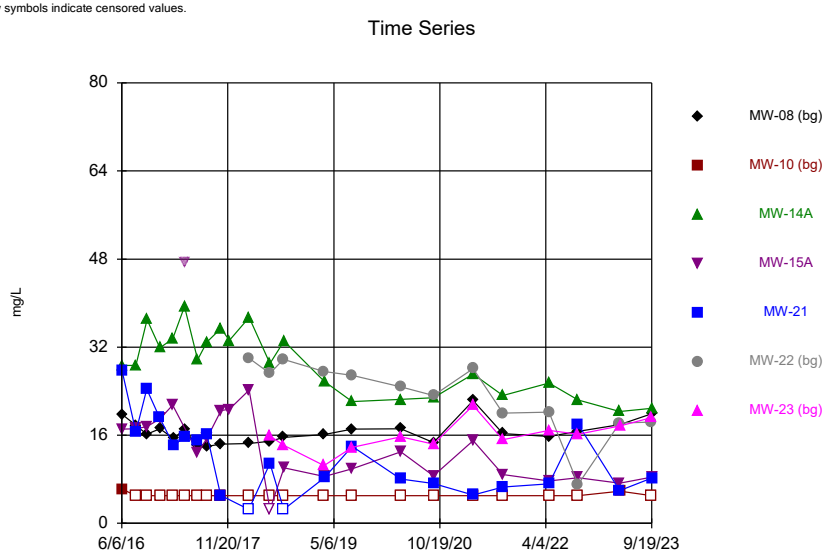


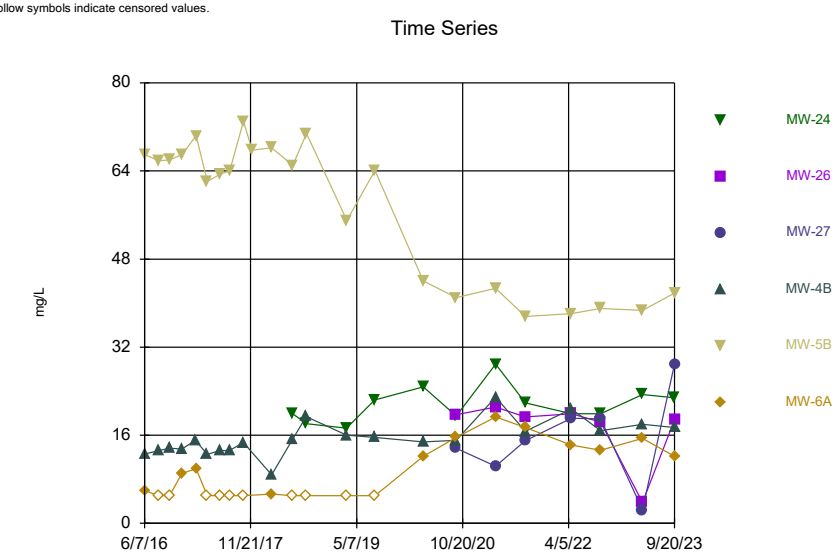
Constituent: Calcium Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.



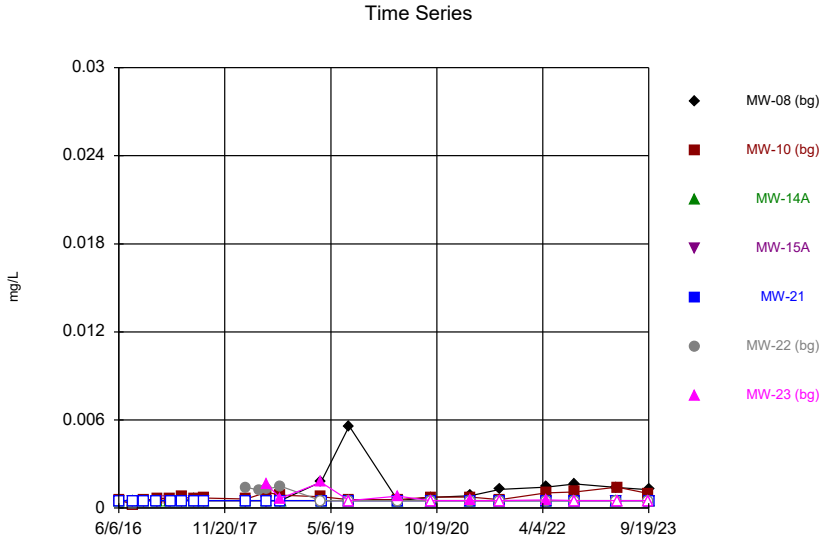
Constituent: Chloride Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.



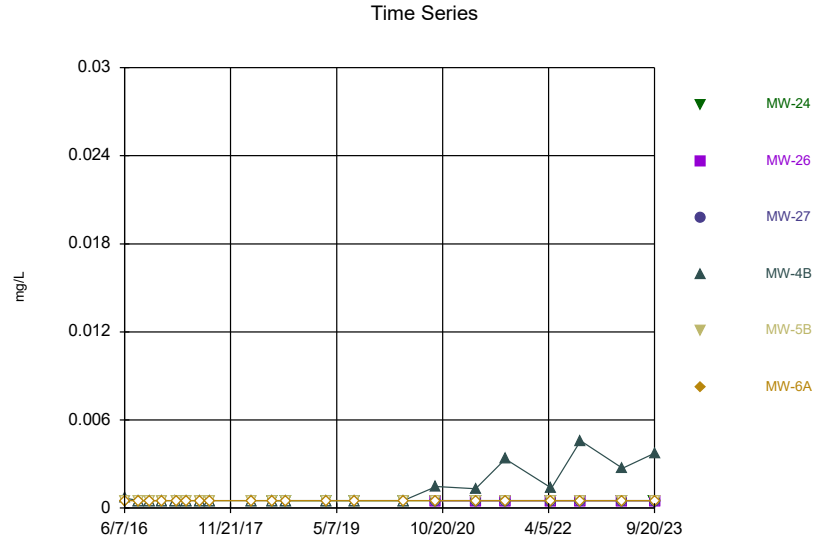
Constituent: Chloride Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.



Constituent: Cobalt Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

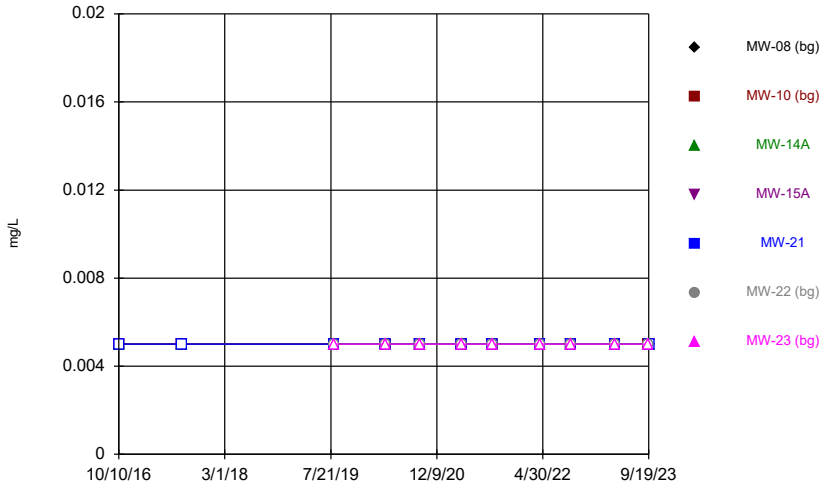
Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.



Constituent: Cobalt Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.

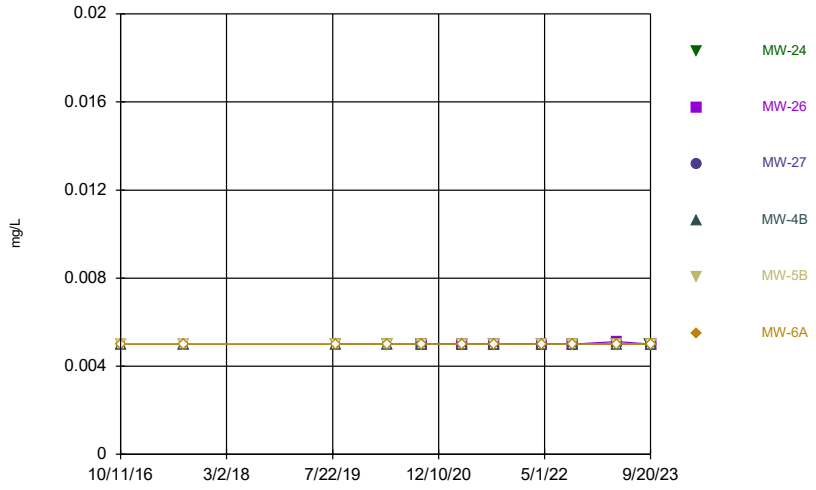
Time Series



Constituent: Copper Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.

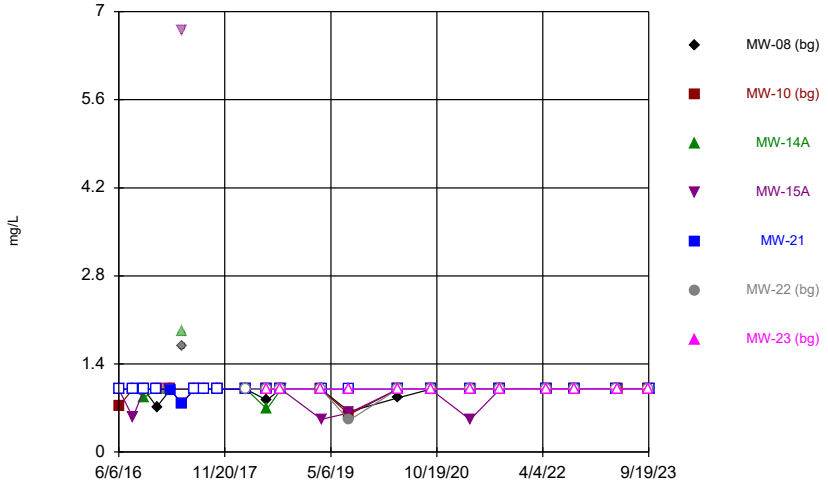
Time Series



Constituent: Copper Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.

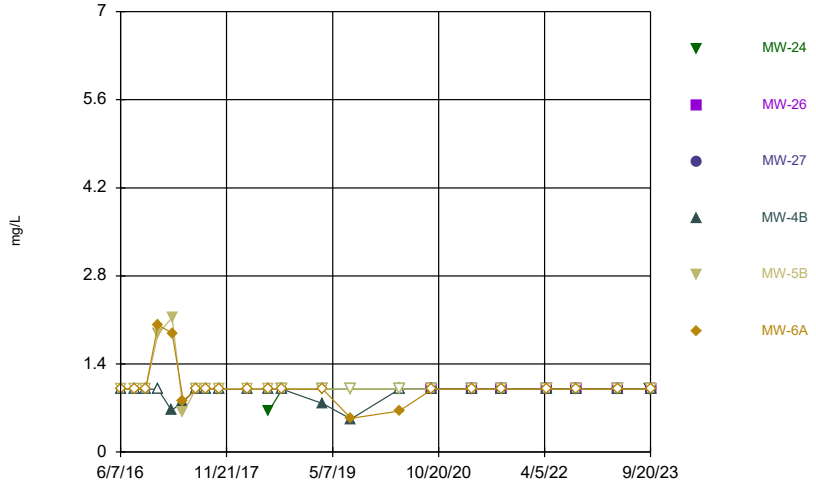
Time Series



Constituent: Fluoride Analysis Run 11/9/2023 7:56 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

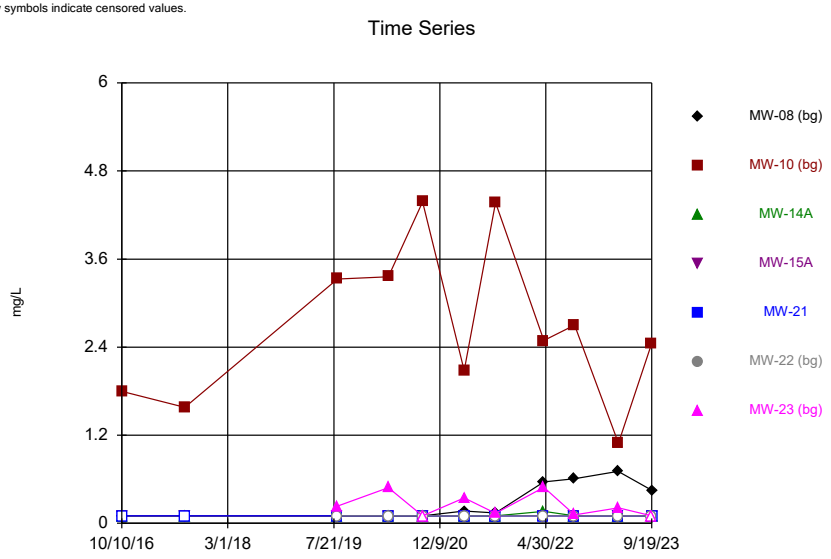
Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.

Time Series



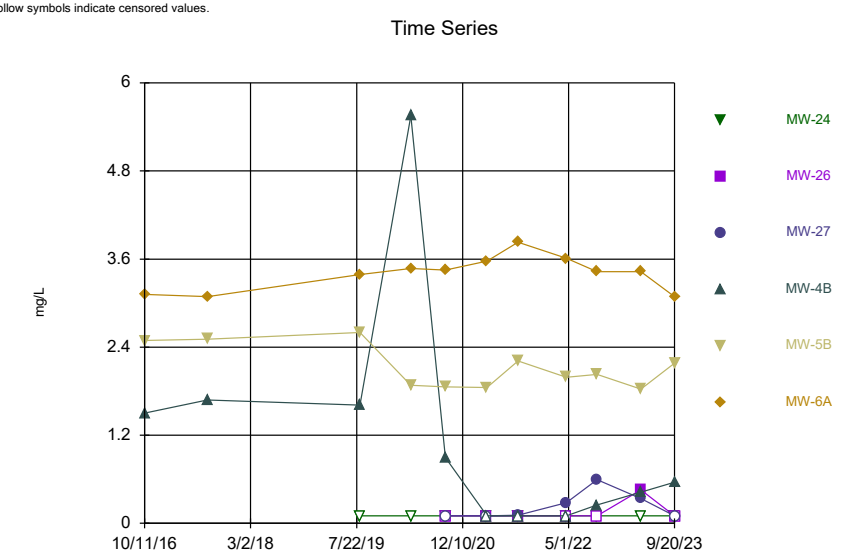
Constituent: Fluoride Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.



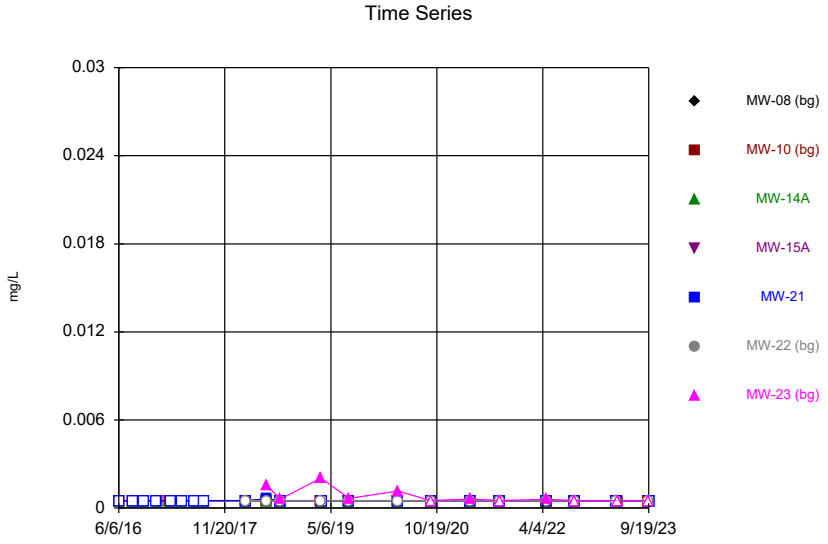
Constituent: Iron Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.



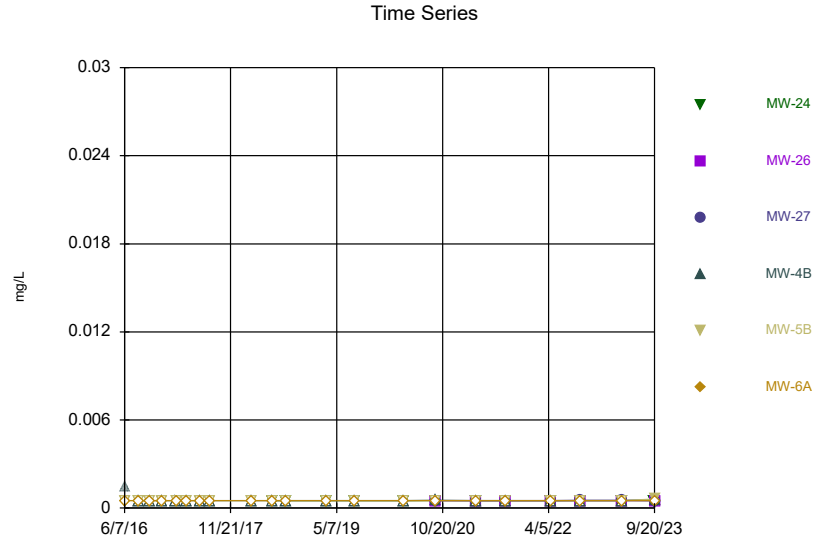
Constituent: Iron Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.



Constituent: Lead Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

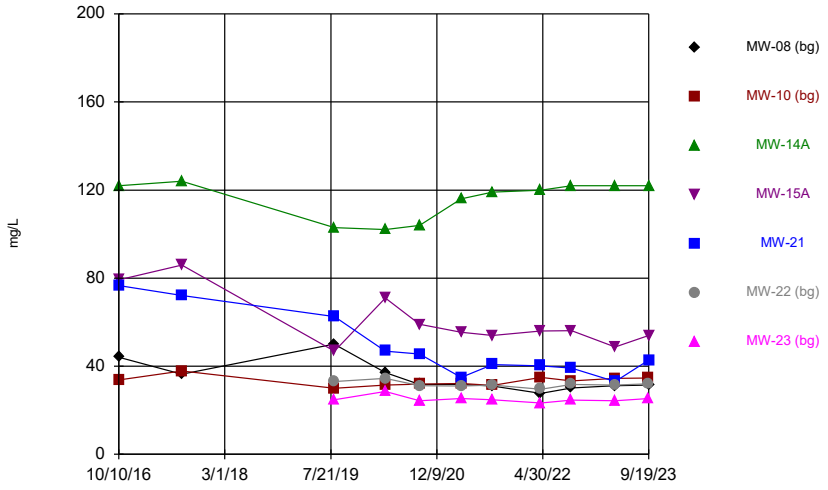
Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.



Constituent: Lead Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG

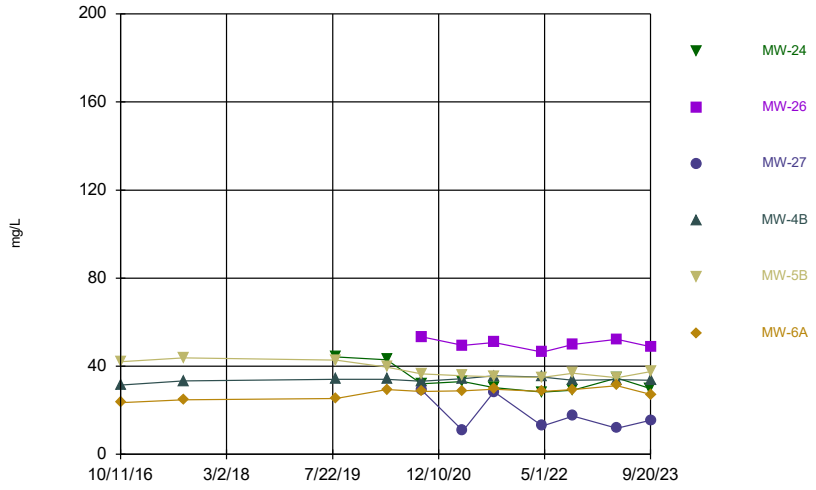
Time Series



Constituent: Magnesium Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG

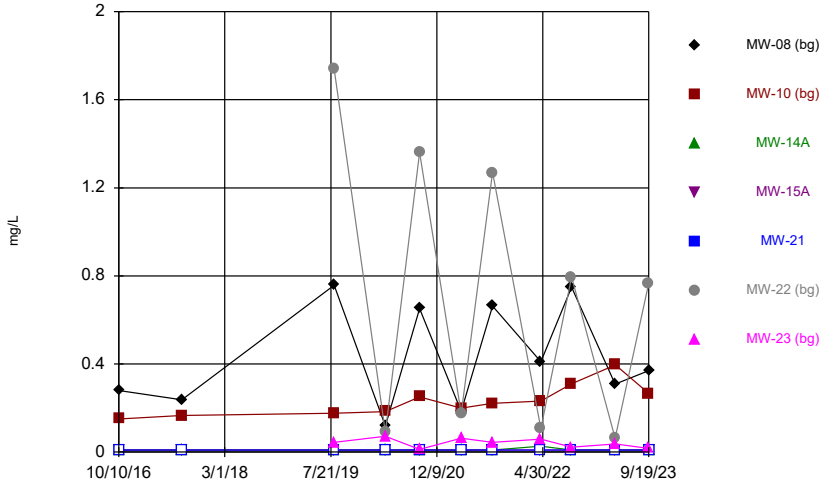
Time Series



Constituent: Magnesium Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.

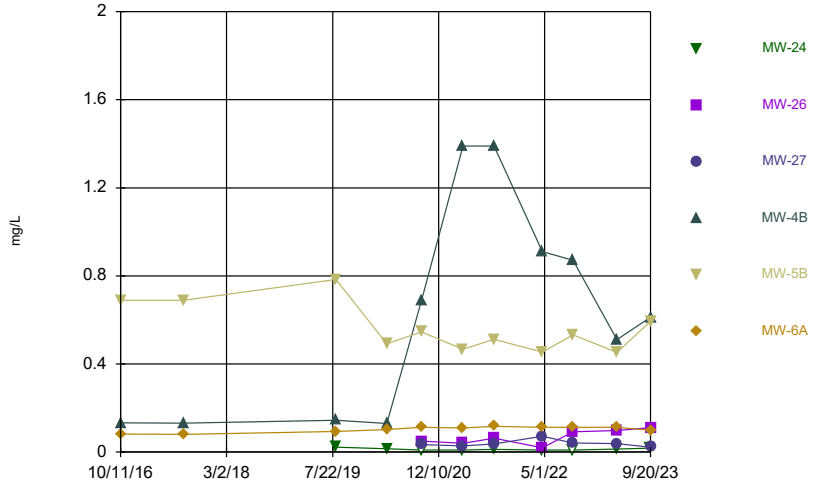
Time Series



Constituent: Manganese Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

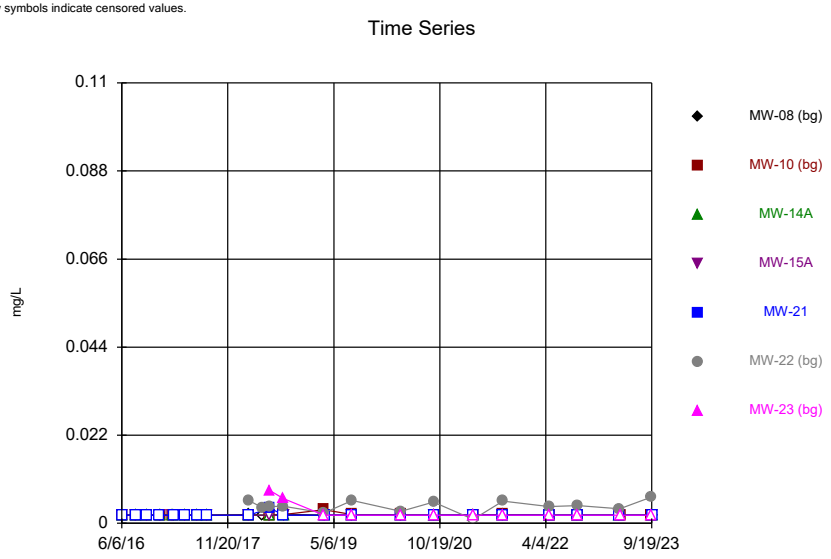
Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.

Time Series



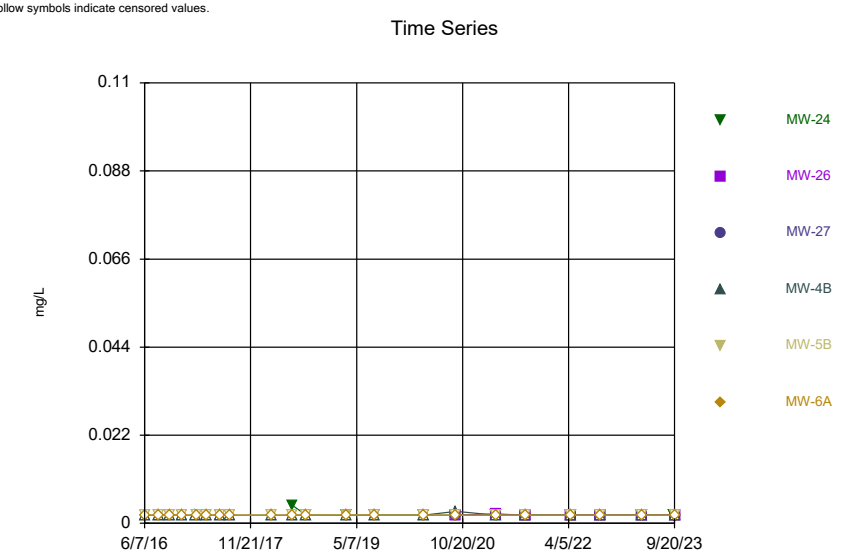
Constituent: Manganese Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.



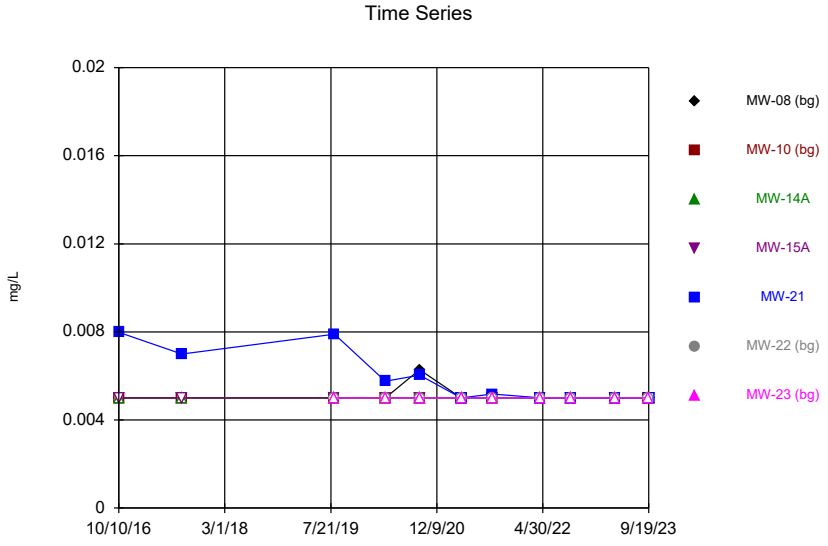
Constituent: Molybdenum Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.



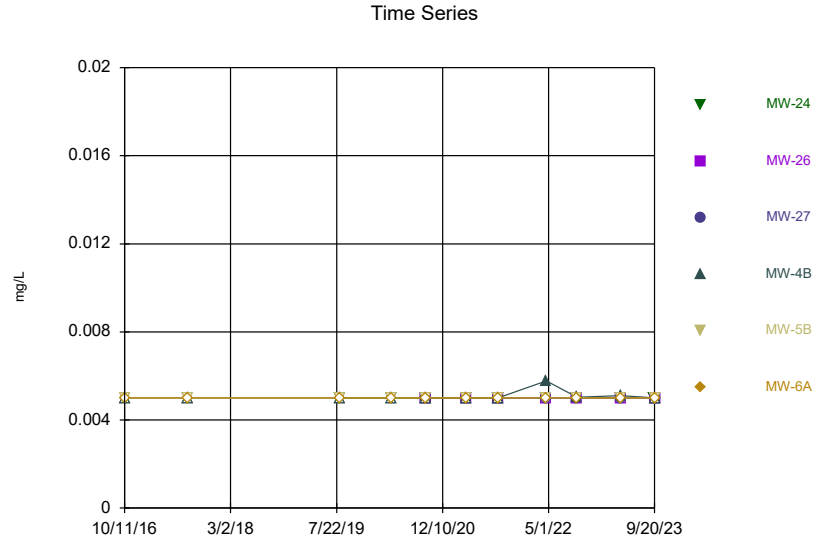
Constituent: Molybdenum Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.



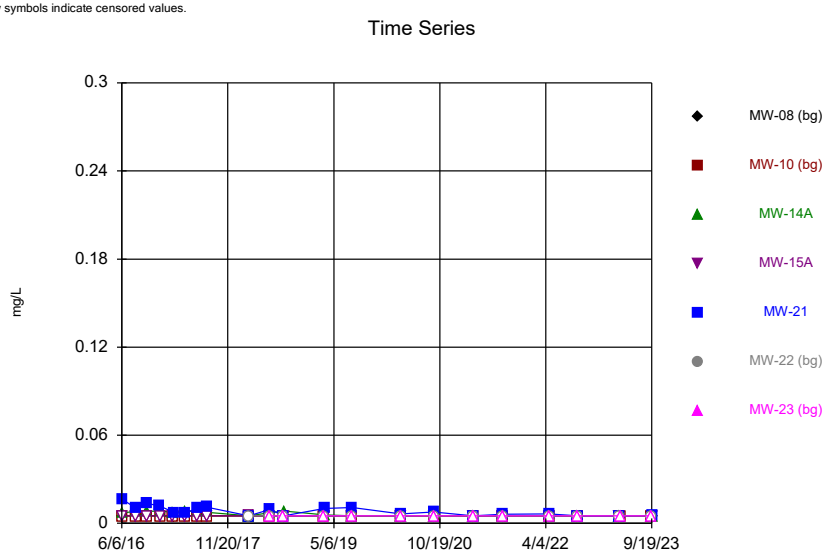
Constituent: Nickel Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.



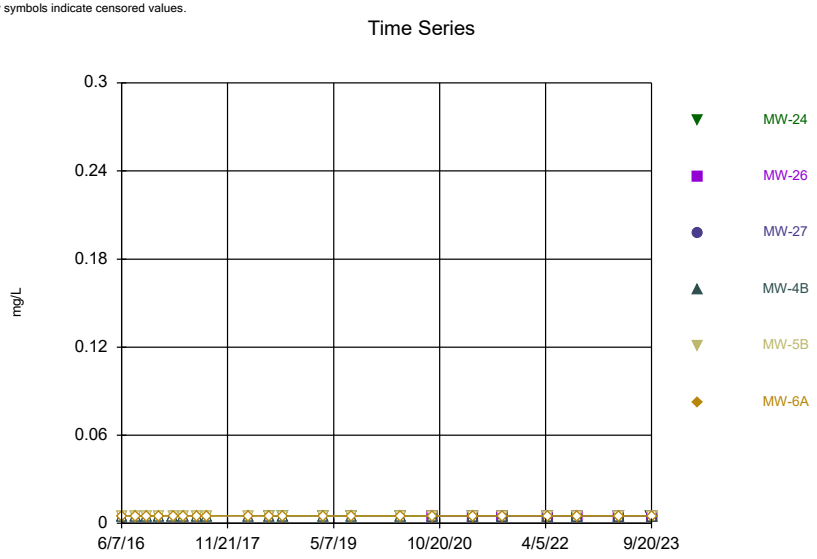
Constituent: Nickel Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.



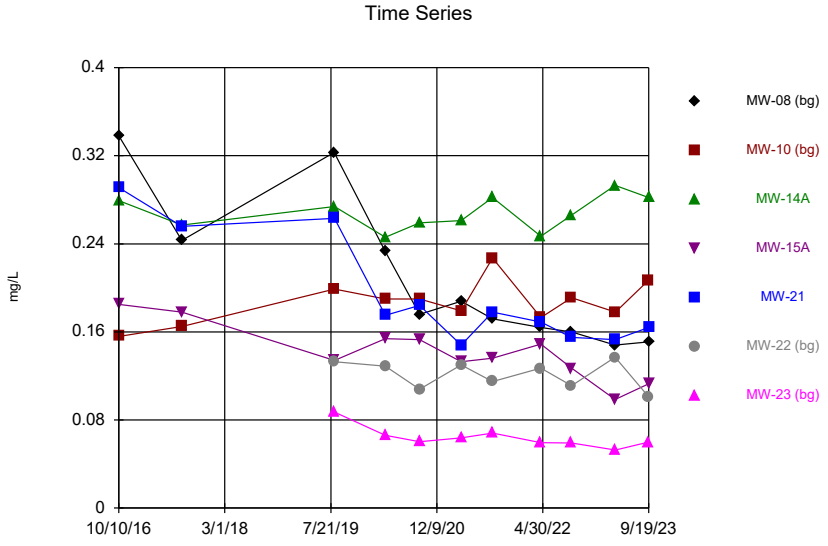
Constituent: Selenium Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.



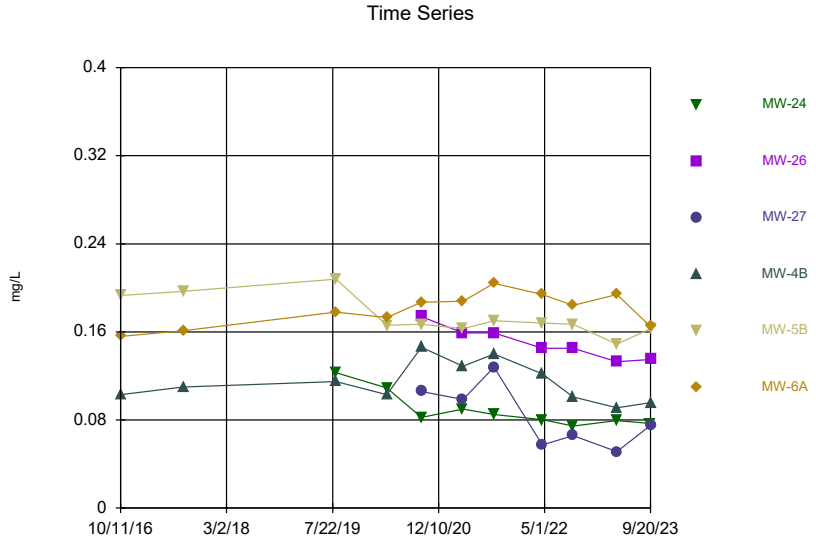
Constituent: Selenium Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG



Constituent: Strontium Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

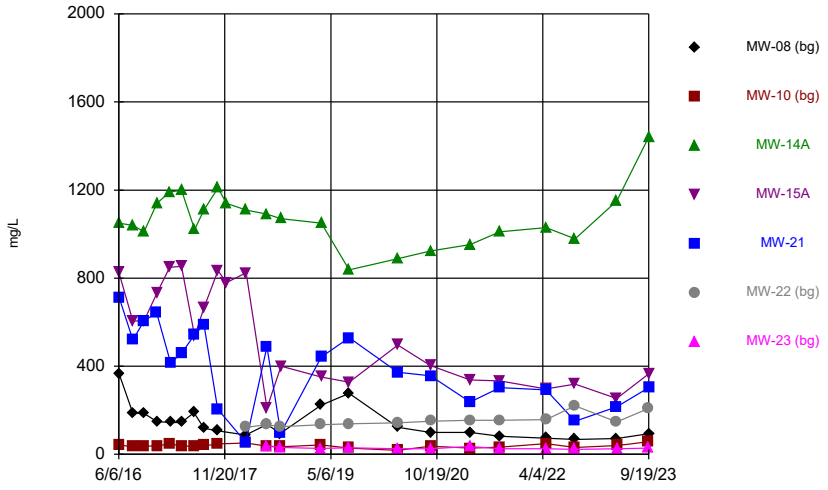
Sanitas™ v.10.0.13b Software licensed to . UG



Constituent: Strontium Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG

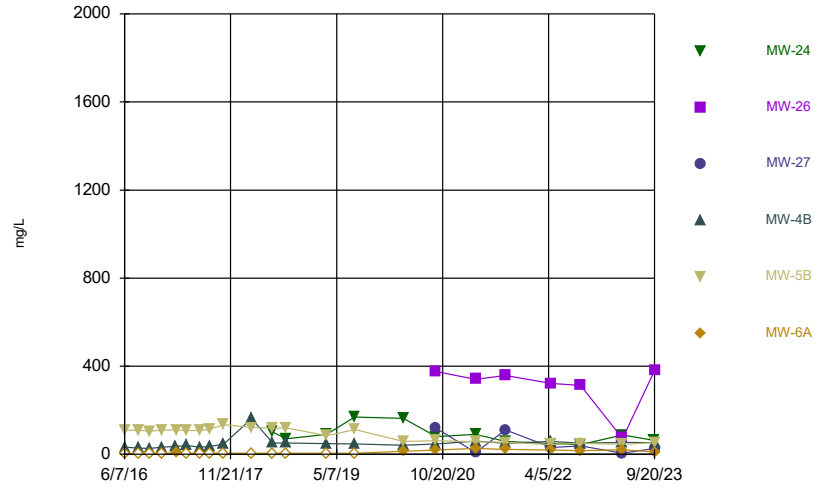
Time Series



Constituent: Sulfate Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.

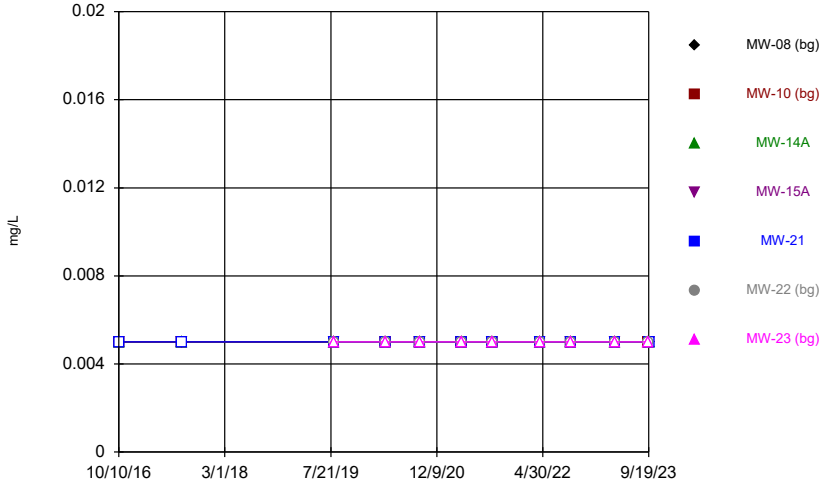
Time Series



Constituent: Sulfate Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.

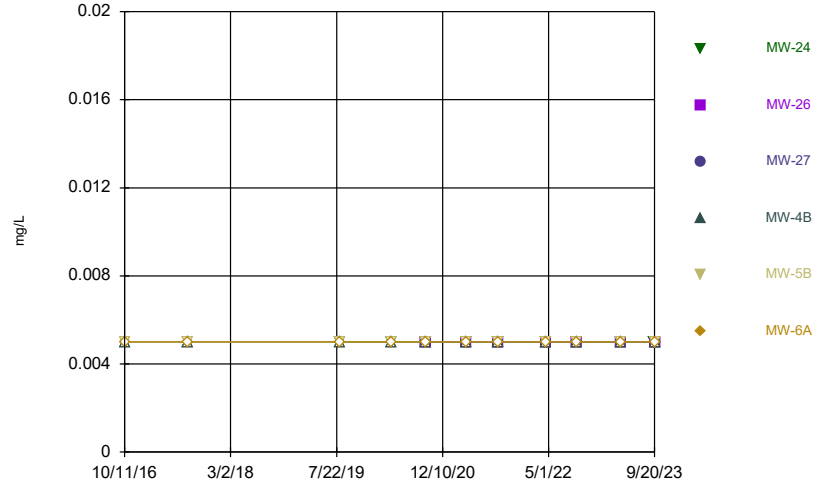
Time Series



Constituent: Vanadium Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.

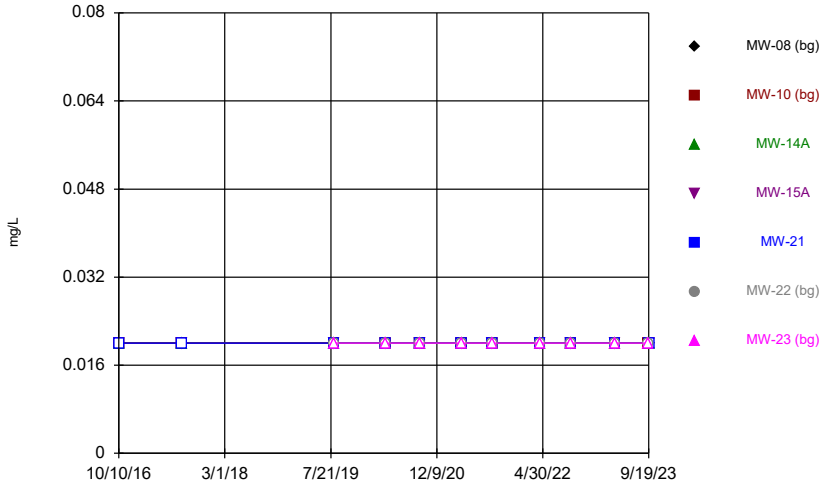
Time Series



Constituent: Vanadium Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.

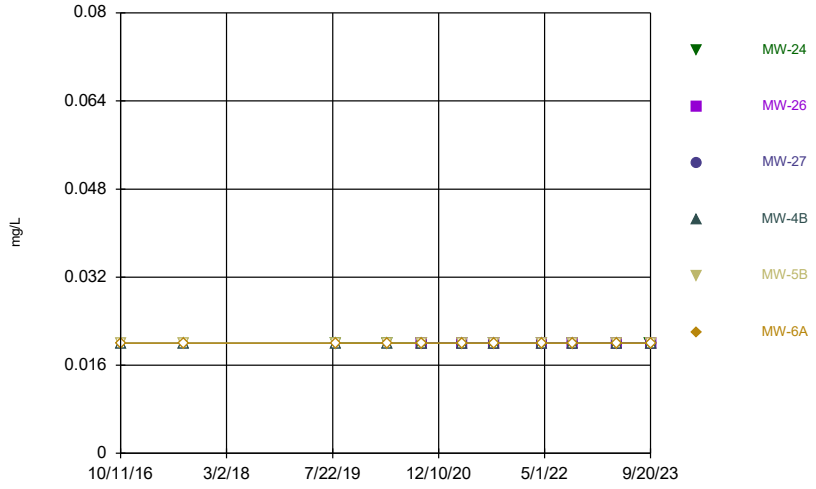
Time Series



Constituent: Zinc Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.

Time Series



Constituent: Zinc Analysis Run 11/9/2023 7:57 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series

Constituent: Aluminum (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
10/10/2016	<0.05	0.0826			<0.05		
10/11/2016			<0.05	<0.05			
8/7/2017	<0.05	<0.05					
8/8/2017			<0.05	<0.05	<0.05		
8/6/2019	<0.05					<0.05	0.253
8/7/2019		<0.05	<0.05	<0.05	<0.05		
4/7/2020	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.552
9/18/2020	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4/5/2021	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.39
9/1/2021	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.135
4/20/2022	<0.05	<0.05	0.111	<0.05	<0.05	<0.05	0.478
9/14/2022	<0.05	<0.05	0.119	<0.05	<0.05	<0.05	0.142
4/10/2023						<0.05	
4/11/2023	<0.05		<0.05	<0.05	<0.05		
4/12/2023		<0.05					0.233
9/18/2023		<0.05				<0.05	0.105
9/19/2023	<0.05		<0.05	<0.05	<0.05		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Aluminum (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	MW-4B	MW-5B	MW-6A
10/11/2016				<0.05	<0.05	<0.05
8/7/2017				<0.05		
8/8/2017					<0.05	<0.05
8/6/2019	<0.05					
8/7/2019				<0.05	<0.05	<0.05
4/7/2020	<0.05			<0.05	<0.05	<0.05
9/18/2020	<0.05	<0.05	<0.05	0.475	<0.05	<0.05
4/5/2021	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
9/1/2021	<0.05	<0.05	0.112	<0.05	<0.05	<0.05
4/20/2022	<0.05	<0.05	0.27	<0.05	<0.05	<0.05
9/14/2022	<0.05	<0.05	0.558	<0.05	<0.05	<0.05
4/11/2023	<0.05					
4/12/2023		0.0884	0.394	<0.05	<0.05	<0.05
9/19/2023	<0.05					
9/20/2023		<0.05	0.0737	<0.05	<0.05	<0.05

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Arsenic (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
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	<0.002	
3/7/2018			<0.002	<0.002			
6/19/2018	<0.002	0.00211			<0.002	0.00245	
6/20/2018			<0.002	<0.002			<0.002
8/27/2018	<0.002	0.0036				0.00261	<0.002
8/28/2018					<0.002		
8/29/2018			<0.002	<0.002			
3/18/2019	<0.002						
3/19/2019		0.0056				<0.002	<0.002
3/20/2019			<0.002	<0.002	<0.002		
8/6/2019	<0.002					<0.002	<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	<0.002	<0.002
9/18/2020	<0.002	0.00748	<0.002	<0.002	<0.002	<0.002	<0.002
4/5/2021	<0.002	0.00393	<0.002	<0.002	<0.002	0.00289	<0.002
9/1/2021	<0.002	0.00781	<0.002	<0.002	<0.002	0.00267	<0.002
4/20/2022	<0.002	0.00371	<0.002	<0.002	<0.002	0.0034	<0.002
9/14/2022	<0.002	0.00497	<0.002	<0.002	<0.002	0.00285	<0.002
4/10/2023						0.00421	
4/11/2023	0.00247		<0.002	<0.002	<0.002		
4/12/2023		0.00224					<0.002
9/18/2023		0.00501				0.00421	<0.002
9/19/2023	<0.002		<0.002	<0.002	<0.002		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Arsenic (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	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
6/20/2018	<0.002					
6/21/2018				<0.002	<0.002	<0.002
8/27/2018	<0.002					
8/28/2018				<0.002		
8/29/2018					<0.002	<0.002
3/18/2019	<0.002					
3/19/2019				<0.002	<0.002	<0.002
8/6/2019	<0.002					
8/7/2019				<0.002	<0.002	<0.002
4/7/2020	<0.002			<0.002	<0.002	<0.002
9/18/2020	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
4/5/2021	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
9/1/2021	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
4/20/2022	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
9/14/2022	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
4/11/2023	<0.002					
4/12/2023		<0.002	<0.002	<0.002	<0.002	<0.002
9/19/2023	<0.002					
9/20/2023		<0.002	<0.002	<0.002	<0.002	<0.002

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Barium (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
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	0.15	
3/7/2018			0.0285	0.0352			
6/19/2018	0.0761	0.162			0.0515	0.184	
6/20/2018			0.0314	0.0338			0.106
8/27/2018	0.0649	0.216				0.181	0.0779
8/28/2018					0.0622		
8/29/2018			0.0344	0.0335			
3/18/2019	0.0751						
3/19/2019		0.185				0.209	0.0922
3/20/2019			0.0328	0.037	0.0511		
8/6/2019	0.0733					0.215	0.0635
8/7/2019		0.215	0.0398	0.047	0.0624		
4/7/2020	0.0613	0.199	0.0266	0.0389	0.0352	0.222	0.0654
9/18/2020	0.0549	0.227	0.0328	0.0416	0.0407	0.222	0.0491
4/5/2021	0.0596	0.196	0.0355	0.0365	0.0309	0.242	0.0608
9/1/2021	0.0623	0.233	0.0345	0.0355	0.0434	0.247	0.0497
4/20/2022	0.0631	0.208	0.0327	0.0443	0.036	0.239	0.0572
9/14/2022	0.0703	0.223	0.034	0.0327	0.0447	0.243	0.0507
4/10/2023						0.227	
4/11/2023	0.07		0.032	0.0299	0.031		
4/12/2023		0.19					0.0518
9/18/2023		0.233				0.256	0.0533
9/19/2023	0.0782		0.0348	0.0338	0.0559		

Time Series

Constituent: Barium (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	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				0.117	0.341	0.206
6/20/2018	0.0695					
6/21/2018				0.144	0.336	0.222
8/27/2018	0.0776					
8/28/2018				0.149		
8/29/2018					0.357	0.206
3/18/2019	0.0889					
3/19/2019				0.161	0.326	0.2
8/6/2019	0.128					
8/7/2019				0.147	0.301	0.211
4/7/2020	0.084			0.156	0.25	0.216
9/18/2020	0.0969	0.114	0.0738	0.147	0.239	0.231
4/5/2021	0.0936	0.0989	0.0534	0.169	0.252	0.245
9/1/2021	0.0922	0.0889	0.0862	0.186	0.241	0.248
4/20/2022	0.0826	0.0802	0.0498	0.191	0.258	0.249
9/14/2022	0.0887	0.0876	0.0594	0.188	0.253	0.229
4/11/2023	0.0863					
4/12/2023		0.0815	0.0508	0.173	0.237	0.246
9/19/2023	0.0698					
9/20/2023		0.0755	0.053	0.181	0.274	0.222

Time Series

Constituent: Beryllium (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
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	<0.001	
3/7/2018			<0.001	<0.001			
6/19/2018	<0.001	<0.001			<0.001	<0.001	
6/20/2018			<0.001	<0.001			<0.001
8/27/2018	<0.001	<0.001				<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				<0.001	<0.001
3/20/2019			<0.001	<0.001	<0.001		
8/6/2019	<0.001					<0.001	<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	<0.001	<0.001
9/18/2020	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
4/5/2021	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
9/1/2021	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
4/20/2022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
9/14/2022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
4/10/2023						<0.001	
4/11/2023	<0.001		<0.001	<0.001	<0.001		
4/12/2023		<0.001					<0.001
9/18/2023		<0.001				<0.001	<0.001
9/19/2023	<0.001		<0.001	<0.001	<0.001		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Beryllium (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	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
6/20/2018	<0.001					
6/21/2018				<0.001	<0.001	<0.001
8/27/2018	<0.001					
8/28/2018				<0.001		
8/29/2018					<0.001	<0.001
3/18/2019	<0.001					
3/19/2019				<0.001	<0.001	<0.001
8/6/2019	<0.001					
8/7/2019				<0.001	<0.001	<0.001
4/7/2020	<0.001			<0.001	<0.001	<0.001
9/18/2020	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
4/5/2021	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
9/1/2021	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
4/20/2022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
9/14/2022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
4/11/2023	<0.001					
4/12/2023		<0.001	<0.001	<0.001	<0.001	<0.001
9/19/2023	<0.001					
9/20/2023		<0.001	<0.001	<0.001	<0.001	<0.001

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Boron (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
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	<0.1	
3/7/2018			11	9.8			
6/19/2018	<0.1	<0.1			6.84	<0.1	
6/20/2018			15	10.5			<0.1
8/27/2018	<0.1	<0.1				<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				0.299	<0.1
3/20/2019			15.5	8.35	6.95		
8/6/2019	0.205					<0.1	<0.1
8/7/2019		<0.1	17.6	7.56	8.46		
4/7/2020	<0.1	<0.1	17.4	10.6	6.76	<0.1	<0.1
9/18/2020	<0.1	<0.1	19.5	14.5	6.82	0.263	0.15
4/5/2021	<0.1	<0.1	17.2	10.3	5.24	<0.1	<0.1
9/1/2021	<0.1	<0.1	17.1	11.1	5.88	<0.1	<0.1
4/20/2022	<0.1	<0.1	15.2	6.98	3.57	<0.1	<0.1
9/14/2022	<0.1	<0.1	15.1	10.4	3.69	0.322	0.204
4/10/2023						0.247	
4/11/2023	<0.1		14.8	5.8	3.35		
4/12/2023		<0.1					0.145
9/18/2023		<0.1				0.207	0.128
9/19/2023	<0.1		18.1	9.28	4.42		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Boron (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	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				0.66	<0.1	<0.1
6/20/2018	<0.1					
6/21/2018				<0.1	<0.1	<0.1
8/27/2018	<0.1					
8/28/2018				<0.1		
8/29/2018					<0.1	<0.1
3/18/2019	<0.1					
3/19/2019				<0.1	<0.1	<0.1
8/6/2019	<0.1					
8/7/2019				<0.1	<0.1	<0.1
4/7/2020	<0.1			<0.1	<0.1	<0.1
9/18/2020	0.109	2.5	3.25	<0.1	<0.1	<0.1
4/5/2021	<0.1	2.33	0.17	<0.1	<0.1	<0.1
9/1/2021	<0.1	2.49	3.82	<0.1	<0.1	<0.1
4/20/2022	<0.1	2.07	0.549	<0.1	<0.1	<0.1
9/14/2022	0.134	1.97	1.41	<0.1	<0.1	<0.1
4/11/2023	0.114					
4/12/2023		2.26	0.741	<0.1	<0.1	<0.1
9/19/2023	<0.1					
9/20/2023		3.08	1	<0.1	<0.1	<0.1

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Calcium (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
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	69.8	
3/7/2018			278	229			
6/19/2018	115	88.5			159	91.5	
6/20/2018			297	102			70.5
8/27/2018	83.6	85.4				80.7	63.9
8/28/2018					78.7		
8/29/2018			309	155			
3/18/2019	97.6						
3/19/2019		76.3				91.6	59.7
3/20/2019			290	118	142		
8/6/2019	132					83.8	59.5
8/7/2019		78.9	255	111	145		
4/7/2020	92.4	75.4	245	163	104	80.9	61
9/18/2020	77.7	74.2	244	134	101	75.5	52.1
4/5/2021	81.2	78.8	259	128	79.5	78.4	56.3
9/1/2021	78.3	80	270	125	93.5	79.4	56.1
4/20/2022	69.6	90.4	289	127	97.5	80.2	54
9/14/2022	76.8	82	301	132	88.2	79.6	54.5
4/10/2023						80.4	
4/11/2023	78.2		318	110	76		
4/12/2023		83.7					55.3
9/18/2023		84.7				79	56
9/19/2023	79.4		291	126	96		

Time Series

Constituent: Calcium (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	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				95.8	134	74.1
6/20/2018	88					
6/21/2018				91.4	147	80.1
8/27/2018	72.8					
8/28/2018				91.3		
8/29/2018					146	73.3
3/18/2019	75					
3/19/2019				99.7	134	73.2
8/6/2019	103					
8/7/2019				93.8	139	80.9
4/7/2020	94.3			89.6	117	85.1
9/18/2020	69.9	134	61	89	108	87.9
4/5/2021	74.6	130	57.6	94.1	104	87.6
9/1/2021	69	134	68.4	95.1	108	90.6
4/20/2022	62.8	121	29.6	106	117	96.5
9/14/2022	66.8	133	38.7	92.3	117	89
4/11/2023	78.6					
4/12/2023		141	26.8	91.3	107	95.4
9/19/2023	70.5					
9/20/2023		127	33.4	90.4	115	82.1

Time Series

Constituent: Chloride (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
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	30	
3/7/2018			37.4	24.2			
6/19/2018	14.9	<5			10.9	27.2	
6/20/2018			29	<5			15.9
8/27/2018	15.6	<5				29.8	14.2
8/28/2018					<5		
8/29/2018			33.1	10.1			
3/18/2019	16.1						
3/19/2019		<5				27.6	10.5
3/20/2019			25.8	8.54	8.3		
8/6/2019	17.1					26.9	13.8
8/7/2019		<5	22.1	9.91	14		
4/7/2020	17.2	<5	22.5	13	8.05	24.8	15.7
9/18/2020	14.7	<5	22.8	8.63	7.21	23.2	14.4
4/5/2021	22.3	<5	27.1	15	5.14	28.1	21.4
9/1/2021	16.3	<5	23.2	8.86	6.58	20	15.2
4/20/2022	15.8	<5	25.5	7.71	7.19	20.2	16.9
9/14/2022	16.7	<5	22.4	8.29	18	7.04	16.2
4/10/2023						18.2	
4/11/2023	17.9		20.3	7.3	5.93		
4/12/2023		5.86					17.7
9/18/2023		<5				18.4	19.2
9/19/2023	19.9		20.9	8.41	8.23		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Chloride (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	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				8.81	68.2	5.33
6/20/2018	19.9					
6/21/2018				15.3	65	<5
8/27/2018	18.1					
8/28/2018				19.4		
8/29/2018					70.8	<5
3/18/2019	17.3					
3/19/2019				16	55	<5
8/6/2019	22.4					
8/7/2019				15.6	64.1	<5
4/7/2020	24.8			14.8	44	12.2
9/18/2020	19.5	19.7	13.6	15.1	41	15.6
4/5/2021	28.9	21.1	10.4	22.9	42.7	19.3
9/1/2021	21.9	19.3	15	16.7	37.6	17.4
4/20/2022	19.9	19.9	19.1	20.8	38.1	14.2
9/14/2022	19.9	18.4	19	16.8	39	13.3
4/11/2023	23.4					
4/12/2023		3.83	2.45	18	38.7	15.4
9/19/2023	22.8					
9/20/2023		18.8	28.9	17.4	41.8	12.2

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Cobalt (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
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	0.00142	
3/7/2018			<0.0005	<0.0005			
5/14/2018						0.0012	
6/19/2018	<0.0005	0.00107			<0.0005	0.00129	
6/20/2018			<0.0005	<0.0005			0.00161
8/27/2018	<0.0005	0.00088				0.00149	0.00066
8/28/2018					<0.0005		
8/29/2018			<0.0005	<0.0005			
3/18/2019	0.00177						
3/19/2019		0.000783				<0.0005	0.00176
3/20/2019			<0.0005	<0.0005	<0.0005		
8/6/2019	0.00558					<0.0005	<0.0005
8/7/2019		0.000572	<0.0005	<0.0005	<0.0005		
4/7/2020	0.000517	0.000581	<0.0005	<0.0005	<0.0005	<0.0005	0.000817
9/18/2020	0.000738	0.000751	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/5/2021	0.000839	0.000752	<0.0005	<0.0005	<0.0005	<0.0005	0.000517
9/1/2021	0.00127	0.000576	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/20/2022	0.00143	0.00104	<0.0005	<0.0005	<0.0005	<0.0005	0.000561
9/14/2022	0.00164	0.00109	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/10/2023						<0.0005	
4/11/2023	0.0014		<0.0005	<0.0005	<0.0005		
4/12/2023		0.00142					<0.0005
9/18/2023		0.000995				<0.0005	<0.0005
9/19/2023	0.00126		<0.0005	<0.0005	<0.0005		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Cobalt (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	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				<0.0005	<0.0005	<0.0005
6/20/2018	<0.0005					
6/21/2018				<0.0005	<0.0005	<0.0005
8/27/2018	<0.0005					
8/28/2018				<0.0005		
8/29/2018					<0.0005	<0.0005
3/18/2019	<0.0005					
3/19/2019				<0.0005	<0.0005	<0.0005
8/6/2019	<0.0005					
8/7/2019				<0.0005	<0.0005	<0.0005
4/7/2020	<0.0005			<0.0005	<0.0005	<0.0005
9/18/2020	<0.0005	<0.0005	<0.0005	0.00147	<0.0005	<0.0005
4/5/2021	<0.0005	<0.0005	<0.0005	0.00132	<0.0005	<0.0005
9/1/2021	<0.0005	<0.0005	<0.0005	0.00335	<0.0005	<0.0005
4/20/2022	<0.0005	<0.0005	<0.0005	0.00135	<0.0005	<0.0005
9/14/2022	<0.0005	<0.0005	<0.0005	0.00459	<0.0005	<0.0005
4/11/2023	<0.0005					
4/12/2023		<0.0005	<0.0005	0.00271	<0.0005	<0.0005
9/19/2023	<0.0005					
9/20/2023		<0.0005	<0.0005	0.00374	<0.0005	<0.0005

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Copper (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
10/10/2016	<0.005	<0.005			<0.005		
10/11/2016			<0.005	<0.005			
8/7/2017	<0.005	<0.005					
8/8/2017			<0.005	<0.005	<0.005		
8/6/2019	<0.005					<0.005	<0.005
8/7/2019		<0.005	<0.005	<0.005	<0.005		
4/7/2020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/18/2020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/10/2023						<0.005	
4/11/2023	<0.005		<0.005	<0.005	<0.005		
4/12/2023		<0.005					<0.005
9/18/2023		<0.005				<0.005	<0.005
9/19/2023	<0.005		<0.005	<0.005	<0.005		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Copper (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	MW-4B	MW-5B	MW-6A
10/11/2016				<0.005	<0.005	<0.005
8/7/2017				<0.005		
8/8/2017					<0.005	<0.005
8/6/2019	<0.005					
8/7/2019				<0.005	<0.005	<0.005
4/7/2020	<0.005			<0.005	<0.005	<0.005
9/18/2020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/11/2023	<0.005					
4/12/2023		0.00512	<0.005	<0.005	<0.005	<0.005
9/19/2023	<0.005					
9/20/2023		<0.005	<0.005	<0.005	<0.005	<0.005

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Fluoride (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
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	<1	
3/7/2018			<1	<1			
6/19/2018	0.826	<1			<1	<1	
6/20/2018			0.684	<1			<1
8/27/2018	<1	<1				<1	<1
8/28/2018					<1		
8/29/2018			<1	<1			
3/18/2019	<1						
3/19/2019		<1				<1	<1
3/20/2019			<1	0.523	<1		
8/6/2019	0.643					0.507	<1
8/7/2019		0.596	<1	0.625	<1		
4/7/2020	0.864	<1	<1	<1	<1	<1	<1
9/18/2020	<1	<1	<1	<1	<1	<1	<1
4/5/2021	<1	<1	<1	0.516	<1	<1	<1
9/1/2021	<1	<1	<1	<1	<1	<1	<1
4/20/2022	<1	<1	<1	<1	<1	<1	<1
9/14/2022	<1	<1	<1	<1	<1	<1	<1
4/10/2023						<1	
4/11/2023	<1		<1	<1	<1		
4/12/2023		<1					<1
9/18/2023		<1				<1	<1
9/19/2023	<1		<1	<1	<1		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Fluoride (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	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
6/20/2018	0.653					
6/21/2018				<1	<1	<1
8/27/2018	<1					
8/28/2018				<1		
8/29/2018					<1	<1
3/18/2019	<1					
3/19/2019				0.771	<1	<1
8/6/2019	<1					
8/7/2019				0.525	<1	0.535
4/7/2020	<1			<1	<1	0.652
9/18/2020	<1	<1	<1	<1	<1	<1
4/5/2021	<1	<1	<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					
4/12/2023		<1	<1	<1	<1	<1
9/19/2023	<1					
9/20/2023		<1	<1	<1	<1	<1

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Iron (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
10/10/2016	<0.1	1.8			<0.1		
10/11/2016			<0.1	<0.1			
8/7/2017	<0.1	1.58					
8/8/2017			<0.1	<0.1	<0.1		
8/6/2019	<0.1					<0.1	0.231
8/7/2019		3.33	<0.1	<0.1	<0.1		
4/7/2020	<0.1	3.36	<0.1	<0.1	<0.1	<0.1	0.485
9/18/2020	<0.1	4.38	<0.1	<0.1	<0.1	<0.1	<0.1
4/5/2021	0.167	2.08	<0.1	<0.1	<0.1	<0.1	0.348
9/1/2021	0.141	4.37	<0.1	<0.1	<0.1	<0.1	0.136
4/20/2022	0.565	2.49	0.165	<0.1	<0.1	<0.1	0.492
9/14/2022	0.609	2.7	<0.1	<0.1	<0.1	<0.1	0.117
4/10/2023						<0.1	
4/11/2023	0.708		<0.1	<0.1	<0.1		
4/12/2023		1.09					0.21
9/18/2023		2.45				<0.1	<0.1
9/19/2023	0.451		<0.1	<0.1	<0.1		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Iron (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	MW-4B	MW-5B	MW-6A
10/11/2016				1.5	2.49	3.12
8/7/2017				1.68		
8/8/2017					2.51	3.09
8/6/2019	<0.1					
8/7/2019				1.61	2.6	3.39
4/7/2020	<0.1			5.55	1.88	3.47
9/18/2020	<0.1	<0.1	<0.1	0.895	1.86	3.45
4/5/2021	<0.1	<0.1	<0.1	<0.1	1.85	3.57
9/1/2021	<0.1	<0.1	0.11	<0.1	2.21	3.83
4/20/2022	<0.1	<0.1	0.281	<0.1	1.99	3.61
9/14/2022	<0.1	<0.1	0.594	0.25	2.03	3.43
4/11/2023	<0.1					
4/12/2023		0.456	0.338	0.423	1.83	3.43
9/19/2023	<0.1					
9/20/2023		<0.1	<0.1	0.559	2.18	3.09

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Lead (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
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	<0.0005	
3/7/2018			<0.0005	<0.0005			
6/19/2018	<0.0005	<0.0005			0.000633	<0.0005	
6/20/2018			<0.0005	<0.0005			0.00151
8/27/2018	<0.0005	<0.0005				<0.0005	0.000626
8/28/2018					<0.0005		
8/29/2018			<0.0005	<0.0005			
3/18/2019	<0.0005						
3/19/2019		<0.0005				<0.0005	0.00204
3/20/2019			<0.0005	<0.0005	<0.0005		
8/6/2019	<0.0005					<0.0005	0.000663
8/7/2019		<0.0005	<0.0005	<0.0005	<0.0005		
4/7/2020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00116
9/18/2020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/5/2021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000624
9/1/2021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/20/2022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000596
9/14/2022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/10/2023						<0.0005	
4/11/2023	<0.0005		<0.0005	<0.0005	<0.0005		
4/12/2023		<0.0005					<0.0005
9/18/2023		<0.0005				<0.0005	<0.0005
9/19/2023	<0.0005		<0.0005	<0.0005	<0.0005		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Lead (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	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
6/20/2018	<0.0005					
6/21/2018				<0.0005	<0.0005	<0.0005
8/27/2018	<0.0005					
8/28/2018				<0.0005		
8/29/2018					<0.0005	<0.0005
3/18/2019	<0.0005					
3/19/2019				<0.0005	<0.0005	<0.0005
8/6/2019	<0.0005					
8/7/2019				<0.0005	<0.0005	<0.0005
4/7/2020	<0.0005			<0.0005	<0.0005	<0.0005
9/18/2020	<0.0005	<0.0005	<0.0005	0.000532	<0.0005	<0.0005
4/5/2021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
9/1/2021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/20/2022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
9/14/2022	<0.0005	<0.0005	0.000536	<0.0005	<0.0005	<0.0005
4/11/2023	<0.0005					
4/12/2023		<0.0005	0.000528	<0.0005	<0.0005	<0.0005
9/19/2023	<0.0005					
9/20/2023		<0.0005	<0.0005	0.000576	0.000627	<0.0005

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Magnesium (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
10/10/2016	44.1	33.8			76.6		
10/11/2016			122	79.3			
8/7/2017	36.4	37.8					
8/8/2017			124	86	72.1		
8/6/2019	50.1					33	24.7
8/7/2019		30	103	46.9	62.5		
4/7/2020	37.1	31.4	102	71	46.9	34.5	28.5
9/18/2020	31.8	31.9	104	59	45.6	31.1	24.3
4/5/2021	31.8	32.2	116	55.4	34.9	31	25.3
9/1/2021	31	31.3	119	54	40.8	31.4	24.8
4/20/2022	27.7	35	120	56	40.2	29.6	23.3
9/14/2022	30.1	33.3	122	56.1	39.1	31.8	24.6
4/10/2023						31.5	
4/11/2023	31.1		122	48.7	33		
4/12/2023		34.5					24.4
9/18/2023		34.7				32	25.4
9/19/2023	31.5		122	54	42.8		

Time Series

Constituent: Magnesium (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	MW-4B	MW-5B	MW-6A
10/11/2016				31.4	42	23.5
8/7/2017				33.4		
8/8/2017					43.8	24.7
8/6/2019	44.2					
8/7/2019				34	42.8	25.4
4/7/2020	43			34	39.6	29.4
9/18/2020	32	53.4	29.2	33.2	36.6	28.5
4/5/2021	33	49.5	10.7	34.3	35.7	28.8
9/1/2021	30.3	50.8	28.4	35.6	35.2	29.6
4/20/2022	28.3	46.4	12.9	35.1	35	28.6
9/14/2022	29.1	49.9	17.3	33.6	36.8	29.4
4/11/2023	34.7					
4/12/2023		52.3	11.9	33.9	34.8	31.2
9/19/2023	29.9					
9/20/2023		48.9	15.5	33.6	37.6	27.2

Time Series

Constituent: Manganese (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
10/10/2016	0.28	0.151			<0.01		
10/11/2016			<0.01	<0.01			
8/7/2017	0.237	0.166					
8/8/2017			<0.01	<0.01	<0.01		
8/6/2019	0.758					1.74	0.0443
8/7/2019		0.177	<0.01	<0.01	<0.01		
4/7/2020	0.119	0.184	<0.01	<0.01	<0.01	0.0896	0.0718
9/18/2020	0.652	0.251	<0.01	<0.01	<0.01	1.36	0.0127
4/5/2021	0.185	0.199	<0.01	<0.01	<0.01	0.175	0.0634
9/1/2021	0.663	0.221	<0.01	<0.01	<0.01	1.27	0.0444
4/20/2022	0.411	0.231	0.0264	<0.01	<0.01	0.106	0.0588
9/14/2022	0.749	0.31	<0.01	<0.01	<0.01	0.795	0.0222
4/10/2023						0.0633	
4/11/2023	0.309		<0.01	<0.01	<0.01		
4/12/2023		0.396					0.0372
9/18/2023		0.266				0.767	0.0169
9/19/2023	0.37		<0.01	<0.01	<0.01		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Manganese (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	MW-4B	MW-5B	MW-6A
10/11/2016				0.133	0.69	0.0818
8/7/2017				0.132		
8/8/2017					0.689	0.0802
8/6/2019	0.0223					
8/7/2019				0.145	0.784	0.0941
4/7/2020	0.0156			0.13	0.492	0.103
9/18/2020	<0.01	0.0501	0.0345	0.686	0.546	0.113
4/5/2021	<0.01	0.0395	0.0278	1.39	0.467	0.109
9/1/2021	0.0126	0.0629	0.0375	1.39	0.512	0.117
4/20/2022	<0.01	0.019	0.0722	0.91	0.454	0.112
9/14/2022	<0.01	0.0917	0.0406	0.871	0.532	0.112
4/11/2023	0.0144					
4/12/2023		0.0983	0.0378	0.51	0.453	0.113
9/19/2023	0.0183					
9/20/2023		0.111	0.0231	0.612	0.594	0.0995

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Molybdenum (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
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	0.00568	
3/7/2018			<0.002	<0.002			
5/14/2018	<0.002					0.00385	
6/19/2018	<0.002	<0.002			0.00383	0.00423	
6/20/2018			<0.002	<0.002			0.00822
8/27/2018	0.00224	0.0022				0.00424	0.00617
8/28/2018					<0.002		
8/29/2018			<0.002	<0.002			
3/18/2019	<0.002						
3/19/2019		0.00341				0.00263	<0.002
3/20/2019			<0.002	<0.002	<0.002		
8/6/2019	<0.002					0.00574	<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	0.00297	<0.002
9/18/2020	<0.002	<0.002	<0.002	<0.002	<0.002	0.00529	<0.002
4/5/2021	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
9/1/2021	0.00218	0.00217	<0.002	<0.002	<0.002	0.00558	<0.002
4/20/2022	<0.002	<0.002	<0.002	<0.002	<0.002	0.0042	<0.002
9/14/2022	<0.002	<0.002	<0.002	<0.002	<0.002	0.00446	<0.002
4/10/2023						0.00364	
4/11/2023	<0.002		<0.002	<0.002	<0.002		
4/12/2023		<0.002					<0.002
9/18/2023		<0.002				0.00661	<0.002
9/19/2023	<0.002		<0.002	<0.002	<0.002		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Molybdenum (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	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
6/20/2018	0.00447					
6/21/2018				<0.002	<0.002	<0.002
8/27/2018	<0.002					
8/28/2018				<0.002		
8/29/2018					<0.002	<0.002
3/18/2019	<0.002					
3/19/2019				<0.002	0.00212	<0.002
8/6/2019	<0.002					
8/7/2019				<0.002	<0.002	<0.002
4/7/2020	<0.002			<0.002	<0.002	<0.002
9/18/2020	<0.002	<0.002	<0.002	0.00296	<0.002	<0.002
4/5/2021	<0.002	0.00239	<0.002	<0.002	<0.002	<0.002
9/1/2021	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
4/20/2022	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
9/14/2022	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
4/11/2023	<0.002					
4/12/2023		<0.002	<0.002	<0.002	<0.002	<0.002
9/19/2023	<0.002					
9/20/2023		<0.002	<0.002	<0.002	<0.002	<0.002

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Nickel (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
10/10/2016	<0.005	<0.005			0.00799		
10/11/2016			<0.005	<0.005			
8/7/2017	<0.005	<0.005					
8/8/2017			<0.005	<0.005	0.00699		
8/6/2019	<0.005					<0.005	<0.005
8/7/2019		<0.005	<0.005	<0.005	0.0079		
4/7/2020	<0.005	<0.005	<0.005	<0.005	0.00576	<0.005	<0.005
9/18/2020	0.00628	<0.005	<0.005	<0.005	0.00604	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	<0.005	0.00518	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/10/2023						<0.005	
4/11/2023	<0.005		<0.005	<0.005	<0.005		
4/12/2023		<0.005					<0.005
9/18/2023		<0.005				<0.005	<0.005
9/19/2023	<0.005		<0.005	<0.005	<0.005		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Nickel (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	MW-4B	MW-5B	MW-6A
10/11/2016				<0.005	<0.005	<0.005
8/7/2017				<0.005		
8/8/2017					<0.005	<0.005
8/6/2019	<0.005					
8/7/2019				<0.005	<0.005	<0.005
4/7/2020	<0.005			<0.005	<0.005	<0.005
9/18/2020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	0.00578	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	0.00503	<0.005	<0.005
4/11/2023	<0.005					
4/12/2023		<0.005	<0.005	0.0051	<0.005	<0.005
9/19/2023	<0.005					
9/20/2023		<0.005	<0.005	<0.005	<0.005	<0.005

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Selenium (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
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	<0.005	
3/7/2018			<0.005	0.00502			
6/19/2018	<0.005	<0.005			0.00939	<0.005	
6/20/2018			0.00739	<0.005			<0.005
8/27/2018	<0.005	<0.005				<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				<0.005	<0.005
3/20/2019			0.00569	<0.005	0.0102		
8/6/2019	<0.005					<0.005	<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	<0.005	<0.005
9/18/2020	<0.005	<0.005	<0.005	<0.005	0.00762	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	<0.005	0.00617	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	<0.005	0.00634	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/10/2023						<0.005	
4/11/2023	<0.005		<0.005	<0.005	<0.005		
4/12/2023		<0.005					<0.005
9/18/2023		<0.005				<0.005	<0.005
9/19/2023	<0.005		<0.005	<0.005	0.0053		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Selenium (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	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
6/20/2018	<0.005					
6/21/2018				<0.005	<0.005	<0.005
8/27/2018	<0.005					
8/28/2018				<0.005		
8/29/2018					<0.005	<0.005
3/18/2019	<0.005					
3/19/2019				<0.005	<0.005	<0.005
8/6/2019	<0.005					
8/7/2019				<0.005	<0.005	<0.005
4/7/2020	<0.005			<0.005	<0.005	<0.005
9/18/2020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/11/2023	<0.005					
4/12/2023		<0.005	<0.005	<0.005	<0.005	<0.005
9/19/2023	<0.005					
9/20/2023		<0.005	<0.005	<0.005	<0.005	<0.005

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Strontium (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
10/10/2016	0.338	0.156			0.291		
10/11/2016			0.279	0.185			
8/7/2017	0.243	0.165					
8/8/2017			0.257	0.178	0.256		
8/6/2019	0.323					0.133	0.0872
8/7/2019		0.199	0.274	0.134	0.263		
4/7/2020	0.233	0.19	0.246	0.154	0.175	0.129	0.0661
9/18/2020	0.176	0.19	0.259	0.153	0.184	0.108	0.0602
4/5/2021	0.188	0.179	0.261	0.133	0.148	0.13	0.0639
9/1/2021	0.172	0.227	0.282	0.136	0.178	0.115	0.068
4/20/2022	0.164	0.173	0.247	0.149	0.169	0.127	0.0595
9/14/2022	0.16	0.191	0.266	0.127	0.155	0.111	0.0592
4/10/2023						0.137	
4/11/2023	0.148		0.293	0.0985	0.153		
4/12/2023		0.178					0.0526
9/18/2023		0.207				0.101	0.0601
9/19/2023	0.151		0.282	0.113	0.164		

Time Series

Constituent: Strontium (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	MW-4B	MW-5B	MW-6A
10/11/2016				0.103	0.193	0.156
8/7/2017				0.11		
8/8/2017					0.197	0.161
8/6/2019	0.123					
8/7/2019				0.115	0.208	0.178
4/7/2020	0.109			0.103	0.166	0.173
9/18/2020	0.0824	0.174	0.106	0.146	0.167	0.187
4/5/2021	0.0899	0.159	0.0986	0.129	0.163	0.188
9/1/2021	0.085	0.159	0.128	0.14	0.17	0.204
4/20/2022	0.0802	0.145	0.0575	0.122	0.168	0.194
9/14/2022	0.0746	0.145	0.0659	0.101	0.167	0.184
4/11/2023	0.0795					
4/12/2023		0.133	0.0512	0.091	0.149	0.194
9/19/2023	0.0768					
9/20/2023		0.135	0.0752	0.0958	0.163	0.165

Time Series

Constituent: Sulfate (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
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	123	
3/7/2018			1110	824			
6/19/2018	136	37.3			489	134	
6/20/2018			1090	210			38.4
8/27/2018	94.7	34.3				125	31.7
8/28/2018					96.6		
8/29/2018			1070	400			
3/18/2019	223						
3/19/2019		42.8				134	26.2
3/20/2019			1050	351	442		
8/6/2019	276					139	29.7
8/7/2019		28.8	837	327	529		
4/7/2020	123	18.6	888	496	373	143	25.5
9/18/2020	100	36.5	924	403	356	151	25.8
4/5/2021	99.7	27.6	952	338	237	154	35.5
9/1/2021	82.7	32.3	1010	333	303	154	25.8
4/20/2022	72.8	48.3	1030	297	293	158	25.4
9/14/2022	67.1	31.2	978	319	151	220	23
4/10/2023						147	
4/11/2023	72.2		1150	254	215		
4/12/2023		39.8					25
9/18/2023		57.4				208	28.6
9/19/2023	94.2		1440	365	303		

Time Series

Constituent: Sulfate (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	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				162	122	<5
6/20/2018	101					
6/21/2018				51.3	119	<5
8/27/2018	70					
8/28/2018				52.2		
8/29/2018					120	<5
3/18/2019	90.8					
3/19/2019				48	85	<5
8/6/2019	169					
8/7/2019				47	112	<5
4/7/2020	164			41.5	58.9	13.6
9/18/2020	81	376	119	46.9	61.9	19.1
4/5/2021	91.2	341	7.63	60.1	57.4	27.3
9/1/2021	59.3	358	111	50.2	53.7	22.7
4/20/2022	48.5	322	30.7	58.4	44.7	18.9
9/14/2022	44.5	313	38.2	49.5	49.9	16.4
4/11/2023	87.8					
4/12/2023		72.5	5.13	54	45.8	20.5
9/19/2023	62.9					
9/20/2023		380	27	53.1	53.4	10.1

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Vanadium (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
10/10/2016	<0.005	<0.005			<0.005		
10/11/2016			<0.005	<0.005			
8/7/2017	<0.005	<0.005					
8/8/2017			<0.005	<0.005	<0.005		
8/6/2019	<0.005					<0.005	<0.005
8/7/2019		<0.005	<0.005	<0.005	<0.005		
4/7/2020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/18/2020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/10/2023						<0.005	
4/11/2023	<0.005		<0.005	<0.005	<0.005		
4/12/2023		<0.005					<0.005
9/18/2023		<0.005				<0.005	<0.005
9/19/2023	<0.005		<0.005	<0.005	<0.005		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Vanadium (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	MW-4B	MW-5B	MW-6A
10/11/2016				<0.005	<0.005	<0.005
8/7/2017				<0.005		
8/8/2017					<0.005	<0.005
8/6/2019	<0.005					
8/7/2019				<0.005	<0.005	<0.005
4/7/2020	<0.005			<0.005	<0.005	<0.005
9/18/2020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/11/2023	<0.005					
4/12/2023		<0.005	<0.005	<0.005	<0.005	<0.005
9/19/2023	<0.005					
9/20/2023		<0.005	<0.005	<0.005	<0.005	<0.005

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Zinc (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21	MW-22 (bg)	MW-23 (bg)
10/10/2016	<0.02	<0.02			<0.02		
10/11/2016			<0.02	<0.02			
8/7/2017	<0.02	<0.02					
8/8/2017			<0.02	<0.02	<0.02		
8/6/2019	<0.02					<0.02	<0.02
8/7/2019		<0.02	<0.02	<0.02	<0.02		
4/7/2020	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
9/18/2020	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
4/5/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
9/1/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
4/20/2022	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
9/14/2022	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
4/10/2023						<0.02	
4/11/2023	<0.02		<0.02	<0.02	<0.02		
4/12/2023		<0.02					<0.02
9/18/2023		<0.02				<0.02	<0.02
9/19/2023	<0.02		<0.02	<0.02	<0.02		

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Zinc (mg/L) Analysis Run 11/9/2023 7:59 AM View: State Wells Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	MW-26	MW-27	MW-4B	MW-5B	MW-6A
10/11/2016				<0.02	<0.02	<0.02
8/7/2017				<0.02		
8/8/2017					<0.02	<0.02
8/6/2019	<0.02					
8/7/2019				<0.02	<0.02	<0.02
4/7/2020	<0.02			<0.02	<0.02	<0.02
9/18/2020	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
4/5/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
9/1/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
4/20/2022	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
9/14/2022	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
4/11/2023	<0.02					
4/12/2023		<0.02	<0.02	<0.02	<0.02	<0.02
9/19/2023	<0.02					
9/20/2023		<0.02	<0.02	<0.02	<0.02	<0.02

ND substitution: RL or RL/2 if <15% NDs.

Surface Water Wells Time Series

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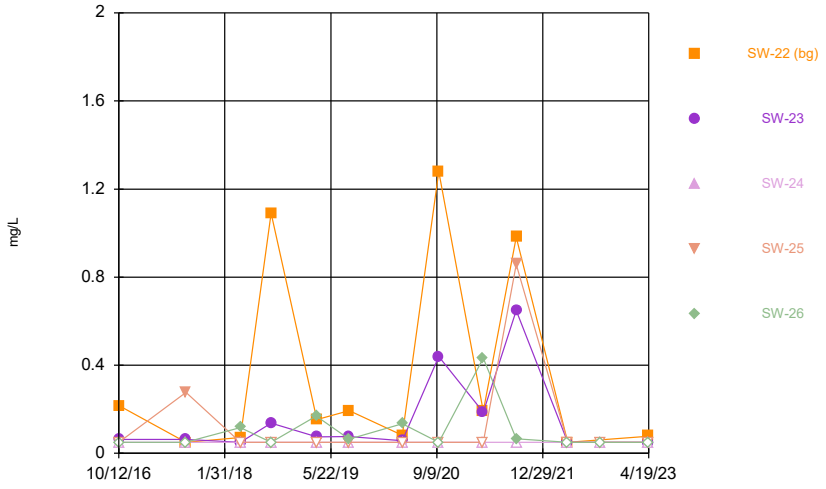
Hollow symbols indicate censored values.

Time Series



Constituent: Aluminum Analysis Run 11/9/2023 9:43 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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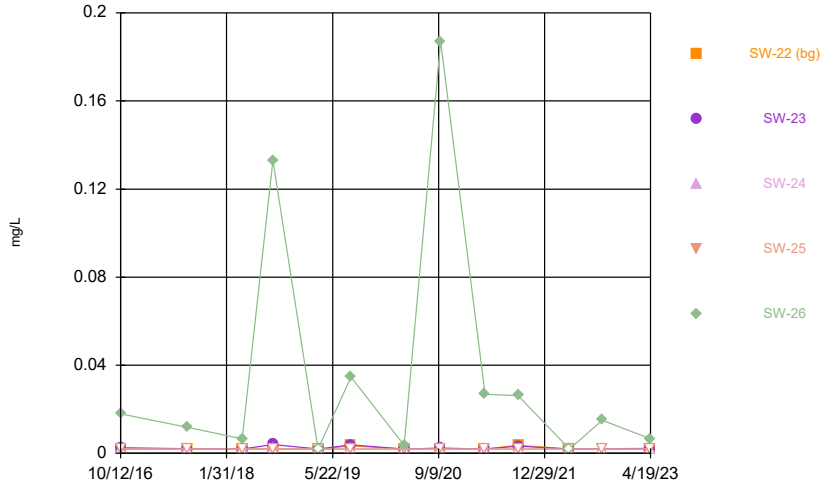
Time Series



Constituent: Arsenic Analysis Run 11/9/2023 9:43 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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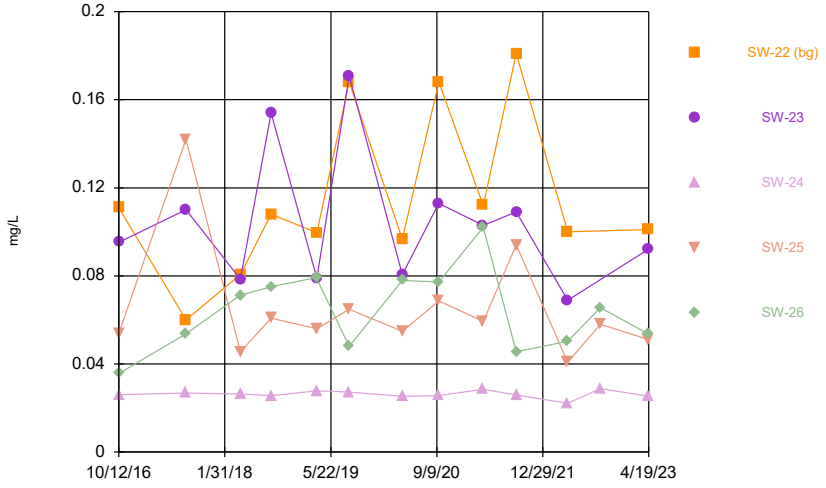
Time Series



Constituent: Barium Analysis Run 11/9/2023 9:43 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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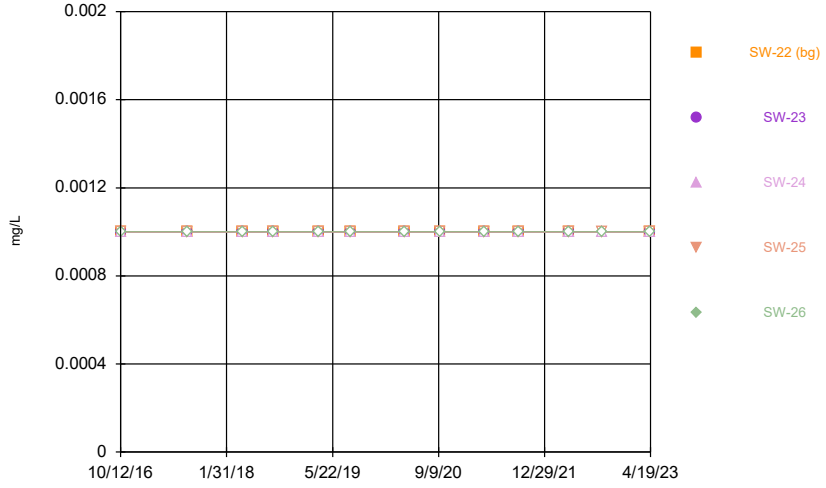
Time Series



Constituent: Beryllium Analysis Run 11/9/2023 9:43 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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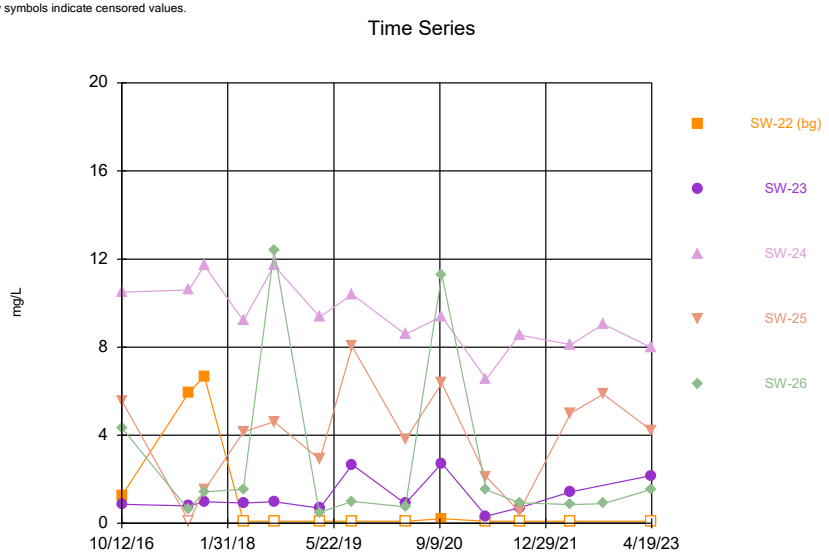
Hollow symbols indicate censored values.



Constituent: Boron Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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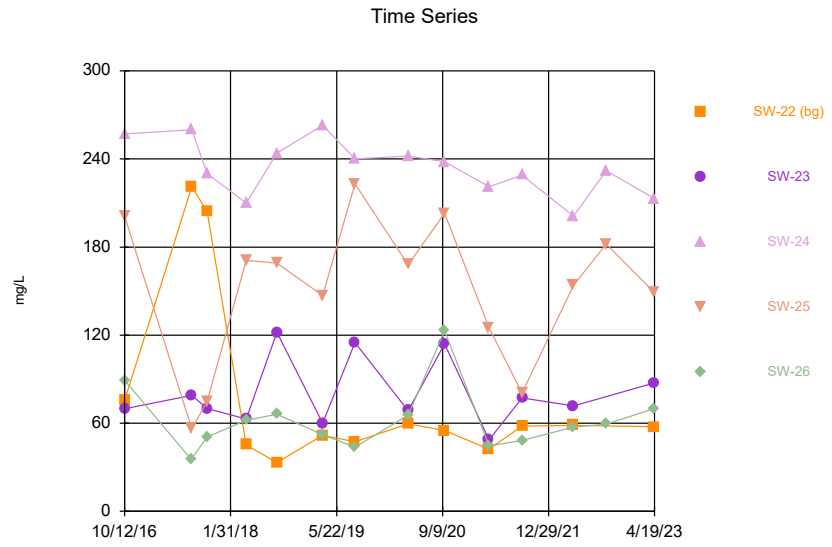

Constituent: Calcium Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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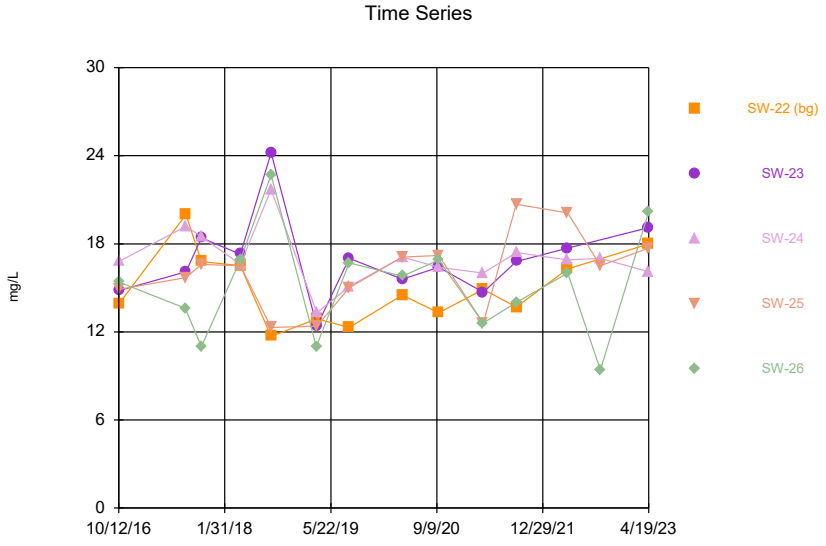

Constituent: Chloride Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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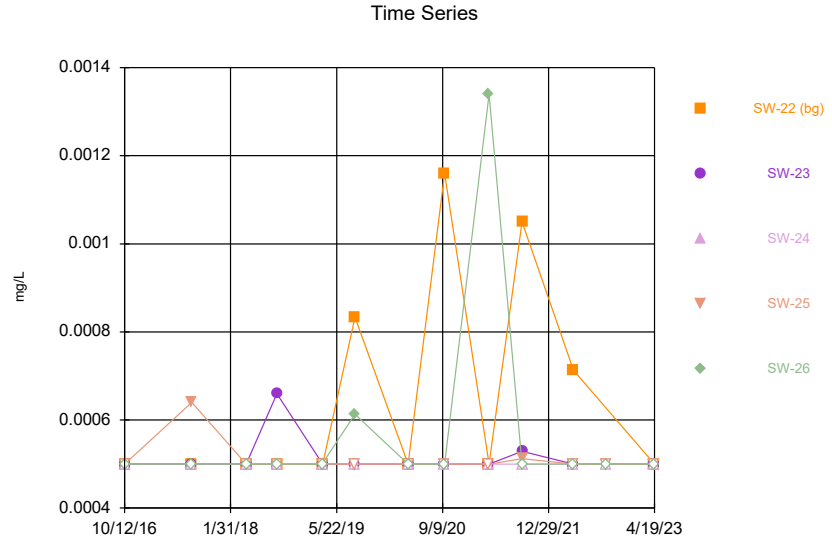
Hollow symbols indicate censored values.



Constituent: Cobalt Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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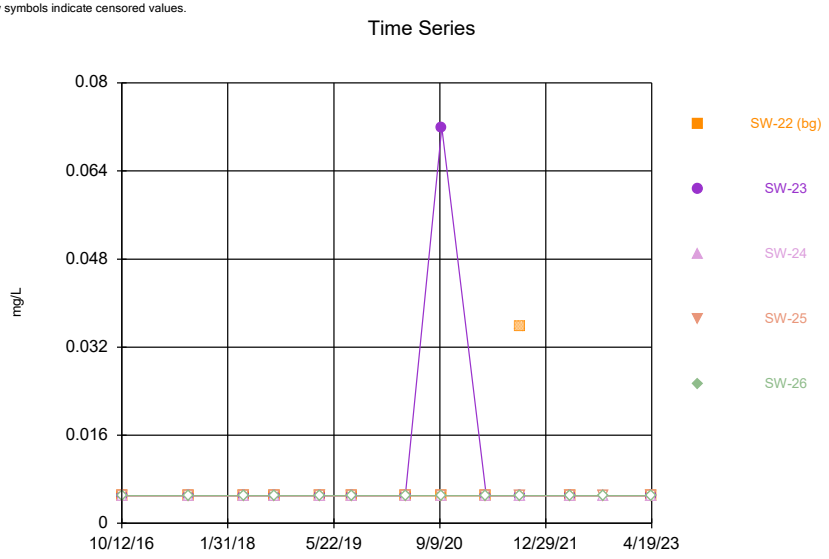
Hollow symbols indicate censored values.



Constituent: Copper Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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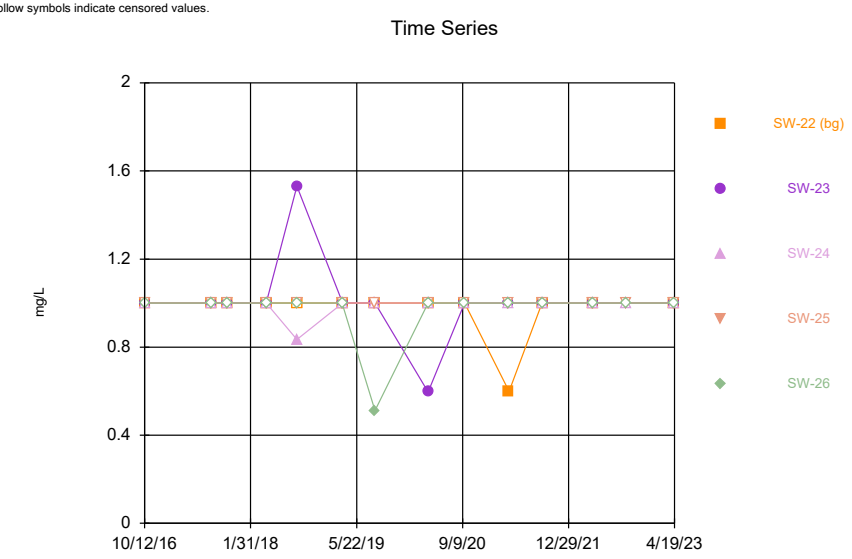
Hollow symbols indicate censored values.



Constituent: Fluoride Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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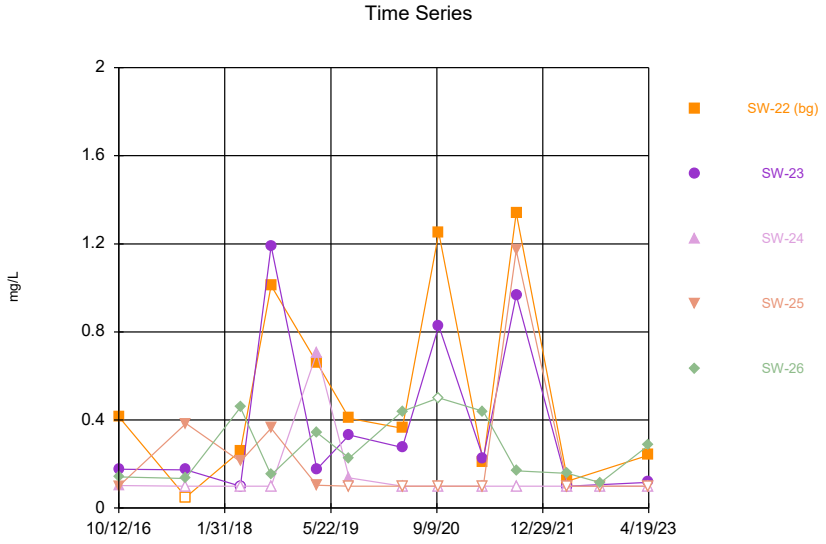
Hollow symbols indicate censored values.



Constituent: Iron Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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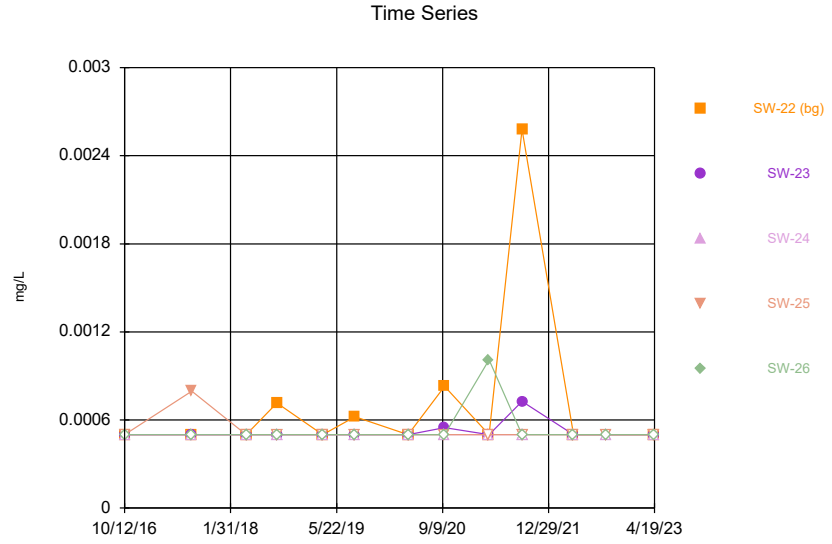
Hollow symbols indicate censored values.



Constituent: Lead Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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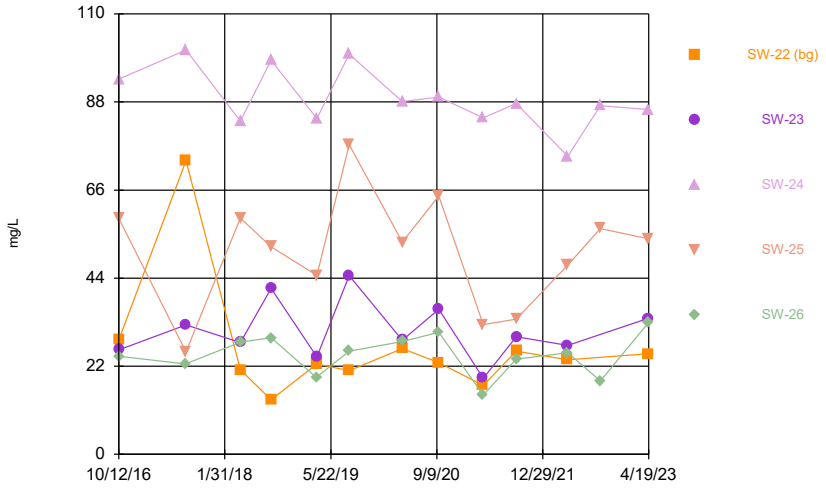
Time Series



Constituent: Magnesium Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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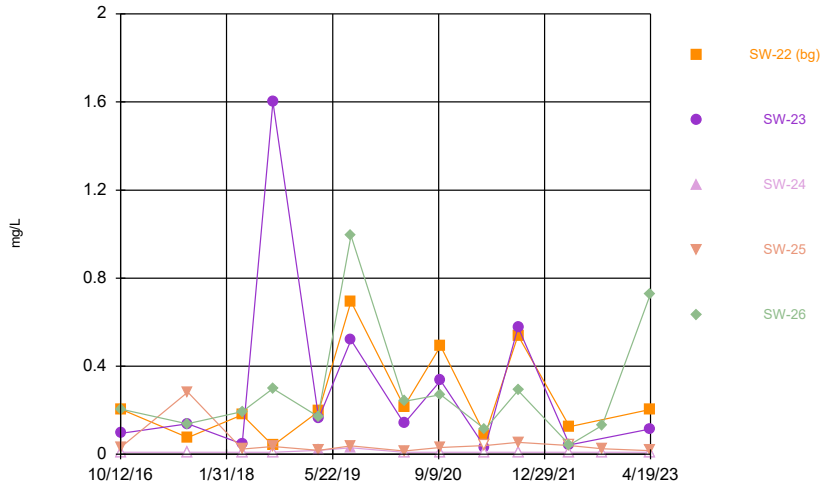
Hollow symbols indicate censored values.

Time Series



Constituent: Manganese Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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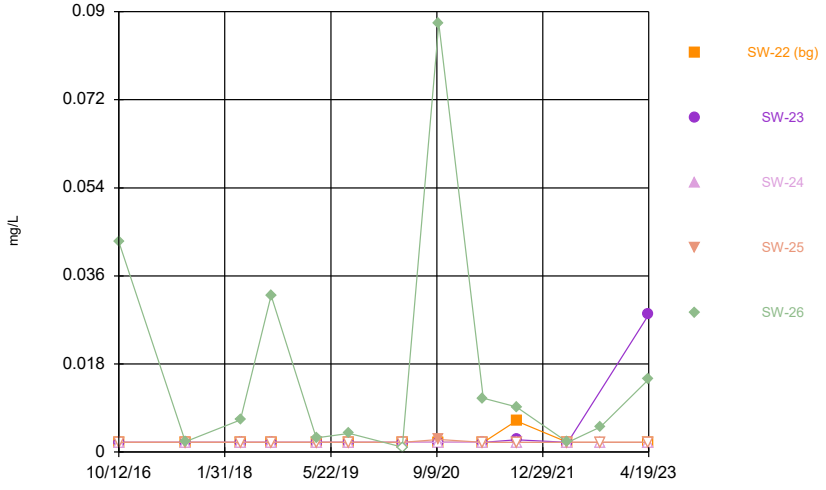
Hollow symbols indicate censored values.

Time Series



Constituent: Molybdenum Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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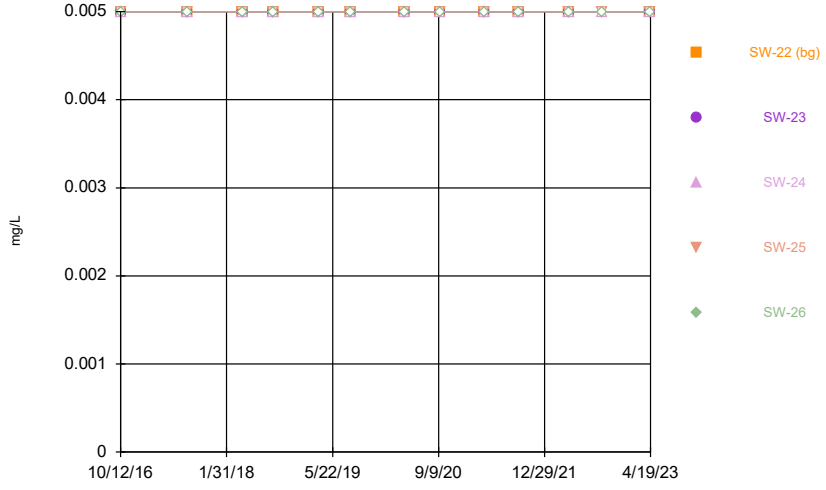
Time Series



Constituent: Nickel Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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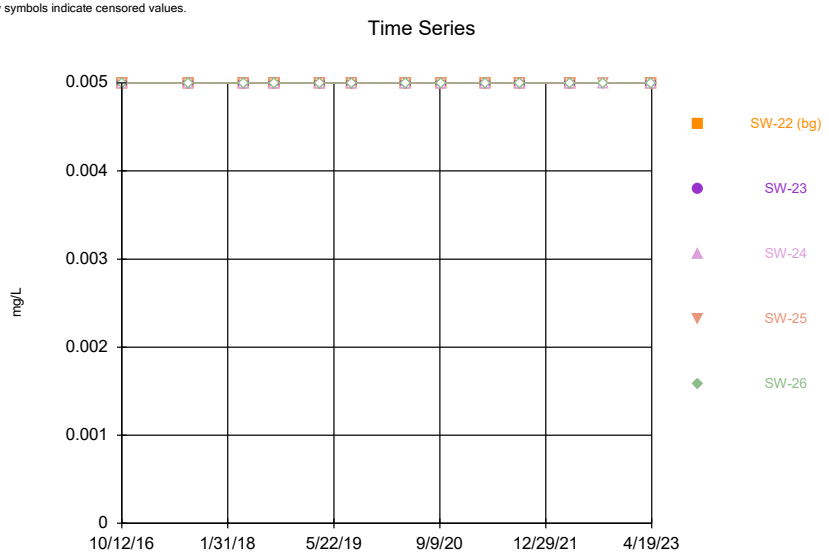
Hollow symbols indicate censored values.



Constituent: Selenium Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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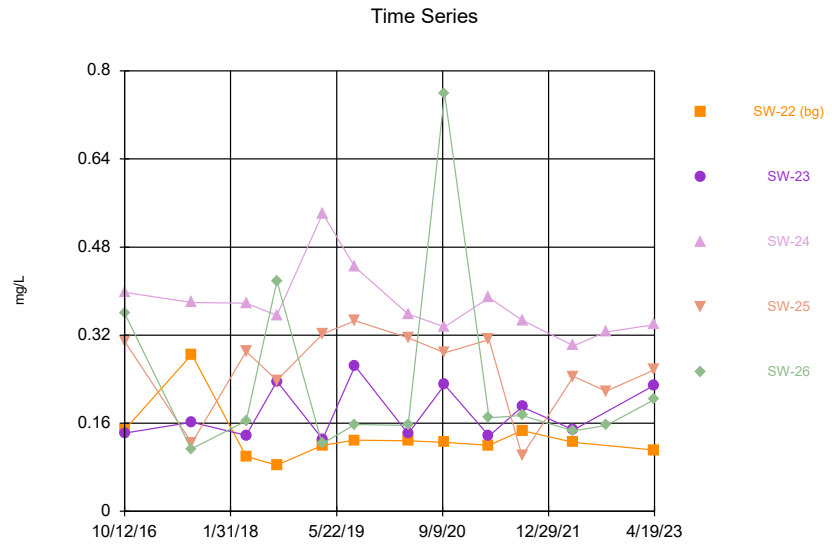

Constituent: Strontium Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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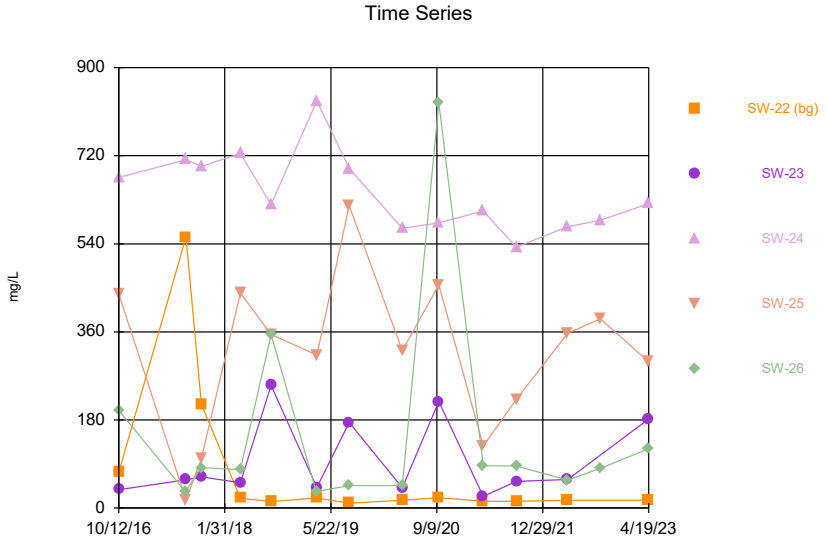

Constituent: Sulfate Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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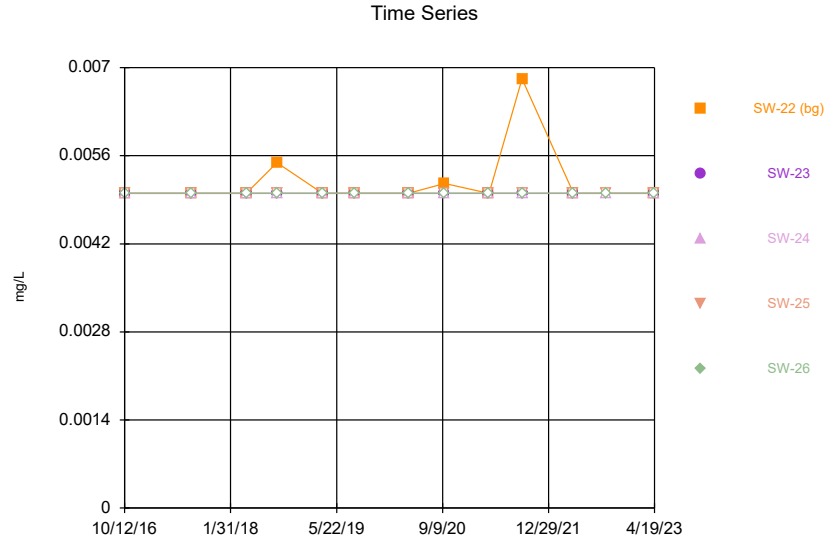
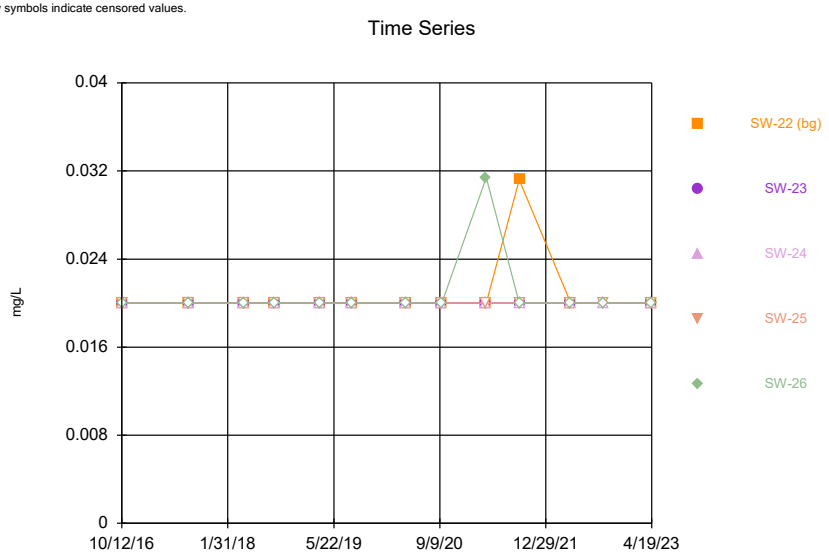
Hollow symbols indicate censored values.



Constituent: Vanadium Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.



Constituent: Zinc Analysis Run 11/9/2023 9:44 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Time Series

Constituent: Aluminum (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	0.217	0.0624	<0.05	<0.05	<0.05
8/7/2017					<0.05
8/9/2017	<0.05	0.0626	<0.05	0.276	
4/11/2018	0.0713	<0.05	<0.05	<0.05	0.117
8/27/2018	1.09	0.137	<0.05	<0.05	<0.05
3/18/2019					0.169
3/20/2019	0.153	0.0744	<0.05	<0.05	
8/13/2019	0.194	0.0761	<0.05	<0.05	0.0646
4/7/2020	0.0821	0.0578	<0.05	<0.05	0.134
9/18/2020	1.28	0.44	<0.05	<0.05	<0.05
4/5/2021	0.191	0.187	<0.05	<0.05	0.432
9/1/2021	0.982	0.648	<0.05	0.858	0.0654
4/20/2022	<0.05	<0.05	<0.05	<0.05	<0.05
9/14/2022			<0.05	<0.05	<0.05
4/19/2023	0.0782	<0.05	<0.05	<0.05	<0.05

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Arsenic (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	<0.002	0.00257	<0.002	<0.002	0.018
8/7/2017					0.0118
8/9/2017	<0.002	0.00211	<0.002	<0.002	
4/11/2018	<0.002	<0.002	<0.002	<0.002	0.00661
8/27/2018	<0.002	0.00401	<0.002	<0.002	0.133
3/18/2019					<0.002
3/20/2019	<0.002	<0.002	<0.002	<0.002	
8/13/2019	0.00342	0.00378	<0.002	<0.002	0.0347
4/7/2020	<0.002	<0.002	<0.002	<0.002	0.00368
9/18/2020	0.00217	0.00236	<0.002	<0.002	0.187
4/5/2021	<0.002	<0.002	<0.002	<0.002	0.0268
9/1/2021	0.00367	0.00332	<0.002	<0.002	0.0262
4/20/2022	<0.002	<0.002	<0.002	<0.002	<0.002
9/14/2022			<0.002	<0.002	0.0151
4/19/2023	<0.002	0.00221	<0.002	<0.002	0.00664

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Barium (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	0.111	0.0953	0.0261	0.0538	0.0357
8/7/2017					0.0535
8/9/2017	0.0601	0.11	0.0268	0.142	
4/11/2018	0.0806	0.0785	0.0264	0.0456	0.0712
8/27/2018	0.108	0.154	0.0256	0.0608	0.0751
3/18/2019					0.0793
3/20/2019	0.0996	0.079	0.0278	0.056	
8/13/2019	0.168	0.171	0.0272	0.0648	0.048
4/7/2020	0.0967	0.0806	0.0254	0.0548	0.078
9/18/2020	0.168	0.113	0.0257	0.0686	0.0772
4/5/2021	0.112	0.103	0.0285	0.0594	0.102
9/1/2021	0.181	0.109	0.0259	0.0941	0.0455
4/20/2022	0.1	0.0689	0.0222	0.0407	0.0503
9/14/2022			0.0288	0.058	0.0656
4/19/2023	0.101	0.0922	0.0253	0.051	0.0536

Time Series

Constituent: Beryllium (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	<0.001	<0.001	<0.001	<0.001	<0.001
8/7/2017					<0.001
8/9/2017	<0.001	<0.001	<0.001	<0.001	
4/11/2018	<0.001	<0.001	<0.001	<0.001	<0.001
8/27/2018	<0.001	<0.001	<0.001	<0.001	<0.001
3/18/2019					<0.001
3/20/2019	<0.001	<0.001	<0.001	<0.001	
8/13/2019	<0.001	<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
4/19/2023	<0.001	<0.001	<0.001	<0.001	<0.001

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Boron (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	1.25	0.869	10.5	5.57	4.33
8/7/2017					0.631
8/9/2017	5.95	0.789	10.6	<0.2	
10/17/2017	6.67	0.981	11.7	1.51	1.43
4/11/2018	<0.1	0.922	9.21	4.15	1.54
8/27/2018	<0.1	0.983	11.7	4.61	12.4
3/18/2019					0.486
3/20/2019	<0.1	0.693	9.36	2.9	
8/13/2019	<0.1	2.66	10.4	8.03	1
4/7/2020	<0.1	0.898	8.58	3.8	0.745
9/18/2020	0.206	2.72	9.39	6.36	11.3
4/5/2021	<0.1	0.32	6.55	2.11	1.52
9/1/2021	<0.1	0.704	8.55	0.528	0.941
4/20/2022	<0.1	1.43	8.12	5	0.855
9/14/2022			9.05	5.86	0.892
4/19/2023	<0.1	2.17	7.97	4.2	1.54

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Calcium (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	75.5	69.8	257	201	89.3
8/7/2017					35.5
8/9/2017	221	79.1	260	56.3	
10/17/2017	204	70	230	74.8	50.6
4/11/2018	45.2	62.9	210	171	62.1
8/27/2018	33.3	122	244	169	66.1
3/18/2019					52.4
3/20/2019	51.8	60.1	263	147	
8/13/2019	47.4	115	240	223	43.6
4/7/2020	59.6	68.6	242	168	65.5
9/18/2020	55.1	114	238	203	123
4/5/2021	42.4	48.7	221	125	44.5
9/1/2021	58.1	77.3	229	80.5	48.3
4/20/2022	58.6	71.7	201	154	57.4
9/14/2022			232	182	59.4
4/19/2023	57.6	87.6	213	149	70

Time Series

Constituent: Chloride (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	13.9	14.8	16.8	14.9	15.4
8/7/2017					13.6
8/9/2017	20	16.1	19.2	15.7	
10/17/2017	16.8	18.4	18.5	16.6	11
4/11/2018	16.5	17.3	16.6	16.5	16.9
8/27/2018	11.7	24.2	21.7	12.3	22.7
3/18/2019					11
3/20/2019	12.9	12.4	13.3	12.4	
8/13/2019	12.3	17	15.1	15	16.7
4/7/2020	14.5	15.6	17.1	17.1	15.8
9/18/2020	13.3	16.4	16.4	17.2	16.9
4/5/2021	14.9	14.7	16	12.6	12.6
9/1/2021	13.7	16.8	17.4	20.7	14
4/20/2022	16.3	17.7	16.9	20.1	16
9/14/2022			17	16.5	9.4
4/19/2023	18	19.1	16.1	17.7	20.2

Time Series

Constituent: Cobalt (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8/7/2017					<0.0005
8/9/2017	<0.0005	<0.0005	<0.0005	0.00064	
4/11/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8/27/2018	<0.0005	0.00066	<0.0005	<0.0005	<0.0005
3/18/2019					<0.0005
3/20/2019	<0.0005	<0.0005	<0.0005	<0.0005	
8/13/2019	0.000833	<0.0005	<0.0005	<0.0005	0.000613
4/7/2020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
9/18/2020	0.00116	<0.0005	<0.0005	<0.0005	<0.0005
4/5/2021	<0.0005	<0.0005	<0.0005	<0.0005	0.00134
9/1/2021	0.00105	0.000529	<0.0005	0.000512	<0.0005
4/20/2022	0.000713	<0.0005	<0.0005	<0.0005	<0.0005
9/14/2022			<0.0005	<0.0005	<0.0005
4/19/2023	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Copper (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	<0.005	<0.005	<0.005	<0.005	<0.005
8/7/2017					<0.005
8/9/2017	<0.005	<0.005	<0.005	<0.005	
4/11/2018	<0.005	<0.005	<0.005	<0.005	<0.005
8/27/2018	<0.005	<0.005	<0.005	<0.005	<0.005
3/18/2019					<0.005
3/20/2019	<0.005	<0.005	<0.005	<0.005	
8/13/2019	<0.005	<0.005	<0.005	<0.005	<0.005
4/7/2020	<0.005	<0.005	<0.005	<0.005	<0.005
9/18/2020	<0.005	0.0719	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	0.0358 (o)	<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
4/19/2023	<0.005	<0.005	<0.005	<0.005	<0.005

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Fluoride (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	<1	<1	<1	<1	<1
8/7/2017					<1
8/9/2017	<1	<1	<1	<1	
10/17/2017	<1	<1	<1	<1	<1
4/11/2018	<1	<1	<1	<1	<1
8/27/2018	<1	1.53	0.834	<1	<1
3/18/2019					<1
3/20/2019	<1	<1	<1	<1	
8/13/2019	<1	<1	<1	<1	0.512
4/7/2020	<1	0.597	<1	<1	<1
9/18/2020	<1	<1	<1	<1	<1
4/5/2021	0.6	<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
4/19/2023	<1	<1	<1	<1	<1

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Iron (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	0.415	0.177	0.102	0.1	0.141
8/7/2017					0.135
8/9/2017	<0.1	0.173	<0.1	0.384	
4/11/2018	0.259	<0.1	<0.1	0.212	0.457
8/27/2018	1.01	1.19	<0.1	0.363	0.151
3/18/2019					0.345
3/20/2019	0.66	0.176	0.705	0.104	
8/13/2019	0.408	0.332	0.137	<0.1	0.227
4/7/2020	0.363	0.275	<0.1	<0.1	0.439
9/18/2020	1.25	0.827	<0.1	<0.1	<1
4/5/2021	0.21	0.228	<0.1	<0.1	0.439
9/1/2021	1.34	0.967	<0.1	1.17	0.169
4/20/2022	0.123	<0.1	<0.1	<0.1	0.157
9/14/2022			<0.1	<0.1	0.116
4/19/2023	0.24	0.117	<0.1	<0.1	0.286

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Lead (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8/7/2017					<0.0005
8/9/2017	<0.0005	<0.0005	<0.0005	0.000796	
4/11/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8/27/2018	0.000716	<0.0005	<0.0005	<0.0005	<0.0005
3/18/2019					<0.0005
3/20/2019	<0.0005	<0.0005	<0.0005	<0.0005	
8/13/2019	0.000623	<0.0005	<0.0005	<0.0005	<0.0005
4/7/2020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
9/18/2020	0.000829	0.000549	<0.0005	<0.0005	<0.0005
4/5/2021	<0.0005	<0.0005	<0.0005	<0.0005	0.00101
9/1/2021	0.00258	0.000726	<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
4/19/2023	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Magnesium (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	28.6	26.1	93.7	58.9	24.5
8/7/2017					22.6
8/9/2017	73.3	32.3	101	25.6	
4/11/2018	21.1	27.9	83.2	59	28
8/27/2018	13.6	41.4	98.4	51.8	29.1
3/18/2019					19.2
3/20/2019	22.6	24.3	83.9	44.7	
8/13/2019	20.9	44.6	99.9	77.3	25.8
4/7/2020	26.4	28.5	88.1	53	28.2
9/18/2020	22.9	36.2	89.2	64.5	30.5
4/5/2021	17.2	19	84	32.4	14.8
9/1/2021	25.8	29.4	87.6	33.8	23.8
4/20/2022	23.6	27.2	74.4	47.3	25.4
9/14/2022			87.1	56.4	18.3
4/19/2023	25.1	34	86.1	53.8	33

Time Series

Constituent: Manganese (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	0.205	0.0951	<0.01	0.0315	0.205
8/7/2017					0.139
8/9/2017	0.0766	0.139	<0.01	0.282	
4/11/2018	0.18	0.0476	<0.01	0.0244	0.194
8/27/2018	0.0399	1.6	<0.01	0.0361	0.298
3/18/2019					0.172
3/20/2019	0.196	0.164	0.0179	0.0184	
8/13/2019	0.694	0.52	0.0304	0.0387	0.993
4/7/2020	0.217	0.14	<0.01	0.0156	0.241
9/18/2020	0.492	0.335	<0.01	0.0311	0.271
4/5/2021	0.0882	0.0311	<0.01	<0.04	0.114
9/1/2021	0.539	0.578	<0.01	0.054	0.29
4/20/2022	0.125	0.0426	<0.01	<0.04	0.0422
9/14/2022			<0.01	0.026	0.131
4/19/2023	0.204	0.115	<0.01	0.0169	0.728

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Molybdenum (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	<0.002	<0.002	<0.002	<0.002	0.043
8/7/2017					0.00214
8/9/2017	<0.002	<0.002	<0.002	<0.002	
4/11/2018	<0.002	<0.002	<0.002	<0.002	0.00659
8/27/2018	<0.002	<0.002	<0.002	<0.002	0.032
3/18/2019					0.00291
3/20/2019	<0.002	<0.002	<0.002	<0.002	
8/13/2019	<0.002	<0.002	<0.002	<0.002	0.00379
4/7/2020	<0.002	<0.002	<0.002	<0.002	<0.002
9/18/2020	<0.002	<0.002	<0.002	0.00256	0.0876
4/5/2021	<0.002	<0.002	<0.002	<0.002	0.011
9/1/2021	0.00637	0.00252	<0.002	<0.002	0.00925
4/20/2022	<0.002	<0.002	<0.002	<0.002	0.00202
9/14/2022			<0.002	<0.002	0.00514
4/19/2023	<0.002	0.0281	<0.002	<0.002	0.0149

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Nickel (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	<0.005	<0.005	<0.005	<0.005	<0.005
8/7/2017					<0.005
8/9/2017	<0.005	<0.005	<0.005	<0.005	
4/11/2018	<0.005	<0.005	<0.005	<0.005	<0.005
8/27/2018	<0.005	<0.005	<0.005	<0.005	<0.005
3/18/2019					<0.005
3/20/2019	<0.005	<0.005	<0.005	<0.005	
8/13/2019	<0.005	<0.005	<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
4/19/2023	<0.005	<0.005	<0.005	<0.005	<0.005

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Selenium (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	<0.005	<0.005	<0.005	<0.005	<0.005
8/7/2017					<0.005
8/9/2017	<0.005	<0.005	<0.005	<0.005	
4/11/2018	<0.005	<0.005	<0.005	<0.005	<0.005
8/27/2018	<0.005	<0.005	<0.005	<0.005	<0.005
3/18/2019					<0.005
3/20/2019	<0.005	<0.005	<0.005	<0.005	
8/13/2019	<0.005	<0.005	<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
4/19/2023	<0.005	<0.005	<0.005	<0.005	<0.005

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Strontium (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	0.148	0.142	0.398	0.309	0.36
8/7/2017					0.113
8/9/2017	0.285	0.162	0.379	0.124	
4/11/2018	0.0998	0.138	0.378	0.29	0.164
8/27/2018	0.0842	0.236	0.356	0.238	0.418
3/18/2019					0.123
3/20/2019	0.12	0.131	0.541	0.322	
8/13/2019	0.129	0.264	0.444	0.346	0.158
4/7/2020	0.128	0.141	0.358	0.315	0.156
9/18/2020	0.125	0.23	0.335	0.288	0.759
4/5/2021	0.12	0.137	0.388	0.312	0.17
9/1/2021	0.147	0.19	0.347	0.101	0.174
4/20/2022	0.125	0.148	0.301	0.245	0.146
9/14/2022			0.326	0.218	0.156
4/19/2023	0.111	0.229	0.339	0.257	0.203

Time Series

Constituent: Sulfate (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	73	37.7	676	438	200
8/7/2017					33.8
8/9/2017	554	58.1	712	16.9	
10/17/2017	213	63.7	698	101	82.5
4/11/2018	20.1	52	725	440	78.8
8/27/2018	13.2	251	620	355	355
3/18/2019					33.7
3/20/2019	20.4	42.2	832	313	
8/13/2019	10.1	175	694	618	46.3
4/7/2020	16.3	41.5	572	322	45.9
9/18/2020	21	218	583	456	828
4/5/2021	13.9	23.6	607	127	86.4
9/1/2021	14.3	54.3	533	222	85.9
4/20/2022	15.7	58.4	575	357	57.3
9/14/2022			588	387	81.4
4/19/2023	15.7	182	622	299	121

Time Series

Constituent: Vanadium (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	<0.005	<0.005	<0.005	<0.005	<0.005
8/7/2017					<0.005
8/9/2017	<0.005	<0.005	<0.005	<0.005	
4/11/2018	<0.005	<0.005	<0.005	<0.005	<0.005
8/27/2018	0.00549	<0.005	<0.005	<0.005	<0.005
3/18/2019					<0.005
3/20/2019	<0.005	<0.005	<0.005	<0.005	
8/13/2019	<0.005	<0.005	<0.005	<0.005	<0.005
4/7/2020	<0.005	<0.005	<0.005	<0.005	<0.005
9/18/2020	0.00516	<0.005	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	0.00682	<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
4/19/2023	<0.005	<0.005	<0.005	<0.005	<0.005

ND substitution: RL or RL/2 if <15% NDs.

Time Series

Constituent: Zinc (mg/L) Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-24	SW-25	SW-26
10/12/2016	<0.02	<0.02	<0.02	<0.02	<0.02
8/7/2017					<0.02
8/9/2017	<0.02	<0.02	<0.02	<0.02	
4/11/2018	<0.02	<0.02	<0.02	<0.02	<0.02
8/27/2018	<0.02	<0.02	<0.02	<0.02	<0.02
3/18/2019					<0.02
3/20/2019	<0.02	<0.02	<0.02	<0.02	
8/13/2019	<0.02	<0.02	<0.02	<0.02	<0.02
4/7/2020	<0.02	<0.02	<0.02	<0.02	<0.02
9/18/2020	<0.02	<0.02	<0.02	<0.02	<0.02
4/5/2021	<0.02	<0.02	<0.02	<0.02	0.0314
9/1/2021	0.0312	<0.02	<0.02	<0.02	<0.02
4/20/2022	<0.02	<0.02	<0.02	<0.02	<0.02
9/14/2022			<0.02	<0.02	<0.02
4/19/2023	<0.02	<0.02	<0.02	<0.02	<0.02

ND substitution: RL or RL/2 if <15% NDs.

Monitoring Wells Box Plots

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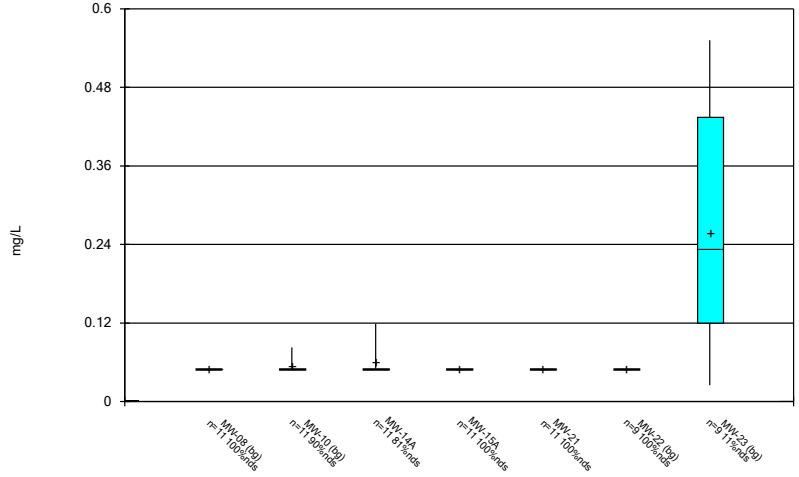
Box & Whiskers Plot



Constituent: Aluminum Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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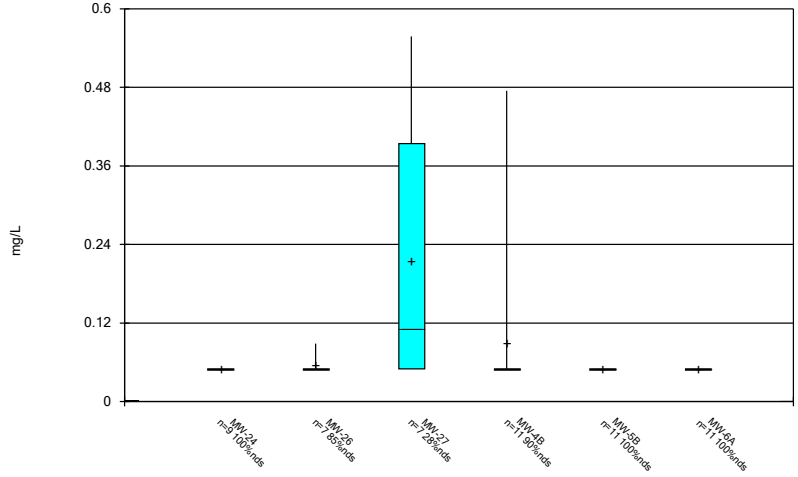
Box & Whiskers Plot



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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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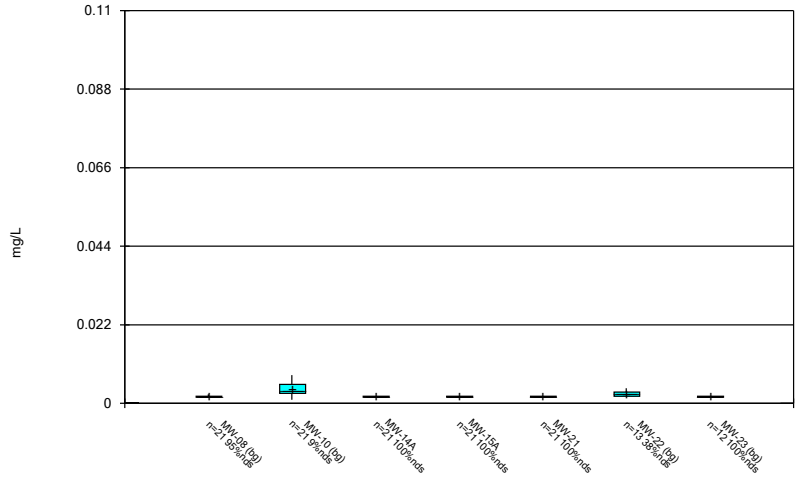
Box & Whiskers Plot



Constituent: Arsenic Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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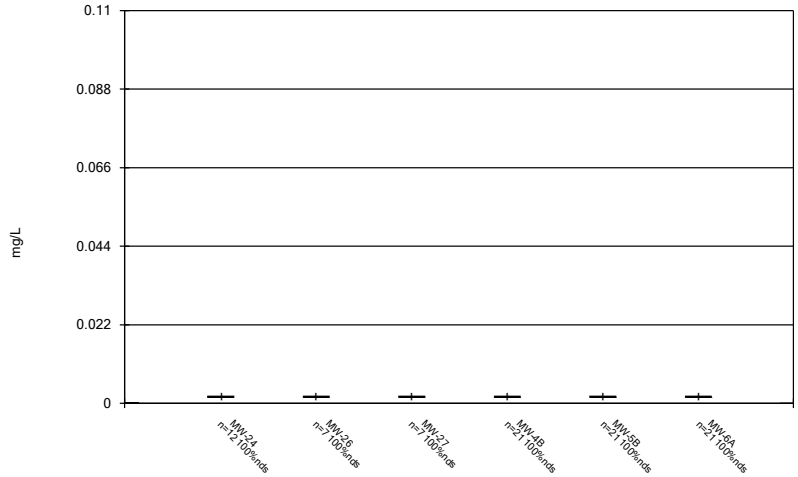
Box & Whiskers Plot



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Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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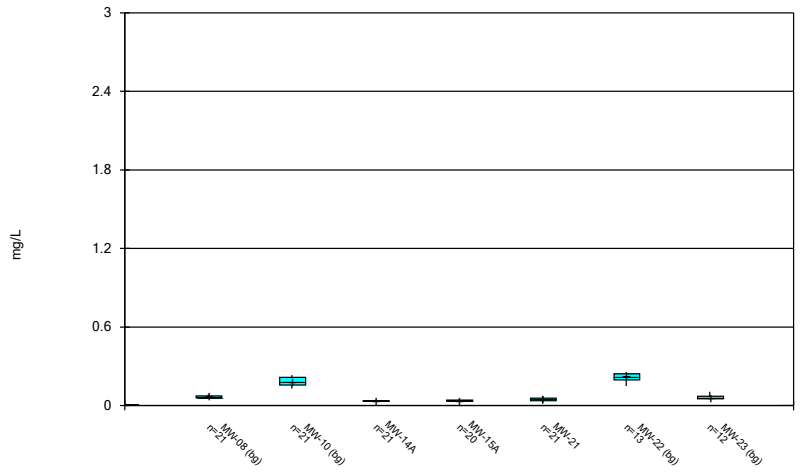
Box & Whiskers Plot



Constituent: Barium Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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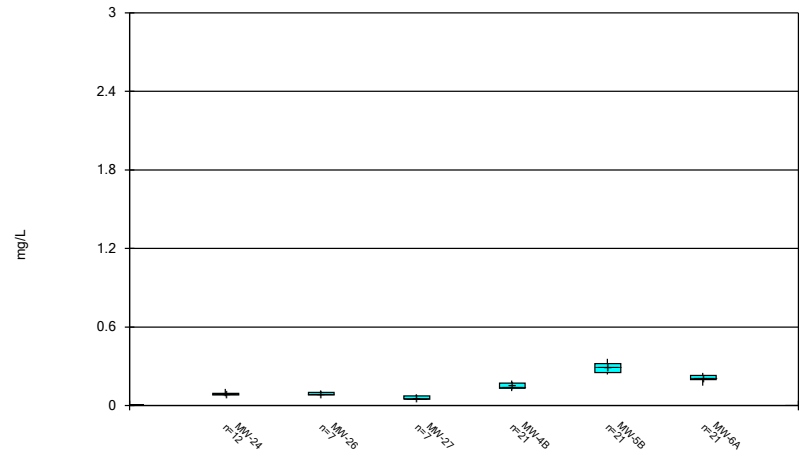
Box & Whiskers Plot



Constituent: Barium Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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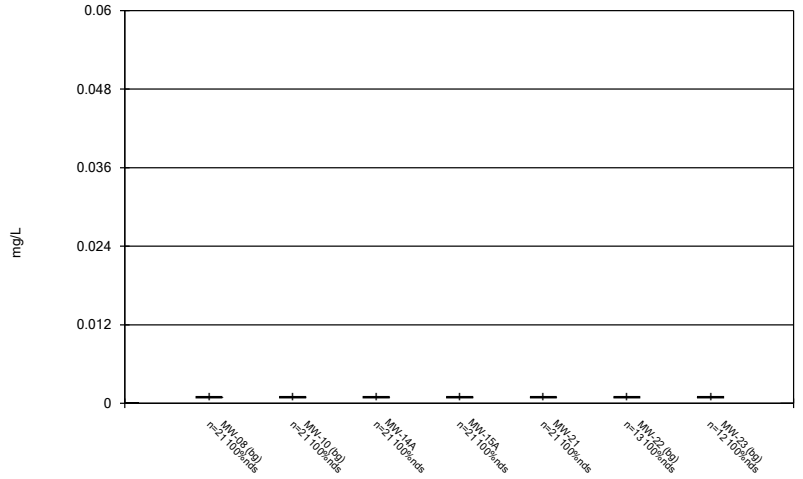
Box & Whiskers Plot



Constituent: Beryllium Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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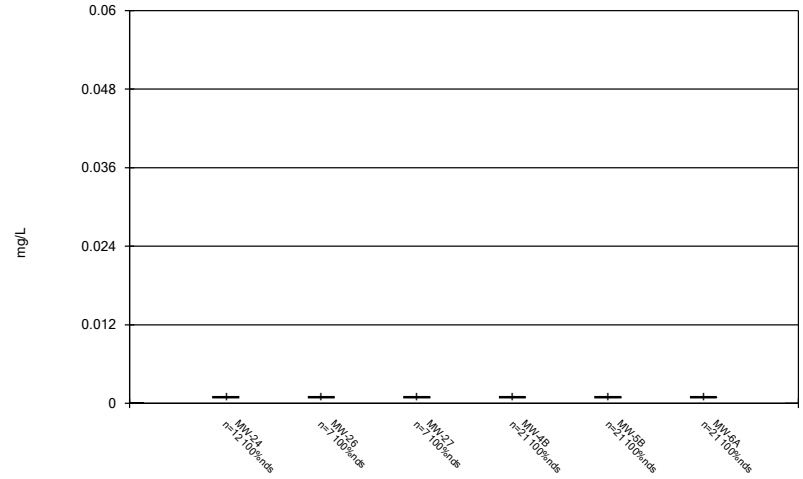
Box & Whiskers Plot



Constituent: Beryllium Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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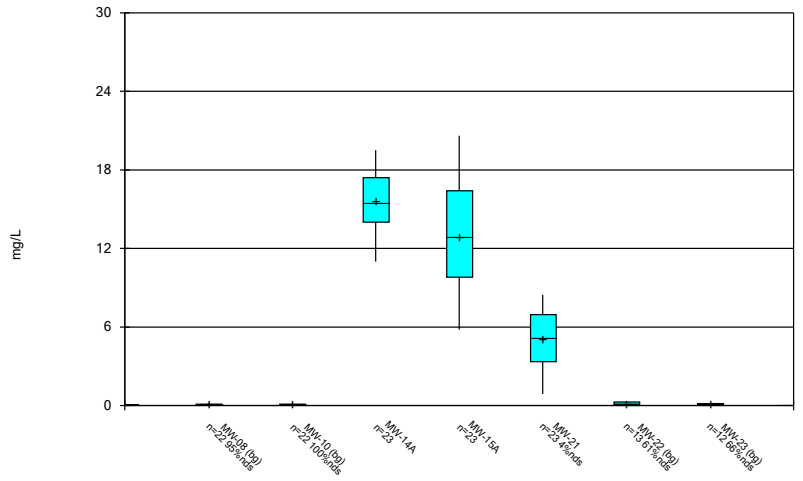
Box & Whiskers Plot



Constituent: Boron Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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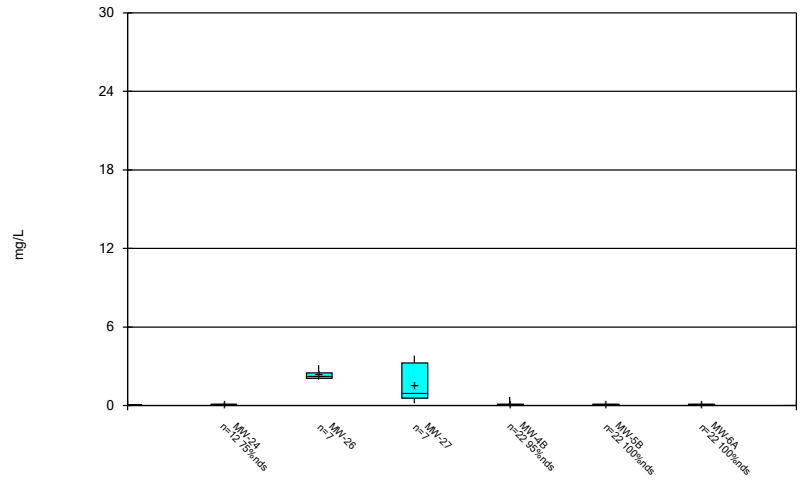
Box & Whiskers Plot



Constituent: Boron Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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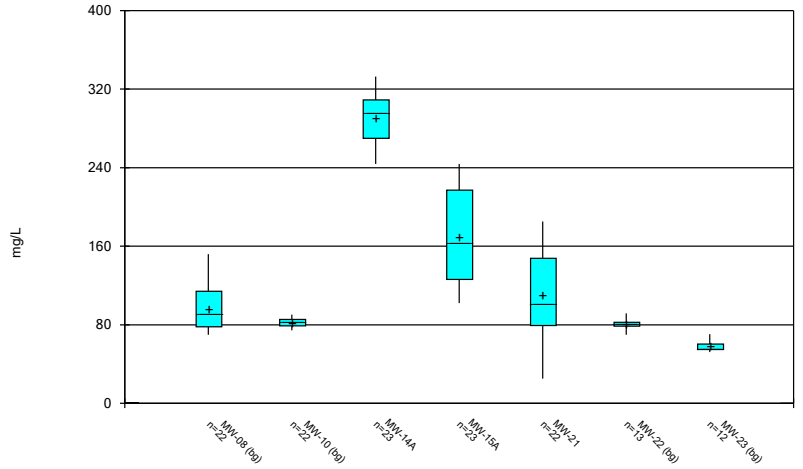
Box & Whiskers Plot



Constituent: Calcium Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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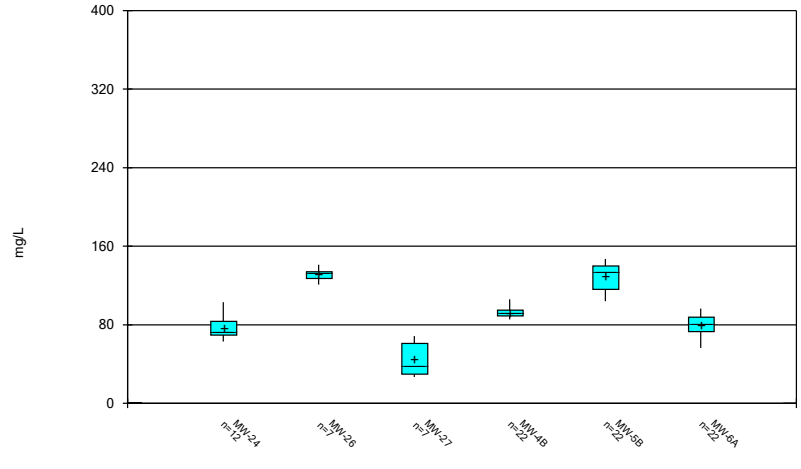
Box & Whiskers Plot



Constituent: Calcium Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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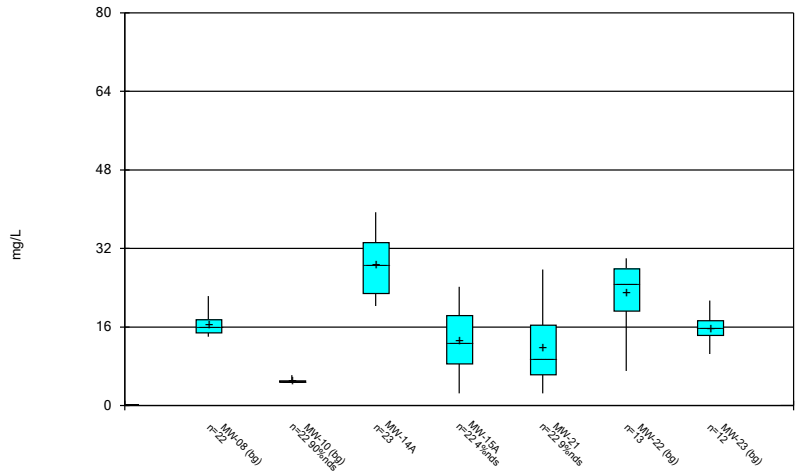

Constituent: Chloride Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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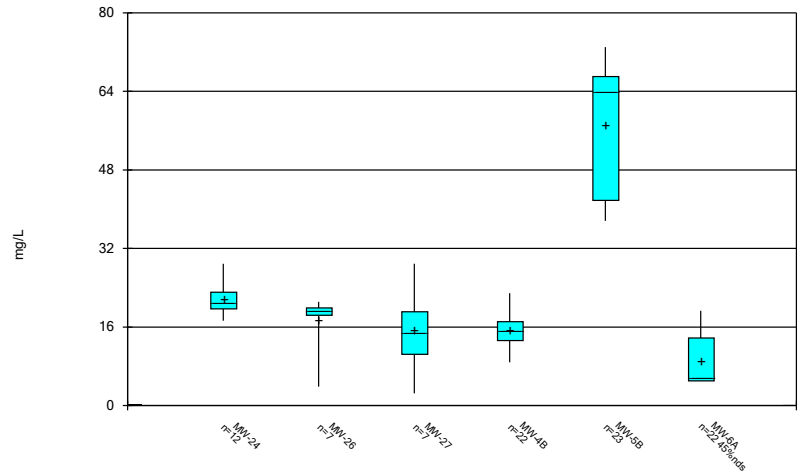
Box & Whiskers Plot



Constituent: Chloride Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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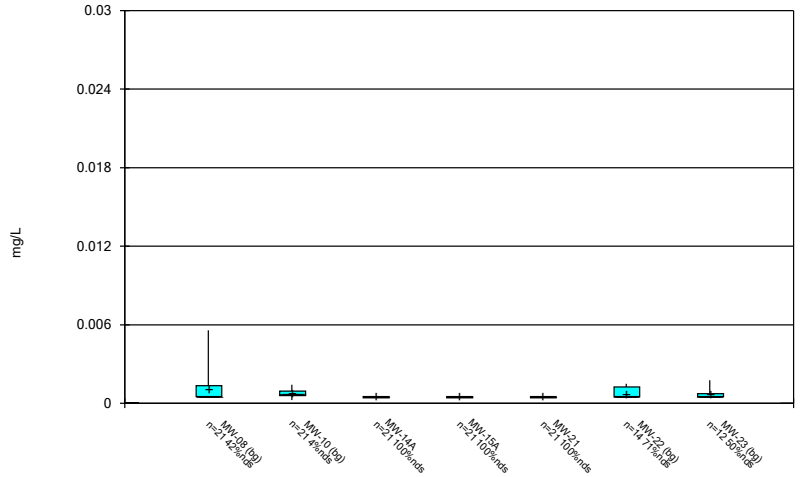
Box & Whiskers Plot



Constituent: Cobalt Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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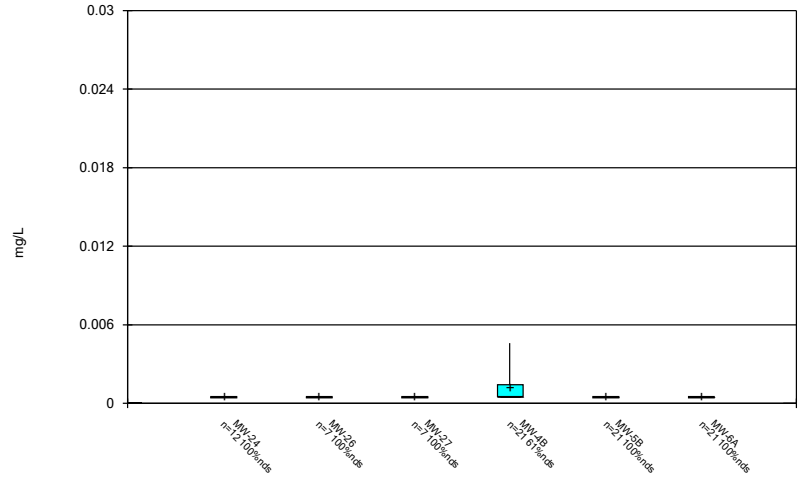
Box & Whiskers Plot



Constituent: Cobalt Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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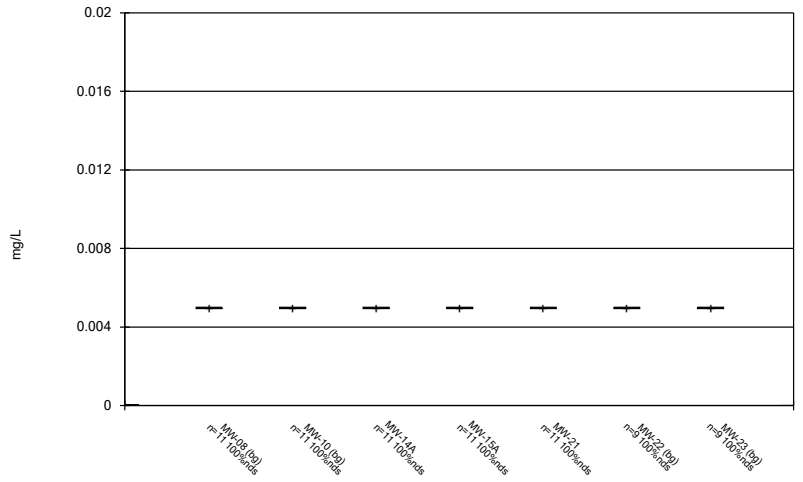
Box & Whiskers Plot



Constituent: Copper Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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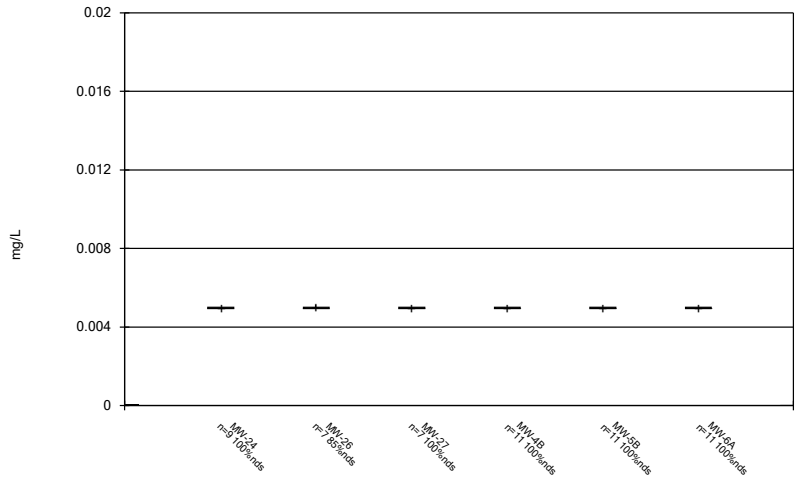
Box & Whiskers Plot



Constituent: Copper Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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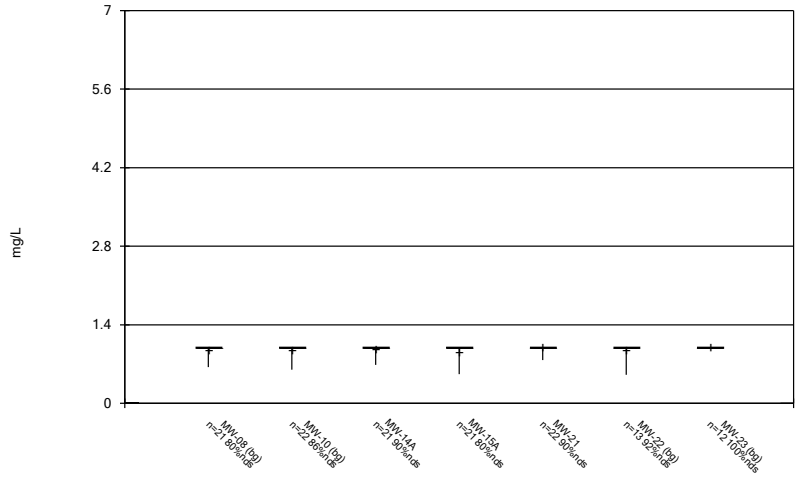
Box & Whiskers Plot



Constituent: Fluoride Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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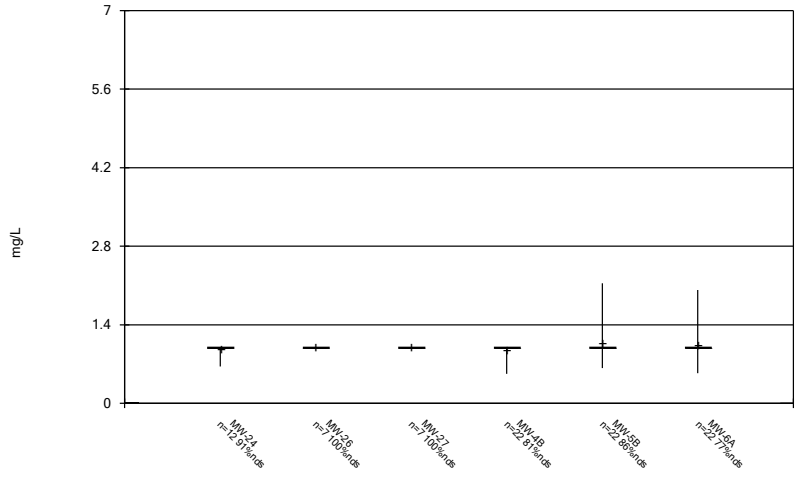
Box & Whiskers Plot



Constituent: Fluoride Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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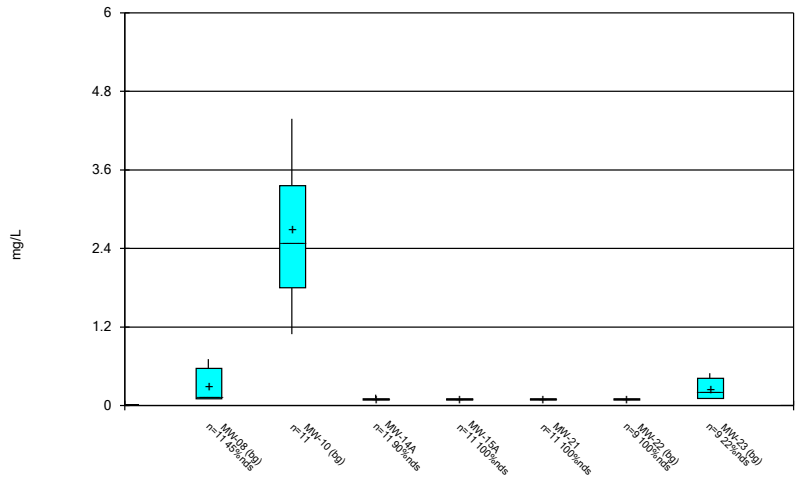
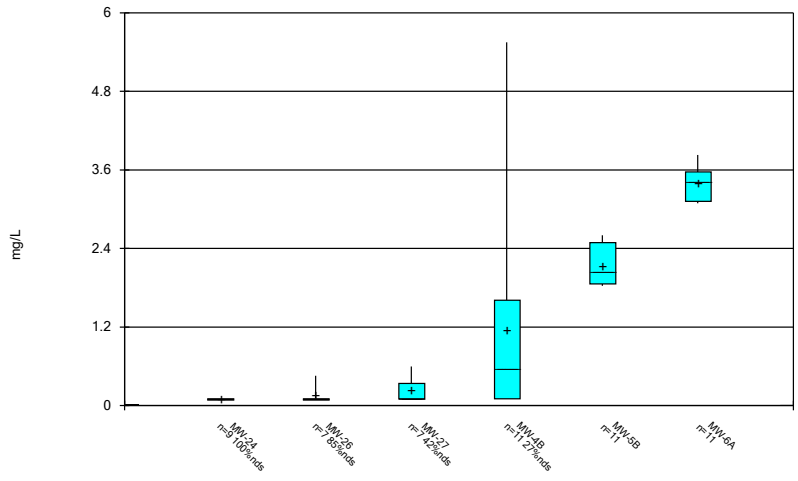
Box & Whiskers Plot



Constituent: Iron Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG

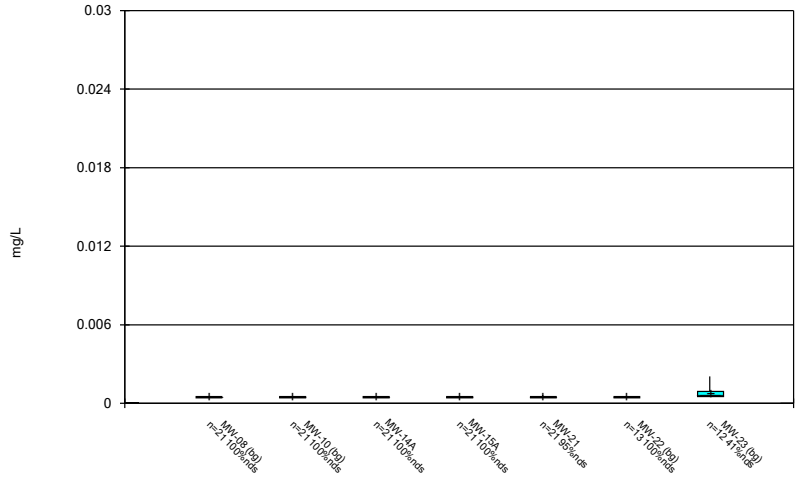
Box & Whiskers Plot



Constituent: Iron Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG

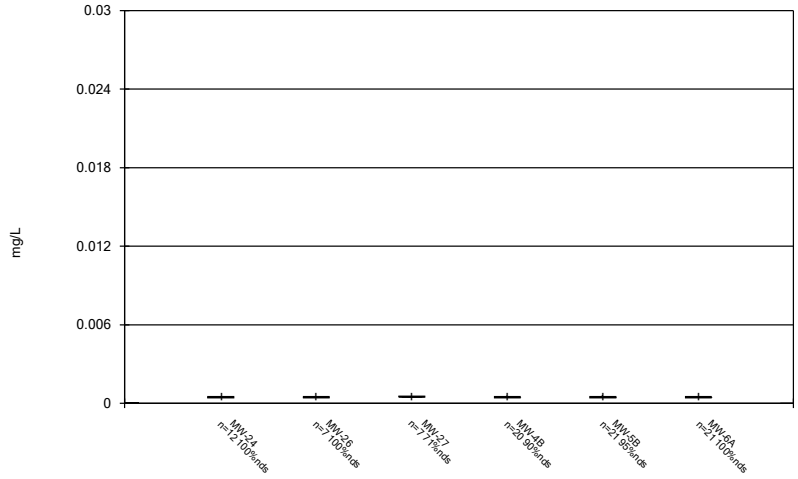
Box & Whiskers Plot



Constituent: Lead Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG

Box & Whiskers Plot



Constituent: Lead Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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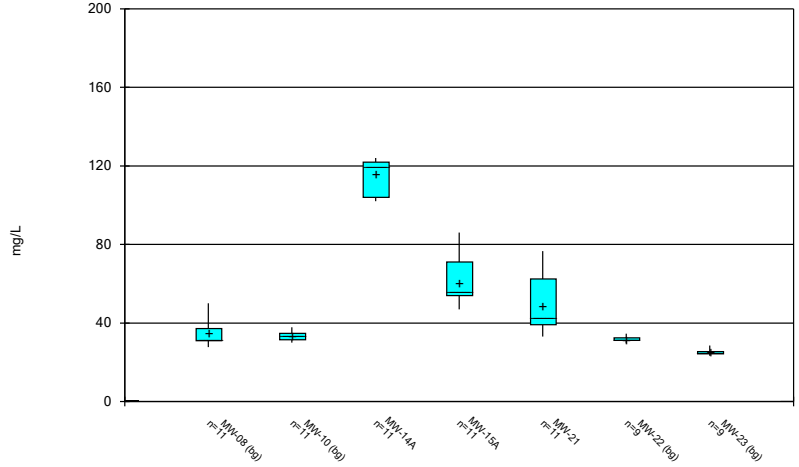
Box & Whiskers Plot



Constituent: Magnesium Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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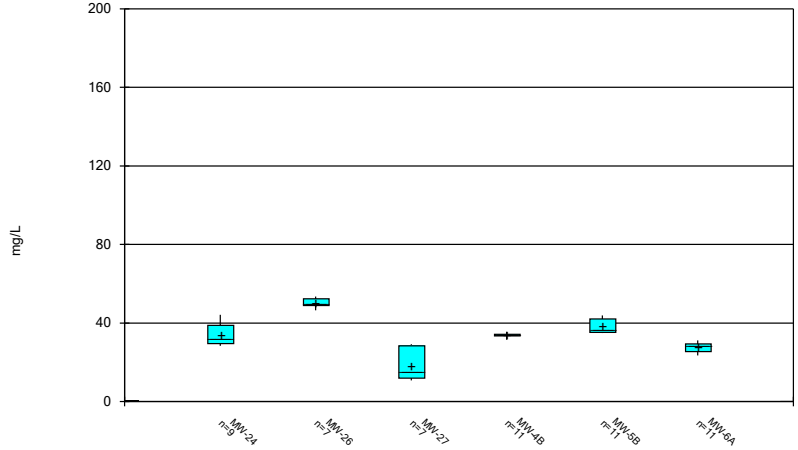
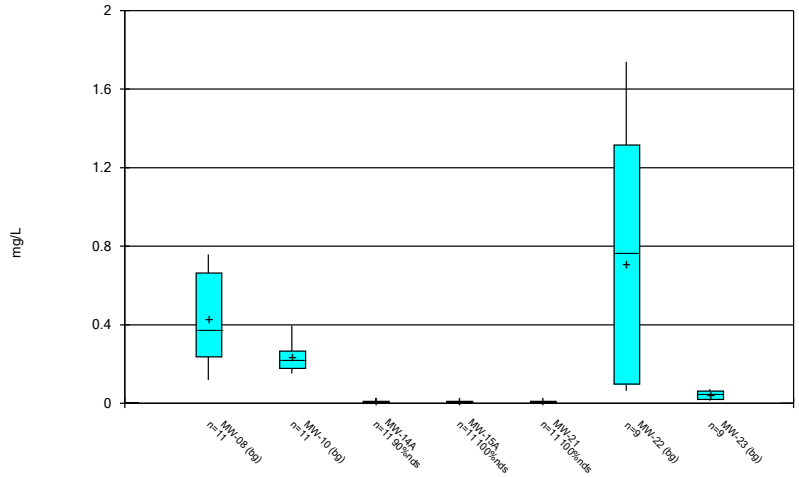
Box & Whiskers Plot



Constituent: Magnesium Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG

Box & Whiskers Plot



Constituent: Manganese Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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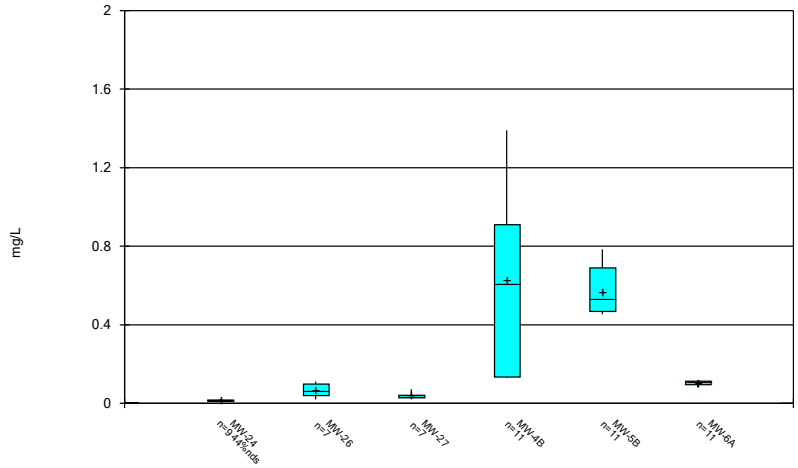
Box & Whiskers Plot



Constituent: Manganese Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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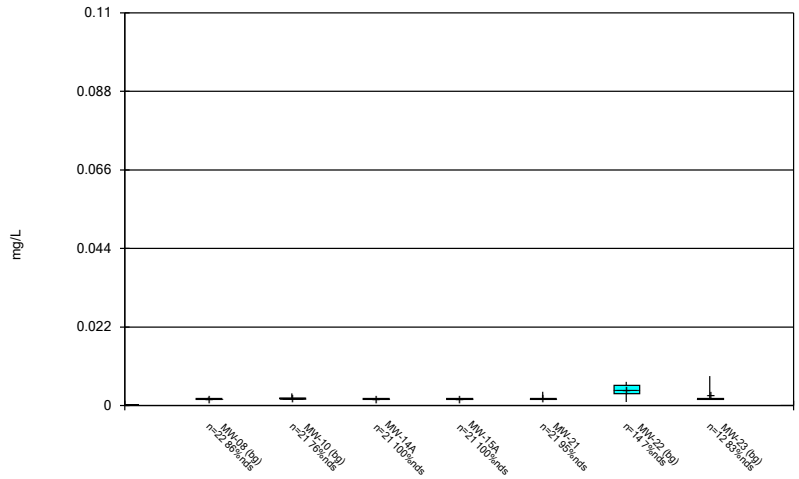
Box & Whiskers Plot



Constituent: Molybdenum Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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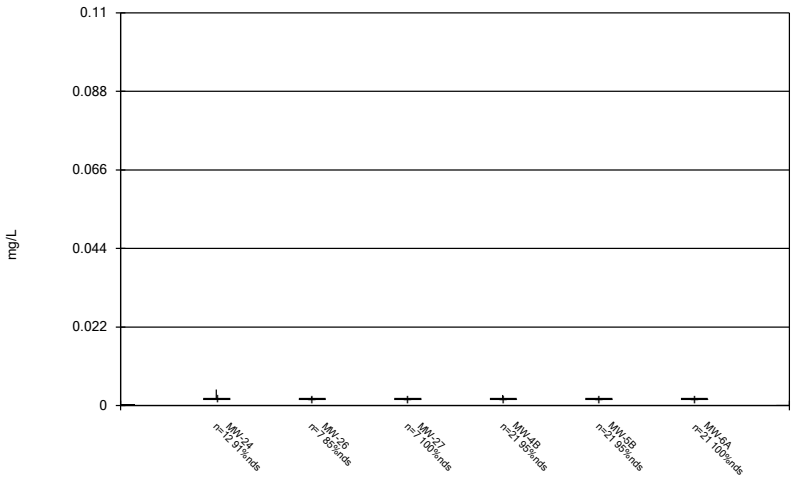
Box & Whiskers Plot



Constituent: Molybdenum Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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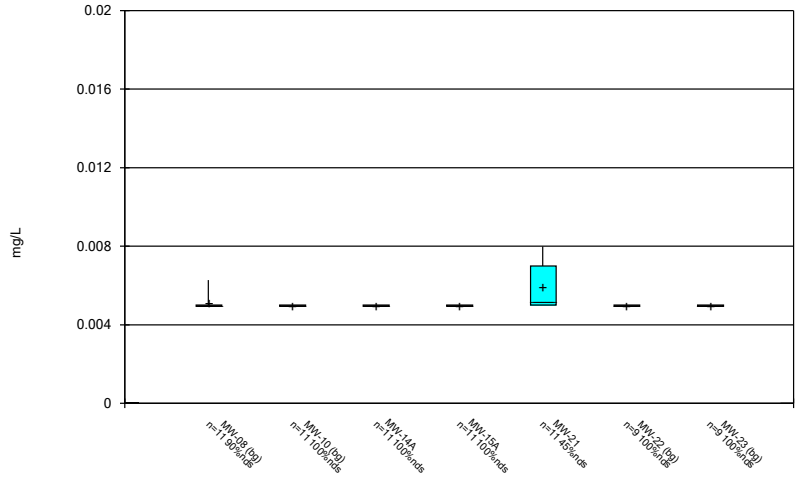
Box & Whiskers Plot



Constituent: Nickel Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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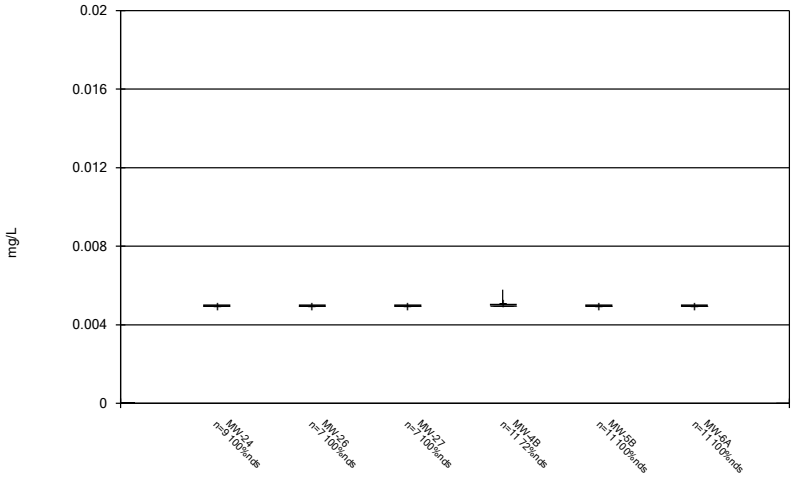
Box & Whiskers Plot



Constituent: Nickel Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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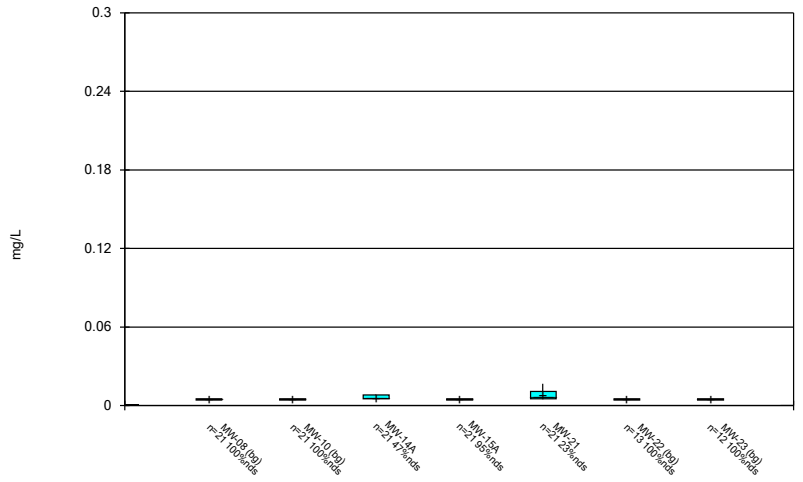
Box & Whiskers Plot



Constituent: Selenium Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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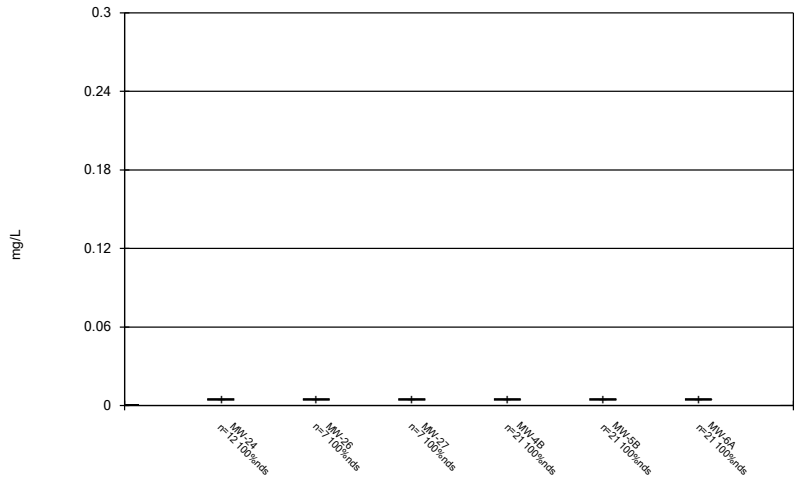
Box & Whiskers Plot



Constituent: Selenium Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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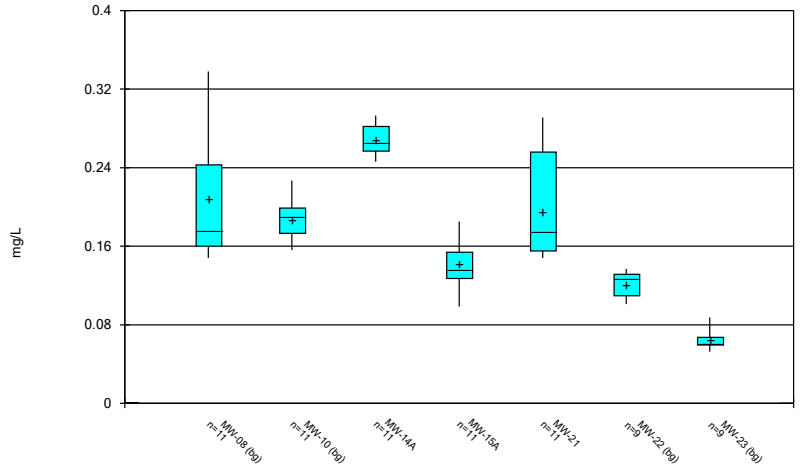
Box & Whiskers Plot



Constituent: Strontium Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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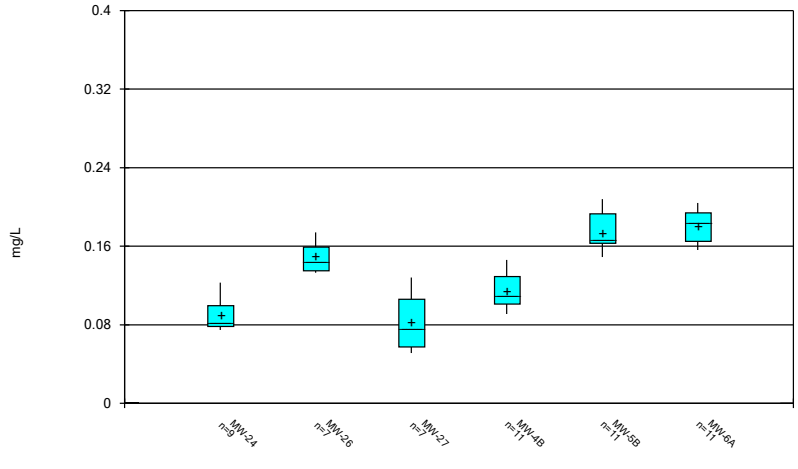
Box & Whiskers Plot



Constituent: Strontium Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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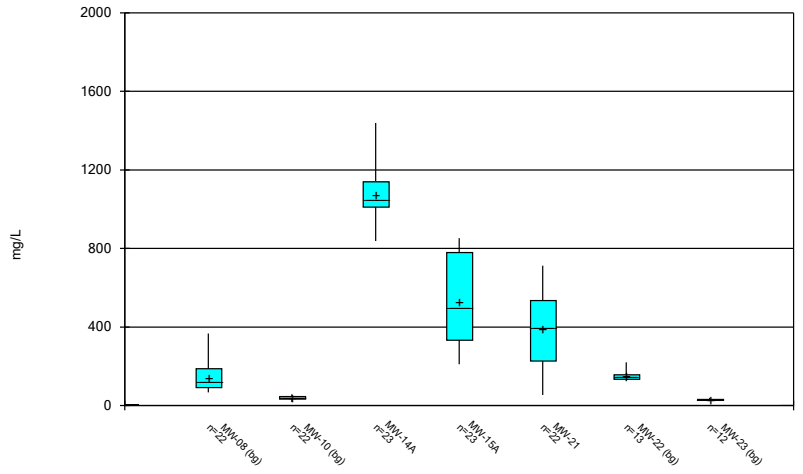
Box & Whiskers Plot



Constituent: Sulfate Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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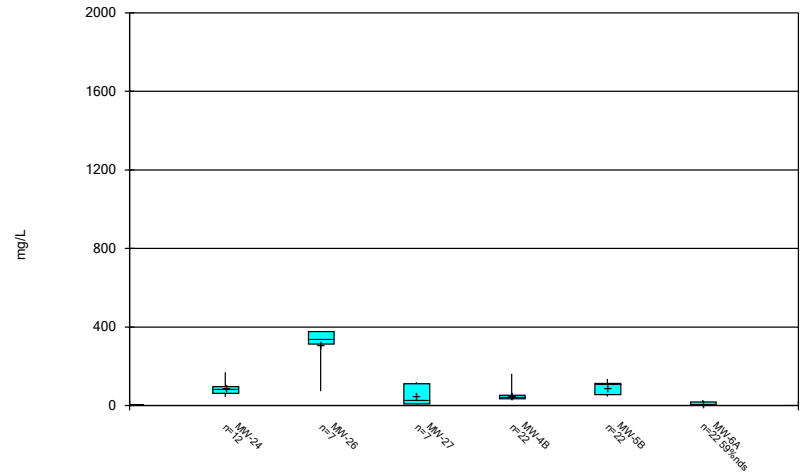
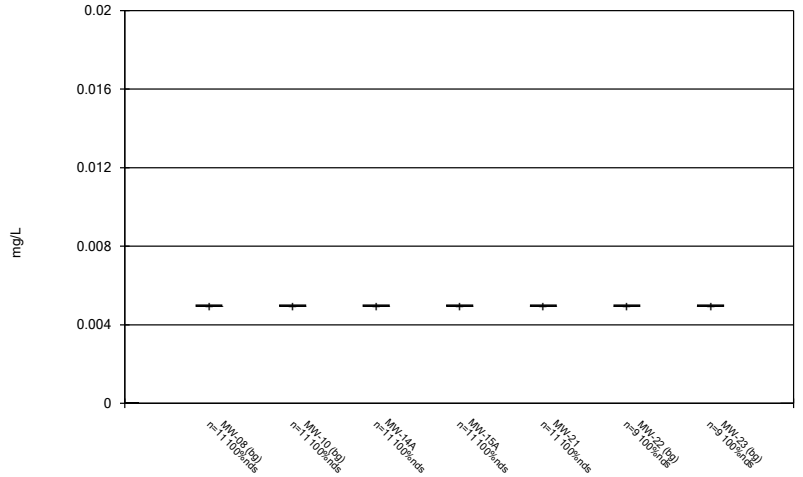
Box & Whiskers Plot



Constituent: Sulfate Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG

Box & Whiskers Plot



Constituent: Vanadium Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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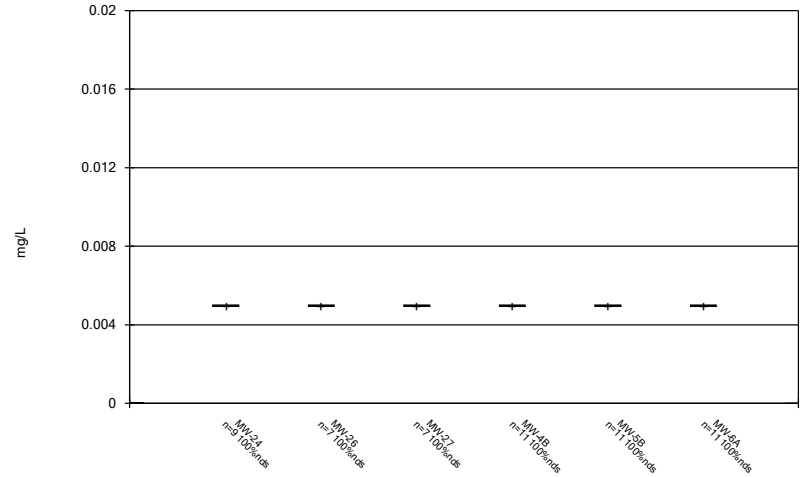
Box & Whiskers Plot



Constituent: Vanadium Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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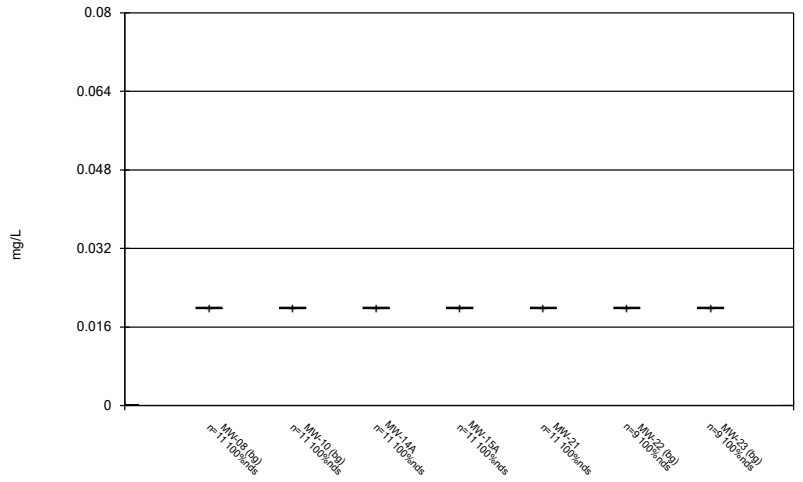
Box & Whiskers Plot



Constituent: Zinc Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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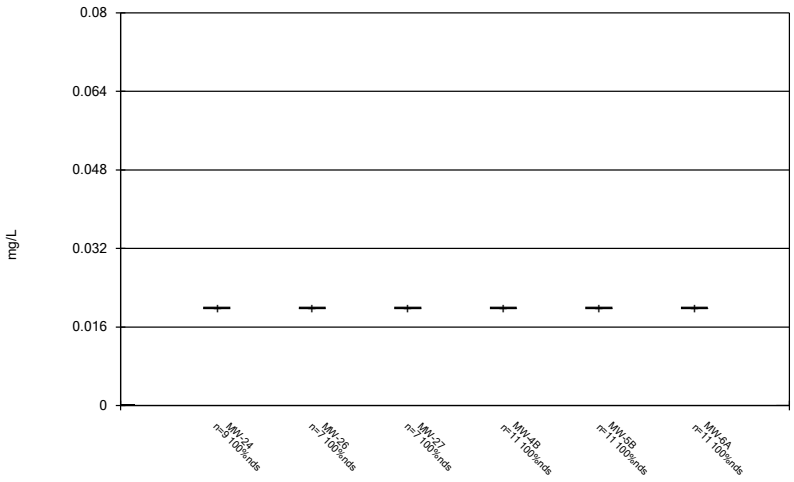
Box & Whiskers Plot



Constituent: Zinc Analysis Run 11/9/2023 8:00 AM View: State Wells Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Surface Water Wells Box Plots

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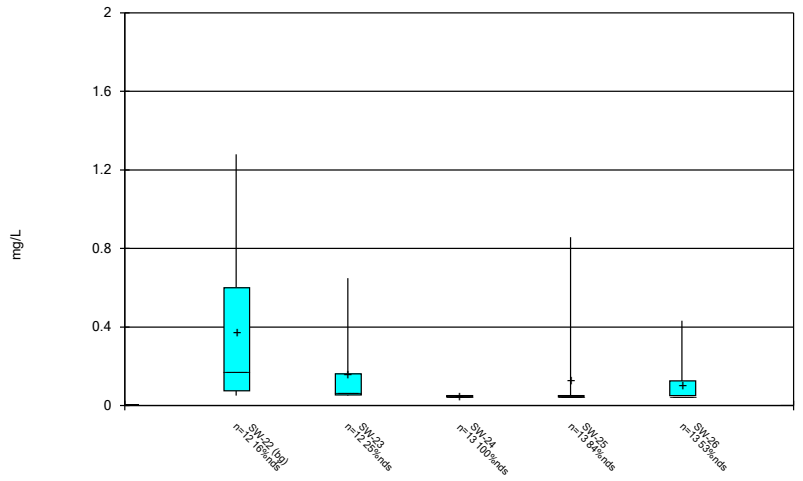
Box & Whiskers Plot



Constituent: Aluminum Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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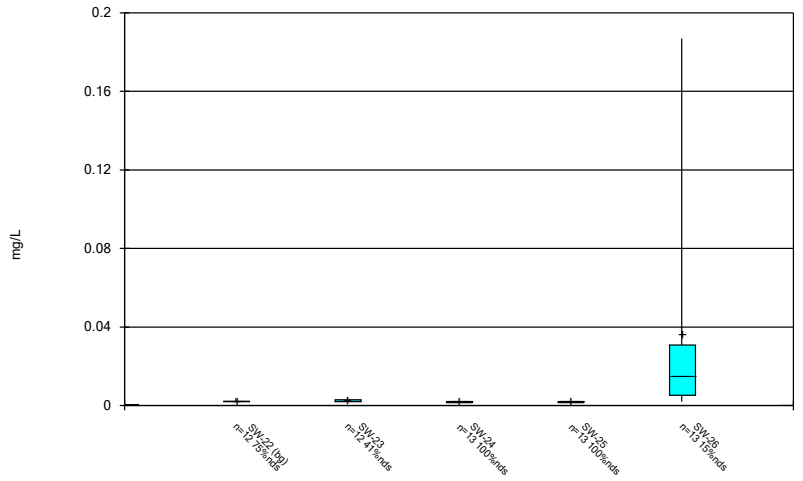
Box & Whiskers Plot



Constituent: Arsenic Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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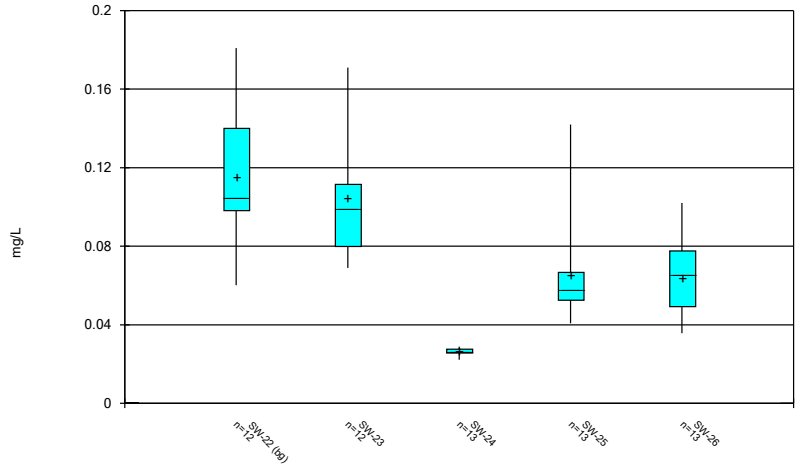
Box & Whiskers Plot



Constituent: Barium Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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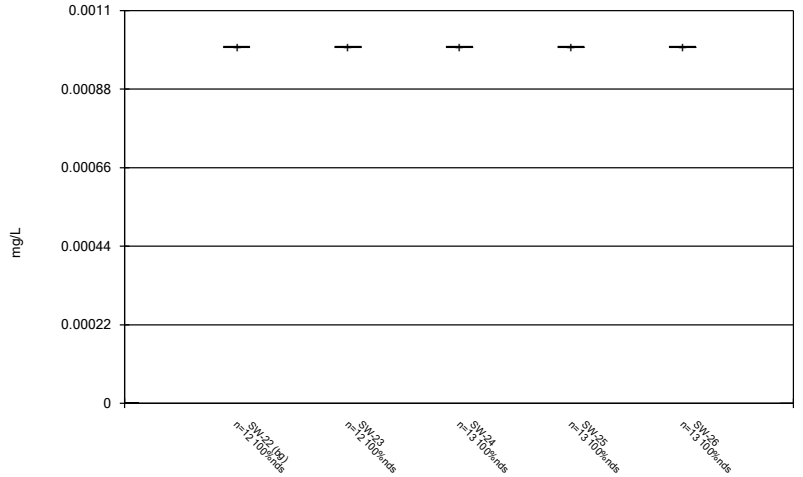
Box & Whiskers Plot



Constituent: Beryllium Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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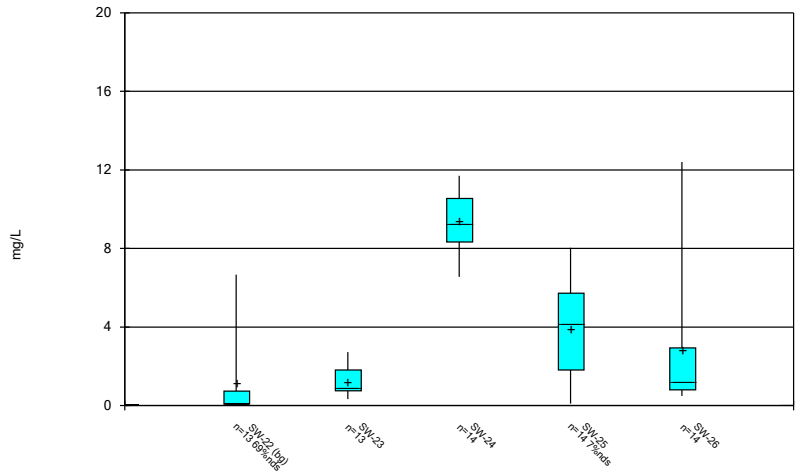
Box & Whiskers Plot



Constituent: Boron Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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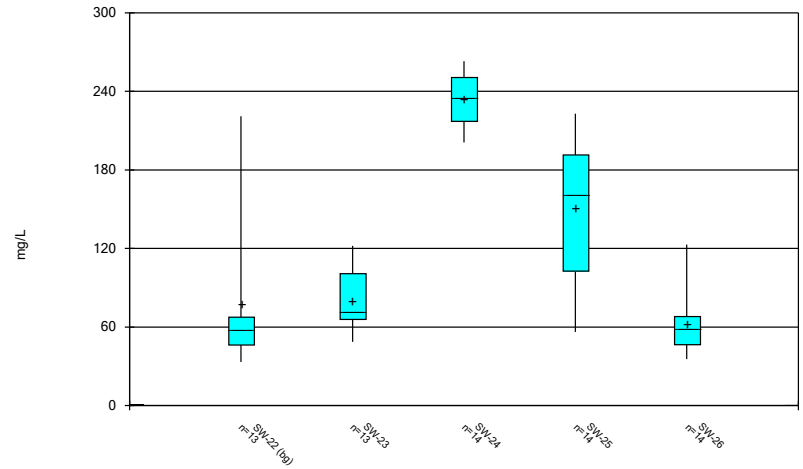
Box & Whiskers Plot



Constituent: Calcium Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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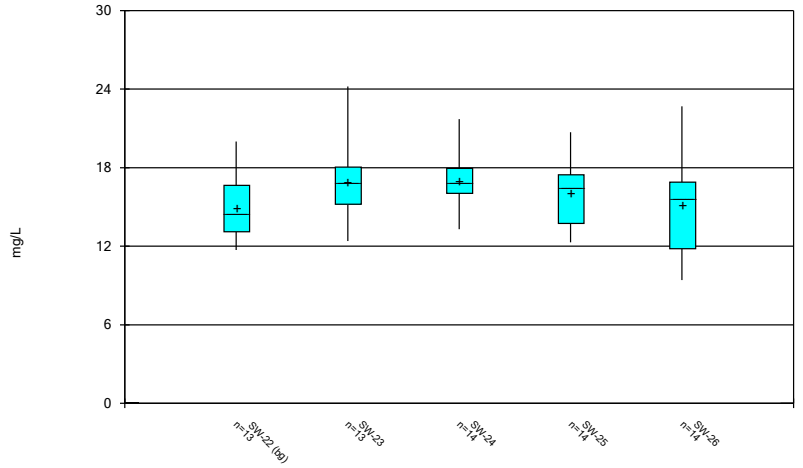
Box & Whiskers Plot



Constituent: Chloride Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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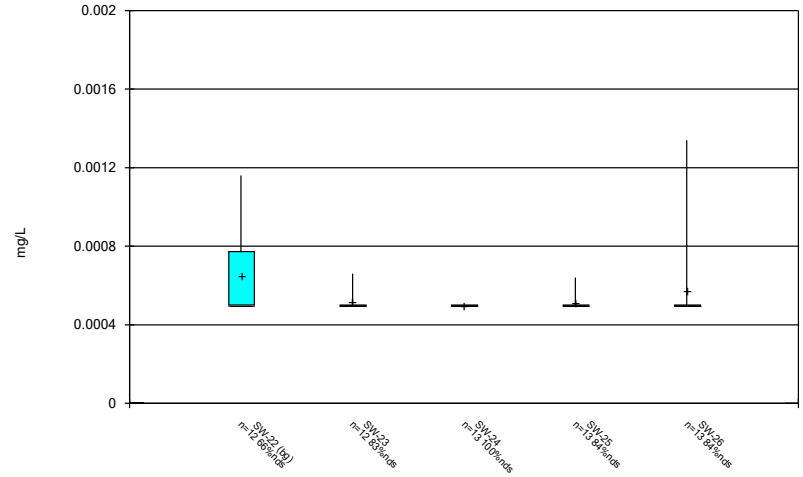
Box & Whiskers Plot



Constituent: Cobalt Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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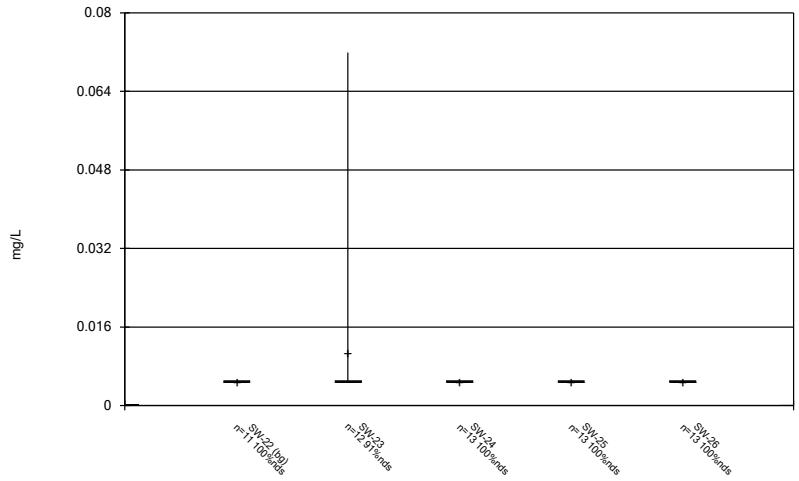
Box & Whiskers Plot



Constituent: Copper Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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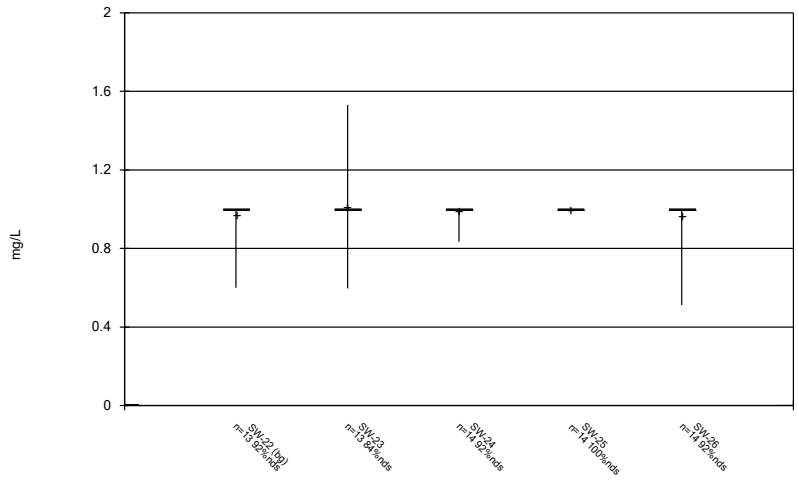
Box & Whiskers Plot



Constituent: Fluoride Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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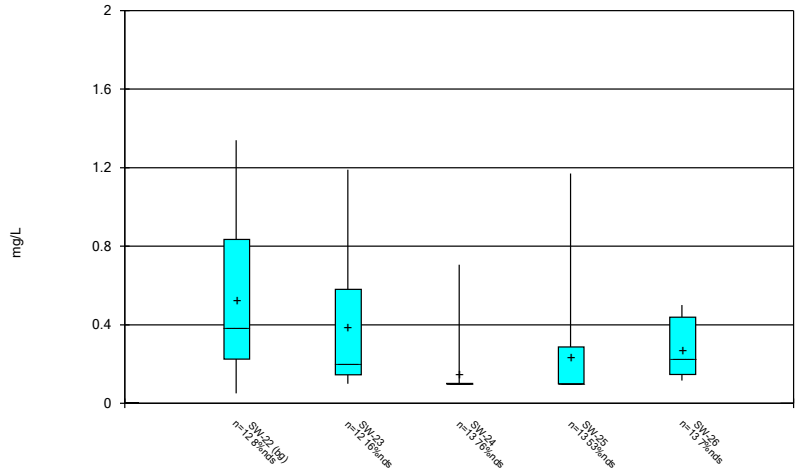
Box & Whiskers Plot



Constituent: Iron Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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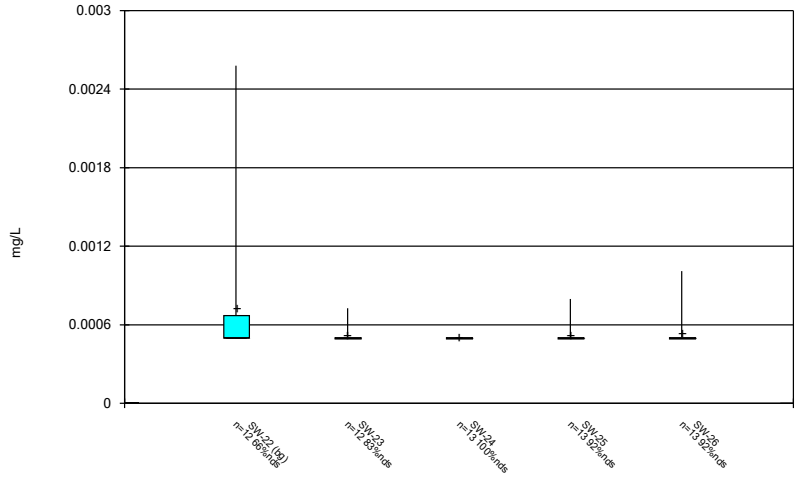
Box & Whiskers Plot



Constituent: Lead Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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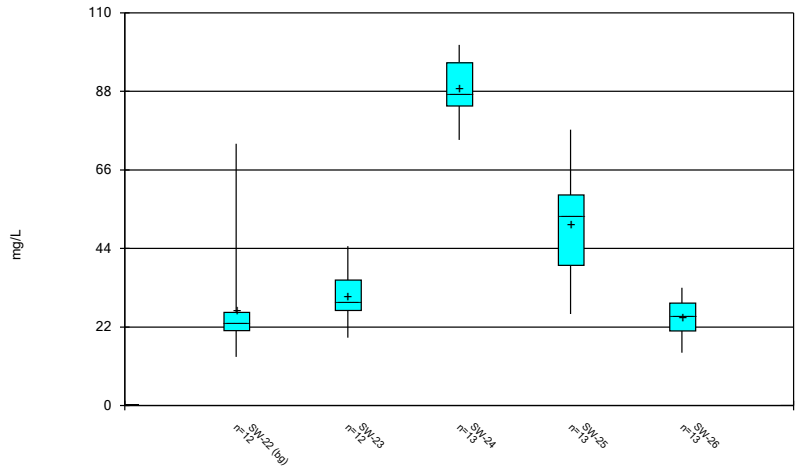
Box & Whiskers Plot



Constituent: Magnesium Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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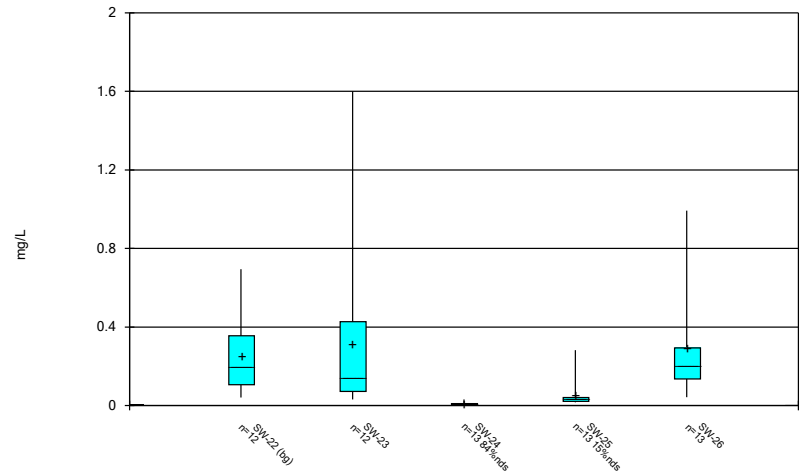
Box & Whiskers Plot



Constituent: Manganese Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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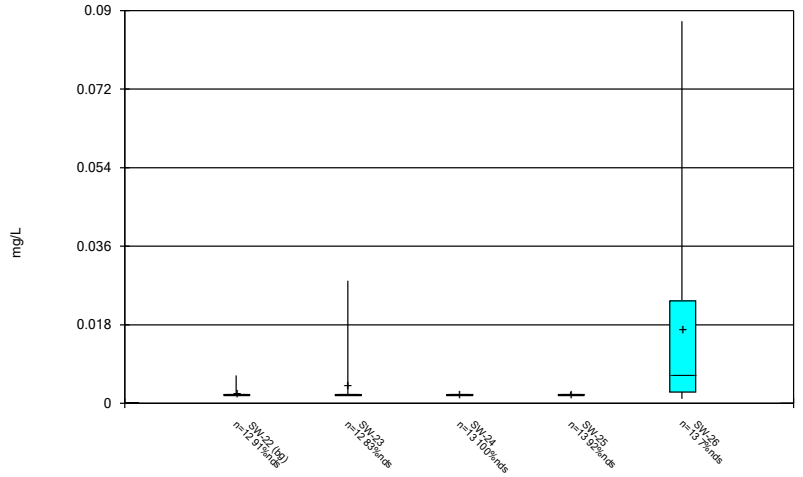
Box & Whiskers Plot



Constituent: Molybdenum Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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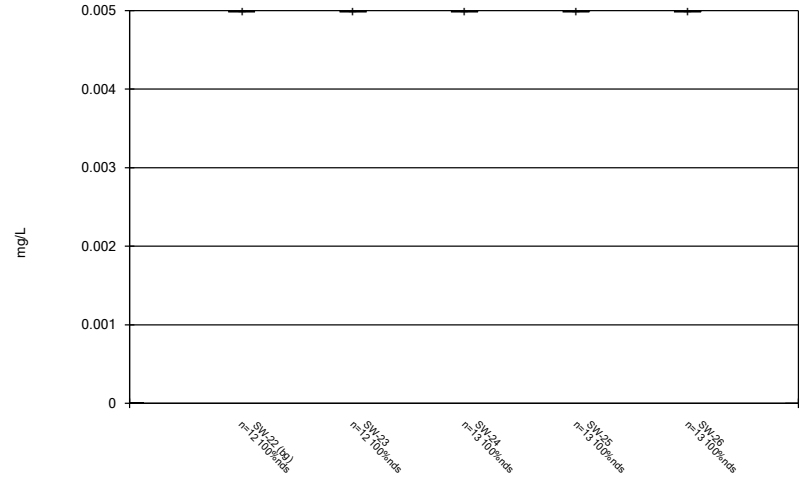
Box & Whiskers Plot



Constituent: Nickel Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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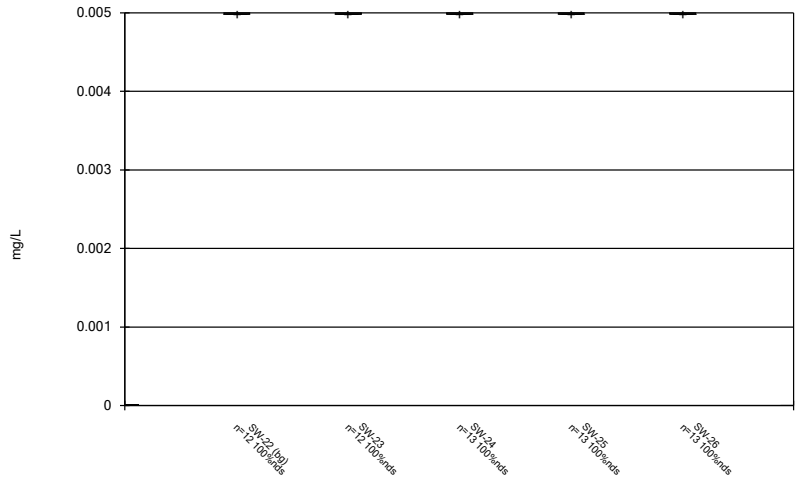
Box & Whiskers Plot



Constituent: Selenium Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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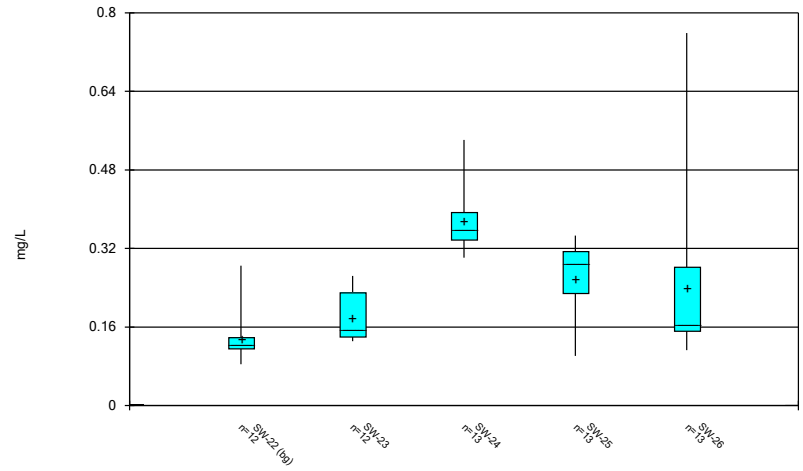

Constituent: Strontium Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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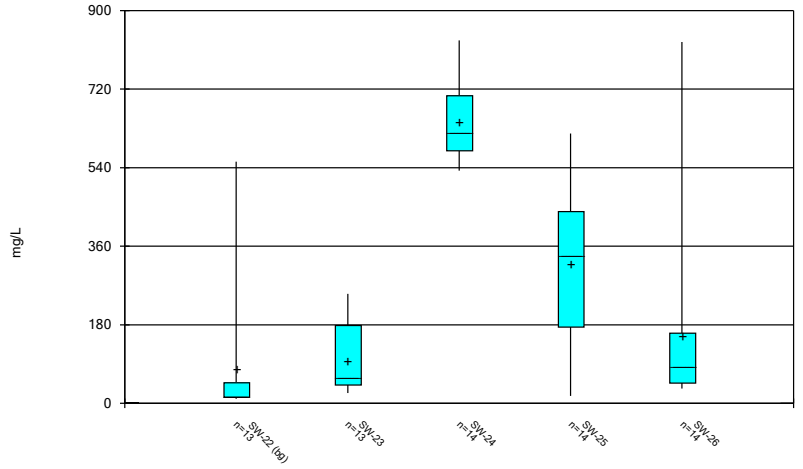

Constituent: Sulfate Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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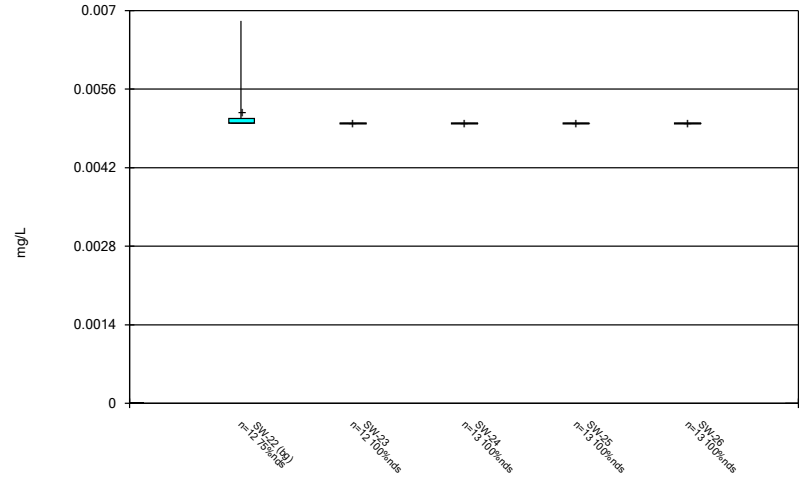
Box & Whiskers Plot



Constituent: Vanadium Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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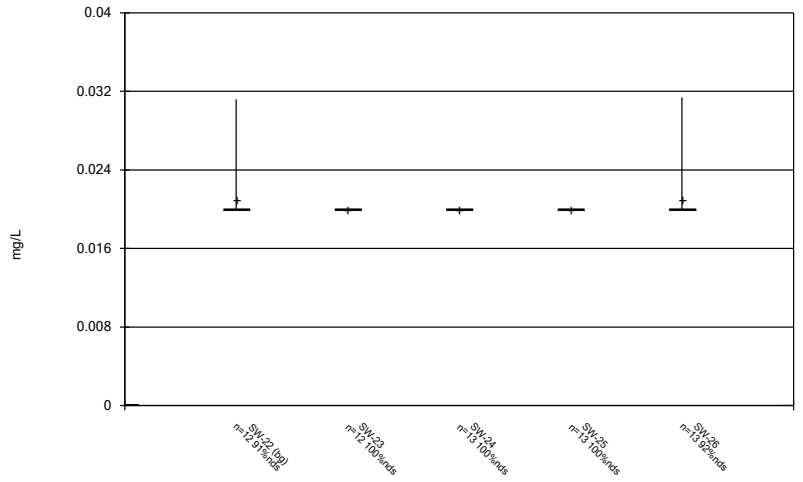
Box & Whiskers Plot



Constituent: Zinc Analysis Run 11/9/2023 9:45 AM View: State Surface Water Descriptive
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

FIGURE C.

Monitoring Wells Outlier Summary

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 8:26 AM

	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-22 Manganese (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)		
8/6/2019							1.74 (o)

Surface Wells Outlier Summary

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/13/2023, 4:33 PM

	SW-22 Copper (mg/L)
9/1/2021	0.0358 (o)

Monitoring Wells

FIGURE D.

Interwell Prediction Limits - Monitoring Wells (April 2023) - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:16 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**	**0.0004535**	**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**	**0.0004535**	**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**	**0.0004535**	**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**	**0.0004535**	**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**	**0.0004535**	**NP Inter (normality) 1 of 2**
Magnesium (mg/L)	**MW-14A**	**44.46**	**n/a**	**4/11/2023**	**122**	**Yes**	**36**	**5.599**	**0.4658**	**0**	**None**	**sqrt(x)**	**0.0003583**	**Param Inter 1 of 2**
Magnesium (mg/L)	**MW-15A**	**44.46**	**n/a**	**4/11/2023**	**48.7**	**Yes**	**36**	**5.599**	**0.4658**	**0**	**None**	**sqrt(x)**	**0.0003583**	**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**	**0.0004535**	**NP Inter (normality) 1 of 2**

Interwell Prediction Limits - Monitoring Wells (April 2023) - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:16 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Aluminum (mg/L)	MW-14A	0.552	n/a	4/11/2023	0.05ND	No	36	n/a	n/a	77.78	n/a	n/a	0.001377	NP Inter (NDs) 1 of 2
Aluminum (mg/L)	MW-4B	0.552	n/a	4/12/2023	0.05ND	No	36	n/a	n/a	77.78	n/a	n/a	0.001377	NP Inter (NDs) 1 of 2
Barium (mg/L)	MW-14A	0.247	n/a	4/11/2023	0.032	No	63	n/a	n/a	0	n/a	n/a	0.0004803	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-15A	0.247	n/a	4/11/2023	0.0299	No	63	n/a	n/a	0	n/a	n/a	0.0004803	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-21	0.247	n/a	4/11/2023	0.031	No	63	n/a	n/a	0	n/a	n/a	0.0004803	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-24	0.247	n/a	4/11/2023	0.0863	No	63	n/a	n/a	0	n/a	n/a	0.0004803	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-4B	0.247	n/a	4/12/2023	0.173	No	63	n/a	n/a	0	n/a	n/a	0.0004803	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-5B	0.247	n/a	4/12/2023	0.237	No	63	n/a	n/a	0	n/a	n/a	0.0004803	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-6A	0.247	n/a	4/12/2023	0.246	No	63	n/a	n/a	0	n/a	n/a	0.0004803	NP Inter (normality) 1 of 2
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**	**0.0004535**	**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**	**0.0004535**	**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**	**0.0004535**	**NP Inter (NDs) 1 of 2**
Boron (mg/L)	MW-24	0.322	n/a	4/11/2023	0.114	No	65	n/a	n/a	87.69	n/a	n/a	0.0004535	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	0.0004535	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**	**0.0004535**	**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	0.0004535	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	0.0004535	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-24	152	n/a	4/11/2023	78.6	No	65	n/a	n/a	0	n/a	n/a	0.0004535	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	0.0004535	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	0.0004535	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	0.0004535	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	0.0004535	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	0.0004535	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	0.0004535	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-24	30	n/a	4/11/2023	23.4	No	65	n/a	n/a	29.23	n/a	n/a	0.0004535	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	0.0004535	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**	**0.0004535**	**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	0.0004535	NP Inter (normality) 1 of 2
Cobalt (mg/L)	MW-4B	0.00558	n/a	4/12/2023	0.00271	No	64	n/a	n/a	37.5	n/a	n/a	0.0004669	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	0.0004669	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	0.0004669	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	0.0004669	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-24	1	n/a	4/11/2023	1ND	No	64	n/a	n/a	87.5	n/a	n/a	0.0004669	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	0.0004669	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	0.0004669	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	0.0004669	NP Inter (NDs) 1 of 2
Iron (mg/L)	MW-14A	4.38	n/a	4/11/2023	0.1ND	No	36	n/a	n/a	38.89	n/a	n/a	0.001377	NP Inter (normality) 1 of 2
Iron (mg/L)	MW-4B	4.38	n/a	4/12/2023	0.423	No	36	n/a	n/a	38.89	n/a	n/a	0.001377	NP Inter (normality) 1 of 2
Iron (mg/L)	MW-5B	4.38	n/a	4/12/2023	1.83	No	36	n/a	n/a	38.89	n/a	n/a	0.001377	NP Inter (normality) 1 of 2
Iron (mg/L)	MW-6A	4.38	n/a	4/12/2023	3.43	No	36	n/a	n/a	38.89	n/a	n/a	0.001377	NP Inter (normality) 1 of 2
Lead (mg/L)	MW-21	0.00204	n/a	4/11/2023	0.0005ND	No	63	n/a	n/a	88.89	n/a	n/a	0.0004803	NP Inter (NDs) 1 of 2
Lead (mg/L)	MW-4B	0.00204	n/a	4/12/2023	0.0005ND	No	63	n/a	n/a	88.89	n/a	n/a	0.0004803	NP Inter (NDs) 1 of 2
Lead (mg/L)	MW-5B	0.00204	n/a	4/12/2023	0.0005ND	No	63	n/a	n/a	88.89	n/a	n/a	0.0004803	NP Inter (NDs) 1 of 2
Magnesium (mg/L)	**MW-14A**	**44.46**	**n/a**	**4/11/2023**	**122**	**Yes**	**36**	**5.599**	**0.4658**	**0**	**None**	**sqrt(x)**	**0.0003583**	**Param Inter 1 of 2**
Magnesium (mg/L)	**MW-15A**	**44.46**	**n/a**	**4/11/2023**	**48.7**	**Yes**	**36**	**5.599**	**0.4658**	**0**	**None**	**sqrt(x)**	**0.0003583**	**Param Inter 1 of 2**
Magnesium (mg/L)	MW-21	44.46	n/a	4/11/2023	33	No	36	5.599	0.4658	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-24	44.46	n/a	4/11/2023	34.7	No	36	5.599	0.4658	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-4B	44.46	n/a	4/12/2023	33.9	No	36	5.599	0.4658	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-5B	44.46	n/a	4/12/2023	34.8	No	36	5.599	0.4658	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-6A	44.46	n/a	4/12/2023	31.2	No	36	5.599	0.4658	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-14A	1.219	n/a	4/11/2023	0.005ND	No	35	0.4912	0.2666	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-24	1.219	n/a	4/11/2023	0.0144	No	35	0.4912	0.2666	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-4B	1.219	n/a	4/12/2023	0.51	No	35	0.4912	0.2666	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-5B	1.219	n/a	4/12/2023	0.453	No	35	0.4912	0.2666	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-6A	1.219	n/a	4/12/2023	0.113	No	35	0.4912	0.2666	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2

Interwell Prediction Limits - Monitoring Wells (April 2023) - All Results

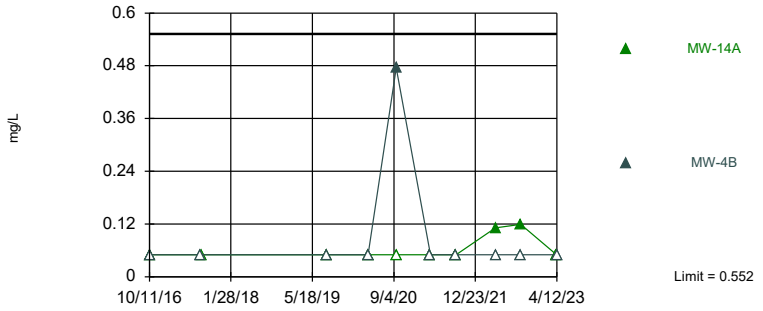
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:16 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Molybdenum (mg/L)	MW-21	0.00822	n/a	4/11/2023	0.002ND	No	65	n/a	n/a	66.15	n/a	n/a	0.0004535	NP Inter (NDs) 1 of 2
Molybdenum (mg/L)	MW-24	0.00822	n/a	4/11/2023	0.002ND	No	65	n/a	n/a	66.15	n/a	n/a	0.0004535	NP Inter (NDs) 1 of 2
Molybdenum (mg/L)	MW-4B	0.00822	n/a	4/12/2023	0.002ND	No	65	n/a	n/a	66.15	n/a	n/a	0.0004535	NP Inter (NDs) 1 of 2
Molybdenum (mg/L)	MW-5B	0.00822	n/a	4/12/2023	0.002ND	No	65	n/a	n/a	66.15	n/a	n/a	0.0004535	NP Inter (NDs) 1 of 2
Nickel (mg/L)	MW-21	0.00628	n/a	4/11/2023	0.005ND	No	36	n/a	n/a	97.22	n/a	n/a	0.001377	NP Inter (NDs) 1 of 2
Nickel (mg/L)	MW-4B	0.00628	n/a	4/12/2023	0.0051	No	36	n/a	n/a	97.22	n/a	n/a	0.001377	NP Inter (NDs) 1 of 2
Selenium (mg/L)	MW-14A	0.005	n/a	4/11/2023	0.005ND	No	63	n/a	n/a	100	n/a	n/a	0.0004803	NP Inter (NDs) 1 of 2
Selenium (mg/L)	MW-15A	0.005	n/a	4/11/2023	0.005ND	No	63	n/a	n/a	100	n/a	n/a	0.0004803	NP Inter (NDs) 1 of 2
Selenium (mg/L)	MW-21	0.005	n/a	4/11/2023	0.005ND	No	63	n/a	n/a	100	n/a	n/a	0.0004803	NP Inter (NDs) 1 of 2
Strontium (mg/L)	MW-14A	0.3101	n/a	4/11/2023	0.293	No	36	0.1528	0.06856	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-15A	0.3101	n/a	4/11/2023	0.0985	No	36	0.1528	0.06856	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-21	0.3101	n/a	4/11/2023	0.153	No	36	0.1528	0.06856	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-24	0.3101	n/a	4/11/2023	0.0795	No	36	0.1528	0.06856	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-4B	0.3101	n/a	4/12/2023	0.091	No	36	0.1528	0.06856	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-5B	0.3101	n/a	4/12/2023	0.149	No	36	0.1528	0.06856	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-6A	0.3101	n/a	4/12/2023	0.194	No	36	0.1528	0.06856	0	None	No	0.0003583	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**	**0.0004535**	**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	0.0004535	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	0.0004535	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-24	366	n/a	4/11/2023	87.8	No	65	n/a	n/a	0	n/a	n/a	0.0004535	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	0.0004535	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	0.0004535	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	0.0004535	NP Inter (normality) 1 of 2

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Non-parametric



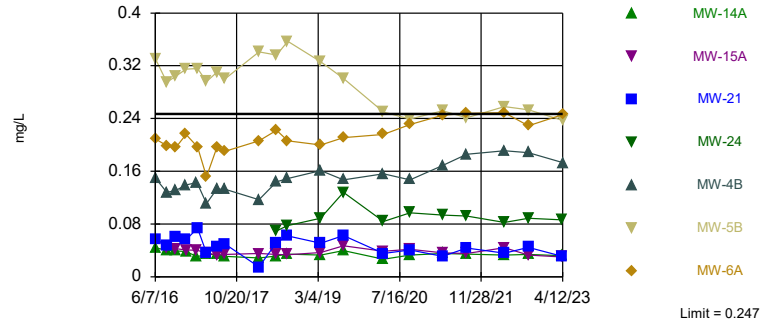
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 36 background values. 77.78% NDs. Annual per-constituent alpha = 0.01911. Individual comparison alpha = 0.001377 (1 of 2). Comparing 2 points to limit. Assumes 5 future values.

Constituent: Aluminum Analysis Run 11/9/2023 9:13 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Within Limit

Prediction Limit

Interwell Non-parametric



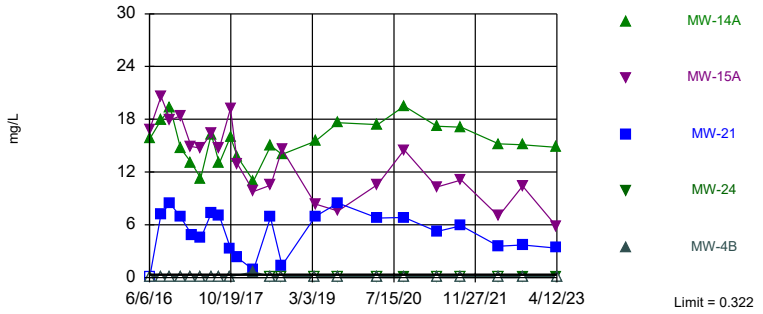
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 63 background values. Annual per-constituent alpha = 0.006703. Individual comparison alpha = 0.0004803 (1 of 2). Comparing 7 points to limit.

Constituent: Barium Analysis Run 11/9/2023 9:13 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Exceeds Limit: MW-14A, MW-15A, MW-21

Prediction Limit

Interwell Non-parametric



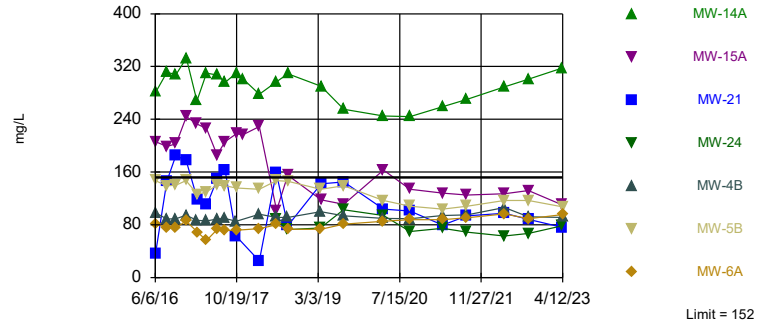
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 65 background values. 87.69% NDs. Annual per-constituent alpha = 0.006331. Individual comparison alpha = 0.0004535 (1 of 2). Comparing 5 points to limit. Assumes 2 future values.

Constituent: Boron Analysis Run 11/9/2023 9:13 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Exceeds Limit: MW-14A

Prediction Limit

Interwell Non-parametric



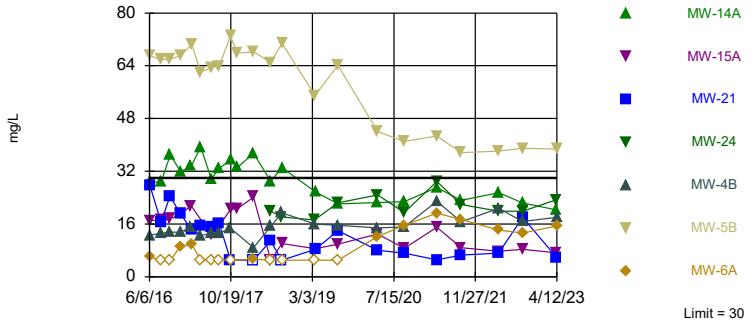
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 65 background values. Annual per-constituent alpha = 0.006331. Individual comparison alpha = 0.0004535 (1 of 2). Comparing 7 points to limit.

Constituent: Calcium Analysis Run 11/9/2023 9:13 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Exceeds Limit: MW-5B

Prediction Limit

Interwell Non-parametric



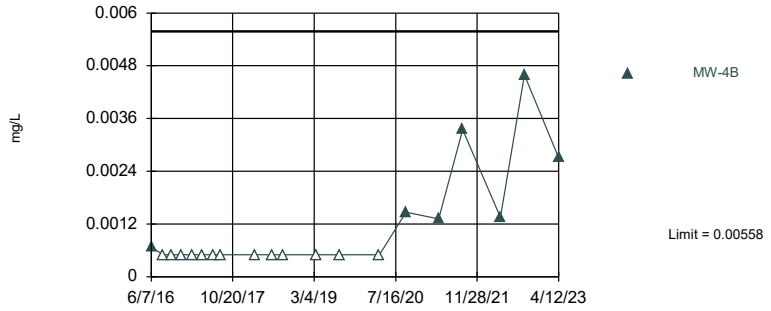
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 65 background values. 29.23% NDs. Annual per-constituent alpha = 0.006331. Individual comparison alpha = 0.0004535 (1 of 2). Comparing 7 points to limit.

Constituent: Chloride Analysis Run 11/9/2023 9:13 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Non-parametric



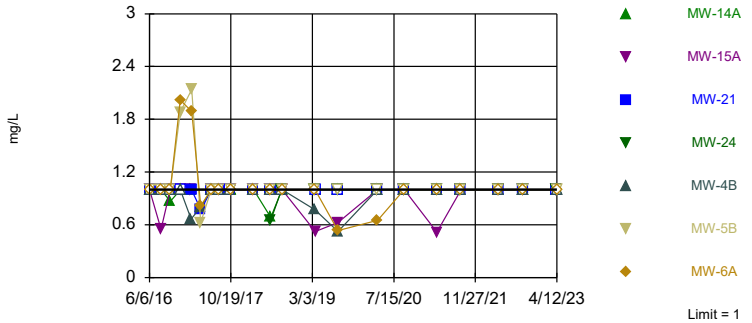
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 64 background values. 37.5% NDs. Annual per-constituent alpha = 0.006517. Individual comparison alpha = 0.0004669 (1 of 2). Assumes 6 future values.

Constituent: Cobalt Analysis Run 11/9/2023 9:13 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Non-parametric



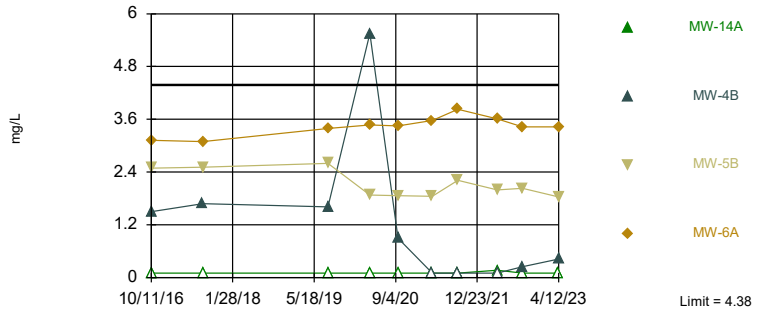
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 64 background values. 87.5% NDs. Annual per-constituent alpha = 0.006517. Individual comparison alpha = 0.0004669 (1 of 2). Comparing 7 points to limit.

Constituent: Fluoride Analysis Run 11/9/2023 9:13 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Non-parametric



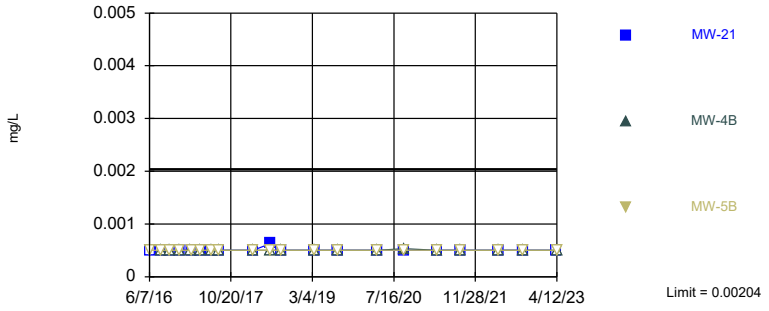
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 36 background values. 38.89% NDs. Annual per-constituent alpha = 0.01911. Individual comparison alpha = 0.001377 (1 of 2). Comparing 4 points to limit. Assumes 3 future values.

Constituent: Iron Analysis Run 11/9/2023 9:13 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
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 63 background values. 88.89% NDs. Annual per-constituent alpha = 0.006703. Individual comparison alpha = 0.0004803 (1 of 2). Comparing 3 points to limit. Assumes 4 future values.

Constituent: Lead Analysis Run 11/9/2023 9:13 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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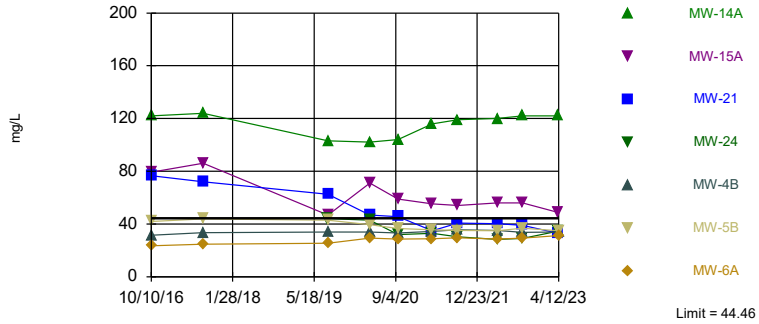
Exceeds Limit: MW-14A, MW-15A

Prediction Limit

Interwell Parametric



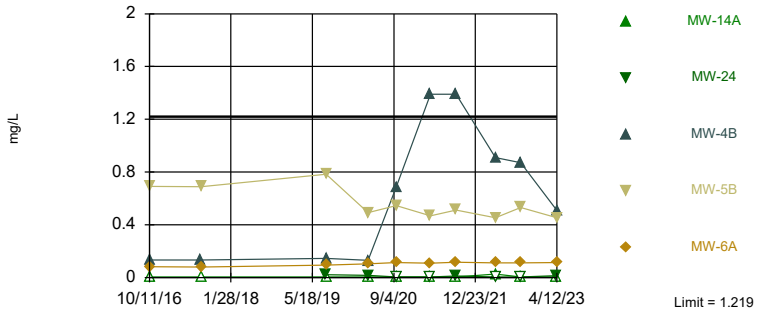
Background Data Summary (based on square root transformation): Mean=5.599, Std. Dev.=0.4658, n=36. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9151, critical = 0.912. Kappa = 2.295 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit.

Constituent: Magnesium Analysis Run 11/9/2023 9:13 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Parametric



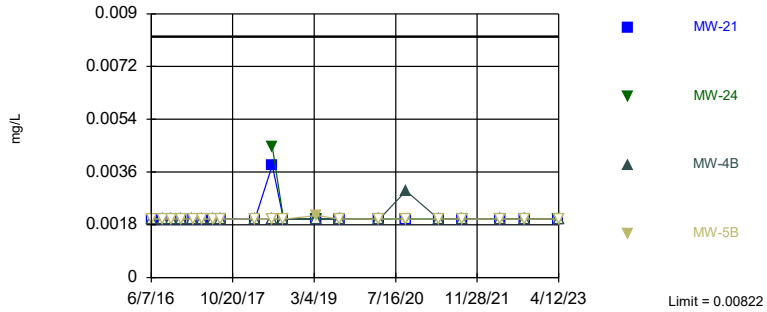
Background Data Summary (based on square root transformation): Mean=0.4912, Std. Dev.=0.2666, n=35. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9155, critical = 0.91. Kappa = 2.299 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 5 points to limit. Assumes 2 future values.

Constituent: Manganese Analysis Run 11/9/2023 9:14 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Non-parametric



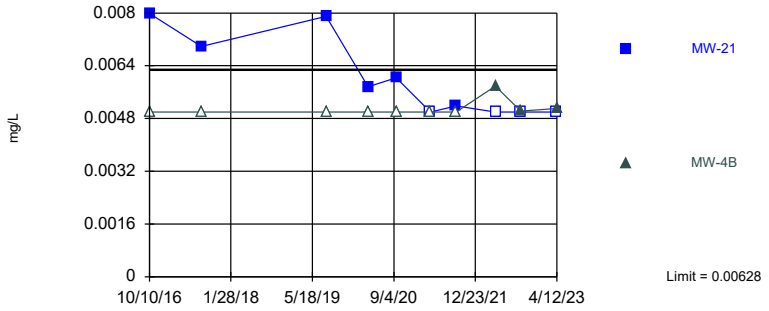
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 65 background values. 66.15% NDs. Annual per-constituent alpha = 0.006331. Individual comparison alpha = 0.0004535 (1 of 2). Comparing 4 points to limit. Assumes 3 future values.

Constituent: Molybdenum Analysis Run 11/9/2023 9:14 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Non-parametric



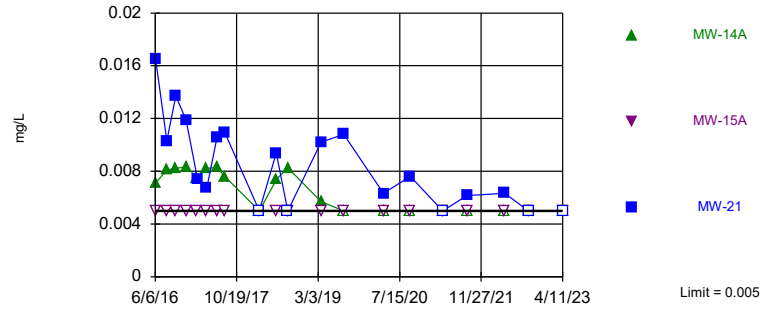
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 36 background values. 97.22% NDs. Annual per-constituent alpha = 0.01911. Individual comparison alpha = 0.001377 (1 of 2). Comparing 2 points to limit. Assumes 5 future values.

Constituent: Nickel Analysis Run 11/9/2023 9:14 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Non-parametric



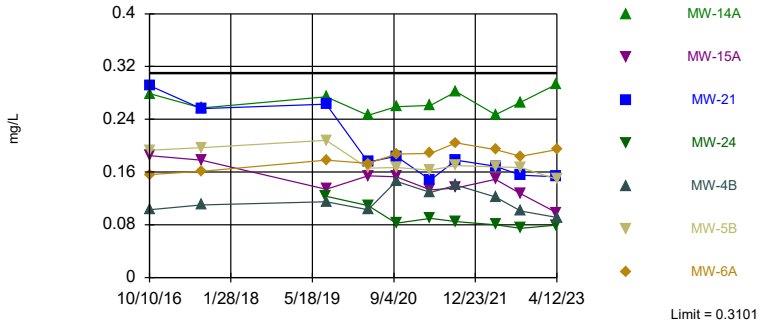
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 63) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.006703. Individual comparison alpha = 0.0004803 (1 of 2). Comparing 3 points to limit. Assumes 4 future values.

Constituent: Selenium Analysis Run 11/9/2023 9:14 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Within Limit

Prediction Limit

Interwell Parametric



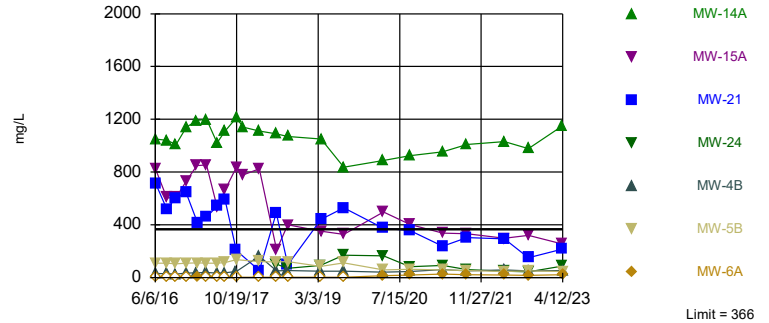
Background Data Summary: Mean=0.1528, Std. Dev.=0.06856, n=36. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9325, critical = 0.912. Kappa = 2.295 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit.

Constituent: Strontium Analysis Run 11/9/2023 9:14 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
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 = 0.006331. Individual comparison alpha = 0.0004535 (1 of 2). Comparing 7 points to limit.

Constituent: Sulfate Analysis Run 11/9/2023 9:14 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Prediction Limit

Constituent: Aluminum (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-4B	MW-14A	MW-22 (bg)	MW-23 (bg)
10/10/2016	<0.05	0.0826				
10/11/2016			<0.05	<0.05		
8/7/2017	<0.05	<0.05	<0.05			
8/8/2017				<0.05		
8/6/2019	<0.05				<0.05	0.253
8/7/2019		<0.05	<0.05	<0.05		
4/7/2020	<0.05	<0.05	<0.05	<0.05	<0.05	0.552
9/18/2020	<0.05	<0.05	0.475	<0.05	<0.05	<0.05
4/5/2021	<0.05	<0.05	<0.05	<0.05	<0.05	0.39
9/1/2021	<0.05	<0.05	<0.05	<0.05	<0.05	0.135
4/20/2022	<0.05	<0.05	<0.05	0.111	<0.05	0.478
9/14/2022	<0.05	<0.05	<0.05	0.119	<0.05	0.142
4/10/2023					<0.05	
4/11/2023	<0.05			<0.05		
4/12/2023		<0.05	<0.05			0.233

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Barium (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-08 (bg)	MW-5B	MW-4B	MW-6A	MW-21	MW-14A	MW-15A	MW-22 (bg)
6/6/2016	0.168							2.13 (o)	
6/7/2016		0.0861	0.331	0.15	0.209				
6/8/2016						0.0573	0.0443		
8/15/2016	0.161					0.0482	0.0402	0.044	
8/16/2016		0.0671	0.295	0.128	0.199				
10/10/2016	0.163	0.0706				0.0606			
10/11/2016			0.304	0.131	0.196		0.0391	0.0426	
12/12/2016			0.315	0.139	0.216	0.056			
12/14/2016	0.15	0.0645					0.0383	0.0406	
2/17/2017	0.151			0.143			0.0306	0.0402	
2/21/2017		0.0594 (F1)	0.316		0.197	0.0735			
4/17/2017	0.138	0.0636	0.296	0.111	0.152		0.0341	0.0364	
4/18/2017						0.0356			
6/19/2017	0.154	0.076							
6/20/2017			0.31	0.133		0.0461			
6/21/2017					0.197		0.0338	0.0327	
8/7/2017	0.157	0.0596		0.133					
8/8/2017			0.3		0.19	0.0499	0.031	0.0338	
3/5/2018	0.129								
3/6/2018		0.0617	0.341	0.117	0.206	0.0148			0.15
3/7/2018							0.0285	0.0352	
6/19/2018	0.162	0.0761				0.0515			0.184
6/20/2018							0.0314	0.0338	
6/21/2018			0.336	0.144	0.222				
8/27/2018	0.216	0.0649							0.181
8/28/2018				0.149		0.0622			
8/29/2018			0.357		0.206		0.0344	0.0335	
3/18/2019		0.0751							
3/19/2019	0.185		0.326	0.161	0.2				0.209
3/20/2019						0.0511	0.0328	0.037	
8/6/2019		0.0733							0.215
8/7/2019	0.215		0.301	0.147	0.211	0.0624	0.0398	0.047	
4/7/2020	0.199	0.0613	0.25	0.156	0.216	0.0352	0.0266	0.0389	0.222
9/18/2020	0.227	0.0549	0.239	0.147	0.231	0.0407	0.0328	0.0416	0.222
4/5/2021	0.196	0.0596	0.252	0.169	0.245	0.0309	0.0355	0.0365	0.242
9/1/2021	0.233	0.0623	0.241	0.186	0.248	0.0434	0.0345	0.0355	0.247
4/20/2022	0.208	0.0631	0.258	0.191	0.249	0.036	0.0327	0.0443	0.239
9/14/2022	0.223	0.0703	0.253	0.188	0.229	0.0447	0.034	0.0327	0.243
4/10/2023									0.227
4/11/2023		0.07				0.031	0.032	0.0299	
4/12/2023	0.19		0.237	0.173	0.246				

Prediction Limit

Constituent: Barium (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-23 (bg)	MW-24
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		
3/5/2018		
3/6/2018		
3/7/2018		
6/19/2018		
6/20/2018	0.106	0.0695
6/21/2018		
8/27/2018	0.0779	0.0776
8/28/2018		
8/29/2018		
3/18/2019		0.0889
3/19/2019	0.0922	
3/20/2019		
8/6/2019	0.0635	0.128
8/7/2019		
4/7/2020	0.0654	0.084
9/18/2020	0.0491	0.0969
4/5/2021	0.0608	0.0936
9/1/2021	0.0497	0.0922
4/20/2022	0.0572	0.0826
9/14/2022	0.0507	0.0887
4/10/2023		
4/11/2023		0.0863
4/12/2023	0.0518	

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-15A	MW-08 (bg)	MW-4B	MW-21	MW-14A	MW-22 (bg)	MW-24	MW-23 (bg)
6/6/2016	<0.1	16.8							
6/7/2016			<0.1	<0.1					
6/8/2016					<0.1	15.8			
8/15/2016	<0.1	20.6			7.23	17.9			
8/16/2016			<0.1	<0.1					
10/10/2016	<0.1		<0.1		8.45				
10/11/2016		17.9		<0.1		19.3			
12/12/2016				<0.1	6.93				
12/14/2016	<0.1	18.4	<0.1			14.7			
2/17/2017	<0.1	14.9		<0.1		13.1			
2/21/2017			<0.1		4.87				
4/17/2017	<0.1	14.7	<0.1	<0.1		11.3			
4/18/2017					4.49				
6/19/2017	<0.1		<0.1						
6/20/2017				<0.1	7.36				
6/21/2017		16.4				16.3			
8/7/2017	<0.1		<0.1	<0.1					
8/8/2017		14.7			7.05	13			
10/16/2017	<0.1		<0.1	<0.1	3.33				
10/17/2017		19.2				16			
11/28/2017		12.9 (R)			2.24 (R)	13.7 (R)			
3/5/2018	<0.1								
3/6/2018			<0.1	0.66	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		<0.1	<0.1
6/21/2018				<0.1					
8/27/2018	<0.1		<0.1				<0.1	<0.1	<0.1
8/28/2018				<0.1	1.36				
8/29/2018		14.6				14			
3/18/2019			<0.1					<0.1	
3/19/2019	<0.1			<0.1			0.299		<0.1
3/20/2019		8.35			6.95	15.5			
8/6/2019			0.205				<0.1	<0.1	<0.1
8/7/2019	<0.1	7.56		<0.1	8.46	17.6			
4/7/2020	<0.1	10.6	<0.1	<0.1	6.76	17.4	<0.1	<0.1	<0.1
9/18/2020	<0.1	14.5	<0.1	<0.1	6.82	19.5	0.263	0.109	0.15
4/5/2021	<0.1	10.3	<0.1	<0.1	5.24	17.2	<0.1	<0.1	<0.1
9/1/2021	<0.1	11.1	<0.1	<0.1	5.88	17.1	<0.1	<0.1	<0.1
4/20/2022	<0.1	6.98	<0.1	<0.1	3.57	15.2	<0.1	<0.1	<0.1
9/14/2022	<0.1	10.4	<0.1	<0.1	3.69	15.1	0.322	0.134	0.204
4/10/2023							0.247		
4/11/2023		5.8	<0.1		3.35	14.8		0.114	
4/12/2023	<0.1			<0.1					0.145

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells 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	206	89.3							
6/7/2016			152	147	81.4	98.2			
6/8/2016							281	37.2	
8/15/2016	199	80.7					311	146	
8/16/2016			117	139	75.4	88.8			
10/10/2016		83.3	118					185	
10/11/2016	203			140	75.7	89.3	308		
12/12/2016				147	85.6	94.5		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	130	56.3	85.9	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		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	134	74.1	95.8		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	80.1	91.4			
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	73.2	99.7			91.6
3/20/2019	118						290	142	
8/6/2019			132						83.8
8/7/2019	111	78.9		139	80.9	93.8	255	145	
4/7/2020	163	75.4	92.4	117	85.1	89.6	245	104	80.9
9/18/2020	134	74.2	77.7	108	87.9	89	244	101	75.5
4/5/2021	128	78.8	81.2	104	87.6	94.1	259	79.5	78.4
9/1/2021	125	80	78.3	108	90.6	95.1	270	93.5	79.4
4/20/2022	127	90.4	69.6	117	96.5	106	289	97.5	80.2
9/14/2022	132	82	76.8	117	89	92.3	301	88.2	79.6
4/10/2023									80.4
4/11/2023	110		78.2				318	76	
4/12/2023		83.7		107	95.4	91.3			

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	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	88	70.5
6/21/2018		
8/27/2018	72.8	63.9
8/28/2018		
8/29/2018		
3/18/2019	75	
3/19/2019		59.7
3/20/2019		
8/6/2019	103	59.5
8/7/2019		
4/7/2020	94.3	61
9/18/2020	69.9	52.1
4/5/2021	74.6	56.3
9/1/2021	69	56.1
4/20/2022	62.8	54
9/14/2022	66.8	54.5
4/10/2023		
4/11/2023	78.6	
4/12/2023		55.3

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells 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			

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	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	19.9	15.9
6/21/2018		
8/27/2018	18.1	14.2
8/28/2018		
8/29/2018		
3/18/2019	17.3	
3/19/2019		10.5
3/20/2019		
8/6/2019	22.4	13.8
8/7/2019		
4/7/2020	24.8	15.7
9/18/2020	19.5	14.4
4/5/2021	28.9	21.4
9/1/2021	21.9	15.2
4/20/2022	19.9	16.9
9/14/2022	19.9	16.2
4/10/2023		
4/11/2023	23.4	
4/12/2023		17.7

Prediction Limit

Constituent: Cobalt (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-22 (bg)	MW-23 (bg)
6/6/2016	0.000555				
6/7/2016		<0.0005	0.000681		
8/15/2016	<0.0005				
8/16/2016		<0.0005	<0.0005		
10/10/2016	0.000523	<0.0005			
10/11/2016			<0.0005		
12/12/2016			<0.0005		
12/14/2016	0.000638	<0.0005			
2/17/2017	0.000663		<0.0005		
2/21/2017		<0.0005			
4/17/2017	0.000779	<0.0005	<0.0005		
6/19/2017	0.000621	0.000601			
6/20/2017			<0.0005		
8/7/2017	0.000695	0.00051	<0.0005		
3/5/2018	0.000627				
3/6/2018		<0.0005	<0.0005	0.00142	
5/14/2018				0.0012	
6/19/2018	0.00107	<0.0005		0.00129	
6/20/2018					0.00161
6/21/2018			<0.0005		
8/27/2018	0.00088	<0.0005		0.00149	0.00066
8/28/2018			<0.0005		
3/18/2019		0.00177			
3/19/2019	0.000783		<0.0005	<0.0005	0.00176
8/6/2019		0.00558		<0.0005	<0.0005
8/7/2019	0.000572		<0.0005		
4/7/2020	0.000581	0.000517	<0.0005	<0.0005	0.000817
9/18/2020	0.000751	0.000738	0.00147	<0.0005	<0.0005
4/5/2021	0.000752	0.000839	0.00132	<0.0005	0.000517
9/1/2021	0.000576	0.00127	0.00335	<0.0005	<0.0005
4/20/2022	0.00104	0.00143	0.00135	<0.0005	0.000561
9/14/2022	0.00109	0.00164	0.00459	<0.0005	<0.0005
4/10/2023				<0.0005	
4/11/2023		0.0014			
4/12/2023	0.00142		0.00271		<0.0005

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-15A	MW-6A	MW-4B	MW-08 (bg)	MW-5B	MW-21	MW-14A	MW-22 (bg)
6/6/2016	0.731	<1							
6/7/2016			<1	<1	<1	<1			
6/8/2016							<1	<1	
8/15/2016	<1	0.549					<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			1.89		<1	2.14	0.993		
4/17/2017	0.774	6.7 (o)	0.814	0.801	1.69 (o)	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	0.596	0.625	0.535	0.525		<1	<1	<1	
4/7/2020	<1	<1	0.652	<1	0.864	<1	<1	<1	<1
9/18/2020	<1	<1	<1	<1	<1	<1	<1	<1	<1
4/5/2021	<1	0.516	<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			

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-23 (bg)	MW-24
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	0.653
6/21/2018		
8/27/2018	<1	<1
8/28/2018		
8/29/2018		
3/18/2019		<1
3/19/2019	<1	
3/20/2019		
8/6/2019	<1	<1
8/7/2019		
4/7/2020	<1	<1
9/18/2020	<1	<1
4/5/2021	<1	<1
9/1/2021	<1	<1
4/20/2022	<1	<1
9/14/2022	<1	<1
4/10/2023		
4/11/2023		<1
4/12/2023	<1	

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Iron (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-5B	MW-4B	MW-6A	MW-14A	MW-23 (bg)	MW-22 (bg)
10/10/2016	<0.1	1.8						
10/11/2016			2.49	1.5	3.12	<0.1		
8/7/2017	<0.1	1.58		1.68				
8/8/2017			2.51		3.09	<0.1		
8/6/2019	<0.1						0.231	<0.1
8/7/2019		3.33	2.6	1.61	3.39	<0.1		
4/7/2020	<0.1	3.36	1.88	5.55	3.47	<0.1	0.485	<0.1
9/18/2020	<0.1	4.38	1.86	0.895	3.45	<0.1	<0.1	<0.1
4/5/2021	0.167	2.08	1.85	<0.1	3.57	<0.1	0.348	<0.1
9/1/2021	0.141	4.37	2.21	<0.1	3.83	<0.1	0.136	<0.1
4/20/2022	0.565	2.49	1.99	<0.1	3.61	0.165	0.492	<0.1
9/14/2022	0.609	2.7	2.03	0.25	3.43	<0.1	0.117	<0.1
4/10/2023								<0.1
4/11/2023	0.708					<0.1		
4/12/2023		1.09	1.83	0.423	3.43		0.21	

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Lead (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-08 (bg)	MW-5B	MW-21	MW-4B	MW-22 (bg)	MW-23 (bg)
6/6/2016	<0.0005						
6/7/2016		<0.0005	<0.0005		0.00147 (o)		
6/8/2016				<0.0005			
8/15/2016	<0.0005			<0.0005			
8/16/2016		<0.0005	<0.0005		<0.0005		
10/10/2016	<0.0005	<0.0005		<0.0005			
10/11/2016			<0.0005		<0.0005		
12/12/2016			<0.0005	<0.0005	<0.0005		
12/14/2016	<0.0005	<0.0005					
2/17/2017	<0.0005				<0.0005		
2/21/2017		<0.0005	<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	<0.0005	<0.0005		
8/7/2017	<0.0005	<0.0005			<0.0005		
8/8/2017			<0.0005	<0.0005			
3/5/2018	<0.0005						
3/6/2018		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6/19/2018	<0.0005	<0.0005		0.000633		<0.0005	
6/20/2018							0.00151
6/21/2018			<0.0005		<0.0005		
8/27/2018	<0.0005	<0.0005				<0.0005	0.000626
8/28/2018				<0.0005	<0.0005		
8/29/2018			<0.0005				
3/18/2019		<0.0005					
3/19/2019	<0.0005		<0.0005		<0.0005	<0.0005	0.00204
3/20/2019				<0.0005			
8/6/2019		<0.0005				<0.0005	0.000663
8/7/2019	<0.0005		<0.0005	<0.0005	<0.0005		
4/7/2020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00116
9/18/2020	<0.0005	<0.0005	<0.0005	<0.0005	0.000532	<0.0005	<0.0005
4/5/2021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000624
9/1/2021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/20/2022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000596
9/14/2022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/10/2023						<0.0005	
4/11/2023		<0.0005		<0.0005			
4/12/2023	<0.0005		<0.0005		<0.0005		<0.0005

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Magnesium (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-21	MW-10 (bg)	MW-15A	MW-14A	MW-4B	MW-5B	MW-6A	MW-22 (bg)
10/10/2016	44.1	76.6	33.8						
10/11/2016				79.3	122	31.4	42	23.5	
8/7/2017	36.4		37.8			33.4			
8/8/2017		72.1		86	124		43.8	24.7	
8/6/2019	50.1								33
8/7/2019		62.5	30	46.9	103	34	42.8	25.4	
4/7/2020	37.1	46.9	31.4	71	102	34	39.6	29.4	34.5
9/18/2020	31.8	45.6	31.9	59	104	33.2	36.6	28.5	31.1
4/5/2021	31.8	34.9	32.2	55.4	116	34.3	35.7	28.8	31
9/1/2021	31	40.8	31.3	54	119	35.6	35.2	29.6	31.4
4/20/2022	27.7	40.2	35	56	120	35.1	35	28.6	29.6
9/14/2022	30.1	39.1	33.3	56.1	122	33.6	36.8	29.4	31.8
4/10/2023									31.5
4/11/2023	31.1	33		48.7	122				
4/12/2023			34.5			33.9	34.8	31.2	

Prediction Limit

Constituent: Magnesium (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-23 (bg)	MW-24
10/10/2016		
10/11/2016		
8/7/2017		
8/8/2017		
8/6/2019	24.7	44.2
8/7/2019		
4/7/2020	28.5	43
9/18/2020	24.3	32
4/5/2021	25.3	33
9/1/2021	24.8	30.3
4/20/2022	23.3	28.3
9/14/2022	24.6	29.1
4/10/2023		
4/11/2023		34.7
4/12/2023	24.4	

Prediction Limit

Constituent: Manganese (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-5B	MW-14A	MW-6A	MW-4B	MW-23 (bg)	MW-24	MW-22 (bg)
10/10/2016	0.28	0.151							
10/11/2016			0.69	<0.01	0.0818	0.133			
8/7/2017	0.237	0.166				0.132			
8/8/2017			0.689	<0.01	0.0802				
8/6/2019	0.758						0.0443	0.0223	1.74 (o)
8/7/2019		0.177	0.784	<0.01	0.0941	0.145			
4/7/2020	0.119	0.184	0.492	<0.01	0.103	0.13	0.0718	0.0156	0.0896
9/18/2020	0.652	0.251	0.546	<0.01	0.113	0.686	0.0127	<0.01	1.36
4/5/2021	0.185	0.199	0.467	<0.01	0.109	1.39	0.0634	<0.01	0.175
9/1/2021	0.663	0.221	0.512	<0.01	0.117	1.39	0.0444	0.0126	1.27
4/20/2022	0.411	0.231	0.454	0.0264	0.112	0.91	0.0588	<0.01	0.106
9/14/2022	0.749	0.31	0.532	<0.01	0.112	0.871	0.0222	<0.01	0.795
4/10/2023									0.0633
4/11/2023	0.309			<0.01				0.0144	
4/12/2023		0.396	0.453		0.113	0.51	0.0372		

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Molybdenum (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-5B	MW-21	MW-22 (bg)	MW-23 (bg)	MW-24
6/6/2016	<0.002							
6/7/2016		<0.002	<0.002	<0.002				
6/8/2016					<0.002			
8/15/2016	<0.002				<0.002			
8/16/2016		<0.002	<0.002	<0.002				
10/10/2016	<0.002	<0.002			<0.002			
10/11/2016			<0.002	<0.002				
12/12/2016			<0.002	<0.002	<0.002			
12/14/2016	<0.002	<0.002						
2/17/2017	<0.002		<0.002					
2/21/2017		<0.002		<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	<0.002	<0.002			
8/7/2017	<0.002	<0.002	<0.002					
8/8/2017				<0.002	<0.002			
3/5/2018	<0.002							
3/6/2018		0.0022	<0.002	<0.002	<0.002	0.00568		
5/14/2018		<0.002				0.00385		
6/19/2018	<0.002	<0.002			0.00383	0.00423		
6/20/2018							0.00822	0.00447
6/21/2018			<0.002	<0.002				
8/27/2018	0.0022	0.00224				0.00424	0.00617	<0.002
8/28/2018			<0.002		<0.002			
8/29/2018				<0.002				
3/18/2019		<0.002						<0.002
3/19/2019	0.00341		<0.002	0.00212		0.00263	<0.002	
3/20/2019					<0.002			
8/6/2019		<0.002				0.00574	<0.002	<0.002
8/7/2019	0.00219		<0.002	<0.002	<0.002			
4/7/2020	0.00215	<0.002	<0.002	<0.002	<0.002	0.00297	<0.002	<0.002
9/18/2020	<0.002	<0.002	0.00296	<0.002	<0.002	0.00529	<0.002	<0.002
4/5/2021	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
9/1/2021	0.00217	0.00218	<0.002	<0.002	<0.002	0.00558	<0.002	<0.002
4/20/2022	<0.002	<0.002	<0.002	<0.002	<0.002	0.0042	<0.002	<0.002
9/14/2022	<0.002	<0.002	<0.002	<0.002	<0.002	0.00446	<0.002	<0.002
4/10/2023						0.00364		
4/11/2023		<0.002			<0.002			<0.002
4/12/2023	<0.002		<0.002	<0.002			<0.002	

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Nickel (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-21	MW-10 (bg)	MW-4B	MW-22 (bg)	MW-23 (bg)
10/10/2016	<0.005	0.00799	<0.005			
10/11/2016				<0.005		
8/7/2017	<0.005		<0.005	<0.005		
8/8/2017		0.00699				
8/6/2019	<0.005				<0.005	<0.005
8/7/2019		0.0079	<0.005	<0.005		
4/7/2020	<0.005	0.00576	<0.005	<0.005	<0.005	<0.005
9/18/2020	0.00628	0.00604	<0.005	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	0.00518	<0.005	<0.005	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	0.00578	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	0.00503	<0.005	<0.005
4/10/2023					<0.005	
4/11/2023	<0.005	<0.005				
4/12/2023			<0.005	0.0051		<0.005

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Selenium (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-21	MW-14A	MW-22 (bg)	MW-23 (bg)
6/6/2016	<0.005	<0.005					
6/7/2016			<0.005				
6/8/2016				0.0165	0.0071		
8/15/2016	<0.005	<0.005		0.0103	0.00811		
8/16/2016			<0.005				
10/10/2016		<0.005	<0.005	0.0137			
10/11/2016	<0.005				0.00821		
12/12/2016				0.0119			
12/14/2016	<0.005	<0.005	<0.005		0.00834		
2/17/2017	<0.005	<0.005			0.00752		
2/21/2017			<0.005	0.0074			
4/17/2017	<0.005	<0.005	<0.005		0.00823		
4/18/2017				0.00674			
6/19/2017		<0.005	<0.005				
6/20/2017				0.0106			
6/21/2017	<0.005				0.00829		
8/7/2017		<0.005	<0.005				
8/8/2017	<0.005			0.0109	0.00759		
3/5/2018		<0.005					
3/6/2018			<0.005	<0.005		<0.005	
3/7/2018	0.00502				<0.005		
6/19/2018		<0.005	<0.005	0.00939		<0.005	
6/20/2018	<0.005				0.00739		<0.005
8/27/2018		<0.005	<0.005			<0.005	<0.005
8/28/2018				<0.005			
8/29/2018	<0.005				0.00827		
3/18/2019			<0.005				
3/19/2019		<0.005				<0.005	<0.005
3/20/2019	<0.005			0.0102	0.00569		
8/6/2019			<0.005			<0.005	<0.005
8/7/2019	<0.005	<0.005		0.0108	<0.005		
4/7/2020	<0.005	<0.005	<0.005	0.00632	<0.005	<0.005	<0.005
9/18/2020	<0.005	<0.005	<0.005	0.00762	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	0.00617	<0.005	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	0.00634	<0.005	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/10/2023						<0.005	
4/11/2023	<0.005		<0.005	<0.005	<0.005		
4/12/2023		<0.005					<0.005

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Strontium (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-21	MW-10 (bg)	MW-15A	MW-14A	MW-4B	MW-5B	MW-6A	MW-22 (bg)
10/10/2016	0.338	0.291	0.156						
10/11/2016				0.185	0.279	0.103	0.193	0.156	
8/7/2017	0.243		0.165			0.11			
8/8/2017		0.256		0.178	0.257		0.197	0.161	
8/6/2019	0.323								0.133
8/7/2019		0.263	0.199	0.134	0.274	0.115	0.208	0.178	
4/7/2020	0.233	0.175	0.19	0.154	0.246	0.103	0.166	0.173	0.129
9/18/2020	0.176	0.184	0.19	0.153	0.259	0.146	0.167	0.187	0.108
4/5/2021	0.188	0.148	0.179	0.133	0.261	0.129	0.163	0.188	0.13
9/1/2021	0.172	0.178	0.227	0.136	0.282	0.14	0.17	0.204	0.115
4/20/2022	0.164	0.169	0.173	0.149	0.247	0.122	0.168	0.194	0.127
9/14/2022	0.16	0.155	0.191	0.127	0.266	0.101	0.167	0.184	0.111
4/10/2023									0.137
4/11/2023	0.148	0.153		0.0985	0.293				
4/12/2023			0.178			0.091	0.149	0.194	

Prediction Limit

Constituent: Strontium (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-23 (bg)	MW-24
10/10/2016		
10/11/2016		
8/7/2017		
8/8/2017		
8/6/2019	0.0872	0.123
8/7/2019		
4/7/2020	0.0661	0.109
9/18/2020	0.0602	0.0824
4/5/2021	0.0639	0.0899
9/1/2021	0.068	0.085
4/20/2022	0.0595	0.0802
9/14/2022	0.0592	0.0746
4/10/2023		
4/11/2023		0.0795
4/12/2023	0.0526	

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells 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	827	42.1							
6/7/2016			366	109	<5	32.2			
6/8/2016							1050	713	
8/15/2016	605	33.8					1040	520	
8/16/2016			187	109	<5	28.4			
10/10/2016		36.4	187					603	
10/11/2016	607			105	<5	27.2	1010		
12/12/2016				109	<5	32.7		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	108	<5	39.5	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		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	122	<5	162		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	<5	51.3			
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	<5	48			134
3/20/2019	351						1050	442	
8/6/2019			276						139
8/7/2019	327	28.8		112	<5	47	837	529	
4/7/2020	496	18.6	123	58.9	13.6	41.5	888	373	143
9/18/2020	403	36.5	100	61.9	19.1	46.9	924	356	151
4/5/2021	338	27.6	99.7	57.4	27.3	60.1	952	237	154
9/1/2021	333	32.3	82.7	53.7	22.7	50.2	1010	303	154
4/20/2022	297	48.3	72.8	44.7	18.9	58.4	1030	293	158
9/14/2022	319	31.2	67.1	49.9	16.4	49.5	978	151	220
4/10/2023									147
4/11/2023	254		72.2				1150	215	
4/12/2023		39.8		45.8	20.5	54			

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 11/9/2023 9:16 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	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	101	38.4
6/21/2018		
8/27/2018	70	31.7
8/28/2018		
8/29/2018		
3/18/2019	90.8	
3/19/2019		26.2
3/20/2019		
8/6/2019	169	29.7
8/7/2019		
4/7/2020	164	25.5
9/18/2020	81	25.8
4/5/2021	91.2	35.5
9/1/2021	59.3	25.8
4/20/2022	48.5	25.4
9/14/2022	44.5	23
4/10/2023		
4/11/2023	87.8	
4/12/2023		25

FIGURE E.

Interwell Prediction Limits - Monitoring Wells (September 2023) - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:23 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Barium (mg/L)	**MW-5B**	**0.256**	**n/a**	**9/20/2023**	**0.274**	**Yes**	**67**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.0004267**	**NP Inter (normality) 1 of 2**
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**	**0.0004**	**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**	**0.0004**	**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**	**0.0004**	**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**	**0.0004**	**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**	**0.0004**	**NP Inter (normality) 1 of 2**
Magnesium (mg/L)	**MW-14A**	**44.12**	**n/a**	**9/19/2023**	**122**	**Yes**	**40**	**3.149**	**0.1687**	**0**	**None**	**x^(1/3)**	**0.0003583**	**Param Inter 1 of 2**
Magnesium (mg/L)	**MW-15A**	**44.12**	**n/a**	**9/19/2023**	**54**	**Yes**	**40**	**3.149**	**0.1687**	**0**	**None**	**x^(1/3)**	**0.0003583**	**Param Inter 1 of 2**
Selenium (mg/L)	**MW-21**	**0.005**	**n/a**	**9/19/2023**	**0.0053**	**Yes**	**67**	**n/a**	**n/a**	**100**	**n/a**	**n/a**	**0.0004267**	**NP Inter (NDs) 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**	**0.0004**	**NP Inter (normality) 1 of 2**

Interwell Prediction Limits - Monitoring Wells (September 2023) - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:23 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Aluminum (mg/L)	MW-14A	0.552	n/a	9/19/2023	0.05ND	No	40	n/a	n/a	77.5	n/a	n/a	0.001124	NP Inter (NDs) 1 of 2
Aluminum (mg/L)	MW-4B	0.552	n/a	9/20/2023	0.05ND	No	40	n/a	n/a	77.5	n/a	n/a	0.001124	NP Inter (NDs) 1 of 2
Barium (mg/L)	MW-14A	0.256	n/a	9/19/2023	0.0348	No	67	n/a	n/a	0	n/a	n/a	0.0004267	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-15A	0.256	n/a	9/19/2023	0.0338	No	67	n/a	n/a	0	n/a	n/a	0.0004267	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-21	0.256	n/a	9/19/2023	0.0559	No	67	n/a	n/a	0	n/a	n/a	0.0004267	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-24	0.256	n/a	9/19/2023	0.0698	No	67	n/a	n/a	0	n/a	n/a	0.0004267	NP Inter (normality) 1 of 2
Barium (mg/L)	MW-4B	0.256	n/a	9/20/2023	0.181	No	67	n/a	n/a	0	n/a	n/a	0.0004267	NP Inter (normality) 1 of 2
Barium (mg/L)	**MW-5B**	**0.256**	**n/a**	**9/20/2023**	**0.274**	**Yes**	**67**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.0004267**	**NP Inter (normality) 1 of 2**
Barium (mg/L)	MW-6A	0.256	n/a	9/20/2023	0.222	No	67	n/a	n/a	0	n/a	n/a	0.0004267	NP Inter (normality) 1 of 2
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**	**0.0004**	**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**	**0.0004**	**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**	**0.0004**	**NP Inter (NDs) 1 of 2**
Boron (mg/L)	MW-24	0.322	n/a	9/19/2023	0.1ND	No	69	n/a	n/a	85.51	n/a	n/a	0.0004	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	0.0004	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**	**0.0004**	**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	0.0004	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	0.0004	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-24	152	n/a	9/19/2023	70.5	No	69	n/a	n/a	0	n/a	n/a	0.0004	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	0.0004	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	0.0004	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	0.0004	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	0.0004	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	0.0004	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	0.0004	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-24	30	n/a	9/19/2023	22.8	No	69	n/a	n/a	28.99	n/a	n/a	0.0004	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	0.0004	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**	**0.0004**	**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	0.0004	NP Inter (normality) 1 of 2
Cobalt (mg/L)	MW-4B	0.00558	n/a	9/20/2023	0.00374	No	68	n/a	n/a	38.24	n/a	n/a	0.0004134	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	0.0004134	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	0.0004134	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	0.0004134	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-24	1	n/a	9/19/2023	1ND	No	68	n/a	n/a	88.24	n/a	n/a	0.0004134	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	0.0004134	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	0.0004134	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	0.0004134	NP Inter (NDs) 1 of 2
Iron (mg/L)	MW-14A	4.38	n/a	9/19/2023	0.1ND	No	40	n/a	n/a	40	n/a	n/a	0.001124	NP Inter (normality) 1 of 2
Iron (mg/L)	MW-4B	4.38	n/a	9/20/2023	0.559	No	40	n/a	n/a	40	n/a	n/a	0.001124	NP Inter (normality) 1 of 2
Iron (mg/L)	MW-5B	4.38	n/a	9/20/2023	2.18	No	40	n/a	n/a	40	n/a	n/a	0.001124	NP Inter (normality) 1 of 2
Iron (mg/L)	MW-6A	4.38	n/a	9/20/2023	3.09	No	40	n/a	n/a	40	n/a	n/a	0.001124	NP Inter (normality) 1 of 2
Lead (mg/L)	MW-21	0.00204	n/a	9/19/2023	0.0005ND	No	67	n/a	n/a	89.55	n/a	n/a	0.0004267	NP Inter (NDs) 1 of 2
Lead (mg/L)	MW-4B	0.00204	n/a	9/20/2023	0.000576	No	67	n/a	n/a	89.55	n/a	n/a	0.0004267	NP Inter (NDs) 1 of 2
Lead (mg/L)	MW-5B	0.00204	n/a	9/20/2023	0.000627	No	67	n/a	n/a	89.55	n/a	n/a	0.0004267	NP Inter (NDs) 1 of 2
Magnesium (mg/L)	**MW-14A**	**44.12**	**n/a**	**9/19/2023**	**122**	**Yes**	**40**	**3.149**	**0.1687**	**0**	**None**	**x^(1/3)**	**0.0003583**	**Param Inter 1 of 2**
Magnesium (mg/L)	**MW-15A**	**44.12**	**n/a**	**9/19/2023**	**54**	**Yes**	**40**	**3.149**	**0.1687**	**0**	**None**	**x^(1/3)**	**0.0003583**	**Param Inter 1 of 2**
Magnesium (mg/L)	MW-21	44.12	n/a	9/19/2023	42.8	No	40	3.149	0.1687	0	None	x^(1/3)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-24	44.12	n/a	9/19/2023	29.9	No	40	3.149	0.1687	0	None	x^(1/3)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-4B	44.12	n/a	9/20/2023	33.6	No	40	3.149	0.1687	0	None	x^(1/3)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-5B	44.12	n/a	9/20/2023	37.6	No	40	3.149	0.1687	0	None	x^(1/3)	0.0003583	Param Inter 1 of 2
Magnesium (mg/L)	MW-6A	44.12	n/a	9/20/2023	27.2	No	40	3.149	0.1687	0	None	x^(1/3)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-14A	1.221	n/a	9/19/2023	0.005ND	No	39	0.4955	0.267	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-24	1.221	n/a	9/19/2023	0.0183	No	39	0.4955	0.267	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-4B	1.221	n/a	9/20/2023	0.612	No	39	0.4955	0.267	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-5B	1.221	n/a	9/20/2023	0.594	No	39	0.4955	0.267	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2
Manganese (mg/L)	MW-6A	1.221	n/a	9/20/2023	0.0995	No	39	0.4955	0.267	0	None	sqrt(x)	0.0003583	Param Inter 1 of 2

Interwell Prediction Limits - Monitoring Wells (September 2023) - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:23 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Molybdenum (mg/L)	MW-21	0.00822	n/a	9/19/2023	0.002ND	No	69	n/a	n/a	66.67	n/a	n/a	0.0004	NP Inter (NDs) 1 of 2
Molybdenum (mg/L)	MW-24	0.00822	n/a	9/19/2023	0.002ND	No	69	n/a	n/a	66.67	n/a	n/a	0.0004	NP Inter (NDs) 1 of 2
Molybdenum (mg/L)	MW-4B	0.00822	n/a	9/20/2023	0.002ND	No	69	n/a	n/a	66.67	n/a	n/a	0.0004	NP Inter (NDs) 1 of 2
Molybdenum (mg/L)	MW-5B	0.00822	n/a	9/20/2023	0.002ND	No	69	n/a	n/a	66.67	n/a	n/a	0.0004	NP Inter (NDs) 1 of 2
Nickel (mg/L)	MW-21	0.00628	n/a	9/19/2023	0.005ND	No	40	n/a	n/a	97.5	n/a	n/a	0.001124	NP Inter (NDs) 1 of 2
Nickel (mg/L)	MW-4B	0.00628	n/a	9/20/2023	0.005ND	No	40	n/a	n/a	97.5	n/a	n/a	0.001124	NP Inter (NDs) 1 of 2
Selenium (mg/L)	MW-14A	0.005	n/a	9/19/2023	0.005ND	No	67	n/a	n/a	100	n/a	n/a	0.0004267	NP Inter (NDs) 1 of 2
Selenium (mg/L)	MW-15A	0.005	n/a	9/19/2023	0.005ND	No	67	n/a	n/a	100	n/a	n/a	0.0004267	NP Inter (NDs) 1 of 2
Selenium (mg/L)	**MW-21**	**0.005**	**n/a**	**9/19/2023**	**0.0053**	**Yes**	**67**	**n/a**	**n/a**	**100**	**n/a**	**n/a**	**0.0004267**	**NP Inter (NDs) 1 of 2**
Strontium (mg/L)	MW-14A	0.3046	n/a	9/19/2023	0.282	No	40	0.1505	0.06765	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-15A	0.3046	n/a	9/19/2023	0.113	No	40	0.1505	0.06765	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-21	0.3046	n/a	9/19/2023	0.164	No	40	0.1505	0.06765	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-24	0.3046	n/a	9/19/2023	0.0768	No	40	0.1505	0.06765	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-4B	0.3046	n/a	9/20/2023	0.0958	No	40	0.1505	0.06765	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-5B	0.3046	n/a	9/20/2023	0.163	No	40	0.1505	0.06765	0	None	No	0.0003583	Param Inter 1 of 2
Strontium (mg/L)	MW-6A	0.3046	n/a	9/20/2023	0.165	No	40	0.1505	0.06765	0	None	No	0.0003583	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**	**0.0004**	**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	0.0004	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	0.0004	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-24	366	n/a	9/19/2023	62.9	No	69	n/a	n/a	0	n/a	n/a	0.0004	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	0.0004	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	0.0004	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	0.0004	NP Inter (normality) 1 of 2

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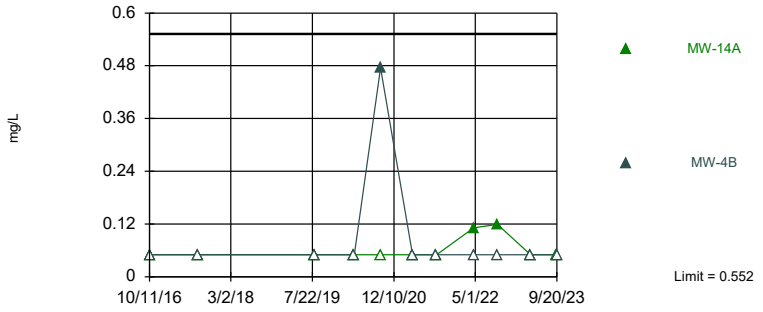
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 40 background values. 77.5% NDs. Annual per-constituent alpha = 0.01562. Individual comparison alpha = 0.001124 (1 of 2). Comparing 2 points to limit. Assumes 5 future values.

Constituent: Aluminum Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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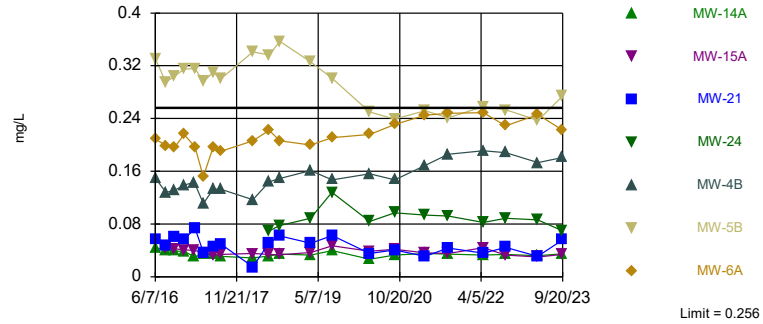
Exceeds Limit: MW-5B

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 67 background values. Annual per-constituent alpha = 0.005958. Individual comparison alpha = 0.0004267 (1 of 2). Comparing 7 points to limit.

Constituent: Barium Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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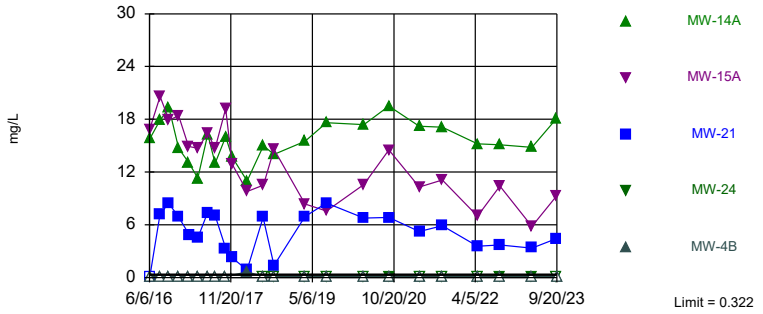
Hollow symbols indicate censored values.
Exceeds Limit: MW-14A, MW-15A, MW-21

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 = 0.005585. Individual comparison alpha = 0.0004 (1 of 2). Comparing 5 points to limit. Assumes 2 future values.

Constituent: Boron Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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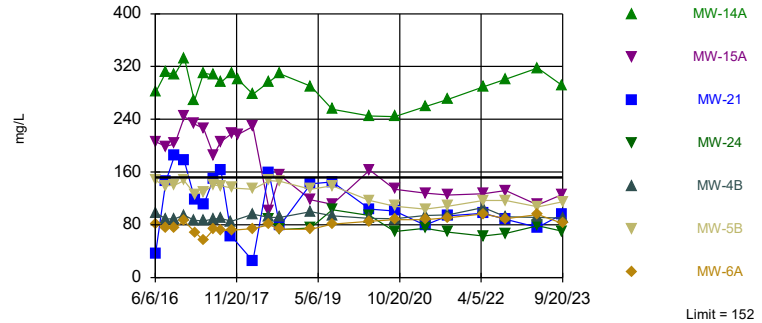
Exceeds Limit: MW-14A

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 = 0.005585. Individual comparison alpha = 0.0004 (1 of 2). Comparing 7 points to limit.

Constituent: Calcium Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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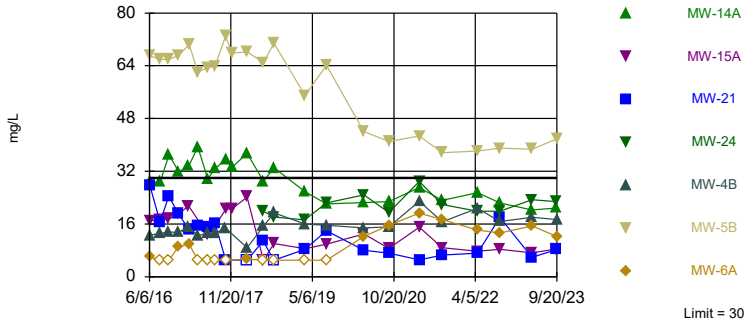
Hollow symbols indicate censored values.
Exceeds Limit: MW-5B

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 = 0.005585. Individual comparison alpha = 0.0004 (1 of 2). Comparing 7 points to limit.

Constituent: Chloride Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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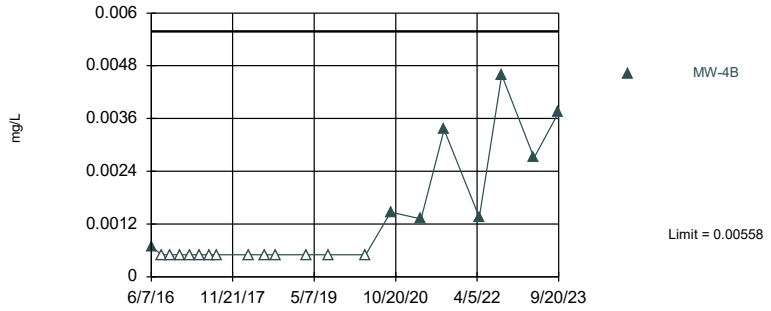
Hollow symbols indicate censored values.
Within Limit

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 68 background values. 38.24% NDs. Annual per-constituent alpha = 0.005771. Individual comparison alpha = 0.0004134 (1 of 2). Assumes 6 future values.

Constituent: Cobalt Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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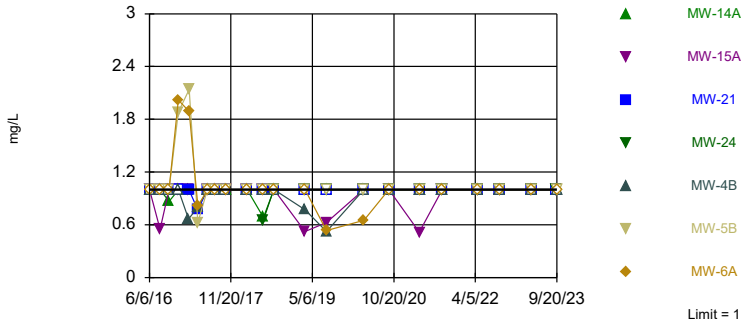
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Non-parametric



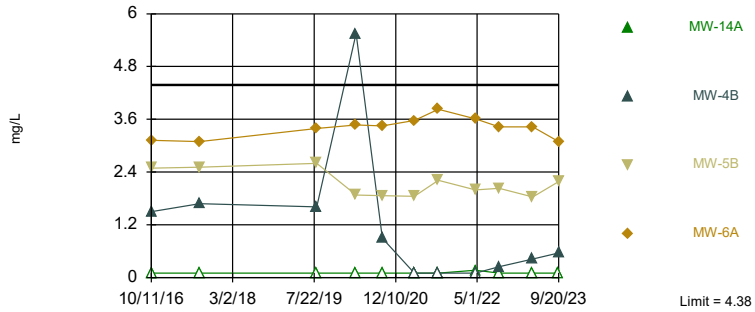
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 68 background values. 88.24% NDs. Annual per-constituent alpha = 0.005771. Individual comparison alpha = 0.0004134 (1 of 2). Comparing 7 points to limit.

Constituent: Fluoride Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Non-parametric



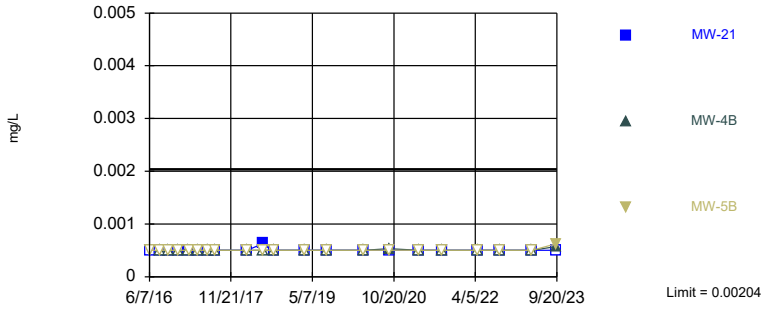
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 40 background values. 40% NDs. Annual per-constituent alpha = 0.01562. Individual comparison alpha = 0.001124 (1 of 2). Comparing 4 points to limit. Assumes 3 future values.

Constituent: Iron Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
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 67 background values. 89.55% NDs. Annual per-constituent alpha = 0.005958. Individual comparison alpha = 0.0004267 (1 of 2). Comparing 3 points to limit. Assumes 4 future values.

Constituent: Lead Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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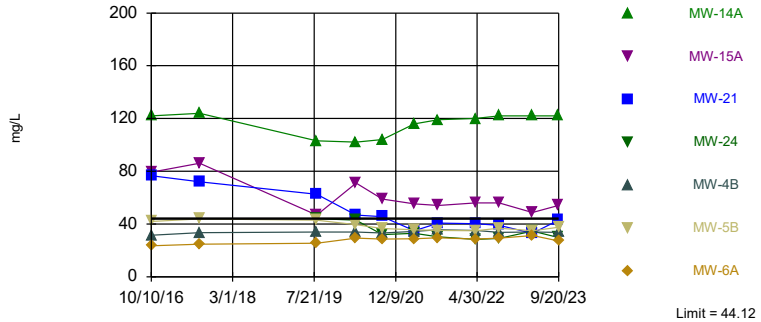
Exceeds Limit: MW-14A, MW-15A

Prediction Limit

Interwell Parametric



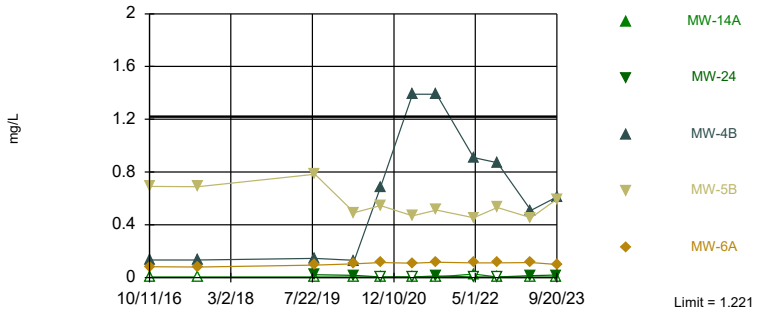
Background Data Summary (based on cube root transformation): Mean=3.149, Std. Dev.=0.1687, n=40. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9196, critical = 0.919. Kappa = 2.279 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit.

Constituent: Magnesium Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Parametric



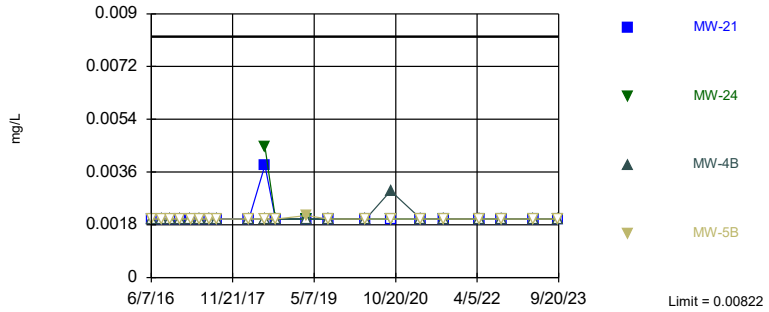
Background Data Summary (based on square root transformation): Mean=0.4955, Std. Dev.=0.267, n=39. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9287, critical = 0.917. Kappa = 2.283 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 5 points to limit. Assumes 2 future values.

Constituent: Manganese Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Non-parametric



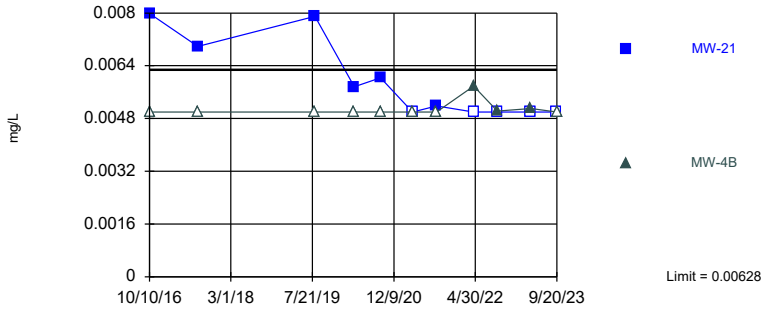
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 69 background values. 66.67% NDs. Annual per-constituent alpha = 0.005585. Individual comparison alpha = 0.0004 (1 of 2). Comparing 4 points to limit. Assumes 3 future values.

Constituent: Molybdenum Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Non-parametric



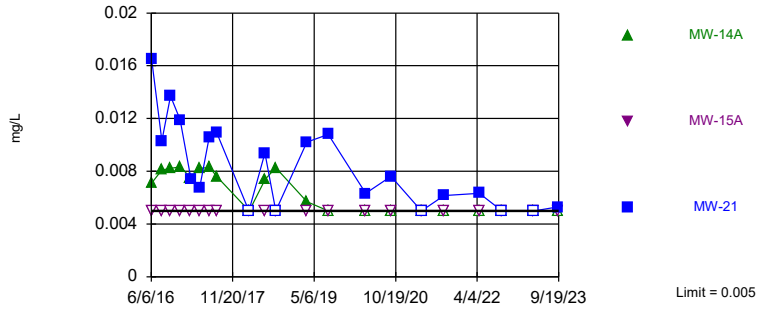
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 40 background values. 97.5% NDs. Annual per-constituent alpha = 0.01562. Individual comparison alpha = 0.001124 (1 of 2). Comparing 2 points to limit. Assumes 5 future values.

Constituent: Nickel Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Exceeds Limit: MW-21

Prediction Limit

Interwell Non-parametric



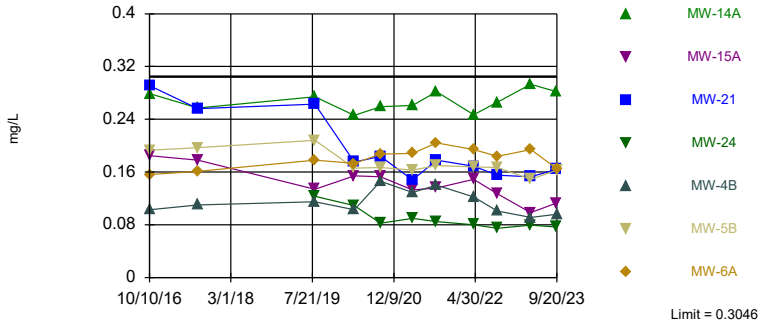
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 67) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.005958. Individual comparison alpha = 0.0004267 (1 of 2). Comparing 3 points to limit. Assumes 4 future values.

Constituent: Selenium Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Within Limit

Prediction Limit

Interwell Parametric



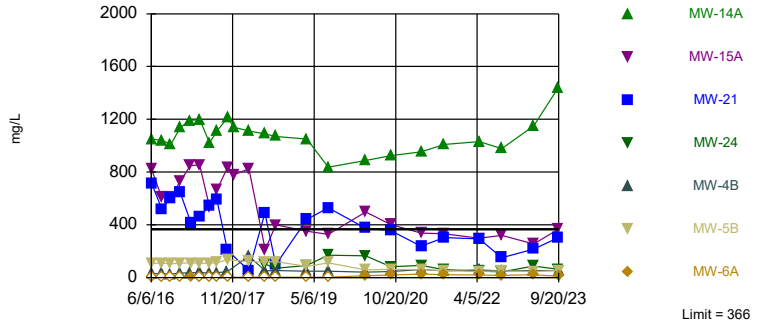
Background Data Summary: Mean=0.1505, Std. Dev.=0.06765, n=40. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9342, critical = 0.919. Kappa = 2.279 (c=21, w=7, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0003583. Comparing 7 points to limit.

Constituent: Strontium Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
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 = 0.005585. Individual comparison alpha = 0.0004 (1 of 2). Comparing 7 points to limit.

Constituent: Sulfate Analysis Run 11/9/2023 9:21 AM View: State Wells Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Prediction Limit

Constituent: Aluminum (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-4B	MW-14A	MW-23 (bg)	MW-22 (bg)
10/10/2016	<0.05	0.0826				
10/11/2016			<0.05	<0.05		
8/7/2017	<0.05	<0.05	<0.05			
8/8/2017				<0.05		
8/6/2019	<0.05				0.253	<0.05
8/7/2019		<0.05	<0.05	<0.05		
4/7/2020	<0.05	<0.05	<0.05	<0.05	0.552	<0.05
9/18/2020	<0.05	<0.05	0.475	<0.05	<0.05	<0.05
4/5/2021	<0.05	<0.05	<0.05	<0.05	0.39	<0.05
9/1/2021	<0.05	<0.05	<0.05	<0.05	0.135	<0.05
4/20/2022	<0.05	<0.05	<0.05	0.111	0.478	<0.05
9/14/2022	<0.05	<0.05	<0.05	0.119	0.142	<0.05
4/10/2023						<0.05
4/11/2023	<0.05			<0.05		
4/12/2023		<0.05	<0.05		0.233	
9/18/2023		<0.05			0.105	<0.05
9/19/2023	<0.05			<0.05		
9/20/2023			<0.05			

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Barium (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-08 (bg)	MW-6A	MW-4B	MW-5B	MW-21	MW-14A	MW-15A	MW-22 (bg)
6/6/2016	0.168							2.13 (o)	
6/7/2016		0.0861	0.209	0.15	0.331				
6/8/2016						0.0573	0.0443		
8/15/2016	0.161					0.0482	0.0402	0.044	
8/16/2016		0.0671	0.199	0.128	0.295				
10/10/2016	0.163	0.0706				0.0606			
10/11/2016			0.196	0.131	0.304		0.0391	0.0426	
12/12/2016			0.216	0.139	0.315	0.056			
12/14/2016	0.15	0.0645					0.0383	0.0406	
2/17/2017	0.151			0.143			0.0306	0.0402	
2/21/2017		0.0594 (F1)	0.197		0.316	0.0735			
4/17/2017	0.138	0.0636	0.152	0.111	0.296		0.0341	0.0364	
4/18/2017						0.0356			
6/19/2017	0.154	0.076							
6/20/2017				0.133	0.31	0.0461			
6/21/2017			0.197				0.0338	0.0327	
8/7/2017	0.157	0.0596		0.133					
8/8/2017			0.19		0.3	0.0499	0.031	0.0338	
3/5/2018	0.129								
3/6/2018		0.0617	0.206	0.117	0.341	0.0148			0.15
3/7/2018							0.0285	0.0352	
6/19/2018	0.162	0.0761				0.0515			0.184
6/20/2018							0.0314	0.0338	
6/21/2018			0.222	0.144	0.336				
8/27/2018	0.216	0.0649							0.181
8/28/2018				0.149		0.0622			
8/29/2018			0.206		0.357		0.0344	0.0335	
3/18/2019		0.0751							
3/19/2019	0.185		0.2	0.161	0.326				0.209
3/20/2019						0.0511	0.0328	0.037	
8/6/2019		0.0733							0.215
8/7/2019	0.215		0.211	0.147	0.301	0.0624	0.0398	0.047	
4/7/2020	0.199	0.0613	0.216	0.156	0.25	0.0352	0.0266	0.0389	0.222
9/18/2020	0.227	0.0549	0.231	0.147	0.239	0.0407	0.0328	0.0416	0.222
4/5/2021	0.196	0.0596	0.245	0.169	0.252	0.0309	0.0355	0.0365	0.242
9/1/2021	0.233	0.0623	0.248	0.186	0.241	0.0434	0.0345	0.0355	0.247
4/20/2022	0.208	0.0631	0.249	0.191	0.258	0.036	0.0327	0.0443	0.239
9/14/2022	0.223	0.0703	0.229	0.188	0.253	0.0447	0.034	0.0327	0.243
4/10/2023									0.227
4/11/2023		0.07				0.031	0.032	0.0299	
4/12/2023	0.19		0.246	0.173	0.237				
9/18/2023	0.233								0.256
9/19/2023		0.0782				0.0559	0.0348	0.0338	
9/20/2023			0.222	0.181	0.274				

Prediction Limit

Constituent: Barium (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	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		
3/5/2018		
3/6/2018		
3/7/2018		
6/19/2018		
6/20/2018	0.0695	0.106
6/21/2018		
8/27/2018	0.0776	0.0779
8/28/2018		
8/29/2018		
3/18/2019	0.0889	
3/19/2019		0.0922
3/20/2019		
8/6/2019	0.128	0.0635
8/7/2019		
4/7/2020	0.084	0.0654
9/18/2020	0.0969	0.0491
4/5/2021	0.0936	0.0608
9/1/2021	0.0922	0.0497
4/20/2022	0.0826	0.0572
9/14/2022	0.0887	0.0507
4/10/2023		
4/11/2023	0.0863	
4/12/2023		0.0518
9/18/2023		0.0533
9/19/2023	0.0698	
9/20/2023		

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-15A	MW-08 (bg)	MW-4B	MW-21	MW-14A	MW-22 (bg)	MW-24	MW-23 (bg)
6/6/2016	<0.1	16.8							
6/7/2016			<0.1	<0.1					
6/8/2016					<0.1	15.8			
8/15/2016	<0.1	20.6			7.23	17.9			
8/16/2016			<0.1	<0.1					
10/10/2016	<0.1		<0.1		8.45				
10/11/2016		17.9		<0.1		19.3			
12/12/2016				<0.1	6.93				
12/14/2016	<0.1	18.4	<0.1			14.7			
2/17/2017	<0.1	14.9		<0.1		13.1			
2/21/2017			<0.1		4.87				
4/17/2017	<0.1	14.7	<0.1	<0.1		11.3			
4/18/2017					4.49				
6/19/2017	<0.1		<0.1						
6/20/2017				<0.1	7.36				
6/21/2017		16.4				16.3			
8/7/2017	<0.1		<0.1	<0.1					
8/8/2017		14.7			7.05	13			
10/16/2017	<0.1		<0.1	<0.1	3.33				
10/17/2017		19.2				16			
11/28/2017		12.9 (R)			2.24 (R)	13.7 (R)			
3/5/2018	<0.1								
3/6/2018			<0.1	0.66	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		<0.1	<0.1
6/21/2018				<0.1					
8/27/2018	<0.1		<0.1				<0.1	<0.1	<0.1
8/28/2018				<0.1	1.36				
8/29/2018		14.6				14			
3/18/2019			<0.1					<0.1	
3/19/2019	<0.1			<0.1			0.299		<0.1
3/20/2019		8.35			6.95	15.5			
8/6/2019			0.205				<0.1	<0.1	<0.1
8/7/2019	<0.1	7.56		<0.1	8.46	17.6			
4/7/2020	<0.1	10.6	<0.1	<0.1	6.76	17.4	<0.1	<0.1	<0.1
9/18/2020	<0.1	14.5	<0.1	<0.1	6.82	19.5	0.263	0.109	0.15
4/5/2021	<0.1	10.3	<0.1	<0.1	5.24	17.2	<0.1	<0.1	<0.1
9/1/2021	<0.1	11.1	<0.1	<0.1	5.88	17.1	<0.1	<0.1	<0.1
4/20/2022	<0.1	6.98	<0.1	<0.1	3.57	15.2	<0.1	<0.1	<0.1
9/14/2022	<0.1	10.4	<0.1	<0.1	3.69	15.1	0.322	0.134	0.204
4/10/2023							0.247		
4/11/2023		5.8	<0.1		3.35	14.8		0.114	
4/12/2023	<0.1			<0.1					0.145
9/18/2023	<0.1						0.207		0.128
9/19/2023		9.28	<0.1		4.42	18.1		<0.1	
9/20/2023				<0.1					

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-6A	MW-5B	MW-4B	MW-14A	MW-21	MW-22 (bg)
6/6/2016	206	89.3							
6/7/2016			152	81.4	147	98.2			
6/8/2016							281	37.2	
8/15/2016	199	80.7					311	146	
8/16/2016			117	75.4	139	88.8			
10/10/2016		83.3	118					185	
10/11/2016	203			75.7	140	89.3	308		
12/12/2016				85.6	147	94.5		178	
12/14/2016	244	86.5	109				333		
2/17/2017	233	81.2				86.8	268		
2/21/2017			89.9	68.8	126			118	
4/17/2017	226	79.2	96.5	56.3	130	85.9	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			71.2	139		296	163	
10/16/2017		83.3	77			85.3		62.3	
10/17/2017	218			71.9	136		310		
11/28/2017	217 (R)						301 (R)		
3/5/2018		77.3							
3/6/2018			74.7	74.1	134	95.8		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				80.1	147	91.4			
8/27/2018		85.4	83.6						80.7
8/28/2018						91.3		78.7	
8/29/2018	155			73.3	146		309		
3/18/2019			97.6						
3/19/2019		76.3		73.2	134	99.7			91.6
3/20/2019	118						290	142	
8/6/2019			132						83.8
8/7/2019	111	78.9		80.9	139	93.8	255	145	
4/7/2020	163	75.4	92.4	85.1	117	89.6	245	104	80.9
9/18/2020	134	74.2	77.7	87.9	108	89	244	101	75.5
4/5/2021	128	78.8	81.2	87.6	104	94.1	259	79.5	78.4
9/1/2021	125	80	78.3	90.6	108	95.1	270	93.5	79.4
4/20/2022	127	90.4	69.6	96.5	117	106	289	97.5	80.2
9/14/2022	132	82	76.8	89	117	92.3	301	88.2	79.6
4/10/2023									80.4
4/11/2023	110		78.2				318	76	
4/12/2023		83.7		95.4	107	91.3			
9/18/2023		84.7							79
9/19/2023	126		79.4				291	96	
9/20/2023				82.1	115	90.4			

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	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	88	70.5
6/21/2018		
8/27/2018	72.8	63.9
8/28/2018		
8/29/2018		
3/18/2019	75	
3/19/2019		59.7
3/20/2019		
8/6/2019	103	59.5
8/7/2019		
4/7/2020	94.3	61
9/18/2020	69.9	52.1
4/5/2021	74.6	56.3
9/1/2021	69	56.1
4/20/2022	62.8	54
9/14/2022	66.8	54.5
4/10/2023		
4/11/2023	78.6	
4/12/2023		55.3
9/18/2023		56
9/19/2023	70.5	
9/20/2023		

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-15A	MW-6A	MW-4B	MW-08 (bg)	MW-5B	MW-14A	MW-21	MW-22 (bg)
6/6/2016	6.22	17.1							
6/7/2016			5.97	12.6	19.8	67			
6/8/2016							28.7	27.7	
8/15/2016	<5	17.2					28.7	16.6	
8/16/2016			<5	13.2	17.8	65.9			
10/10/2016	<5				16.2			24.4	
10/11/2016		17.6	<5	13.6		66	37		
12/12/2016			9.08	13.5		67		19.2	
12/14/2016	<5	19			17.2		31.9		
2/17/2017	<5	21.5		15.1			33.5		
2/21/2017			9.93		15.4	70.4		14.2	
4/17/2017	<5	47.4 (o)	<5	12.5	17.1	62.1	39.4		
4/18/2017								15.6	
6/19/2017	<5				14.1				
6/20/2017				13.2		63.4		15.1	
6/21/2017		12.8	<5				29.7		
8/7/2017	<5			13.2	14				
8/8/2017		15.4	<5			64	32.9	16.1	
10/16/2017	<5			14.7	14.4			5.09	
10/17/2017		20.5	<5			73	35.4		
11/28/2017		20.7 (R)				67.8 (R)	33.2 (R)		
3/5/2018	<5								
3/6/2018			5.33	8.81	14.5	68.2		<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			<5	15.3		65			
8/27/2018	<5				15.6				29.8
8/28/2018				19.4				<5	
8/29/2018		10.1	<5			70.8	33.1		
3/18/2019					16.1				
3/19/2019	<5		<5	16		55			27.6
3/20/2019		8.54					25.8	8.3	
8/6/2019					17.1				26.9
8/7/2019	<5	9.91	<5	15.6		64.1	22.1	14	
4/7/2020	<5	13	12.2	14.8	17.2	44	22.5	8.05	24.8
9/18/2020	<5	8.63	15.6	15.1	14.7	41	22.8	7.21	23.2
4/5/2021	<5	15	19.3	22.9	22.3	42.7	27.1	5.14	28.1
9/1/2021	<5	8.86	17.4	16.7	16.3	37.6	23.2	6.58	20
4/20/2022	<5	7.71	14.2	20.8	15.8	38.1	25.5	7.19	20.2
9/14/2022	<5	8.29	13.3	16.8	16.7	39	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		15.4	18		38.7			
9/18/2023	<5								18.4
9/19/2023		8.41			19.9		20.9	8.23	
9/20/2023			12.2	17.4		41.8			

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-23 (bg)	MW-24
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	19.9
6/21/2018		
8/27/2018	14.2	18.1
8/28/2018		
8/29/2018		
3/18/2019		17.3
3/19/2019	10.5	
3/20/2019		
8/6/2019	13.8	22.4
8/7/2019		
4/7/2020	15.7	24.8
9/18/2020	14.4	19.5
4/5/2021	21.4	28.9
9/1/2021	15.2	21.9
4/20/2022	16.9	19.9
9/14/2022	16.2	19.9
4/10/2023		
4/11/2023		23.4
4/12/2023	17.7	
9/18/2023	19.2	
9/19/2023		22.8
9/20/2023		

Prediction Limit

Constituent: Cobalt (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-22 (bg)	MW-23 (bg)
6/6/2016	0.000555				
6/7/2016		<0.0005	0.000681		
8/15/2016	<0.0005				
8/16/2016		<0.0005	<0.0005		
10/10/2016	0.000523	<0.0005			
10/11/2016			<0.0005		
12/12/2016			<0.0005		
12/14/2016	0.000638	<0.0005			
2/17/2017	0.000663		<0.0005		
2/21/2017		<0.0005			
4/17/2017	0.000779	<0.0005	<0.0005		
6/19/2017	0.000621	0.000601			
6/20/2017			<0.0005		
8/7/2017	0.000695	0.00051	<0.0005		
3/5/2018	0.000627				
3/6/2018		<0.0005	<0.0005	0.00142	
5/14/2018				0.0012	
6/19/2018	0.00107	<0.0005		0.00129	
6/20/2018					0.00161
6/21/2018			<0.0005		
8/27/2018	0.00088	<0.0005		0.00149	0.00066
8/28/2018			<0.0005		
3/18/2019		0.00177			
3/19/2019	0.000783		<0.0005	<0.0005	0.00176
8/6/2019		0.00558		<0.0005	<0.0005
8/7/2019	0.000572		<0.0005		
4/7/2020	0.000581	0.000517	<0.0005	<0.0005	0.000817
9/18/2020	0.000751	0.000738	0.00147	<0.0005	<0.0005
4/5/2021	0.000752	0.000839	0.00132	<0.0005	0.000517
9/1/2021	0.000576	0.00127	0.00335	<0.0005	<0.0005
4/20/2022	0.00104	0.00143	0.00135	<0.0005	0.000561
9/14/2022	0.00109	0.00164	0.00459	<0.0005	<0.0005
4/10/2023				<0.0005	
4/11/2023		0.0014			
4/12/2023	0.00142		0.00271		<0.0005
9/18/2023	0.000995			<0.0005	<0.0005
9/19/2023		0.00126			
9/20/2023			0.00374		

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells 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			
9/18/2023		<1							<1
9/19/2023	<1		<1				<1	<1	
9/20/2023				<1	<1	<1			

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	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	0.653	<1
6/21/2018		
8/27/2018	<1	<1
8/28/2018		
8/29/2018		
3/18/2019	<1	
3/19/2019		<1
3/20/2019		
8/6/2019	<1	<1
8/7/2019		
4/7/2020	<1	<1
9/18/2020	<1	<1
4/5/2021	<1	<1
9/1/2021	<1	<1
4/20/2022	<1	<1
9/14/2022	<1	<1
4/10/2023		
4/11/2023	<1	
4/12/2023		<1
9/18/2023		<1
9/19/2023	<1	
9/20/2023		

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Iron (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-4B	MW-5B	MW-14A	MW-6A	MW-23 (bg)	MW-22 (bg)
10/10/2016	<0.1	1.8						
10/11/2016			1.5	2.49	<0.1	3.12		
8/7/2017	<0.1	1.58	1.68					
8/8/2017				2.51	<0.1	3.09		
8/6/2019	<0.1						0.231	<0.1
8/7/2019		3.33	1.61	2.6	<0.1	3.39		
4/7/2020	<0.1	3.36	5.55	1.88	<0.1	3.47	0.485	<0.1
9/18/2020	<0.1	4.38	0.895	1.86	<0.1	3.45	<0.1	<0.1
4/5/2021	0.167	2.08	<0.1	1.85	<0.1	3.57	0.348	<0.1
9/1/2021	0.141	4.37	<0.1	2.21	<0.1	3.83	0.136	<0.1
4/20/2022	0.565	2.49	<0.1	1.99	0.165	3.61	0.492	<0.1
9/14/2022	0.609	2.7	0.25	2.03	<0.1	3.43	0.117	<0.1
4/10/2023								<0.1
4/11/2023	0.708				<0.1			
4/12/2023		1.09	0.423	1.83		3.43	0.21	
9/18/2023		2.45					<0.1	<0.1
9/19/2023	0.451				<0.1			
9/20/2023			0.559	2.18		3.09		

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Lead (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-08 (bg)	MW-5B	MW-21	MW-4B	MW-22 (bg)	MW-23 (bg)
6/6/2016	<0.0005						
6/7/2016		<0.0005	<0.0005		0.00147 (o)		
6/8/2016				<0.0005			
8/15/2016	<0.0005			<0.0005			
8/16/2016		<0.0005	<0.0005		<0.0005		
10/10/2016	<0.0005	<0.0005		<0.0005			
10/11/2016			<0.0005		<0.0005		
12/12/2016			<0.0005	<0.0005	<0.0005		
12/14/2016	<0.0005	<0.0005					
2/17/2017	<0.0005				<0.0005		
2/21/2017		<0.0005	<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	<0.0005	<0.0005		
8/7/2017	<0.0005	<0.0005			<0.0005		
8/8/2017			<0.0005	<0.0005			
3/5/2018	<0.0005						
3/6/2018		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6/19/2018	<0.0005	<0.0005		0.000633		<0.0005	
6/20/2018							0.00151
6/21/2018			<0.0005		<0.0005		
8/27/2018	<0.0005	<0.0005				<0.0005	0.000626
8/28/2018				<0.0005	<0.0005		
8/29/2018			<0.0005				
3/18/2019		<0.0005					
3/19/2019	<0.0005		<0.0005		<0.0005	<0.0005	0.00204
3/20/2019				<0.0005			
8/6/2019		<0.0005				<0.0005	0.000663
8/7/2019	<0.0005		<0.0005	<0.0005	<0.0005		
4/7/2020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00116
9/18/2020	<0.0005	<0.0005	<0.0005	<0.0005	0.000532	<0.0005	<0.0005
4/5/2021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000624
9/1/2021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/20/2022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000596
9/14/2022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/10/2023						<0.0005	
4/11/2023		<0.0005		<0.0005			
4/12/2023	<0.0005		<0.0005		<0.0005		<0.0005
9/18/2023	<0.0005					<0.0005	<0.0005
9/19/2023		<0.0005		<0.0005			
9/20/2023			0.000627		0.000576		

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Magnesium (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-21	MW-15A	MW-4B	MW-14A	MW-6A	MW-5B	MW-24
10/10/2016	44.1	33.8	76.6						
10/11/2016				79.3	31.4	122	23.5	42	
8/7/2017	36.4	37.8			33.4				
8/8/2017			72.1	86		124	24.7	43.8	
8/6/2019	50.1								44.2
8/7/2019		30	62.5	46.9	34	103	25.4	42.8	
4/7/2020	37.1	31.4	46.9	71	34	102	29.4	39.6	43
9/18/2020	31.8	31.9	45.6	59	33.2	104	28.5	36.6	32
4/5/2021	31.8	32.2	34.9	55.4	34.3	116	28.8	35.7	33
9/1/2021	31	31.3	40.8	54	35.6	119	29.6	35.2	30.3
4/20/2022	27.7	35	40.2	56	35.1	120	28.6	35	28.3
9/14/2022	30.1	33.3	39.1	56.1	33.6	122	29.4	36.8	29.1
4/10/2023									
4/11/2023	31.1		33	48.7		122			34.7
4/12/2023		34.5			33.9		31.2	34.8	
9/18/2023		34.7							
9/19/2023	31.5		42.8	54		122			29.9
9/20/2023					33.6		27.2	37.6	

Prediction Limit

Constituent: Magnesium (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)
10/10/2016		
10/11/2016		
8/7/2017		
8/8/2017		
8/6/2019	33	24.7
8/7/2019		
4/7/2020	34.5	28.5
9/18/2020	31.1	24.3
4/5/2021	31	25.3
9/1/2021	31.4	24.8
4/20/2022	29.6	23.3
9/14/2022	31.8	24.6
4/10/2023	31.5	
4/11/2023		
4/12/2023		24.4
9/18/2023	32	25.4
9/19/2023		
9/20/2023		

Prediction Limit

Constituent: Manganese (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-4B	MW-5B	MW-14A	MW-6A	MW-23 (bg)	MW-24	MW-22 (bg)
10/10/2016	0.28	0.151							
10/11/2016			0.133	0.69	<0.01	0.0818			
8/7/2017	0.237	0.166	0.132						
8/8/2017				0.689	<0.01	0.0802			
8/6/2019	0.758						0.0443	0.0223	1.74 (o)
8/7/2019		0.177	0.145	0.784	<0.01	0.0941			
4/7/2020	0.119	0.184	0.13	0.492	<0.01	0.103	0.0718	0.0156	0.0896
9/18/2020	0.652	0.251	0.686	0.546	<0.01	0.113	0.0127	<0.01	1.36
4/5/2021	0.185	0.199	1.39	0.467	<0.01	0.109	0.0634	<0.01	0.175
9/1/2021	0.663	0.221	1.39	0.512	<0.01	0.117	0.0444	0.0126	1.27
4/20/2022	0.411	0.231	0.91	0.454	0.0264	0.112	0.0588	<0.01	0.106
9/14/2022	0.749	0.31	0.871	0.532	<0.01	0.112	0.0222	<0.01	0.795
4/10/2023									0.0633
4/11/2023	0.309				<0.01			0.0144	
4/12/2023		0.396	0.51	0.453		0.113	0.0372		
9/18/2023		0.266					0.0169		0.767
9/19/2023	0.37				<0.01			0.0183	
9/20/2023			0.612	0.594		0.0995			

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Molybdenum (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-5B	MW-21	MW-22 (bg)	MW-23 (bg)	MW-24
6/6/2016	<0.002							
6/7/2016		<0.002	<0.002	<0.002				
6/8/2016					<0.002			
8/15/2016	<0.002				<0.002			
8/16/2016		<0.002	<0.002	<0.002				
10/10/2016	<0.002	<0.002			<0.002			
10/11/2016			<0.002	<0.002				
12/12/2016			<0.002	<0.002	<0.002			
12/14/2016	<0.002	<0.002						
2/17/2017	<0.002		<0.002					
2/21/2017		<0.002		<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	<0.002	<0.002			
8/7/2017	<0.002	<0.002	<0.002					
8/8/2017				<0.002	<0.002			
3/5/2018	<0.002							
3/6/2018		0.0022	<0.002	<0.002	<0.002	0.00568		
5/14/2018		<0.002				0.00385		
6/19/2018	<0.002	<0.002			0.00383	0.00423		
6/20/2018							0.00822	0.00447
6/21/2018			<0.002	<0.002				
8/27/2018	0.0022	0.00224				0.00424	0.00617	<0.002
8/28/2018			<0.002		<0.002			
8/29/2018				<0.002				
3/18/2019		<0.002						<0.002
3/19/2019	0.00341		<0.002	0.00212		0.00263	<0.002	
3/20/2019					<0.002			
8/6/2019		<0.002				0.00574	<0.002	<0.002
8/7/2019	0.00219		<0.002	<0.002	<0.002			
4/7/2020	0.00215	<0.002	<0.002	<0.002	<0.002	0.00297	<0.002	<0.002
9/18/2020	<0.002	<0.002	0.00296	<0.002	<0.002	0.00529	<0.002	<0.002
4/5/2021	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
9/1/2021	0.00217	0.00218	<0.002	<0.002	<0.002	0.00558	<0.002	<0.002
4/20/2022	<0.002	<0.002	<0.002	<0.002	<0.002	0.0042	<0.002	<0.002
9/14/2022	<0.002	<0.002	<0.002	<0.002	<0.002	0.00446	<0.002	<0.002
4/10/2023						0.00364		
4/11/2023		<0.002			<0.002			<0.002
4/12/2023	<0.002		<0.002	<0.002			<0.002	
9/18/2023	<0.002					0.00661	<0.002	
9/19/2023		<0.002			<0.002			<0.002
9/20/2023			<0.002	<0.002				

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Nickel (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-21	MW-4B	MW-23 (bg)	MW-22 (bg)
10/10/2016	<0.005	<0.005	0.00799			
10/11/2016				<0.005		
8/7/2017	<0.005	<0.005		<0.005		
8/8/2017			0.00699			
8/6/2019	<0.005				<0.005	<0.005
8/7/2019		<0.005	0.0079	<0.005		
4/7/2020	<0.005	<0.005	0.00576	<0.005	<0.005	<0.005
9/18/2020	0.00628	<0.005	0.00604	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	0.00518	<0.005	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	0.00578	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	0.00503	<0.005	<0.005
4/10/2023						<0.005
4/11/2023	<0.005		<0.005			
4/12/2023		<0.005		0.0051	<0.005	
9/18/2023		<0.005			<0.005	<0.005
9/19/2023	<0.005		<0.005			
9/20/2023				<0.005		

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Selenium (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-21	MW-14A	MW-22 (bg)	MW-23 (bg)
6/6/2016	<0.005	<0.005					
6/7/2016			<0.005				
6/8/2016				0.0165	0.0071		
8/15/2016	<0.005	<0.005		0.0103	0.00811		
8/16/2016			<0.005				
10/10/2016		<0.005	<0.005	0.0137			
10/11/2016	<0.005				0.00821		
12/12/2016				0.0119			
12/14/2016	<0.005	<0.005	<0.005		0.00834		
2/17/2017	<0.005	<0.005			0.00752		
2/21/2017			<0.005	0.0074			
4/17/2017	<0.005	<0.005	<0.005		0.00823		
4/18/2017				0.00674			
6/19/2017		<0.005	<0.005				
6/20/2017				0.0106			
6/21/2017	<0.005				0.00829		
8/7/2017		<0.005	<0.005				
8/8/2017	<0.005			0.0109	0.00759		
3/5/2018		<0.005					
3/6/2018			<0.005	<0.005		<0.005	
3/7/2018	0.00502				<0.005		
6/19/2018		<0.005	<0.005	0.00939		<0.005	
6/20/2018	<0.005				0.00739		<0.005
8/27/2018		<0.005	<0.005			<0.005	<0.005
8/28/2018				<0.005			
8/29/2018	<0.005				0.00827		
3/18/2019			<0.005				
3/19/2019		<0.005				<0.005	<0.005
3/20/2019	<0.005			0.0102	0.00569		
8/6/2019			<0.005			<0.005	<0.005
8/7/2019	<0.005	<0.005		0.0108	<0.005		
4/7/2020	<0.005	<0.005	<0.005	0.00632	<0.005	<0.005	<0.005
9/18/2020	<0.005	<0.005	<0.005	0.00762	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	0.00617	<0.005	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	0.00634	<0.005	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4/10/2023						<0.005	
4/11/2023	<0.005		<0.005	<0.005	<0.005		
4/12/2023		<0.005					<0.005
9/18/2023		<0.005				<0.005	<0.005
9/19/2023	<0.005		<0.005	0.0053	<0.005		

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Strontium (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-21	MW-15A	MW-4B	MW-14A	MW-6A	MW-5B	MW-24
10/10/2016	0.338	0.156	0.291						
10/11/2016				0.185	0.103	0.279	0.156	0.193	
8/7/2017	0.243	0.165			0.11				
8/8/2017			0.256	0.178		0.257	0.161	0.197	
8/6/2019	0.323								0.123
8/7/2019		0.199	0.263	0.134	0.115	0.274	0.178	0.208	
4/7/2020	0.233	0.19	0.175	0.154	0.103	0.246	0.173	0.166	0.109
9/18/2020	0.176	0.19	0.184	0.153	0.146	0.259	0.187	0.167	0.0824
4/5/2021	0.188	0.179	0.148	0.133	0.129	0.261	0.188	0.163	0.0899
9/1/2021	0.172	0.227	0.178	0.136	0.14	0.282	0.204	0.17	0.085
4/20/2022	0.164	0.173	0.169	0.149	0.122	0.247	0.194	0.168	0.0802
9/14/2022	0.16	0.191	0.155	0.127	0.101	0.266	0.184	0.167	0.0746
4/10/2023									
4/11/2023	0.148		0.153	0.0985		0.293			0.0795
4/12/2023		0.178			0.091		0.194	0.149	
9/18/2023		0.207							
9/19/2023	0.151		0.164	0.113		0.282			0.0768
9/20/2023					0.0958		0.165	0.163	

Prediction Limit

Constituent: Strontium (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)
10/10/2016		
10/11/2016		
8/7/2017		
8/8/2017		
8/6/2019	0.133	0.0872
8/7/2019		
4/7/2020	0.129	0.0661
9/18/2020	0.108	0.0602
4/5/2021	0.13	0.0639
9/1/2021	0.115	0.068
4/20/2022	0.127	0.0595
9/14/2022	0.111	0.0592
4/10/2023	0.137	
4/11/2023		
4/12/2023		0.0526
9/18/2023	0.101	0.0601
9/19/2023		
9/20/2023		

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-6A	MW-5B	MW-4B	MW-14A	MW-21	MW-22 (bg)
6/6/2016	827	42.1							
6/7/2016			366	<5	109	32.2			
6/8/2016							1050	713	
8/15/2016	605	33.8					1040	520	
8/16/2016			187	<5	109	28.4			
10/10/2016		36.4	187					603	
10/11/2016	607			<5	105	27.2	1010		
12/12/2016				<5	109	32.7		645	
12/14/2016	732	38.4	149				1140		
2/17/2017	849	47.3				36	1190		
2/21/2017			145	5.94	111			415	
4/17/2017	853	38.3	145	<5	108	39.5	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			<5	114		1110	590	
10/16/2017		46.9	106			45.4		206	
10/17/2017	835			<5	135		1210		
11/28/2017	779 (R)						1140 (R)		
3/5/2018		51.4							
3/6/2018			87.3	<5	122	162		53.7	123
3/7/2018	824						1110		
6/19/2018		37.3	136					489	134
6/20/2018	210						1090		
6/21/2018				<5	119	51.3			
8/27/2018		34.3	94.7						125
8/28/2018						52.2		96.6	
8/29/2018	400			<5	120		1070		
3/18/2019			223						
3/19/2019		42.8		<5	85	48			134
3/20/2019	351						1050	442	
8/6/2019			276						139
8/7/2019	327	28.8		<5	112	47	837	529	
4/7/2020	496	18.6	123	13.6	58.9	41.5	888	373	143
9/18/2020	403	36.5	100	19.1	61.9	46.9	924	356	151
4/5/2021	338	27.6	99.7	27.3	57.4	60.1	952	237	154
9/1/2021	333	32.3	82.7	22.7	53.7	50.2	1010	303	154
4/20/2022	297	48.3	72.8	18.9	44.7	58.4	1030	293	158
9/14/2022	319	31.2	67.1	16.4	49.9	49.5	978	151	220
4/10/2023									147
4/11/2023	254		72.2				1150	215	
4/12/2023		39.8		20.5	45.8	54			
9/18/2023		57.4							208
9/19/2023	365		94.2				1440	303	
9/20/2023				10.1	53.4	53.1			

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 11/9/2023 9:23 AM View: State Wells Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	MW-24	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	101	38.4
6/21/2018		
8/27/2018	70	31.7
8/28/2018		
8/29/2018		
3/18/2019	90.8	
3/19/2019		26.2
3/20/2019		
8/6/2019	169	29.7
8/7/2019		
4/7/2020	164	25.5
9/18/2020	81	25.8
4/5/2021	91.2	35.5
9/1/2021	59.3	25.8
4/20/2022	48.5	25.4
9/14/2022	44.5	23
4/10/2023		
4/11/2023	87.8	
4/12/2023		25
9/18/2023		28.6
9/19/2023	62.9	
9/20/2023		

FIGURE F.

Trend Tests - Prediction Limit Exceedances (Monitoring Wells) - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:38 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Alpha	Method
Barium (mg/L)	**MW-10 (bg)**	**0.01067**	**107**	**87**	**Yes**	**21**	**0**	**n/a**	**0.01**	**NP**
Barium (mg/L)	**MW-22 (bg)**	**0.01381**	**61**	**43**	**Yes**	**13**	**0**	**n/a**	**0.01**	**NP**
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**
Selenium (mg/L)	**MW-21**	**-0.001031**	**-110**	**-87**	**Yes**	**21**	**23.81**	**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**

Trend Tests - Prediction Limit Exceedances (Monitoring Wells) - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:38 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Alpha	Method
Barium (mg/L)	MW-08 (bg)	-0.0002793	-11	-87	No	21	0	n/a	0.01	NP
Barium (mg/L)	**MW-10 (bg)**	**0.01067**	**107**	**87**	**Yes**	**21**	**0**	**n/a**	**0.01**	**NP**
Barium (mg/L)	**MW-22 (bg)**	**0.01381**	**61**	**43**	**Yes**	**13**	**0**	**n/a**	**0.01**	**NP**
Barium (mg/L)	MW-23 (bg)	-0.006292	-36	-38	No	12	0	n/a	0.01	NP
Barium (mg/L)	MW-5B	-0.01098	-78	-87	No	21	0	n/a	0.01	NP
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**
Magnesium (mg/L)	MW-08 (bg)	-1.814	-32	-34	No	11	0	n/a	0.01	NP
Magnesium (mg/L)	MW-10 (bg)	0.7039	13	34	No	11	0	n/a	0.01	NP
Magnesium (mg/L)	MW-14A	2.051	17	34	No	11	0	n/a	0.01	NP
Magnesium (mg/L)	MW-15A	-3.913	-24	-34	No	11	0	n/a	0.01	NP
Magnesium (mg/L)	MW-22 (bg)	-0.2131	-2	-25	No	9	0	n/a	0.01	NP
Magnesium (mg/L)	MW-23 (bg)	-0.1373	-4	-25	No	9	0	n/a	0.01	NP
Selenium (mg/L)	MW-08 (bg)	0	0	87	No	21	100	n/a	0.01	NP
Selenium (mg/L)	MW-10 (bg)	0	0	87	No	21	100	n/a	0.01	NP
Selenium (mg/L)	**MW-21**	**-0.001031**	**-110**	**-87**	**Yes**	**21**	**23.81**	**n/a**	**0.01**	**NP**
Selenium (mg/L)	MW-22 (bg)	0	0	43	No	13	100	n/a	0.01	NP
Selenium (mg/L)	MW-23 (bg)	0	0	38	No	12	100	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

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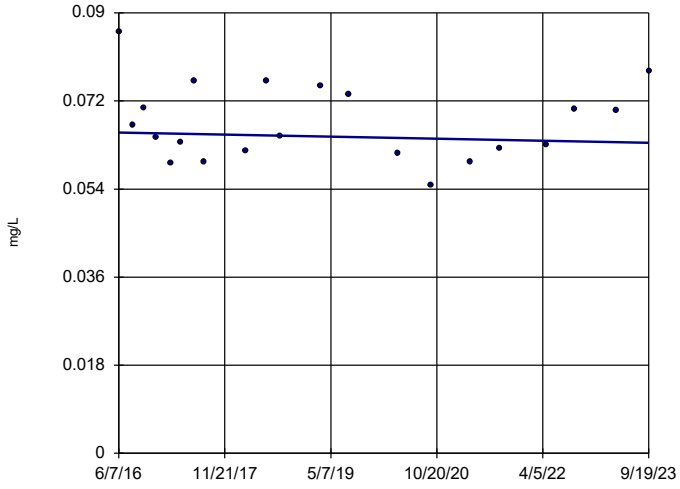
Sen's Slope Estimator

MW-08 (bg)



n = 21

Slope = -0.0002793 units per year.

Mann-Kendall statistic = -11 critical = -87

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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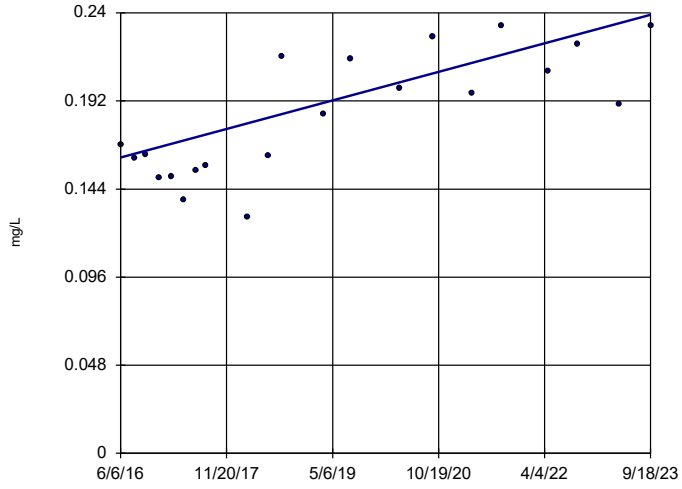
Sen's Slope Estimator

MW-10 (bg)



n = 21

Slope = 0.01067 units per year.

Mann-Kendall statistic = 107 critical = 87

Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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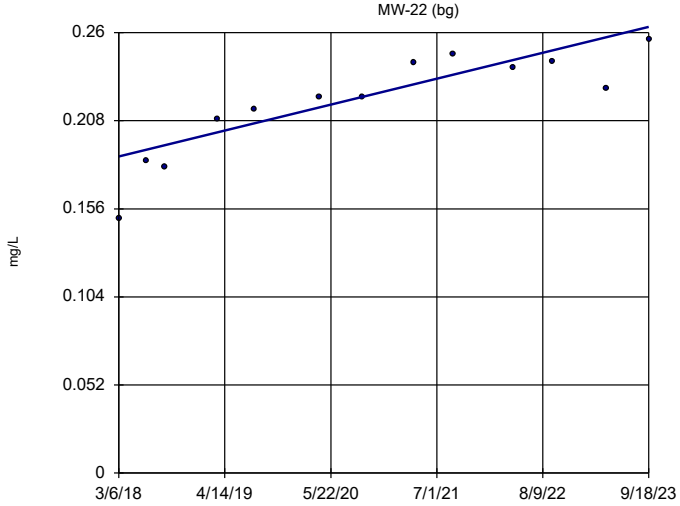
Sen's Slope Estimator

MW-22 (bg)



n = 13

Slope = 0.01381 units per year.

Mann-Kendall statistic = 61 critical = 43

Increasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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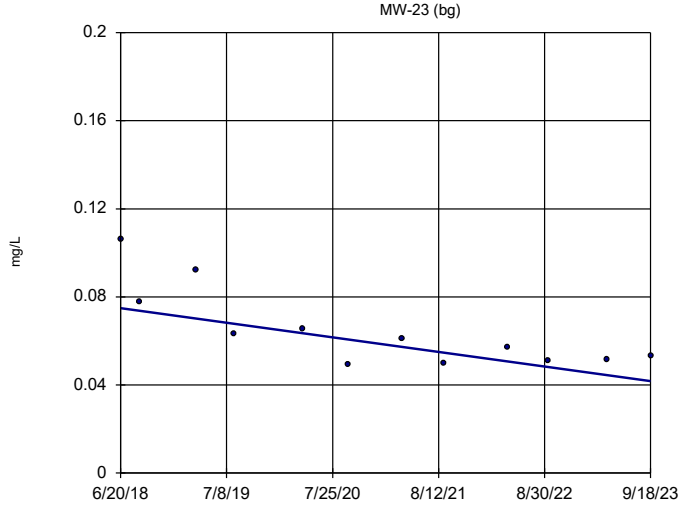
Sen's Slope Estimator

MW-23 (bg)



n = 12

Slope = -0.006292 units per year.

Mann-Kendall statistic = -36 critical = -38

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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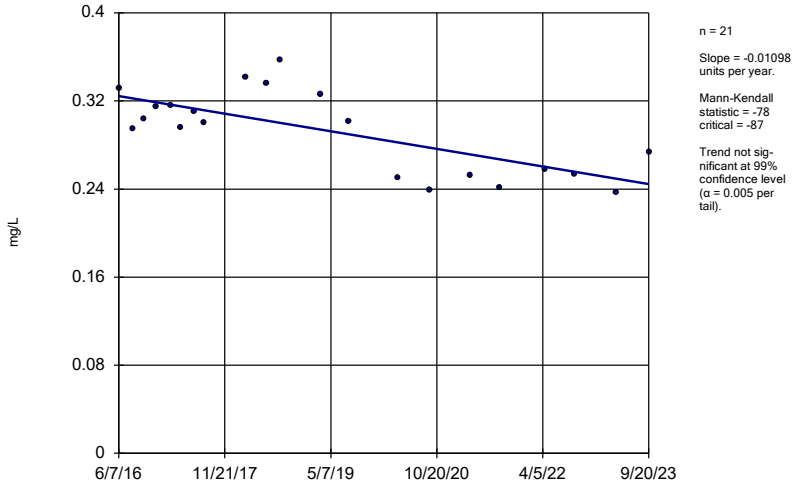
Sen's Slope Estimator

MW-5B



n = 21

Slope = -0.01098 units per year.

Mann-Kendall statistic = -78 critical = -87

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Barium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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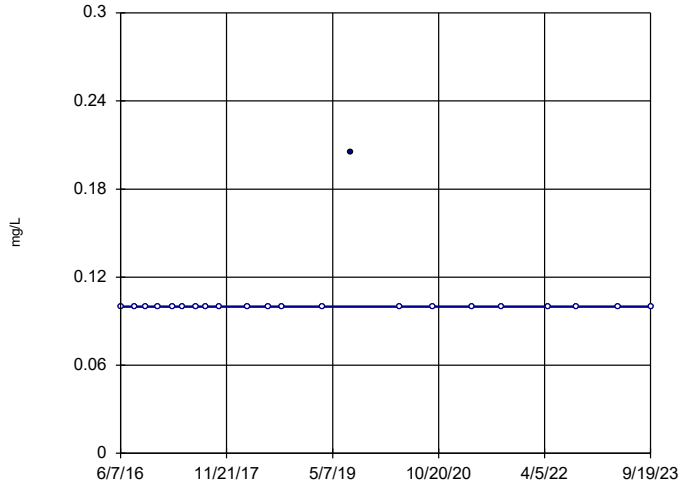
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08 (bg)



n = 22

Slope = 0 units per year.

Mann-Kendall statistic = 5 critical = 92

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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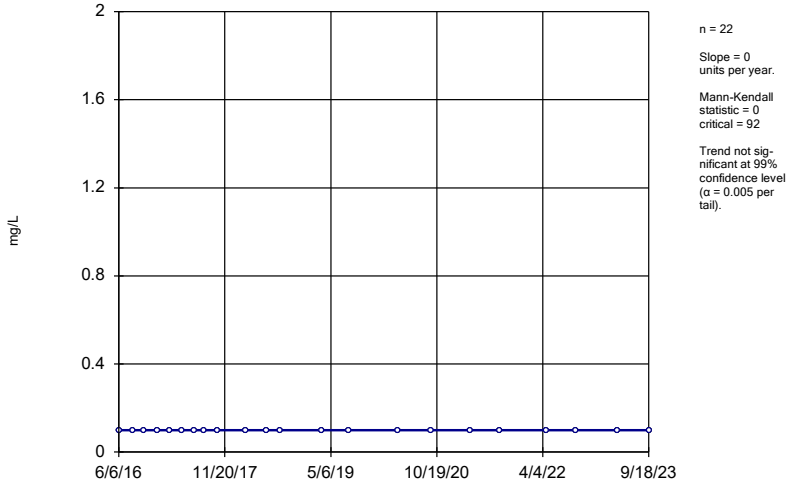
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10 (bg)



n = 22

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 92

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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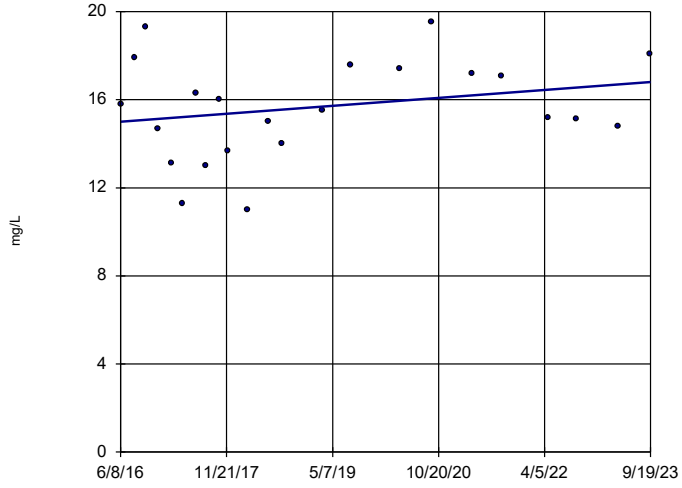
Sen's Slope Estimator

MW-14A



n = 23

Slope = 0.2483 units per year.

Mann-Kendall statistic = 31 critical = 98

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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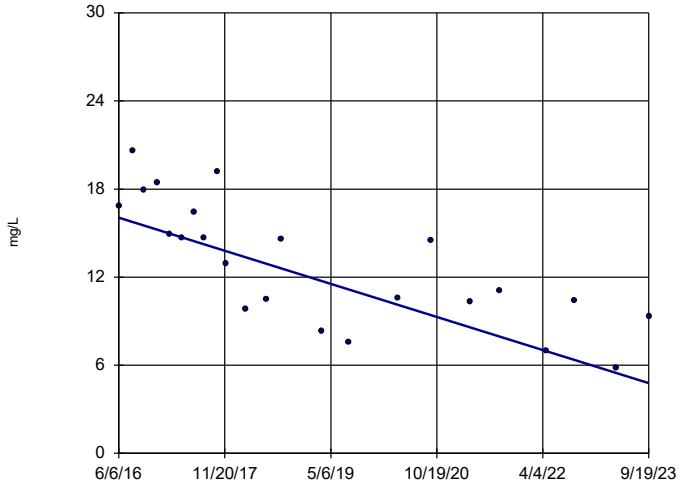
Sen's Slope Estimator

MW-15A



n = 23

Slope = -1.547 units per year.

Mann-Kendall statistic = -162 critical = -98

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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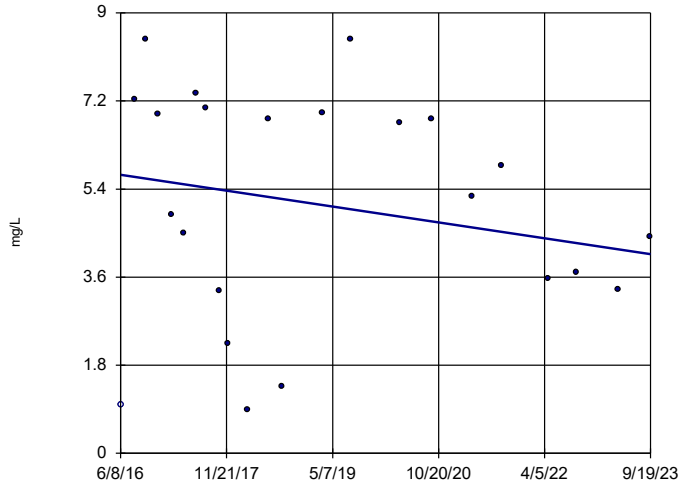
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-21



n = 23

Slope = -0.2223 units per year.

Mann-Kendall statistic = -49 critical = -98

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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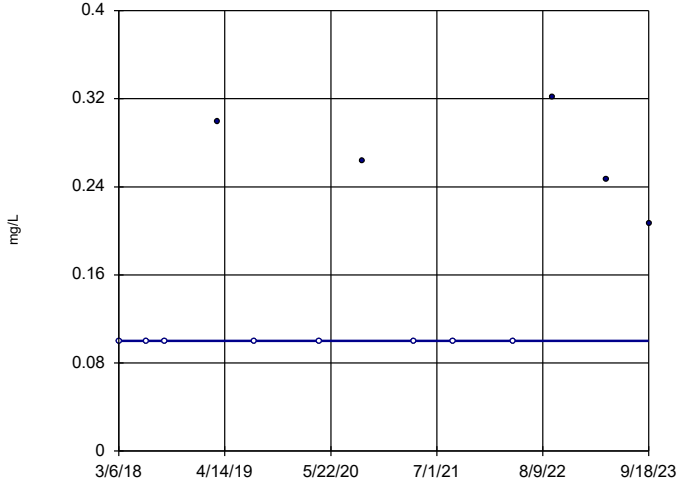
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-22 (bg)



n = 13

Slope = 0 units per year.

Mann-Kendall statistic = 18 critical = 43

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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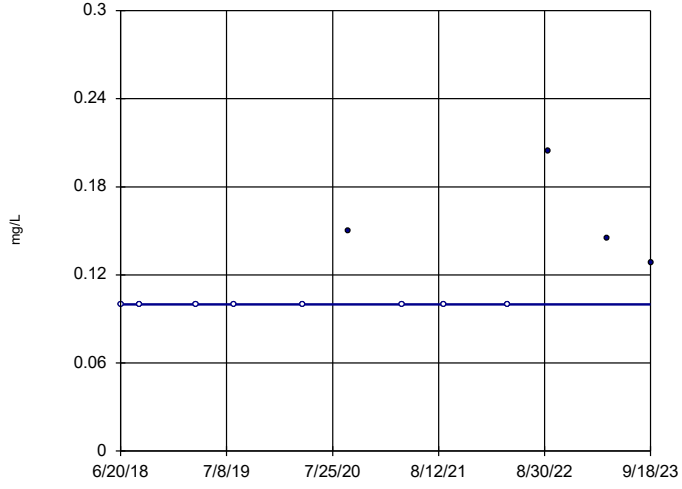
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-23 (bg)



n = 12

Slope = 0 units per year.

Mann-Kendall statistic = 22 critical = 38

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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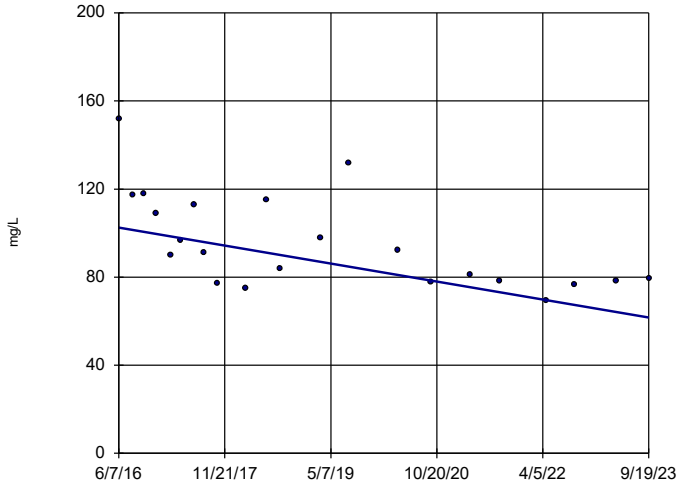
Sen's Slope Estimator

MW-08 (bg)



n = 22

Slope = -5.597 units per year.

Mann-Kendall statistic = -111 critical = -92

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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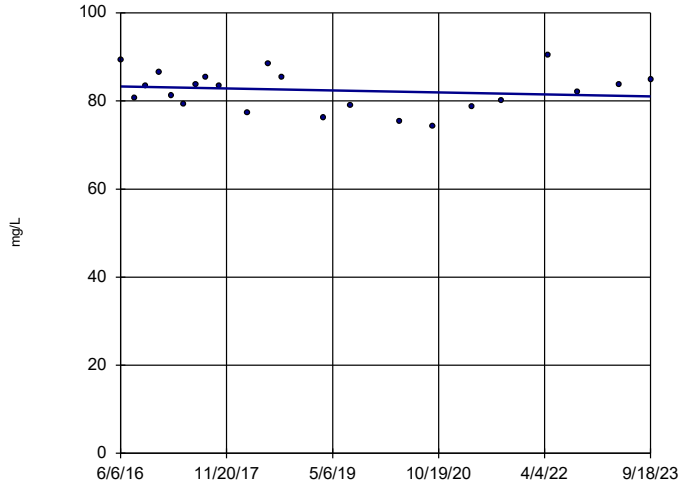
Sen's Slope Estimator

MW-10 (bg)



n = 22

Slope = -0.3168 units per year.

Mann-Kendall statistic = -26 critical = -92

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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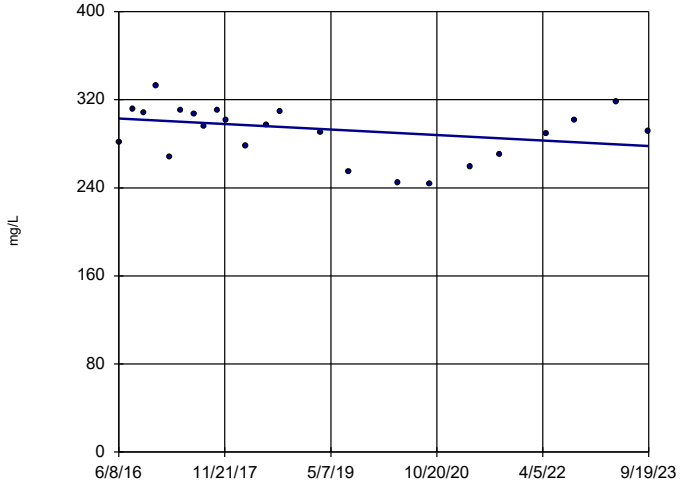
Sen's Slope Estimator

MW-14A



n = 23

Slope = -3.438 units per year.

Mann-Kendall statistic = -63 critical = -98

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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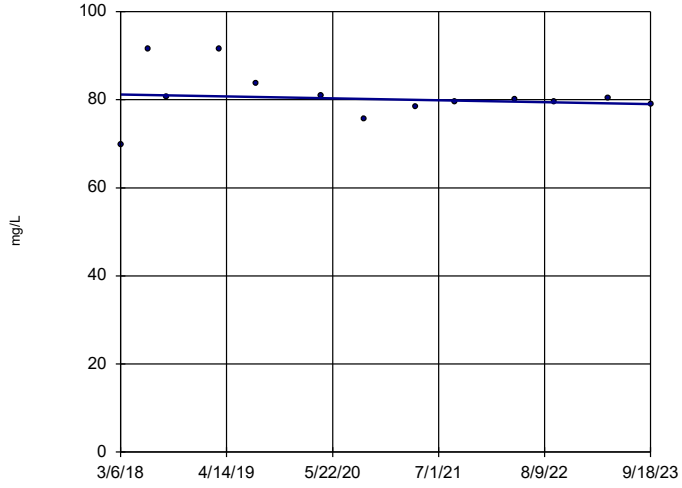
Sen's Slope Estimator

MW-22 (bg)



n = 13

Slope = -0.3874 units per year.

Mann-Kendall statistic = -14 critical = -43

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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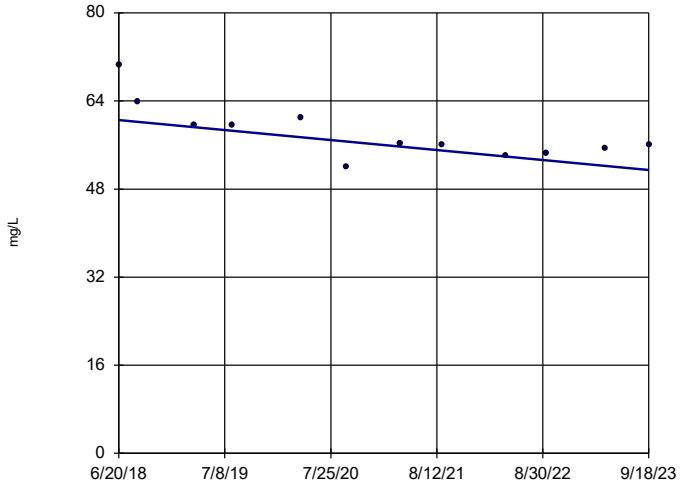
Sen's Slope Estimator

MW-23 (bg)



n = 12

Slope = -1.728 units per year.

Mann-Kendall statistic = -38 critical = -38

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Calcium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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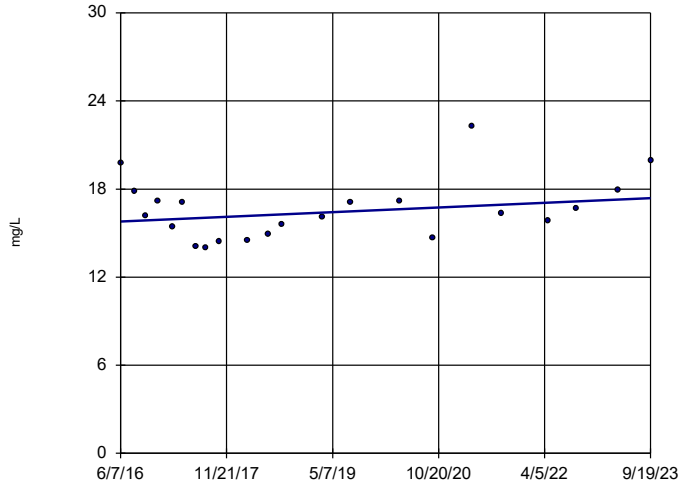
Sen's Slope Estimator

MW-08 (bg)



n = 22

Slope = 0.2173 units per year.

Mann-Kendall statistic = 37 critical = 92

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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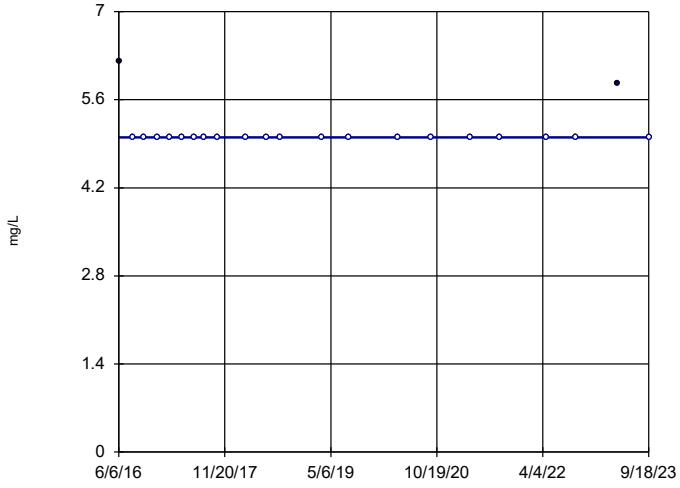
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10 (bg)



n = 22

Slope = 0 units per year.

Mann-Kendall statistic = -3 critical = -92

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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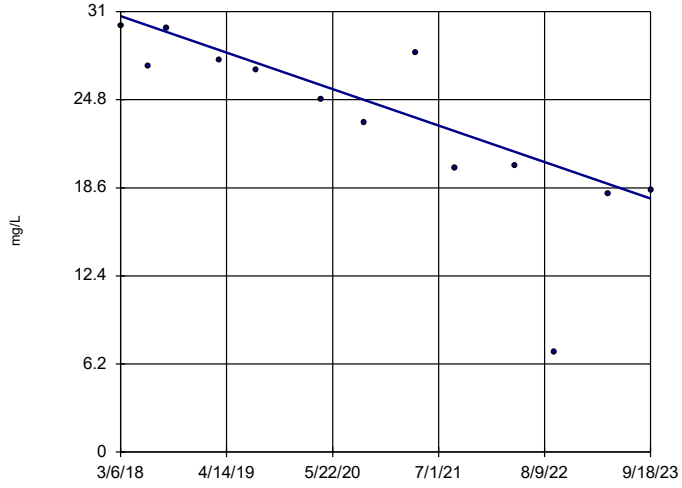
Sen's Slope Estimator

MW-22 (bg)



n = 13

Slope = -2.316 units per year.

Mann-Kendall statistic = -56 critical = -43

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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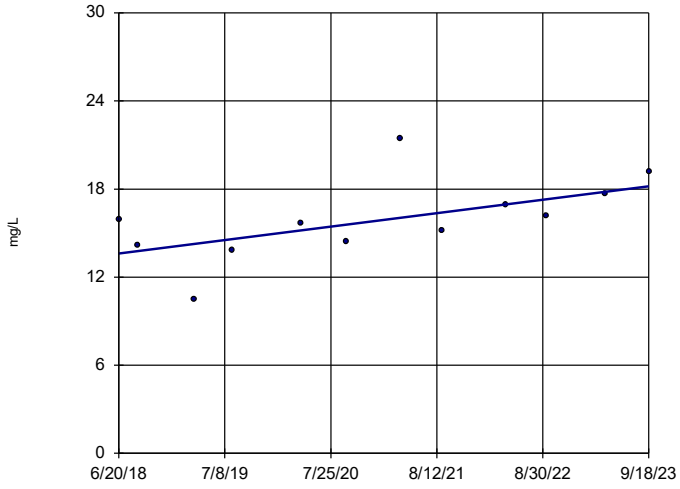
Sen's Slope Estimator

MW-23 (bg)



n = 12

Slope = 0.872 units per year.

Mann-Kendall statistic = 34 critical = 38

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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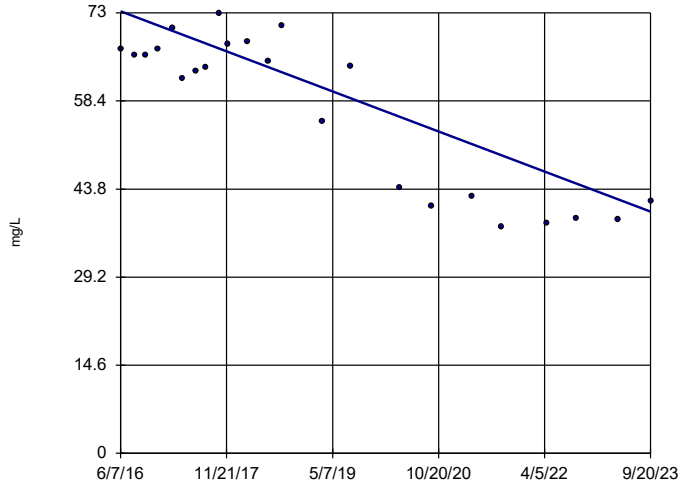
Sen's Slope Estimator

MW-5B



n = 23

Slope = -4.554 units per year.

Mann-Kendall statistic = -128 critical = -98

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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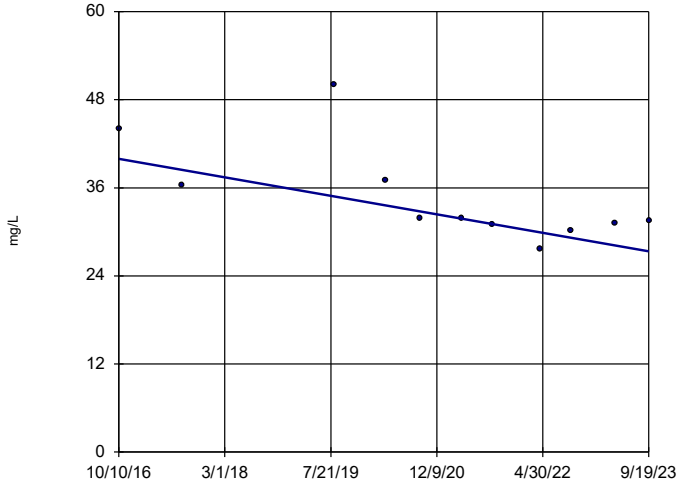
Sen's Slope Estimator

MW-08 (bg)



n = 11

Slope = -1.814 units per year.

Mann-Kendall statistic = -32 critical = -34

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Magnesium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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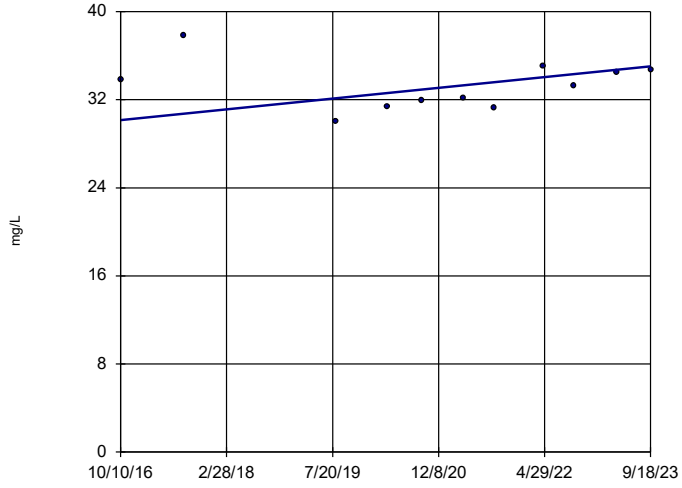
Sen's Slope Estimator

MW-10 (bg)



n = 11

Slope = 0.7039 units per year.

Mann-Kendall statistic = 13 critical = 34

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Magnesium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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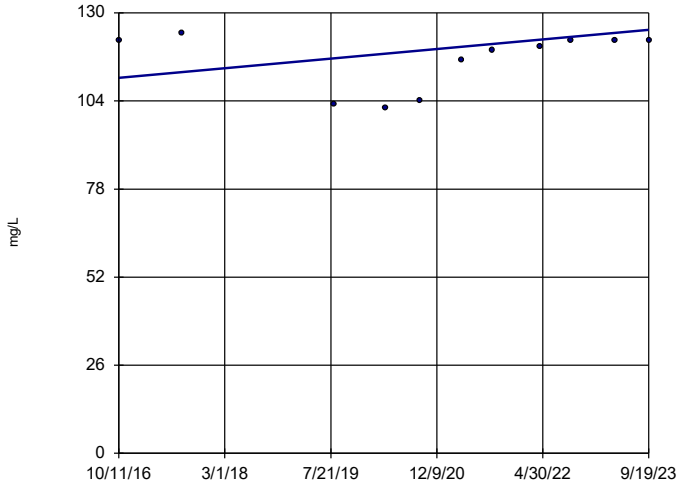
Sen's Slope Estimator

MW-14A



n = 11

Slope = 2.051 units per year.

Mann-Kendall statistic = 17 critical = 34

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Magnesium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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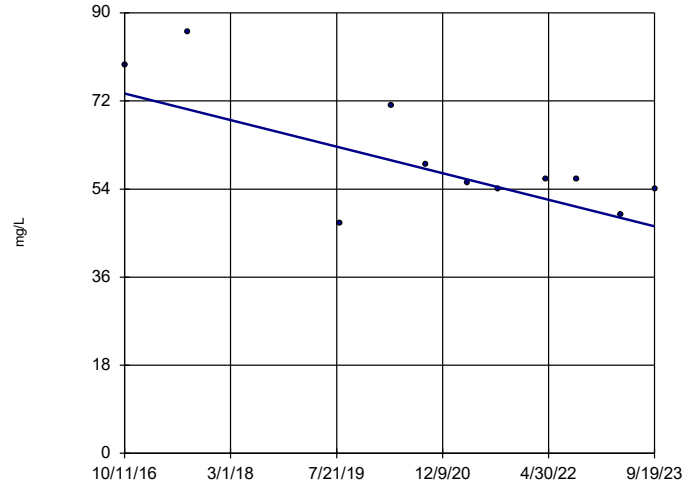
Sen's Slope Estimator

MW-15A



n = 11

Slope = -3.913 units per year.

Mann-Kendall statistic = -24 critical = -34

Trend not significant at 99% confidence level (α = 0.005 per tail).

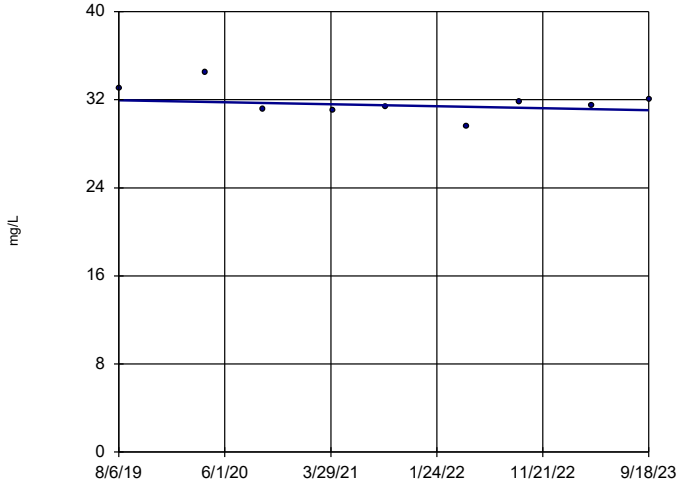
Constituent: Magnesium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG

Sen's Slope Estimator

MW-22 (bg)



n = 9

Slope = -0.2131 units per year.

Mann-Kendall statistic = -2 critical = -25

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Magnesium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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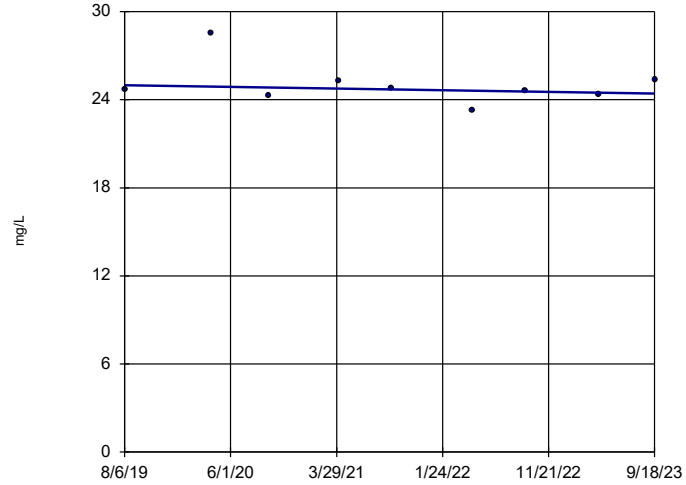
Sen's Slope Estimator

MW-23 (bg)



n = 9

Slope = -0.1373 units per year.

Mann-Kendall statistic = -4 critical = -25

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Magnesium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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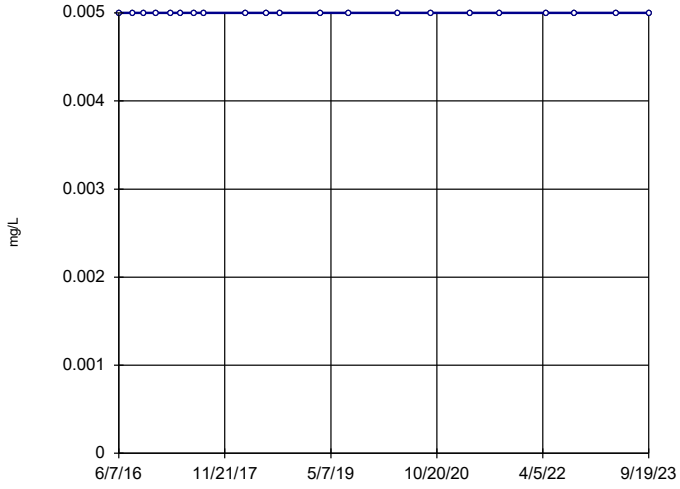
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-08 (bg)



n = 21

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 87

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Selenium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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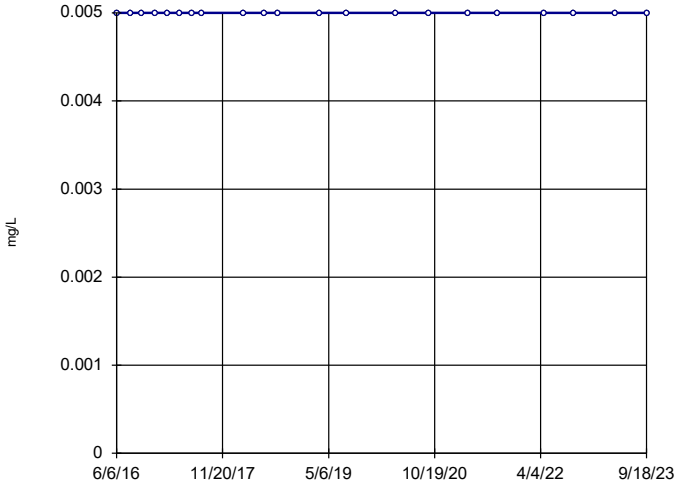
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-10 (bg)



n = 21

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 87

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Selenium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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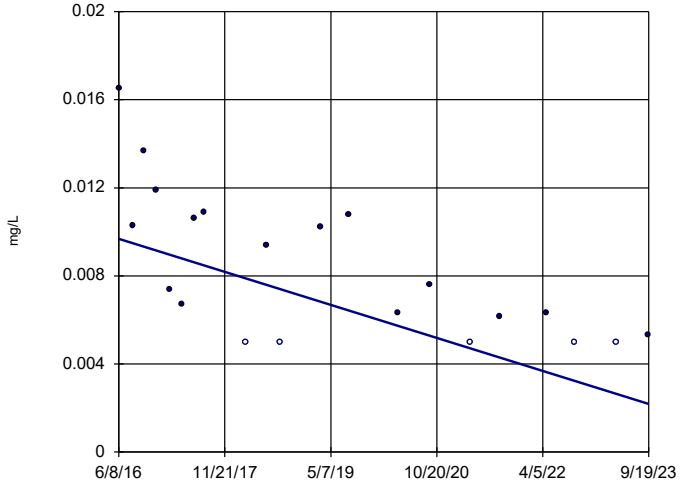
Sen's Slope Estimator

MW-21



n = 21

Slope = -0.001031
units per year.

Mann-Kendall
statistic = -110
critical = -87

Decreasing trend
significant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Selenium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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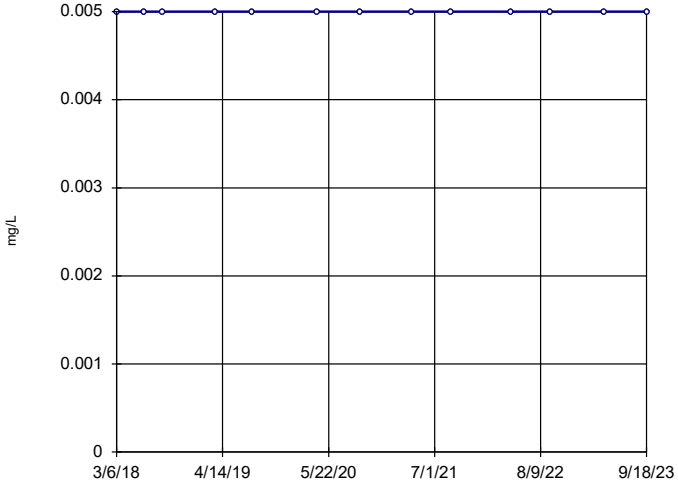
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-22 (bg)



n = 13

Slope = 0
units per year.

Mann-Kendall
statistic = 0
critical = 43

Trend not sig-
nificant at 99%
confidence level
(α = 0.005 per
tail).

Constituent: Selenium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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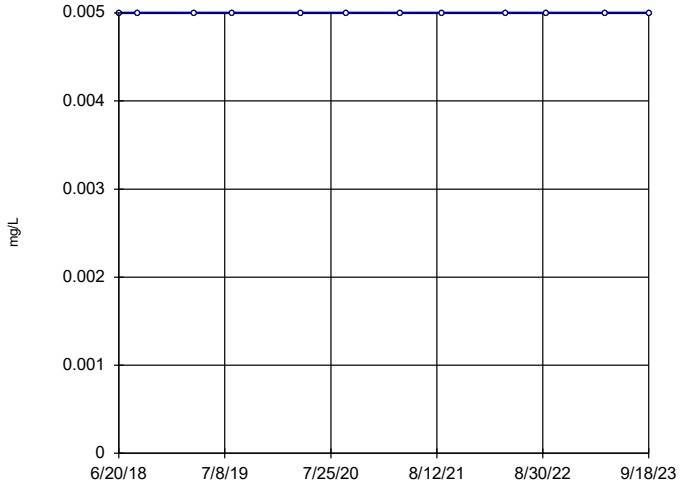
Hollow symbols indicate censored values.

Sen's Slope Estimator

MW-23 (bg)



n = 12

Slope = 0 units per year.

Mann-Kendall statistic = 0 critical = 38

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Selenium Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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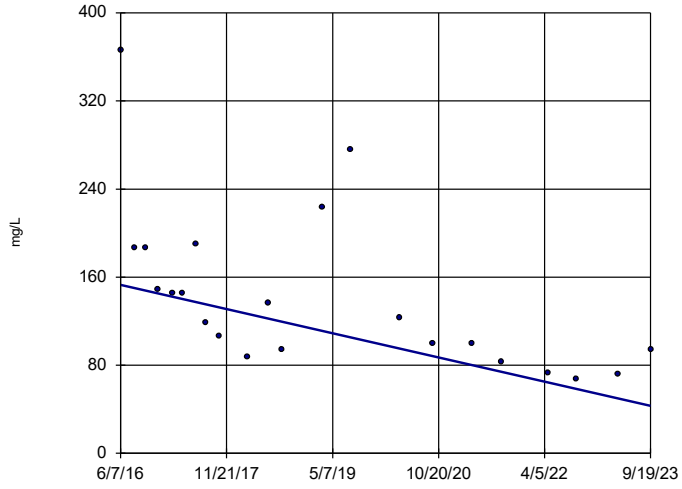
Sen's Slope Estimator

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 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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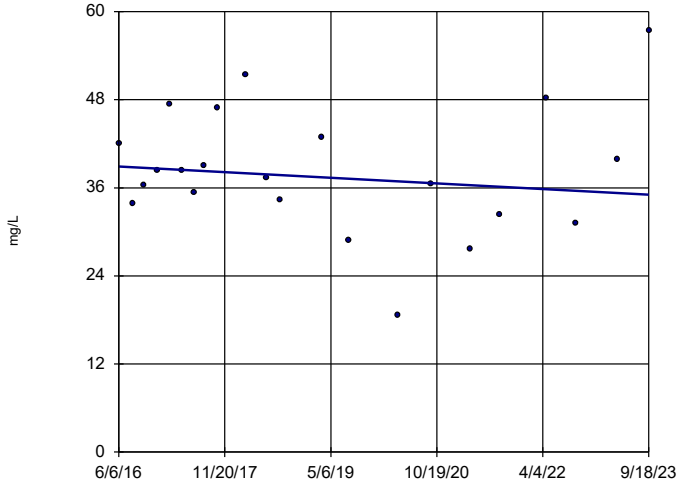
Sen's Slope Estimator

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 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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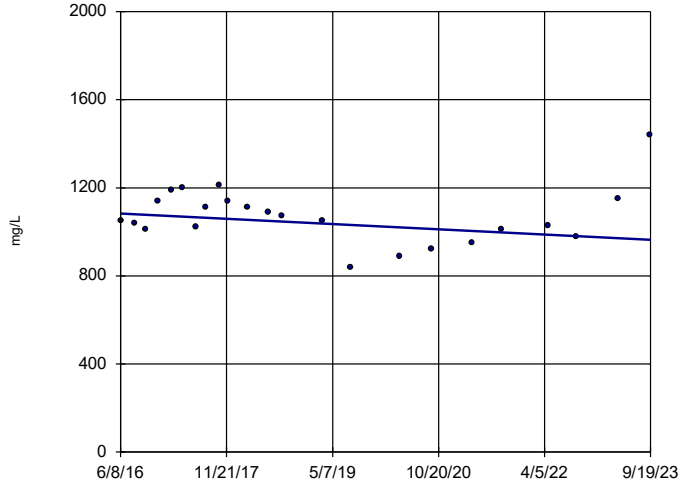
Sen's Slope Estimator

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 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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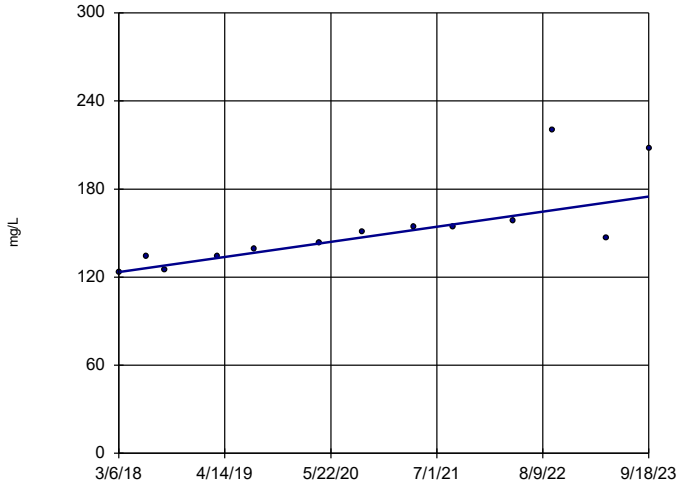
Sen's Slope Estimator

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).

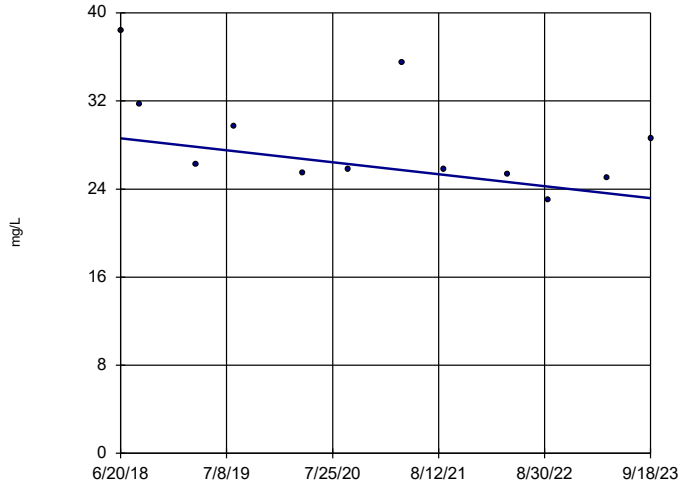
Constituent: Sulfate Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG

Sen's Slope Estimator

MW-23 (bg)



n = 12

Slope = -1.032 units per year.

Mann-Kendall statistic = -33 critical = -38

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 11/9/2023 9:30 AM View: State Wells Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Surface Water Wells

FIGURE G.

Interwell Prediction Limits - Surface Water (April 2023) - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:54 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Arsenic (mg/L)	**SW-26**	**0.00367**	**n/a**	**4/19/2023**	**0.00664**	**Yes**	**12**	**n/a**	**n/a**	**75**	**n/a**	**n/a**	**0.009707**	**NP Inter (NDs) 1 of 2**
Boron (mg/L)	**SW-24**	**6.67**	**n/a**	**4/19/2023**	**7.97**	**Yes**	**13**	**n/a**	**n/a**	**69.23**	**n/a**	**n/a**	**0.008777**	**NP Inter (NDs) 1 of 2**
Magnesium (mg/L)	**SW-24**	**73.3**	**n/a**	**4/19/2023**	**86.1**	**Yes**	**12**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.009707**	**NP Inter (normality) 1 of 2**
Molybdenum (mg/L)	**SW-23**	**0.00637**	**n/a**	**4/19/2023**	**0.0281**	**Yes**	**12**	**n/a**	**n/a**	**91.67**	**n/a**	**n/a**	**0.009707**	**NP Inter (NDs) 1 of 2**
Molybdenum (mg/L)	**SW-26**	**0.00637**	**n/a**	**4/19/2023**	**0.0149**	**Yes**	**12**	**n/a**	**n/a**	**91.67**	**n/a**	**n/a**	**0.009707**	**NP Inter (NDs) 1 of 2**
Strontium (mg/L)	**SW-24**	**0.285**	**n/a**	**4/19/2023**	**0.339**	**Yes**	**12**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.009707**	**NP Inter (normality) 1 of 2**
Sulfate (mg/L)	**SW-24**	**554**	**n/a**	**4/19/2023**	**622**	**Yes**	**13**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.008777**	**NP Inter (normality) 1 of 2**

Interwell Prediction Limits - Surface Water (April 2023) - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 9:54 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Aluminum (mg/L)	SW-23	3.96	n/a	4/19/2023	0.05ND	No	12	-1.672	1.135	16.67	Kaplan-Meier	ln(x)	0.0006269	Param Inter 1 of 2
Aluminum (mg/L)	SW-25	3.96	n/a	4/19/2023	0.05ND	No	12	-1.672	1.135	16.67	Kaplan-Meier	ln(x)	0.0006269	Param Inter 1 of 2
Aluminum (mg/L)	SW-26	3.96	n/a	4/19/2023	0.05ND	No	12	-1.672	1.135	16.67	Kaplan-Meier	ln(x)	0.0006269	Param Inter 1 of 2
Arsenic (mg/L)	SW-23	0.00367	n/a	4/19/2023	0.00221	No	12	n/a	n/a	75	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Arsenic (mg/L)	**SW-26**	**0.00367**	**n/a**	**4/19/2023**	**0.00664**	**Yes**	**12**	**n/a**	**n/a**	**75**	**n/a**	**n/a**	**0.009707**	**NP Inter (NDs) 1 of 2**
Barium (mg/L)	SW-23	0.2154	n/a	4/19/2023	0.0922	No	12	0.1155	0.03722	0	None	No	0.0006269	Param Inter 1 of 2
Barium (mg/L)	SW-24	0.2154	n/a	4/19/2023	0.0253	No	12	0.1155	0.03722	0	None	No	0.0006269	Param Inter 1 of 2
Barium (mg/L)	SW-25	0.2154	n/a	4/19/2023	0.051	No	12	0.1155	0.03722	0	None	No	0.0006269	Param Inter 1 of 2
Barium (mg/L)	SW-26	0.2154	n/a	4/19/2023	0.0536	No	12	0.1155	0.03722	0	None	No	0.0006269	Param Inter 1 of 2
Boron (mg/L)	SW-23	6.67	n/a	4/19/2023	2.17	No	13	n/a	n/a	69.23	n/a	n/a	0.008777	NP Inter (NDs) 1 of 2
Boron (mg/L)	**SW-24**	**6.67**	**n/a**	**4/19/2023**	**7.97**	**Yes**	**13**	**n/a**	**n/a**	**69.23**	**n/a**	**n/a**	**0.008777**	**NP Inter (NDs) 1 of 2**
Boron (mg/L)	SW-25	6.67	n/a	4/19/2023	4.2	No	13	n/a	n/a	69.23	n/a	n/a	0.008777	NP Inter (NDs) 1 of 2
Boron (mg/L)	SW-26	6.67	n/a	4/19/2023	1.54	No	13	n/a	n/a	69.23	n/a	n/a	0.008777	NP Inter (NDs) 1 of 2
Calcium (mg/L)	SW-23	221	n/a	4/19/2023	87.6	No	13	n/a	n/a	0	n/a	n/a	0.008777	NP Inter (normality) 1 of 2
Calcium (mg/L)	SW-24	221	n/a	4/19/2023	213	No	13	n/a	n/a	0	n/a	n/a	0.008777	NP Inter (normality) 1 of 2
Calcium (mg/L)	SW-25	221	n/a	4/19/2023	149	No	13	n/a	n/a	0	n/a	n/a	0.008777	NP Inter (normality) 1 of 2
Calcium (mg/L)	SW-26	221	n/a	4/19/2023	70	No	13	n/a	n/a	0	n/a	n/a	0.008777	NP Inter (normality) 1 of 2
Chloride (mg/L)	SW-23	21.33	n/a	4/19/2023	19.1	No	13	14.98	2.412	0	None	No	0.0006269	Param Inter 1 of 2
Chloride (mg/L)	SW-24	21.33	n/a	4/19/2023	16.1	No	13	14.98	2.412	0	None	No	0.0006269	Param Inter 1 of 2
Chloride (mg/L)	SW-25	21.33	n/a	4/19/2023	17.7	No	13	14.98	2.412	0	None	No	0.0006269	Param Inter 1 of 2
Chloride (mg/L)	SW-26	21.33	n/a	4/19/2023	20.2	No	13	14.98	2.412	0	None	No	0.0006269	Param Inter 1 of 2
Cobalt (mg/L)	SW-23	0.00116	n/a	4/19/2023	0.0005ND	No	12	n/a	n/a	66.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Cobalt (mg/L)	SW-25	0.00116	n/a	4/19/2023	0.0005ND	No	12	n/a	n/a	66.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Cobalt (mg/L)	SW-26	0.00116	n/a	4/19/2023	0.0005ND	No	12	n/a	n/a	66.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Copper (mg/L)	SW-23	0.005	n/a	4/19/2023	0.005ND	No	11	n/a	n/a	100	n/a	n/a	0.01131	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	SW-23	1	n/a	4/19/2023	1ND	No	13	n/a	n/a	92.31	n/a	n/a	0.008777	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	SW-24	1	n/a	4/19/2023	1ND	No	13	n/a	n/a	92.31	n/a	n/a	0.008777	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	SW-26	1	n/a	4/19/2023	1ND	No	13	n/a	n/a	92.31	n/a	n/a	0.008777	NP Inter (NDs) 1 of 2
Iron (mg/L)	SW-23	2.16	n/a	4/19/2023	0.117	No	12	0.6675	0.2987	8.333	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Iron (mg/L)	SW-24	2.16	n/a	4/19/2023	0.05ND	No	12	0.6675	0.2987	8.333	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Iron (mg/L)	SW-25	2.16	n/a	4/19/2023	0.05ND	No	12	0.6675	0.2987	8.333	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Iron (mg/L)	SW-26	2.16	n/a	4/19/2023	0.286	No	12	0.6675	0.2987	8.333	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Lead (mg/L)	SW-23	0.00258	n/a	4/19/2023	0.0005ND	No	12	n/a	n/a	66.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Lead (mg/L)	SW-25	0.00258	n/a	4/19/2023	0.0005ND	No	12	n/a	n/a	66.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Lead (mg/L)	SW-26	0.00258	n/a	4/19/2023	0.0005ND	No	12	n/a	n/a	66.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Magnesium (mg/L)	SW-23	73.3	n/a	4/19/2023	34	No	12	n/a	n/a	0	n/a	n/a	0.009707	NP Inter (normality) 1 of 2
Magnesium (mg/L)	**SW-24**	**73.3**	**n/a**	**4/19/2023**	**86.1**	**Yes**	**12**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.009707**	**NP Inter (normality) 1 of 2**
Magnesium (mg/L)	SW-25	73.3	n/a	4/19/2023	53.8	No	12	n/a	n/a	0	n/a	n/a	0.009707	NP Inter (normality) 1 of 2
Magnesium (mg/L)	SW-26	73.3	n/a	4/19/2023	33	No	12	n/a	n/a	0	n/a	n/a	0.009707	NP Inter (normality) 1 of 2
Manganese (mg/L)	SW-23	0.9788	n/a	4/19/2023	0.115	No	12	0.4694	0.1937	0	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Manganese (mg/L)	SW-24	0.9788	n/a	4/19/2023	0.005ND	No	12	0.4694	0.1937	0	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Manganese (mg/L)	SW-25	0.9788	n/a	4/19/2023	0.0169	No	12	0.4694	0.1937	0	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Manganese (mg/L)	SW-26	0.9788	n/a	4/19/2023	0.728	No	12	0.4694	0.1937	0	None	sqrt(x)	0.0006269	Param Inter 1 of 2
Molybdenum (mg/L)	**SW-23**	**0.00637**	**n/a**	**4/19/2023**	**0.0281**	**Yes**	**12**	**n/a**	**n/a**	**91.67**	**n/a**	**n/a**	**0.009707**	**NP Inter (NDs) 1 of 2**
Molybdenum (mg/L)	SW-25	0.00637	n/a	4/19/2023	0.002ND	No	12	n/a	n/a	91.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2
Molybdenum (mg/L)	**SW-26**	**0.00637**	**n/a**	**4/19/2023**	**0.0149**	**Yes**	**12**	**n/a**	**n/a**	**91.67**	**n/a**	**n/a**	**0.009707**	**NP Inter (NDs) 1 of 2**
Strontium (mg/L)	SW-23	0.285	n/a	4/19/2023	0.229	No	12	n/a	n/a	0	n/a	n/a	0.009707	NP Inter (normality) 1 of 2
Strontium (mg/L)	**SW-24**	**0.285**	**n/a**	**4/19/2023**	**0.339**	**Yes**	**12**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.009707**	**NP Inter (normality) 1 of 2**
Strontium (mg/L)	SW-25	0.285	n/a	4/19/2023	0.257	No	12	n/a	n/a	0	n/a	n/a	0.009707	NP Inter (normality) 1 of 2
Strontium (mg/L)	SW-26	0.285	n/a	4/19/2023	0.203	No	12	n/a	n/a	0	n/a	n/a	0.009707	NP Inter (normality) 1 of 2
Sulfate (mg/L)	SW-23	554	n/a	4/19/2023	182	No	13	n/a	n/a	0	n/a	n/a	0.008777	NP Inter (normality) 1 of 2
Sulfate (mg/L)	**SW-24**	**554**	**n/a**	**4/19/2023**	**622**	**Yes**	**13**	**n/a**	**n/a**	**0**	**n/a**	**n/a**	**0.008777**	**NP Inter (normality) 1 of 2**
Sulfate (mg/L)	SW-25	554	n/a	4/19/2023	299	No	13	n/a	n/a	0	n/a	n/a	0.008777	NP Inter (normality) 1 of 2
Sulfate (mg/L)	SW-26	554	n/a	4/19/2023	121	No	13	n/a	n/a	0	n/a	n/a	0.008777	NP Inter (normality) 1 of 2
Zinc (mg/L)	SW-26	0.0312	n/a	4/19/2023	0.02ND	No	12	n/a	n/a	91.67	n/a	n/a	0.009707	NP Inter (NDs) 1 of 2

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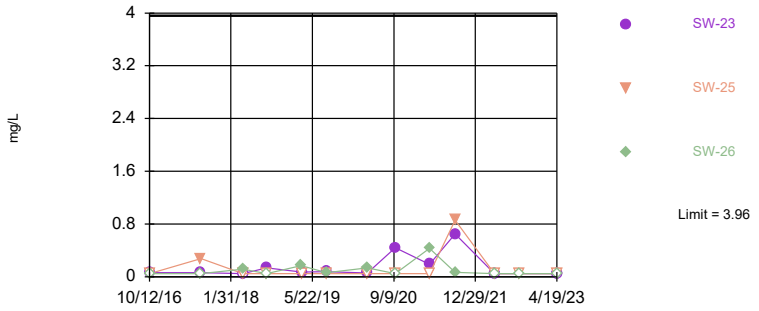
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary (based on natural log transformation) (after Kaplan-Meier Adjustment): Mean=-1.672, Std. Dev.=1.135, n=12, 16.67% NDs. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8676, critical = 0.859. Kappa = 2.685 (c=21, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0006269. Comparing 3 points to limit. Assumes 1 future value.

Constituent: Aluminum Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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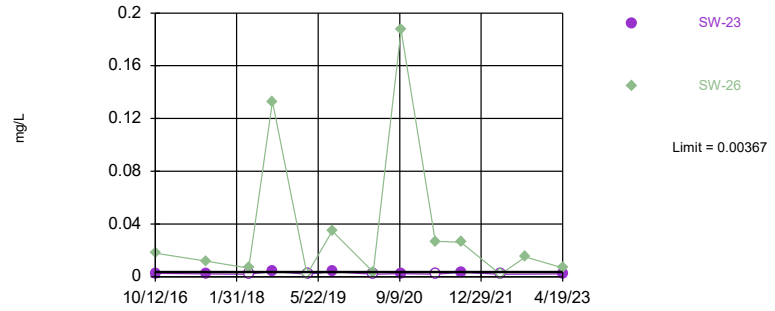
Hollow symbols indicate censored values.

Exceeds Limit: SW-26

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 12 background values. 75% NDs. Annual per-constituent alpha = 0.07507. Individual comparison alpha = 0.009707 (1 of 2). Comparing 2 points to limit. Assumes 2 future values.

Constituent: Arsenic Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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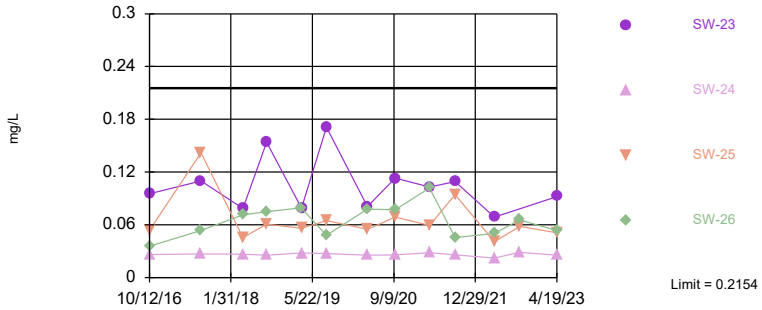
Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=0.1155, Std. Dev.=0.03722, n=12. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8708, critical = 0.859. Kappa = 2.685 (c=21, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0006269. Comparing 4 points to limit.

Constituent: Barium Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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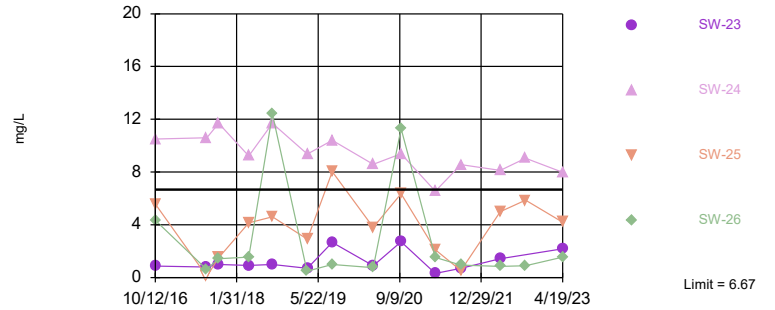
Hollow symbols indicate censored values.

Exceeds Limit: SW-24

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 13 background values. 69.23% NDs. Annual per-constituent alpha = 0.0681. Individual comparison alpha = 0.008777 (1 of 2). Comparing 4 points to limit.

Constituent: Boron Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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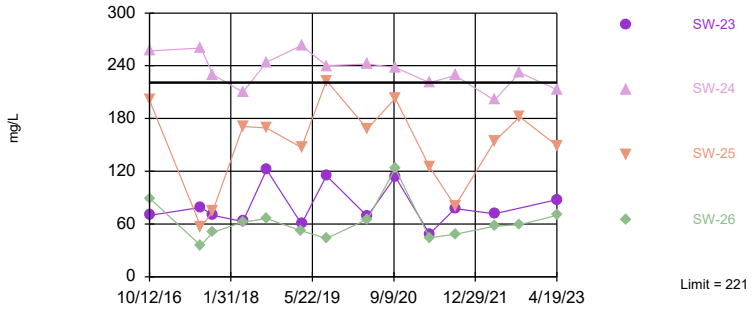
Within Limit

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 13 background values. Annual per-constituent alpha = 0.0681. Individual comparison alpha = 0.008777 (1 of 2). Comparing 4 points to limit.

Constituent: Calcium Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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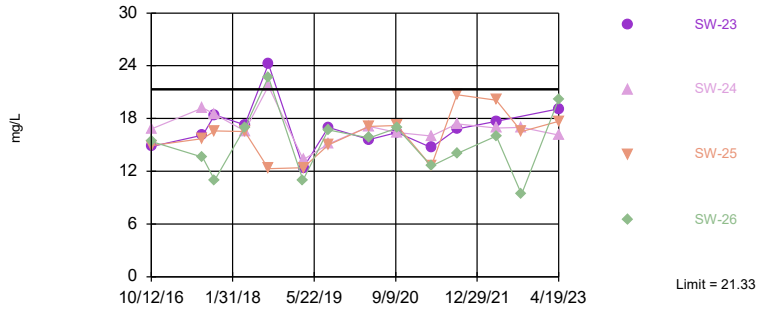
Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary: Mean=14.98, Std. Dev.=2.412, n=13. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.956, critical = 0.866. Kappa = 2.629 (c=21, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0006269. Comparing 4 points to limit.

Constituent: Chloride Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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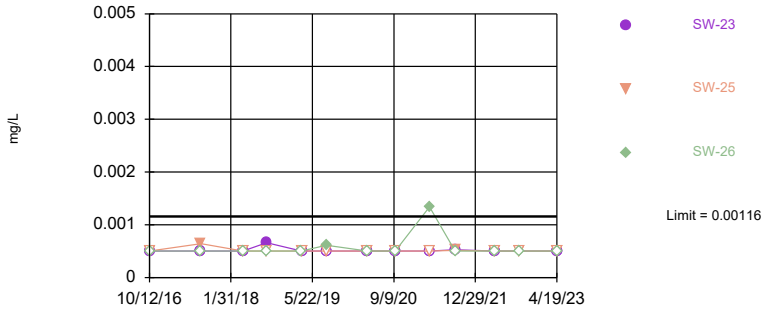
Hollow symbols indicate censored values.

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 12 background values. 66.67% NDs. Annual per-constituent alpha = 0.07507. Individual comparison alpha = 0.009707 (1 of 2). Comparing 3 points to limit. Assumes 1 future value.

Constituent: Cobalt Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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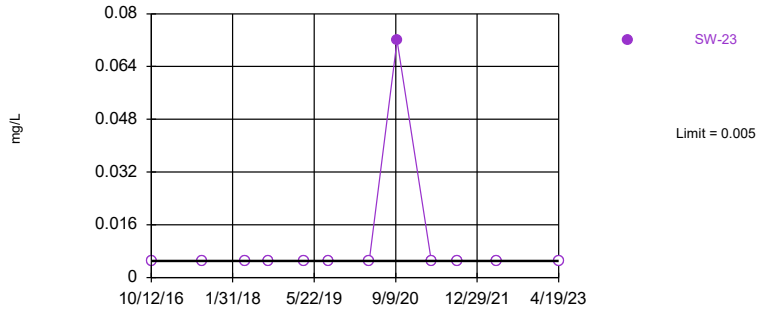
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. All background values (n = 11) were censored; limit is most recent reporting limit. Annual per-constituent alpha = 0.08699. Individual comparison alpha = 0.01131 (1 of 2). Assumes 3 future values.

Constituent: Copper Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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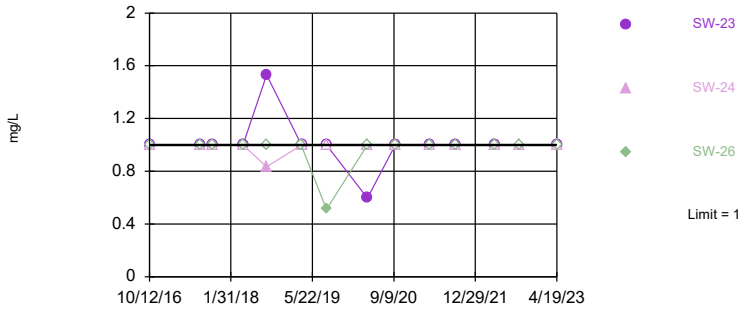
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Non-parametric



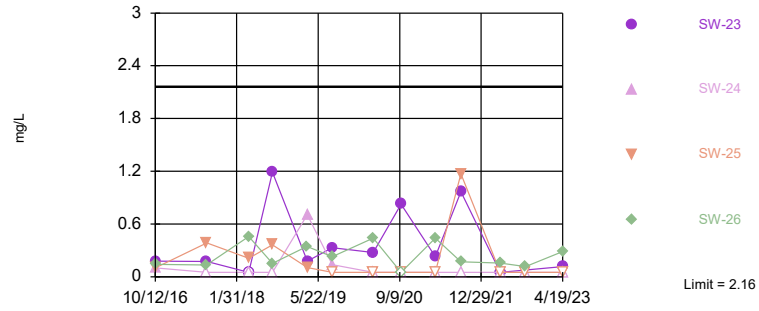
Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 13 background values. 92.31% NDs. Annual per-constituent alpha = 0.0681. Individual comparison alpha = 0.008777 (1 of 2). Comparing 3 points to limit. Assumes 1 future value.

Constituent: Fluoride Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
Within Limit

Prediction Limit

Interwell Parametric



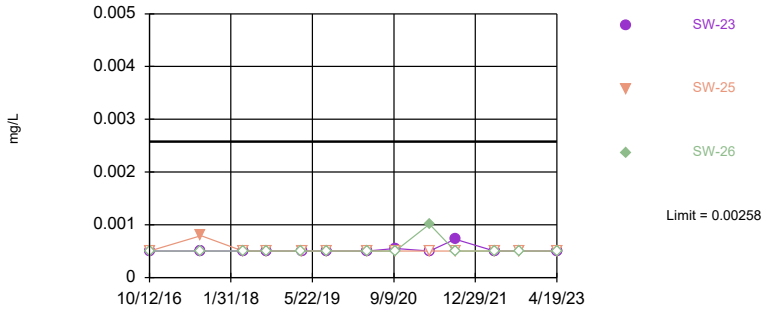
Background Data Summary (based on square root transformation): Mean=0.6675, Std. Dev.=0.2987, n=12, 8.333% NDs. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.938, critical = 0.859. Kappa = 2.685 (c=21, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0006269. Comparing 4 points to limit.

Constituent: Iron Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
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 12 background values. 66.67% NDs. Annual per-constituent alpha = 0.07507. Individual comparison alpha = 0.009707 (1 of 2). Comparing 3 points to limit. Assumes 1 future value.

Constituent: Lead Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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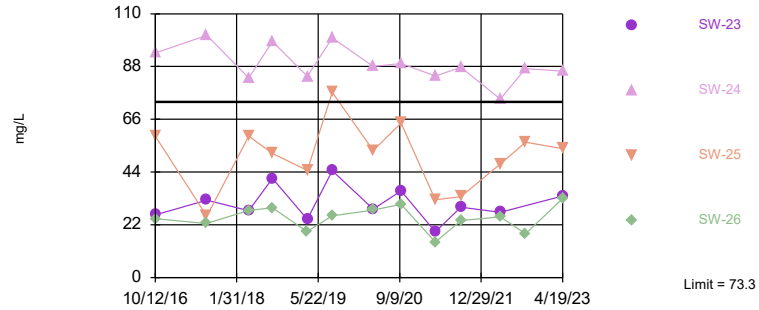
Exceeds Limit: SW-24

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 12 background values. Annual per-constituent alpha = 0.07507. Individual comparison alpha = 0.009707 (1 of 2). Comparing 4 points to limit.

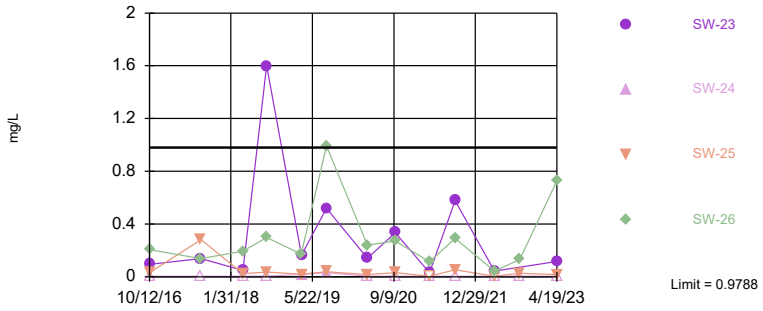
Constituent: Magnesium Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Interwell Parametric



Background Data Summary (based on square root transformation): Mean=0.4694, Std. Dev.=0.1937, n=12. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9153, critical = 0.859. Kappa = 2.685 (c=21, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Individual comparison alpha = 0.0006269. Comparing 4 points to limit.

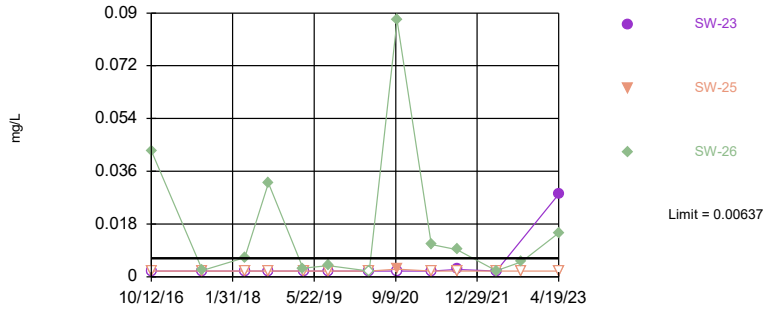
Constituent: Manganese Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.

Exceeds Limit: SW-23, SW-26

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 12 background values. 91.67% NDs. Annual per-constituent alpha = 0.07507. Individual comparison alpha = 0.009707 (1 of 2). Comparing 3 points to limit. Assumes 1 future value.

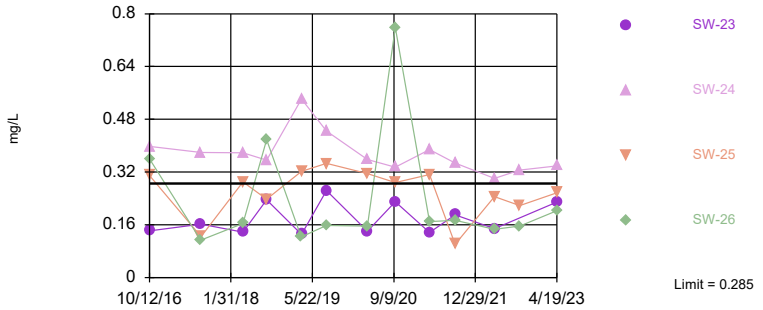
Constituent: Molybdenum Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG

Exceeds Limit: SW-24

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 12 background values. Annual per-constituent alpha = 0.07507. Individual comparison alpha = 0.009707 (1 of 2). Comparing 4 points to limit.

Constituent: Strontium Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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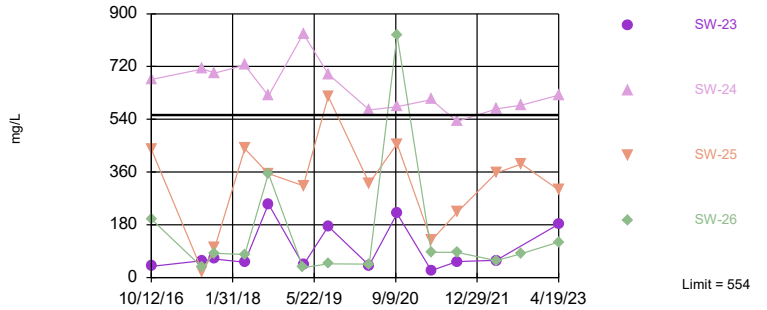
Exceeds Limit: SW-24

Prediction Limit

Interwell Non-parametric



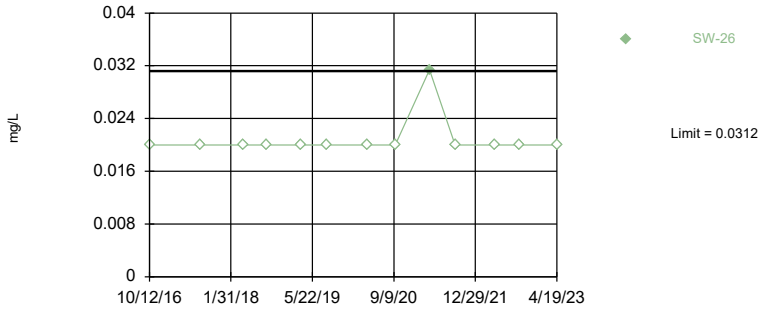
Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 13 background values. Annual per-constituent alpha = 0.0681. Individual comparison alpha = 0.008777 (1 of 2). Comparing 4 points to limit.

Constituent: Sulfate Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG
Hollow symbols indicate censored values.
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 12 background values. 91.67% NDs. Annual per-constituent alpha = 0.07507. Individual comparison alpha = 0.009707 (1 of 2). Assumes 3 future values.

Constituent: Zinc Analysis Run 11/9/2023 9:52 AM View: State Surface Water Prediction Limits
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Prediction Limit

Constituent: Aluminum (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-26	SW-23	SW-25
10/12/2016	0.217	<0.05	0.0624	<0.05
8/7/2017		<0.05		
8/9/2017	<0.05		0.0626	0.276
4/11/2018	0.0713	0.117	<0.05	<0.05
8/27/2018	1.09	<0.05	0.137	<0.05
3/18/2019		0.169		
3/20/2019	0.153		0.0744	<0.05
8/13/2019	0.194	0.0646	0.0761	<0.05
4/7/2020	0.0821	0.134	0.0578	<0.05
9/18/2020	1.28	<0.05	0.44	<0.05
4/5/2021	0.191	0.432	0.187	<0.05
9/1/2021	0.982	0.0654	0.648	0.858
4/20/2022	<0.05	<0.05	<0.05	<0.05
9/14/2022		<0.05		<0.05
4/19/2023	0.0782	<0.05	<0.05	<0.05

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Arsenic (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23	SW-26
10/12/2016	<0.002	0.00257	0.018
8/7/2017			0.0118
8/9/2017	<0.002	0.00211	
4/11/2018	<0.002	<0.002	0.00661
8/27/2018	<0.002	0.00401	0.133
3/18/2019			<0.002
3/20/2019	<0.002	<0.002	
8/13/2019	0.00342	0.00378	0.0347
4/7/2020	<0.002	<0.002	0.00368
9/18/2020	0.00217	0.00236	0.187
4/5/2021	<0.002	<0.002	0.0268
9/1/2021	0.00367	0.00332	0.0262
4/20/2022	<0.002	<0.002	<0.002
9/14/2022			0.0151
4/19/2023	<0.002	0.00221	0.00664

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Barium (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-24	SW-26	SW-23	SW-25
10/12/2016	0.111	0.0261	0.0357	0.0953	0.0538
8/7/2017			0.0535		
8/9/2017	0.0601	0.0268		0.11	0.142
4/11/2018	0.0806	0.0264	0.0712	0.0785	0.0456
8/27/2018	0.108	0.0256	0.0751	0.154	0.0608
3/18/2019			0.0793		
3/20/2019	0.0996	0.0278		0.079	0.056
8/13/2019	0.168	0.0272	0.048	0.171	0.0648
4/7/2020	0.0967	0.0254	0.078	0.0806	0.0548
9/18/2020	0.168	0.0257	0.0772	0.113	0.0686
4/5/2021	0.112	0.0285	0.102	0.103	0.0594
9/1/2021	0.181	0.0259	0.0455	0.109	0.0941
4/20/2022	0.1	0.0222	0.0503	0.0689	0.0407
9/14/2022		0.0288	0.0656		0.058
4/19/2023	0.101	0.0253	0.0536	0.0922	0.051

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-24	SW-26	SW-23	SW-25
10/12/2016	1.25	10.5	4.33	0.869	5.57
8/7/2017			0.631		
8/9/2017	5.95	10.6		0.789	<0.1
10/17/2017	6.67	11.7	1.43	0.981	1.51
4/11/2018	<0.1	9.21	1.54	0.922	4.15
8/27/2018	<0.1	11.7	12.4	0.983	4.61
3/18/2019			0.486		
3/20/2019	<0.1	9.36		0.693	2.9
8/13/2019	<0.1	10.4	1	2.66	8.03
4/7/2020	<0.1	8.58	0.745	0.898	3.8
9/18/2020	0.206	9.39	11.3	2.72	6.36
4/5/2021	<0.1	6.55	1.52	0.32	2.11
9/1/2021	<0.1	8.55	0.941	0.704	0.528
4/20/2022	<0.1	8.12	0.855	1.43	5
9/14/2022		9.05	0.892		5.86
4/19/2023	<0.1	7.97	1.54	2.17	4.2

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-24	SW-26	SW-23	SW-25
10/12/2016	75.5	257	89.3	69.8	201
8/7/2017			35.5		
8/9/2017	221	260		79.1	56.3
10/17/2017	204	230	50.6	70	74.8
4/11/2018	45.2	210	62.1	62.9	171
8/27/2018	33.3	244	66.1	122	169
3/18/2019			52.4		
3/20/2019	51.8	263		60.1	147
8/13/2019	47.4	240	43.6	115	223
4/7/2020	59.6	242	65.5	68.6	168
9/18/2020	55.1	238	123	114	203
4/5/2021	42.4	221	44.5	48.7	125
9/1/2021	58.1	229	48.3	77.3	80.5
4/20/2022	58.6	201	57.4	71.7	154
9/14/2022		232	59.4		182
4/19/2023	57.6	213	70	87.6	149

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-24	SW-26	SW-23	SW-25
10/12/2016	13.9	16.8	15.4	14.8	14.9
8/7/2017			13.6		
8/9/2017	20	19.2		16.1	15.7
10/17/2017	16.8	18.5	11	18.4	16.6
4/11/2018	16.5	16.6	16.9	17.3	16.5
8/27/2018	11.7	21.7	22.7	24.2	12.3
3/18/2019			11		
3/20/2019	12.9	13.3		12.4	12.4
8/13/2019	12.3	15.1	16.7	17	15
4/7/2020	14.5	17.1	15.8	15.6	17.1
9/18/2020	13.3	16.4	16.9	16.4	17.2
4/5/2021	14.9	16	12.6	14.7	12.6
9/1/2021	13.7	17.4	14	16.8	20.7
4/20/2022	16.3	16.9	16	17.7	20.1
9/14/2022		17	9.4		16.5
4/19/2023	18	16.1	20.2	19.1	17.7

Prediction Limit

Constituent: Cobalt (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-26	SW-23	SW-25
10/12/2016	<0.0005	<0.0005	<0.0005	<0.0005
8/7/2017		<0.0005		
8/9/2017	<0.0005		<0.0005	0.00064
4/11/2018	<0.0005	<0.0005	<0.0005	<0.0005
8/27/2018	<0.0005	<0.0005	0.00066	<0.0005
3/18/2019		<0.0005		
3/20/2019	<0.0005		<0.0005	<0.0005
8/13/2019	0.000833	0.000613	<0.0005	<0.0005
4/7/2020	<0.0005	<0.0005	<0.0005	<0.0005
9/18/2020	0.00116	<0.0005	<0.0005	<0.0005
4/5/2021	<0.0005	0.00134	<0.0005	<0.0005
9/1/2021	0.00105	<0.0005	0.000529	0.000512
4/20/2022	0.000713	<0.0005	<0.0005	<0.0005
9/14/2022		<0.0005		<0.0005
4/19/2023	<0.0005	<0.0005	<0.0005	<0.0005

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Copper (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-23
10/12/2016	<0.005	<0.005
8/9/2017	<0.005	<0.005
4/11/2018	<0.005	<0.005
8/27/2018	<0.005	<0.005
3/20/2019	<0.005	<0.005
8/13/2019	<0.005	<0.005
4/7/2020	<0.005	<0.005
9/18/2020	<0.005	0.0719
4/5/2021	<0.005	<0.005
9/1/2021	0.0358 (o)	<0.005
4/20/2022	<0.005	<0.005
4/19/2023	<0.005	<0.005

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-26	SW-23	SW-24
10/12/2016	<1	<1	<1	<1
8/7/2017		<1		
8/9/2017	<1		<1	<1
10/17/2017	<1	<1	<1	<1
4/11/2018	<1	<1	<1	<1
8/27/2018	<1	<1	1.53	0.834
3/18/2019		<1		
3/20/2019	<1		<1	<1
8/13/2019	<1	0.512	<1	<1
4/7/2020	<1	<1	0.597	<1
9/18/2020	<1	<1	<1	<1
4/5/2021	0.6	<1	<1	<1
9/1/2021	<1	<1	<1	<1
4/20/2022	<1	<1	<1	<1
9/14/2022		<1		<1
4/19/2023	<1	<1	<1	<1

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Iron (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-24	SW-26	SW-23	SW-25
10/12/2016	0.415	0.102	0.141	0.177	0.1
8/7/2017			0.135		
8/9/2017	<0.1	<0.1		0.173	0.384
4/11/2018	0.259	<0.1	0.457	<0.1	0.212
8/27/2018	1.01	<0.1	0.151	1.19	0.363
3/18/2019			0.345		
3/20/2019	0.66	0.705		0.176	0.104
8/13/2019	0.408	0.137	0.227	0.332	<0.1
4/7/2020	0.363	<0.1	0.439	0.275	<0.1
9/18/2020	1.25	<0.1	<0.1	0.827	<0.1
4/5/2021	0.21	<0.1	0.439	0.228	<0.1
9/1/2021	1.34	<0.1	0.169	0.967	1.17
4/20/2022	0.123	<0.1	0.157	<0.1	<0.1
9/14/2022		<0.1	0.116		<0.1
4/19/2023	0.24	<0.1	0.286	0.117	<0.1

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Lead (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-26	SW-23	SW-25
10/12/2016	<0.0005	<0.0005	<0.0005	<0.0005
8/7/2017		<0.0005		
8/9/2017	<0.0005		<0.0005	0.000796
4/11/2018	<0.0005	<0.0005	<0.0005	<0.0005
8/27/2018	0.000716	<0.0005	<0.0005	<0.0005
3/18/2019		<0.0005		
3/20/2019	<0.0005		<0.0005	<0.0005
8/13/2019	0.000623	<0.0005	<0.0005	<0.0005
4/7/2020	<0.0005	<0.0005	<0.0005	<0.0005
9/18/2020	0.000829	<0.0005	0.000549	<0.0005
4/5/2021	<0.0005	0.00101	<0.0005	<0.0005
9/1/2021	0.00258	<0.0005	0.000726	<0.0005
4/20/2022	<0.0005	<0.0005	<0.0005	<0.0005
9/14/2022		<0.0005		<0.0005
4/19/2023	<0.0005	<0.0005	<0.0005	<0.0005

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Magnesium (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-24	SW-26	SW-23	SW-25
10/12/2016	28.6	93.7	24.5	26.1	58.9
8/7/2017			22.6		
8/9/2017	73.3	101		32.3	25.6
4/11/2018	21.1	83.2	28	27.9	59
8/27/2018	13.6	98.4	29.1	41.4	51.8
3/18/2019			19.2		
3/20/2019	22.6	83.9		24.3	44.7
8/13/2019	20.9	99.9	25.8	44.6	77.3
4/7/2020	26.4	88.1	28.2	28.5	53
9/18/2020	22.9	89.2	30.5	36.2	64.5
4/5/2021	17.2	84	14.8	19	32.4
9/1/2021	25.8	87.6	23.8	29.4	33.8
4/20/2022	23.6	74.4	25.4	27.2	47.3
9/14/2022		87.1	18.3		56.4
4/19/2023	25.1	86.1	33	34	53.8

Prediction Limit

Constituent: Manganese (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-24	SW-26	SW-23	SW-25
10/12/2016	0.205	<0.01	0.205	0.0951	0.0315
8/7/2017			0.139		
8/9/2017	0.0766	<0.01		0.139	0.282
4/11/2018	0.18	<0.01	0.194	0.0476	0.0244
8/27/2018	0.0399	<0.01	0.298	1.6	0.0361
3/18/2019			0.172		
3/20/2019	0.196	0.0179		0.164	0.0184
8/13/2019	0.694	0.0304	0.993	0.52	0.0387
4/7/2020	0.217	<0.01	0.241	0.14	0.0156
9/18/2020	0.492	<0.01	0.271	0.335	0.0311
4/5/2021	0.0882	<0.01	0.114	0.0311	<0.01
9/1/2021	0.539	<0.01	0.29	0.578	0.054
4/20/2022	0.125	<0.01	0.0422	0.0426	<0.01
9/14/2022		<0.01	0.131		0.026
4/19/2023	0.204	<0.01	0.728	0.115	0.0169

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Molybdenum (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-26	SW-23	SW-25
10/12/2016	<0.002	0.043	<0.002	<0.002
8/7/2017		0.00214		
8/9/2017	<0.002		<0.002	<0.002
4/11/2018	<0.002	0.00659	<0.002	<0.002
8/27/2018	<0.002	0.032	<0.002	<0.002
3/18/2019		0.00291		
3/20/2019	<0.002		<0.002	<0.002
8/13/2019	<0.002	0.00379	<0.002	<0.002
4/7/2020	<0.002	<0.002	<0.002	<0.002
9/18/2020	<0.002	0.0876	<0.002	0.00256
4/5/2021	<0.002	0.011	<0.002	<0.002
9/1/2021	0.00637	0.00925	0.00252	<0.002
4/20/2022	<0.002	0.00202	<0.002	<0.002
9/14/2022		0.00514		<0.002
4/19/2023	<0.002	0.0149	0.0281	<0.002

ND substitution: RL or RL/2 if <15% NDs.

Prediction Limit

Constituent: Strontium (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-24	SW-26	SW-23	SW-25
10/12/2016	0.148	0.398	0.36	0.142	0.309
8/7/2017			0.113		
8/9/2017	0.285	0.379		0.162	0.124
4/11/2018	0.0998	0.378	0.164	0.138	0.29
8/27/2018	0.0842	0.356	0.418	0.236	0.238
3/18/2019			0.123		
3/20/2019	0.12	0.541		0.131	0.322
8/13/2019	0.129	0.444	0.158	0.264	0.346
4/7/2020	0.128	0.358	0.156	0.141	0.315
9/18/2020	0.125	0.335	0.759	0.23	0.288
4/5/2021	0.12	0.388	0.17	0.137	0.312
9/1/2021	0.147	0.347	0.174	0.19	0.101
4/20/2022	0.125	0.301	0.146	0.148	0.245
9/14/2022		0.326	0.156		0.218
4/19/2023	0.111	0.339	0.203	0.229	0.257

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-24	SW-26	SW-23	SW-25
10/12/2016	73	676	200	37.7	438
8/7/2017			33.8		
8/9/2017	554	712		58.1	16.9
10/17/2017	213	698	82.5	63.7	101
4/11/2018	20.1	725	78.8	52	440
8/27/2018	13.2	620	355	251	355
3/18/2019			33.7		
3/20/2019	20.4	832		42.2	313
8/13/2019	10.1	694	46.3	175	618
4/7/2020	16.3	572	45.9	41.5	322
9/18/2020	21	583	828	218	456
4/5/2021	13.9	607	86.4	23.6	127
9/1/2021	14.3	533	85.9	54.3	222
4/20/2022	15.7	575	57.3	58.4	357
9/14/2022		588	81.4		387
4/19/2023	15.7	622	121	182	299

Prediction Limit

Constituent: Zinc (mg/L) Analysis Run 11/9/2023 9:54 AM View: State Surface Water Prediction Limits

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

	SW-22 (bg)	SW-26
10/12/2016	<0.02	<0.02
8/7/2017		<0.02
8/9/2017	<0.02	
4/11/2018	<0.02	<0.02
8/27/2018	<0.02	<0.02
3/18/2019		<0.02
3/20/2019	<0.02	
8/13/2019	<0.02	<0.02
4/7/2020	<0.02	<0.02
9/18/2020	<0.02	<0.02
4/5/2021	<0.02	0.0314
9/1/2021	0.0312	<0.02
4/20/2022	<0.02	<0.02
9/14/2022		<0.02
4/19/2023	<0.02	<0.02

ND substitution: RL or RL/2 if <15% NDs.

FIGURE H.

Trend Tests - Prediction Limit Exceedances (Surface Water) - Significant Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 10:01 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Alpha	Method
Boron (mg/L)	**SW-24**	**-0.4617**	**-52**	**-48**	**Yes**	**14**	**0**	**n/a**	**0.01**	**NP**

Trend Tests - Prediction Limit Exceedances (Surface Water) - All Results

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water Printed 11/9/2023, 10:01 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Alpha	Method
Arsenic (mg/L)	SW-22 (bg)	0	10	38	No	12	75	n/a	0.01	NP
Arsenic (mg/L)	SW-26	-0.001307	-9	-43	No	13	15.38	n/a	0.01	NP
Boron (mg/L)	SW-22 (bg)	0	-26	-43	No	13	69.23	n/a	0.01	NP
Boron (mg/L)	**SW-24**	**-0.4617**	**-52**	**-48**	**Yes**	**14**	**0**	**n/a**	**0.01**	**NP**
Magnesium (mg/L)	SW-22 (bg)	-0.2885	-2	-38	No	12	0	n/a	0.01	NP
Magnesium (mg/L)	SW-24	-1.642	-26	-43	No	13	0	n/a	0.01	NP
Molybdenum (mg/L)	SW-22 (bg)	0	7	38	No	12	91.67	n/a	0.01	NP
Molybdenum (mg/L)	SW-23	0	19	38	No	12	83.33	n/a	0.01	NP
Molybdenum (mg/L)	SW-26	-0.0001566	-2	-43	No	13	7.692	n/a	0.01	NP
Strontium (mg/L)	SW-22 (bg)	-0.001868	-10	-38	No	12	0	n/a	0.01	NP
Strontium (mg/L)	SW-24	-0.0116	-40	-43	No	13	0	n/a	0.01	NP
Sulfate (mg/L)	SW-22 (bg)	-3.2	-29	-43	No	13	0	n/a	0.01	NP
Sulfate (mg/L)	SW-24	-23.14	-35	-48	No	14	0	n/a	0.01	NP

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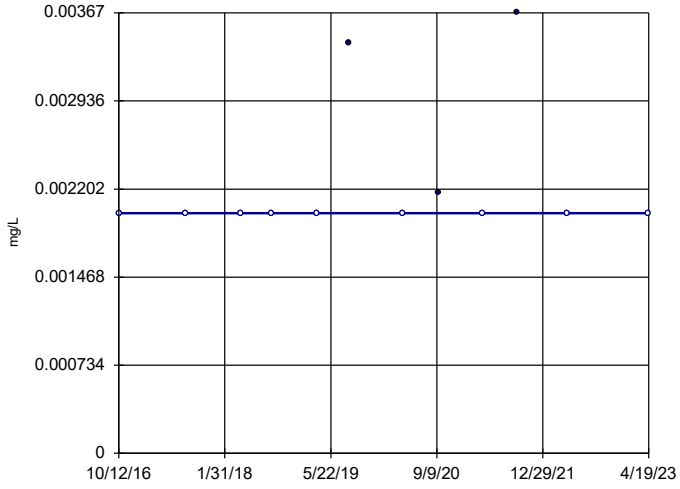
Hollow symbols indicate censored values.

Sen's Slope Estimator

SW-22 (bg)



n = 12

Slope = 0 units per year.

Mann-Kendall statistic = 10 critical = 38

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic Analysis Run 11/9/2023 9:58 AM View: State Surface Water Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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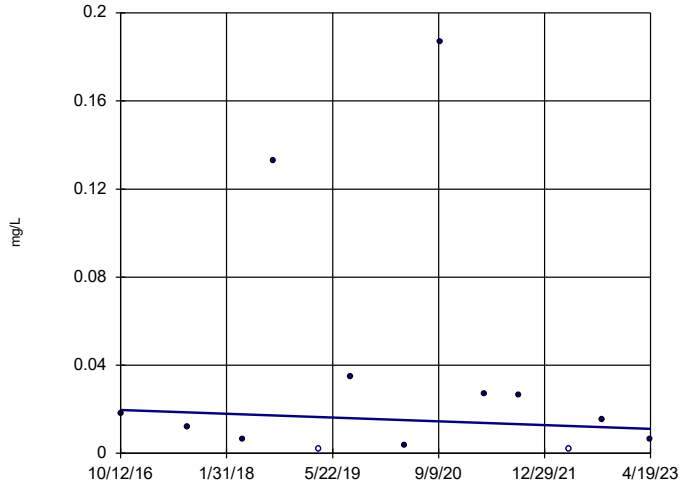
Sen's Slope Estimator

SW-26



n = 13

Slope = -0.001307 units per year.

Mann-Kendall statistic = -9 critical = -43

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Arsenic Analysis Run 11/9/2023 9:58 AM View: State Surface Water Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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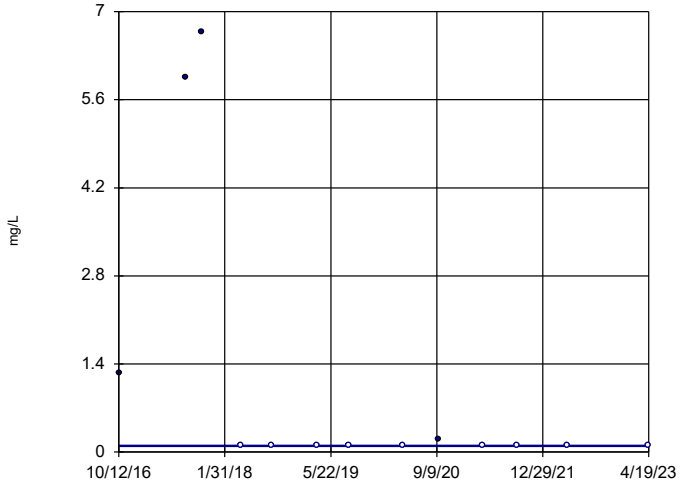
Hollow symbols indicate censored values.

Sen's Slope Estimator

SW-22 (bg)



n = 13

Slope = 0 units per year.

Mann-Kendall statistic = -26 critical = -43

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron Analysis Run 11/9/2023 9:58 AM View: State Surface Water Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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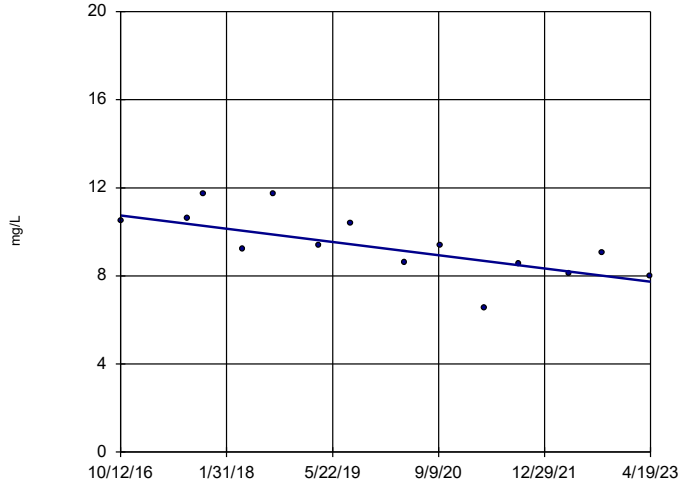
Sen's Slope Estimator

SW-24



n = 14

Slope = -0.4617 units per year.

Mann-Kendall statistic = -52 critical = -48

Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Boron Analysis Run 11/9/2023 9:58 AM View: State Surface Water Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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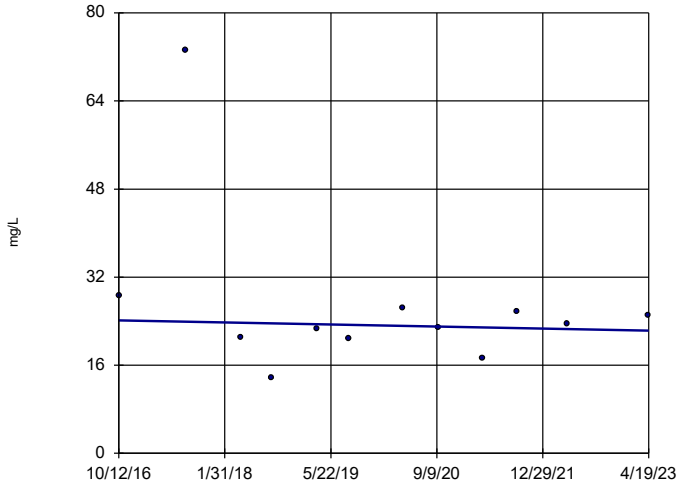
Sen's Slope Estimator

SW-22 (bg)



n = 12

Slope = -0.2885 units per year.

Mann-Kendall statistic = -2 critical = -38

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Magnesium Analysis Run 11/9/2023 9:58 AM View: State Surface Water Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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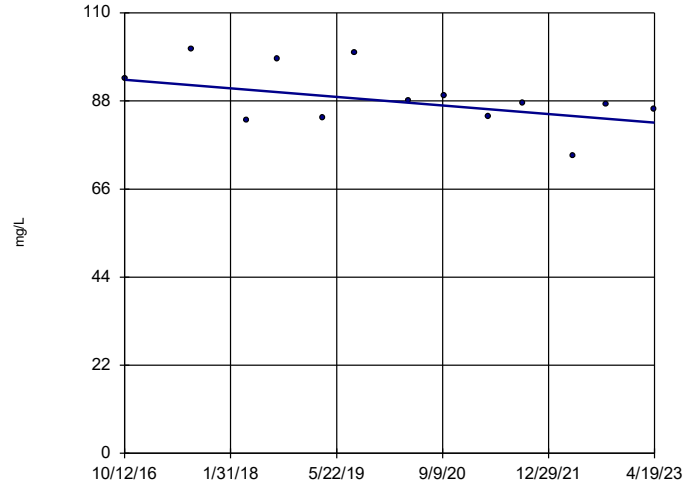
Sen's Slope Estimator

SW-24



n = 13

Slope = -1.642 units per year.

Mann-Kendall statistic = -26 critical = -43

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Magnesium Analysis Run 11/9/2023 9:58 AM View: State Surface Water Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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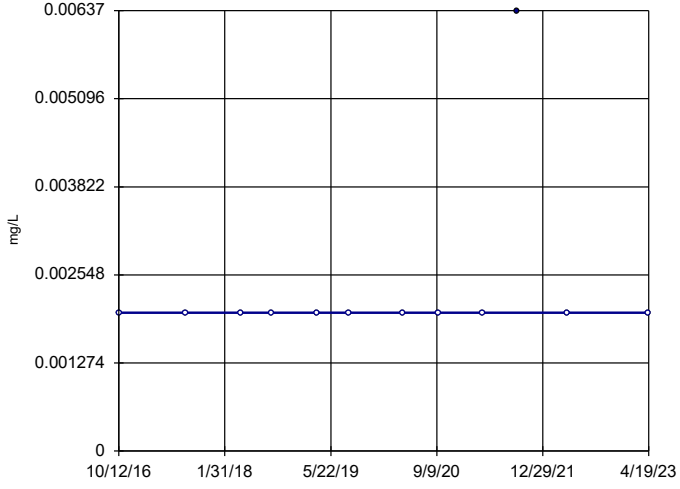
Sen's Slope Estimator

SW-22 (bg)



n = 12

Slope = 0 units per year.

Mann-Kendall statistic = 7 critical = 38

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Molybdenum Analysis Run 11/9/2023 9:58 AM View: State Surface Water Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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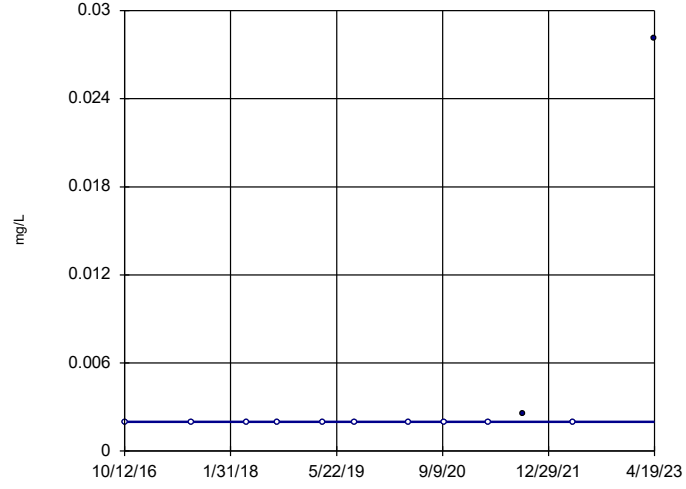
Sen's Slope Estimator

SW-23



n = 12

Slope = 0 units per year.

Mann-Kendall statistic = 19 critical = 38

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Molybdenum Analysis Run 11/9/2023 9:58 AM View: State Surface Water Trend Tests

Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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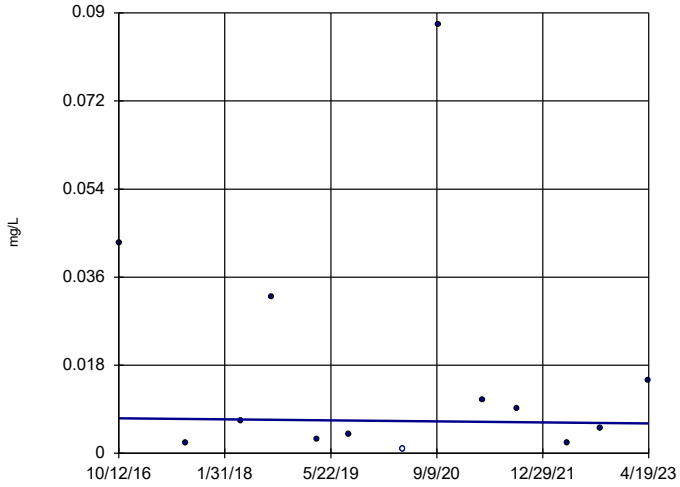
Hollow symbols indicate censored values.

Sen's Slope Estimator

SW-26



n = 13

Slope = -0.0001566 units per year.

Mann-Kendall statistic = -2 critical = -43

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Molybdenum Analysis Run 11/9/2023 9:58 AM View: State Surface Water Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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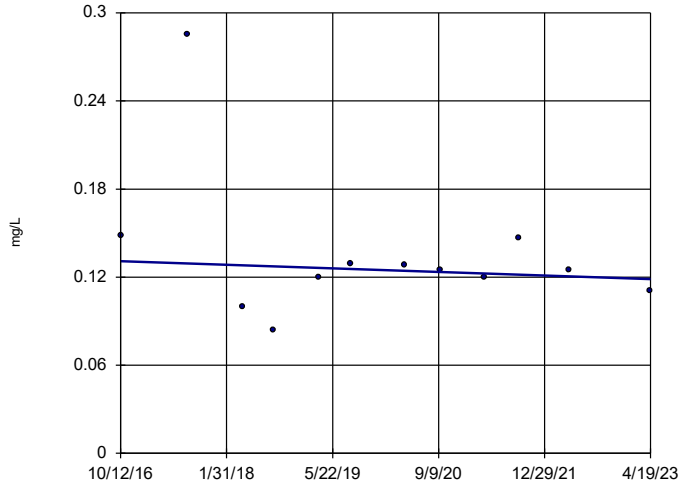
Sen's Slope Estimator

SW-22 (bg)



n = 12

Slope = -0.001868 units per year.

Mann-Kendall statistic = -10 critical = -38

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Strontium Analysis Run 11/9/2023 9:58 AM View: State Surface Water Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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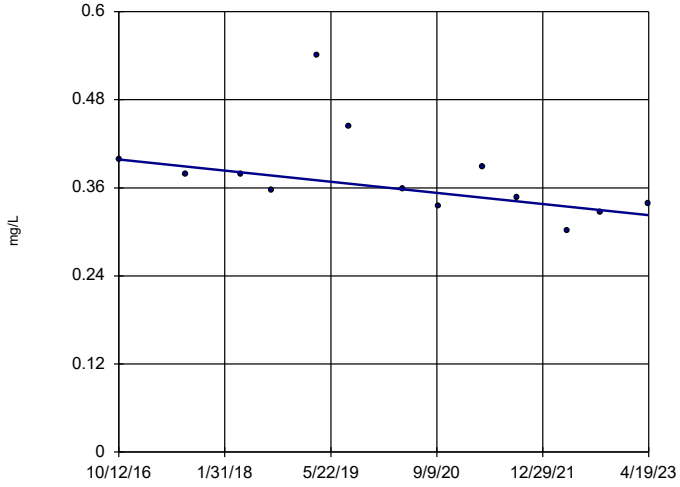
Sen's Slope Estimator

SW-24



n = 13

Slope = -0.0116 units per year.

Mann-Kendall statistic = -40 critical = -43

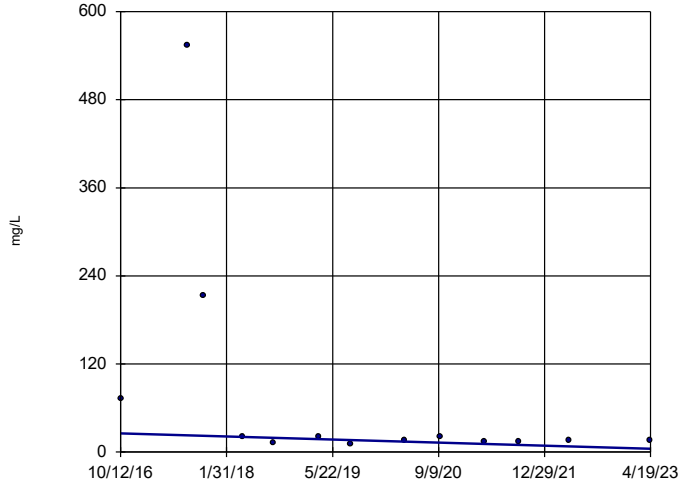
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Strontium Analysis Run 11/9/2023 9:58 AM View: State Surface Water Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

Sanitas™ v.10.0.13b Software licensed to . UG

Sen's Slope Estimator

SW-22 (bg)



n = 13

Slope = -3.2 units per year.

Mann-Kendall statistic = -29 critical = -43

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 11/9/2023 9:58 AM View: State Surface Water Trend Tests
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

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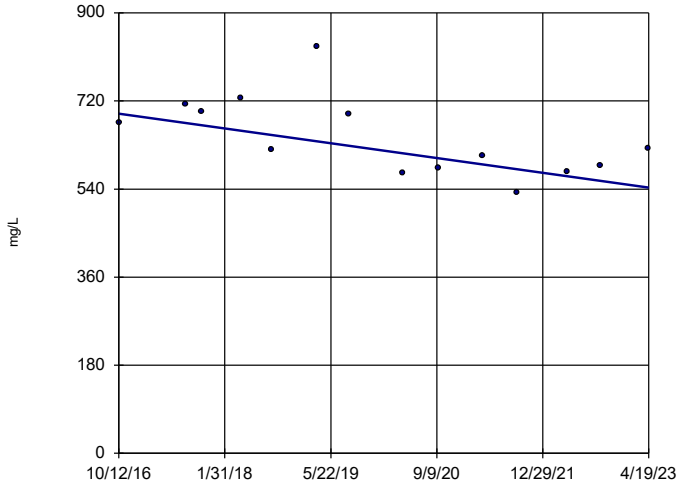
Sen's Slope Estimator

SW-24



n = 14

Slope = -23.14 units per year.

Mann-Kendall statistic = -35 critical = -48

Trend not significant at 99% confidence level (α = 0.005 per tail).

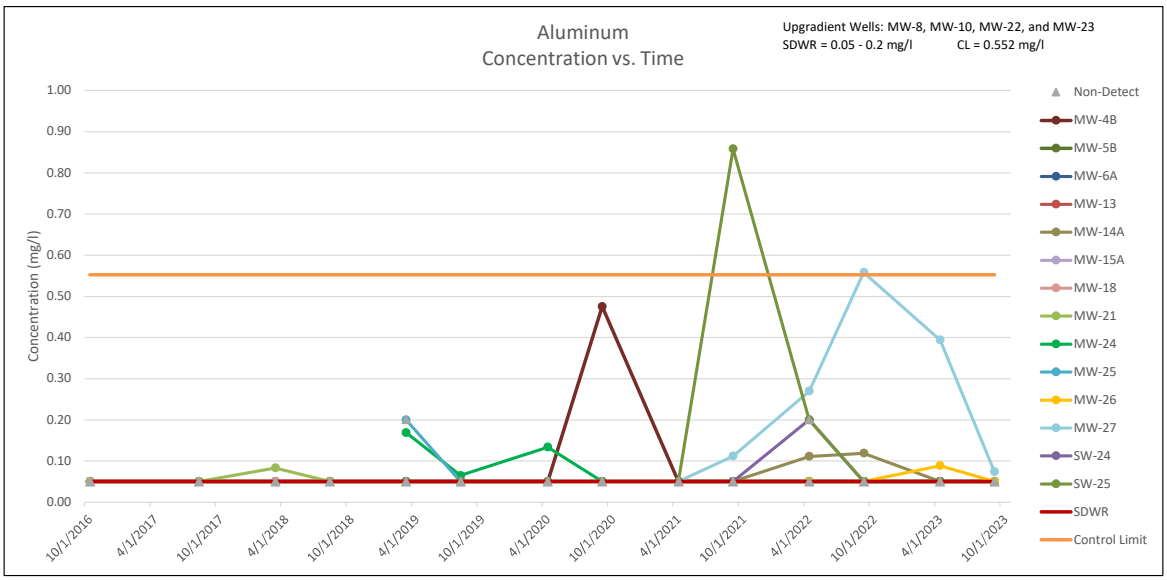
Constituent: Sulfate Analysis Run 11/9/2023 9:58 AM View: State Surface Water Trend Tests

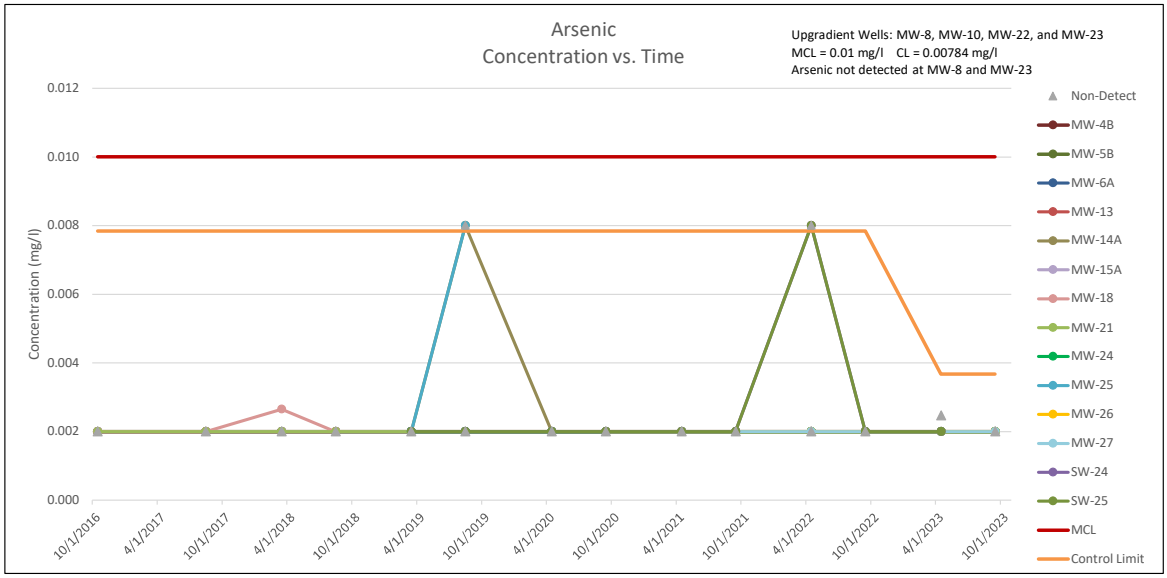
Muscatine Power & Water Client: GHD Data: Muscatine Power & Water

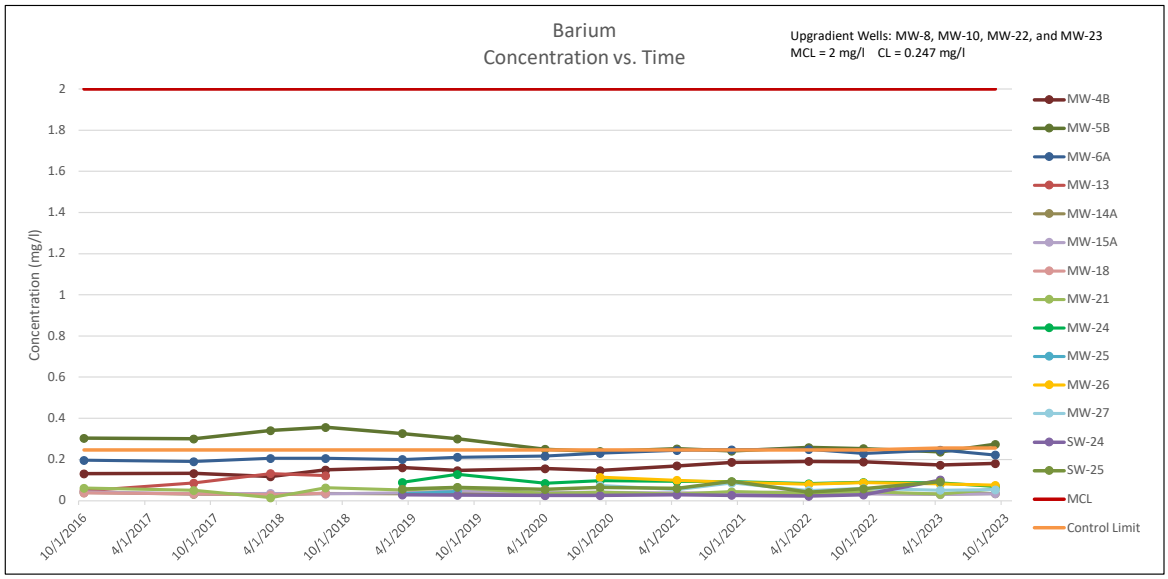
Appendix D

Time-Series Graphs

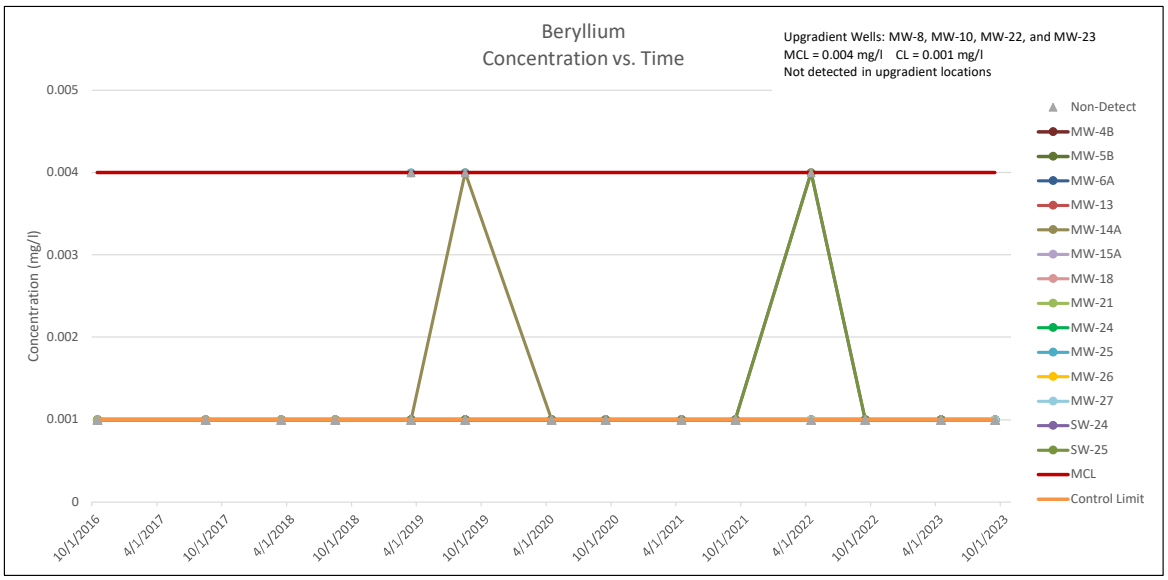
Water Quality Results
2016 - 2023

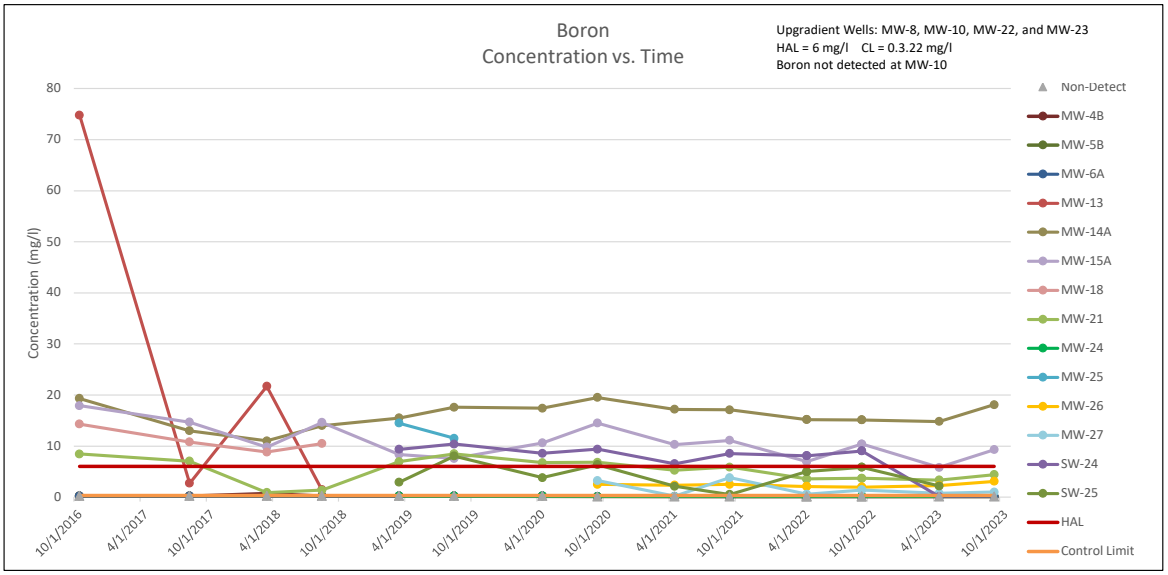


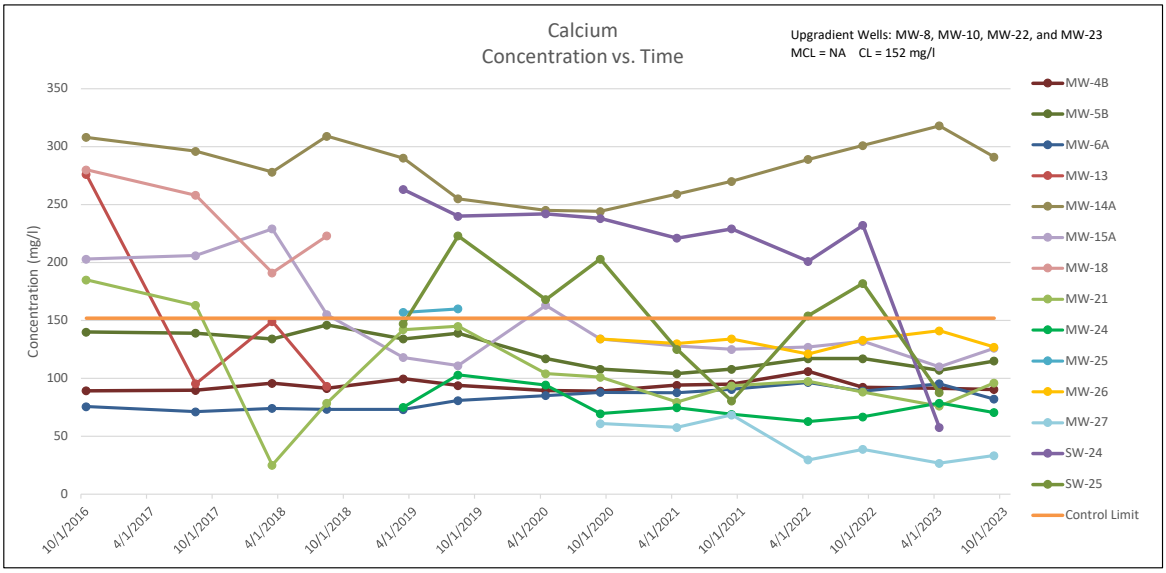




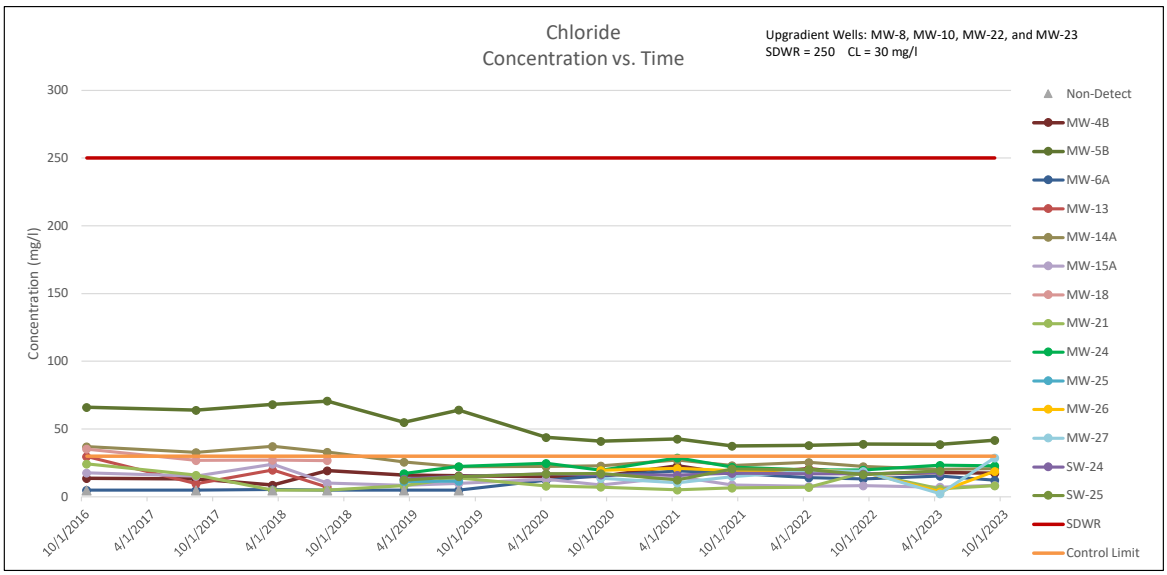
Water Quality Results
2016 - 2023

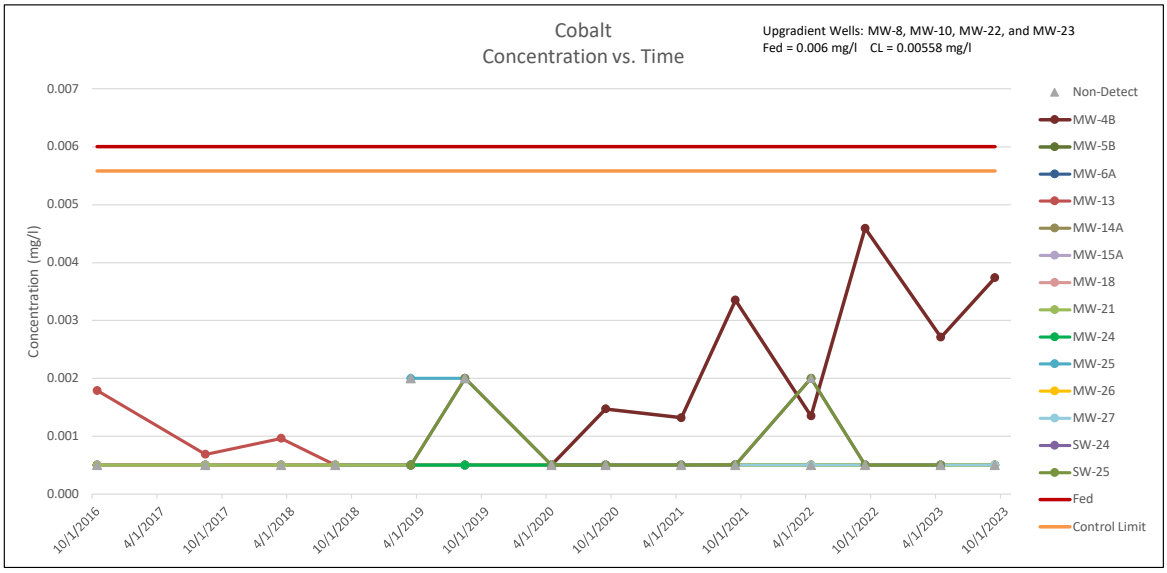


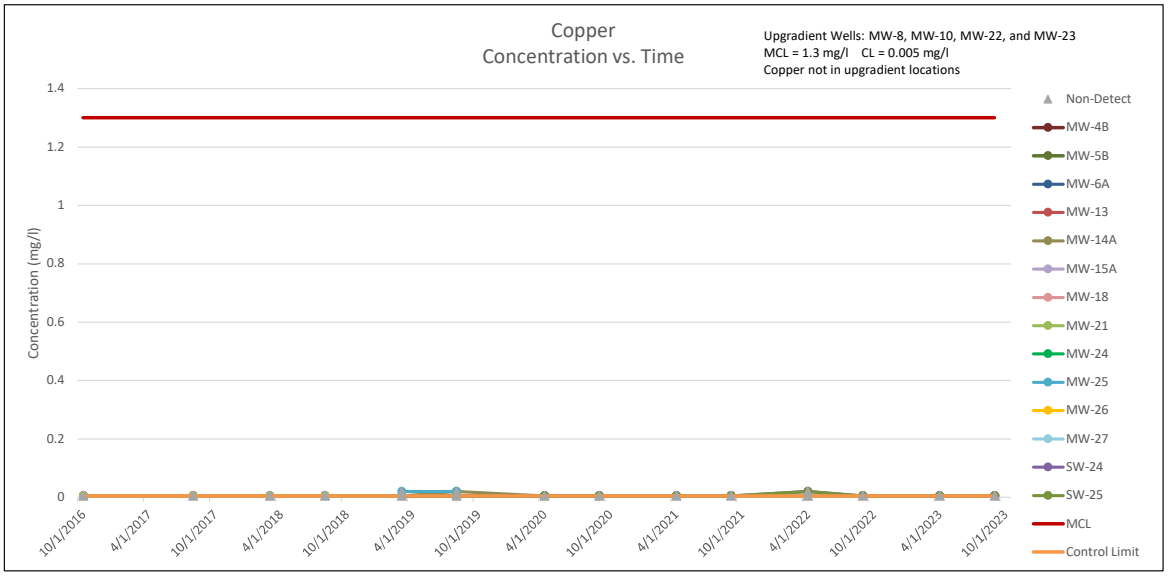




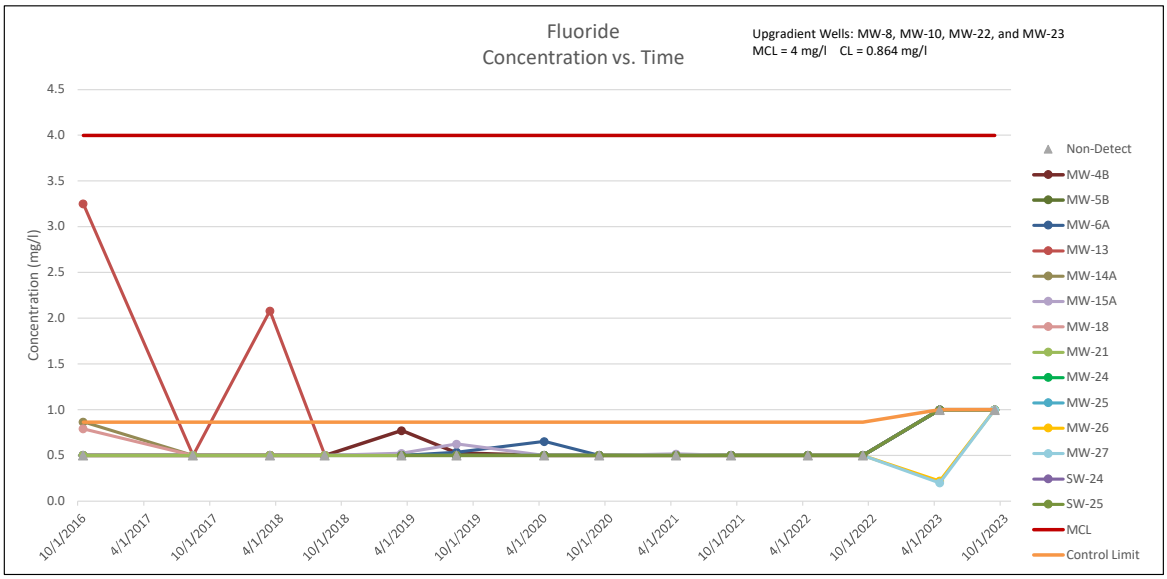
Water Quality Results
2016 - 2023

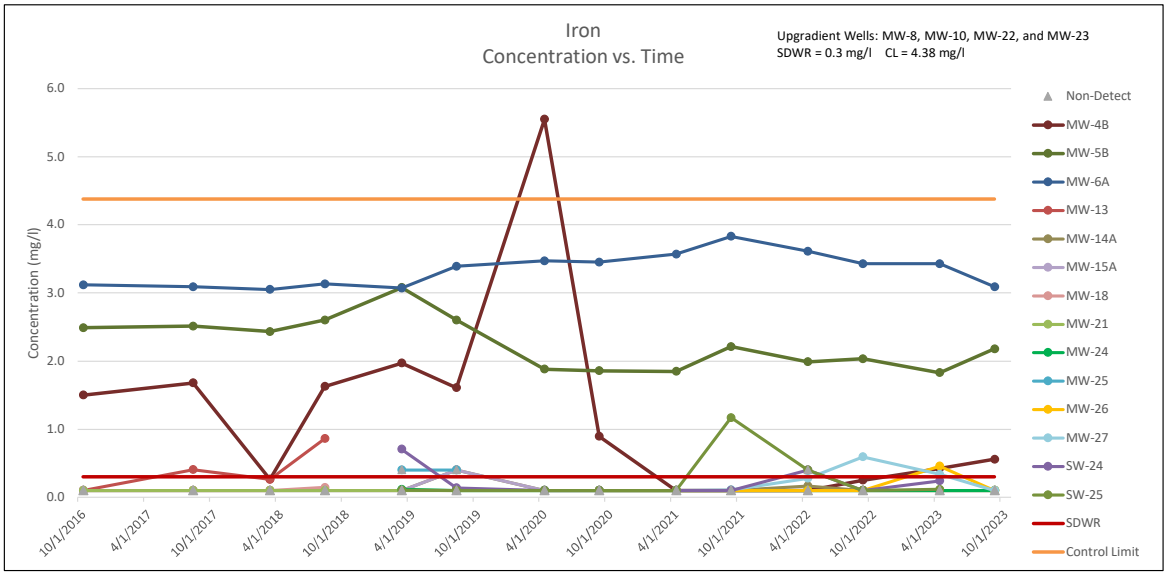


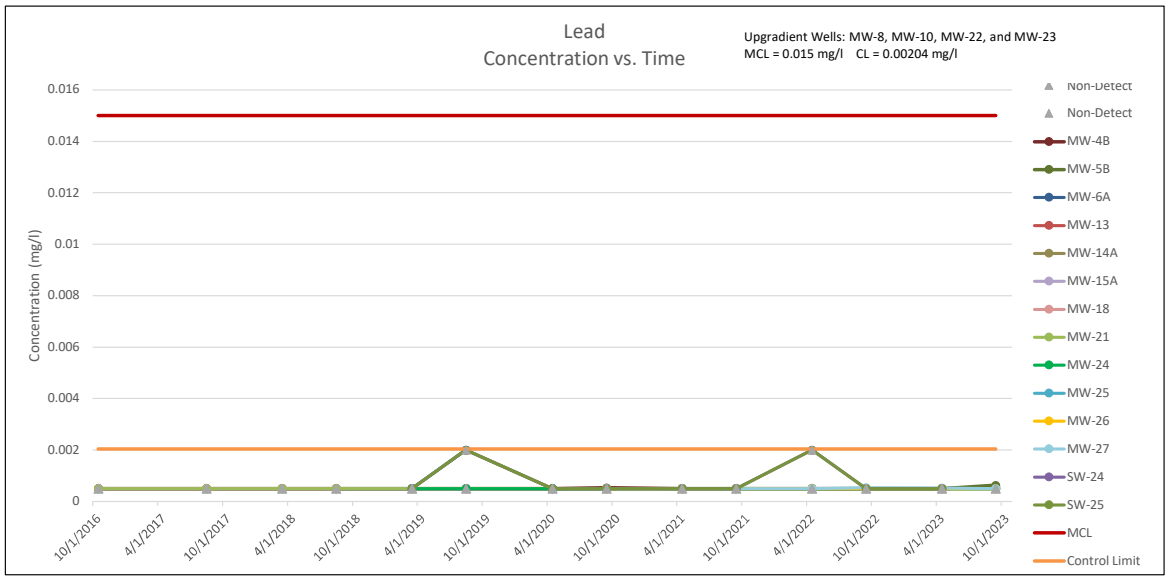




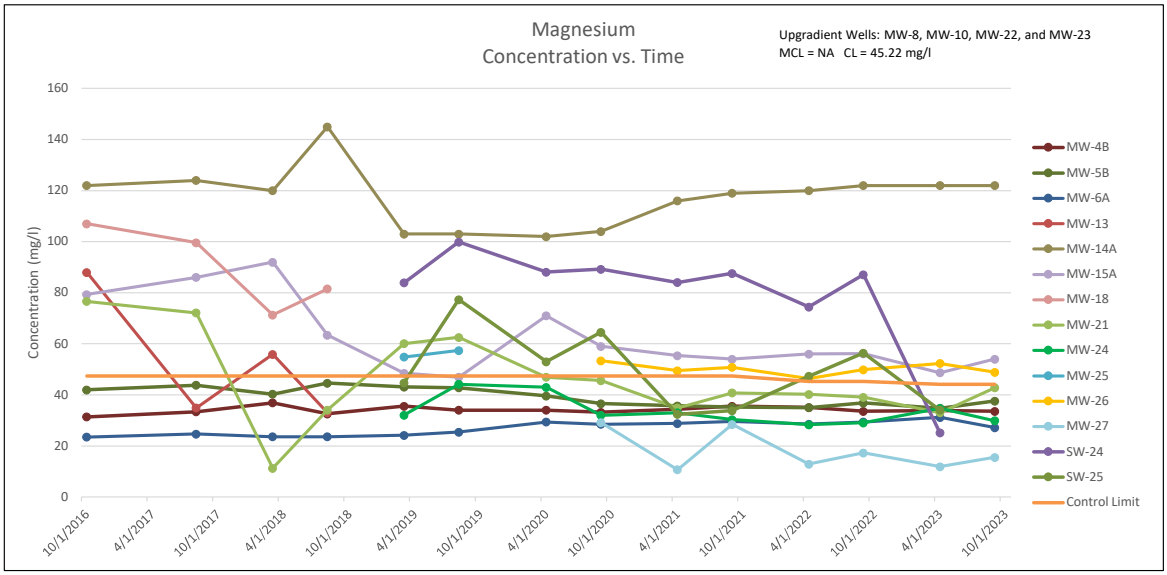
Water Quality Results
2016 - 2023

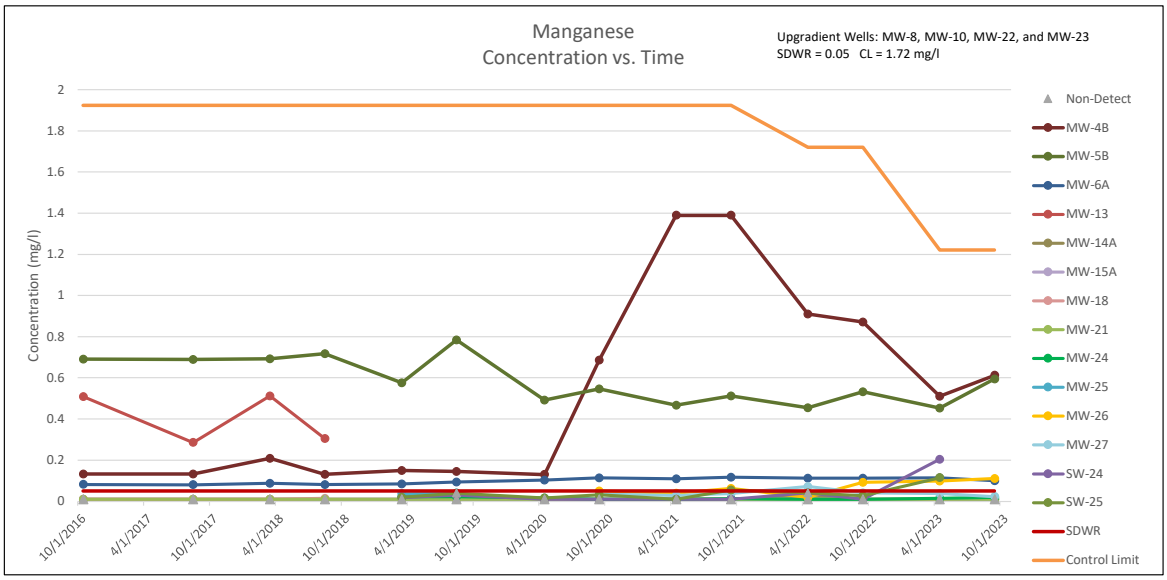


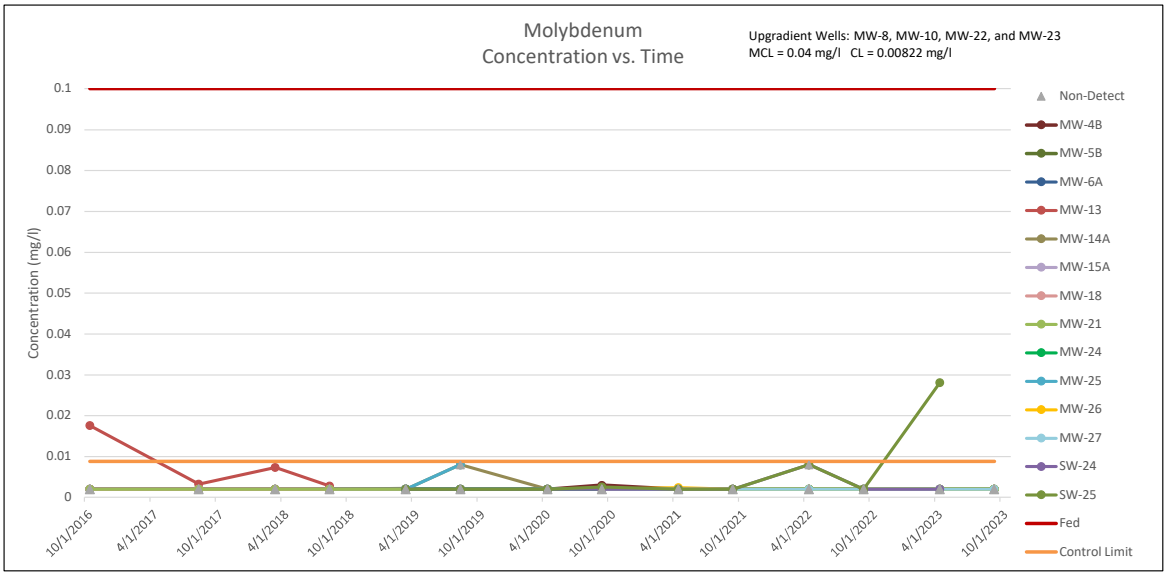




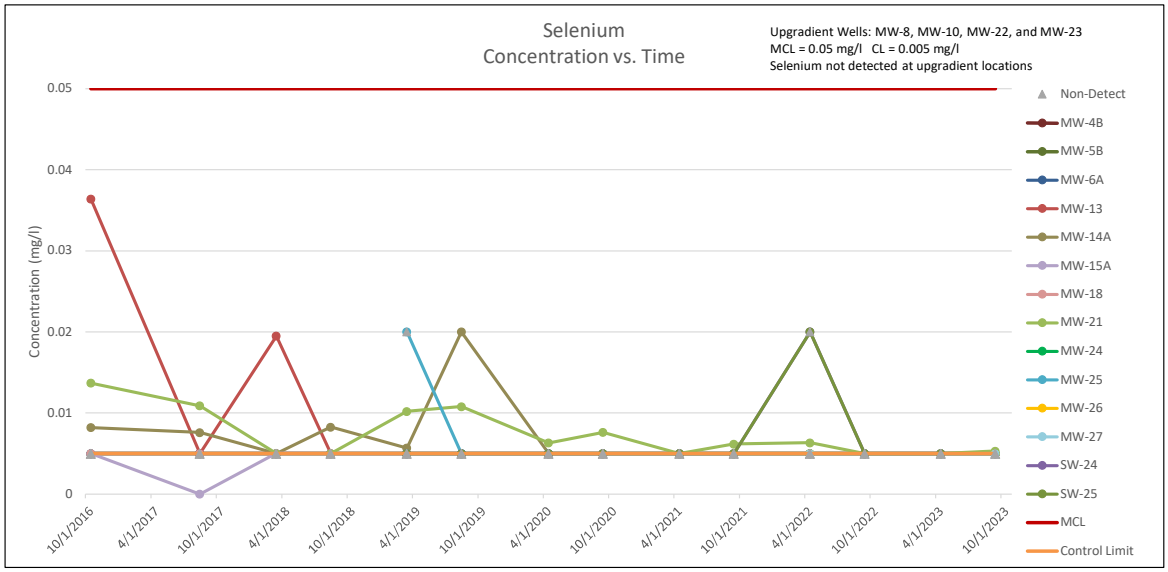
Water Quality Results
2016 - 2023

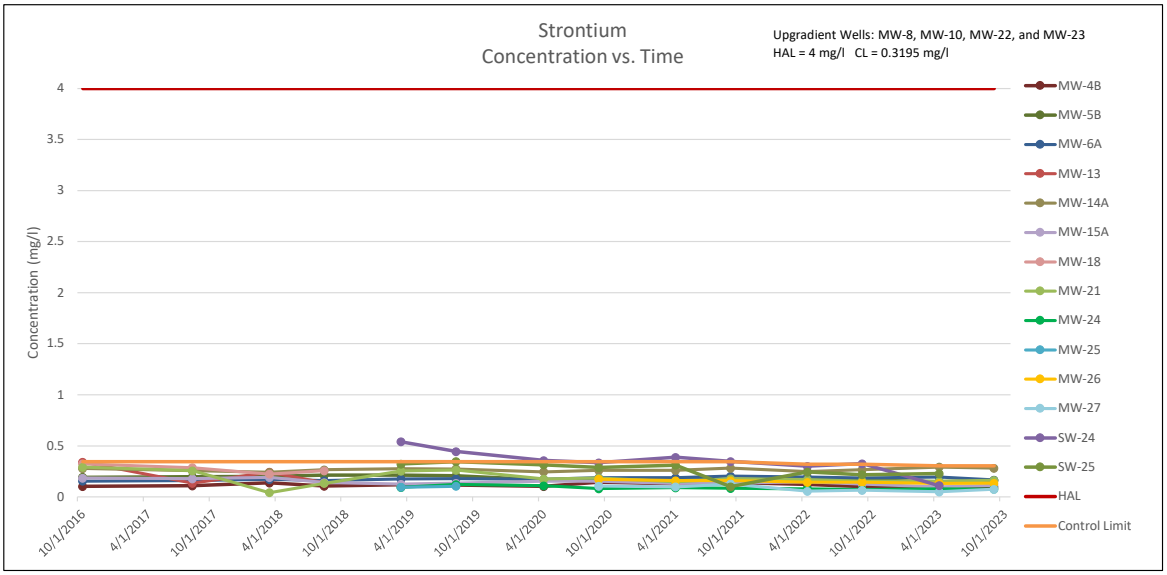


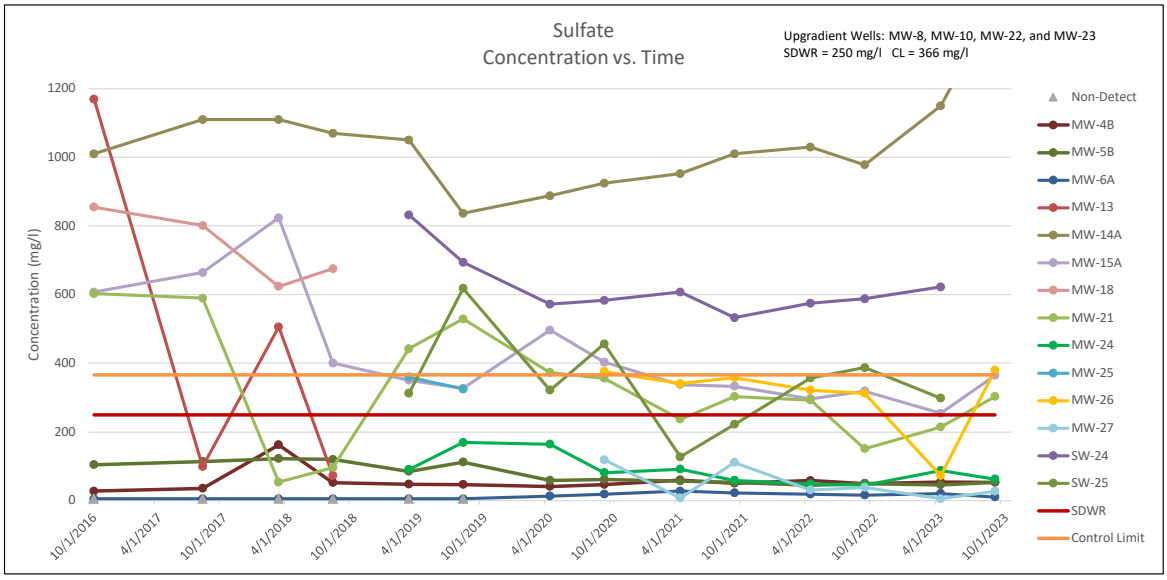




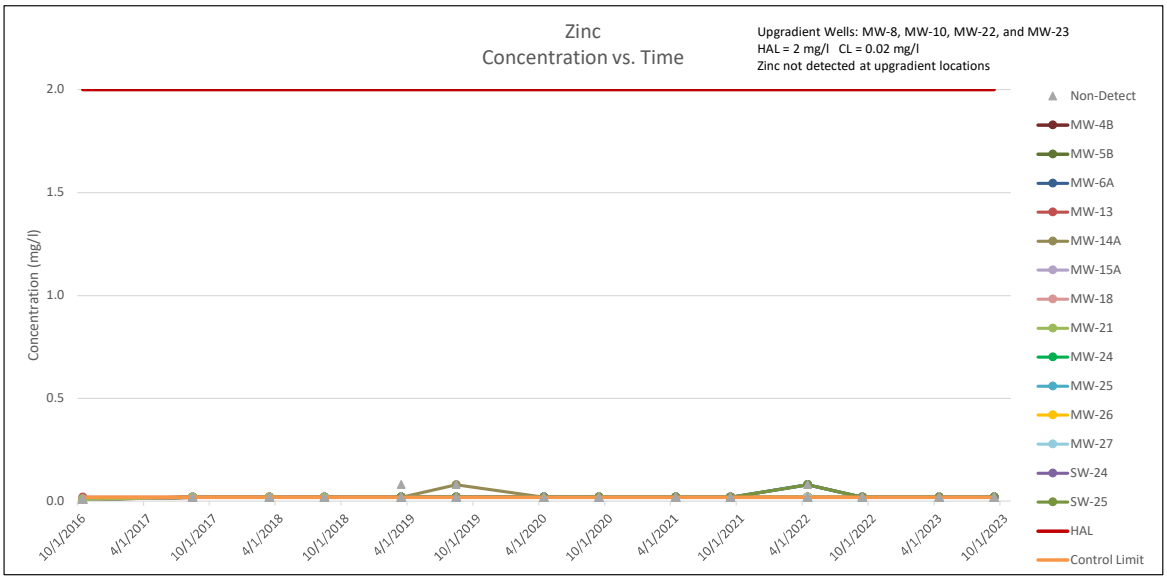
Water Quality Results
2016 - 2023



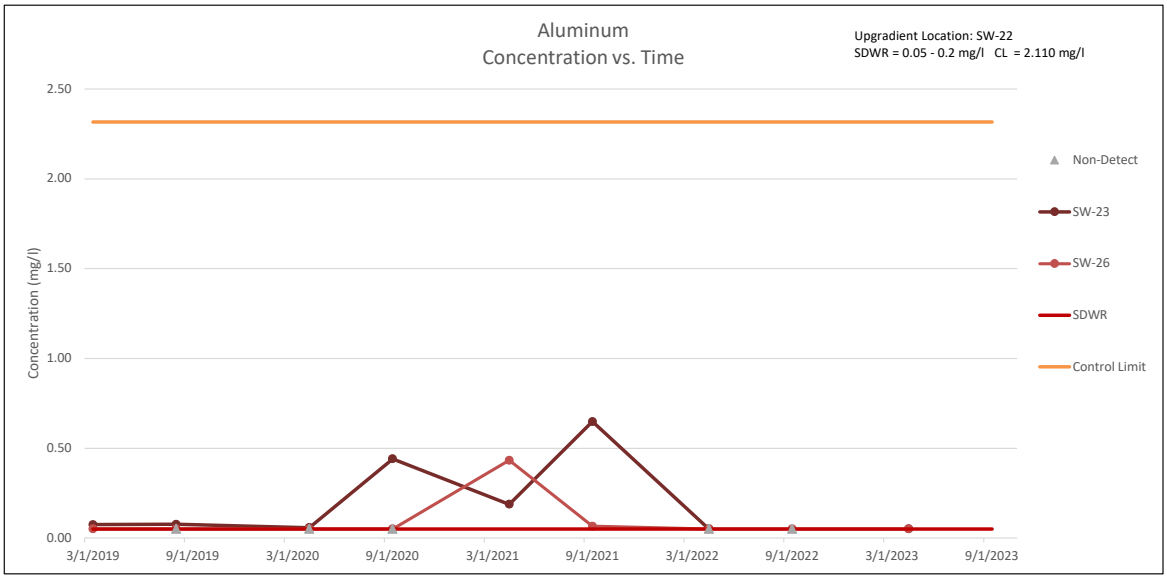


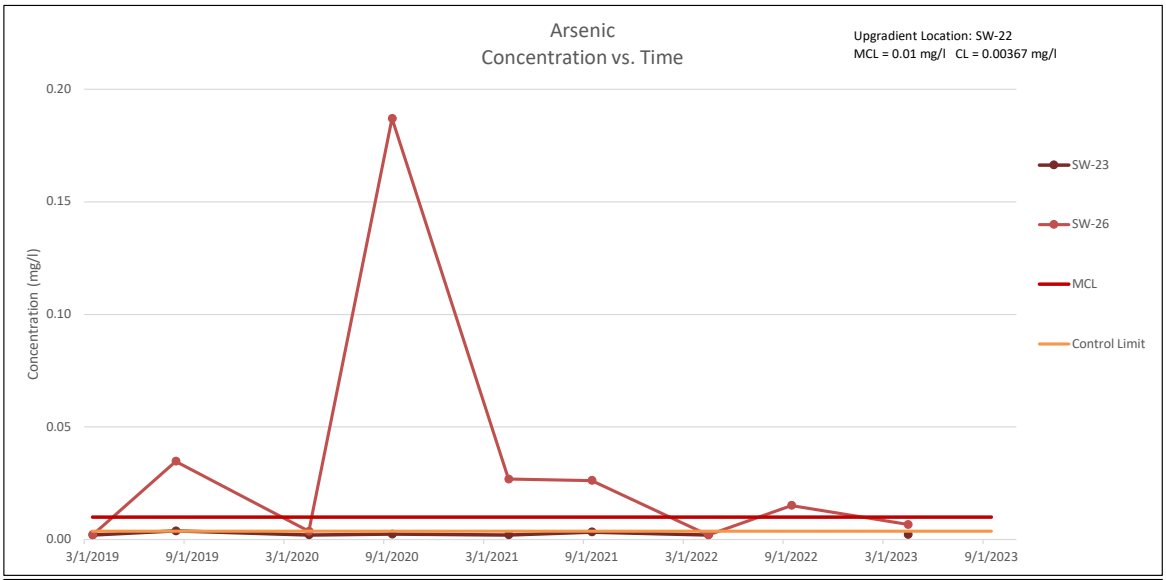


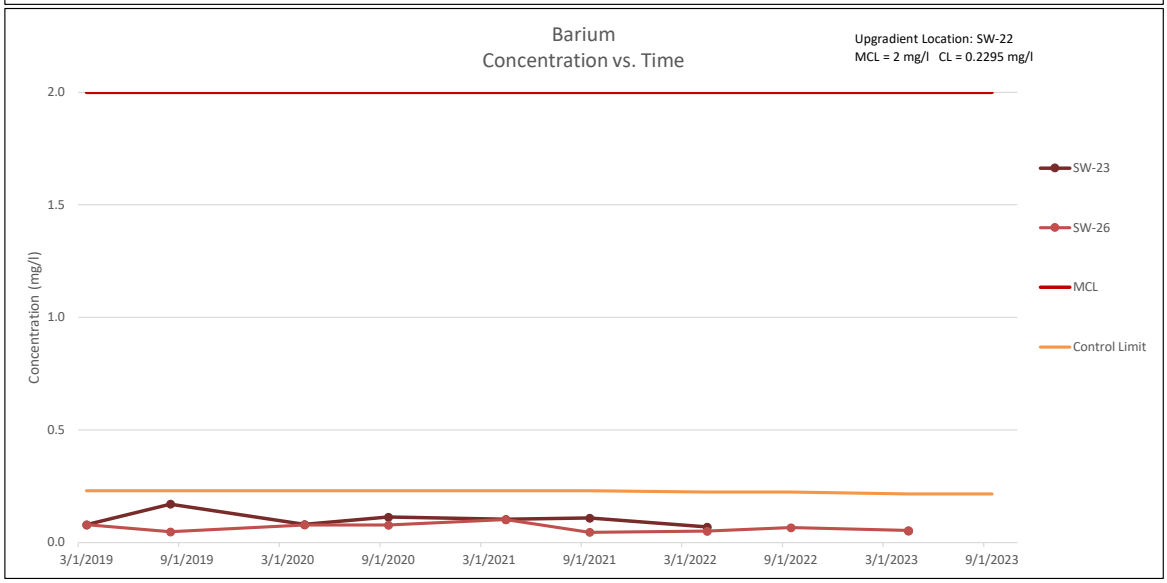
Water Quality Results
2016 - 2023



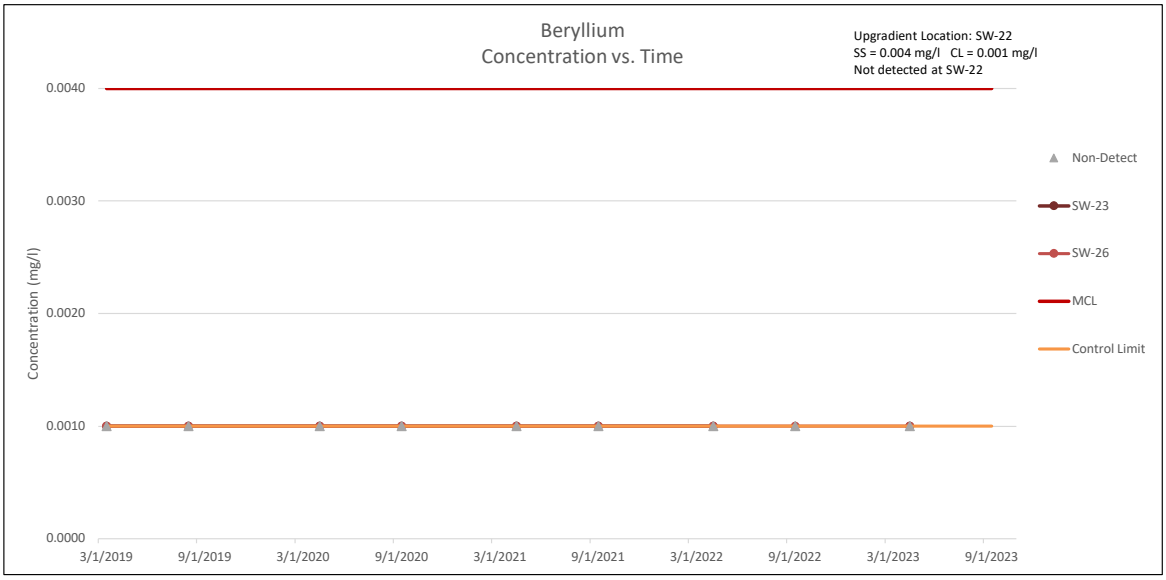
Water Quality Results
2016 - 2023

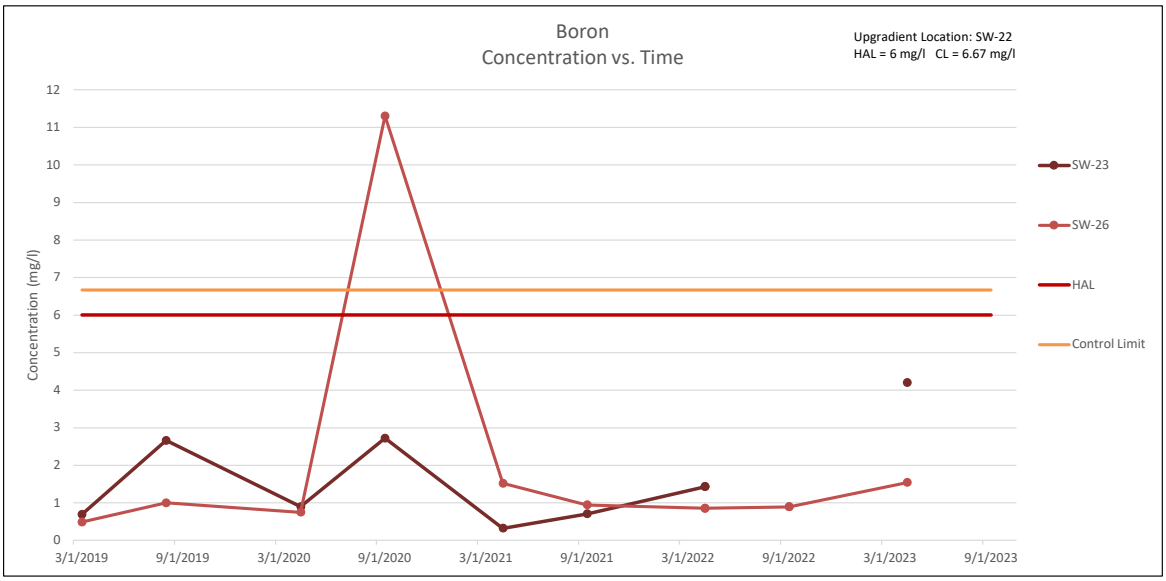


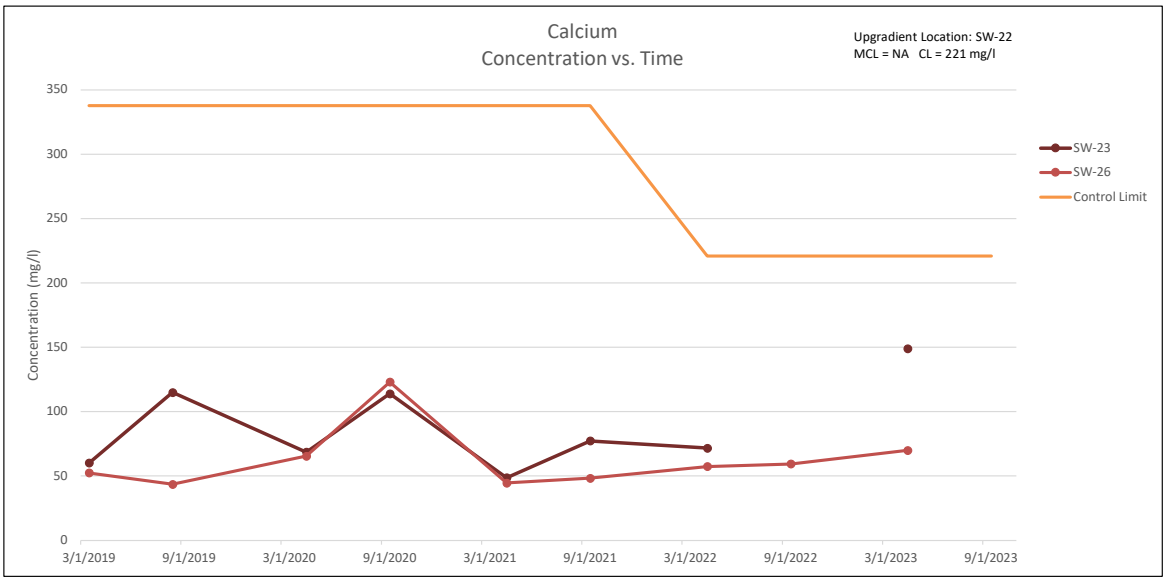




Water Quality Results
2016 - 2023







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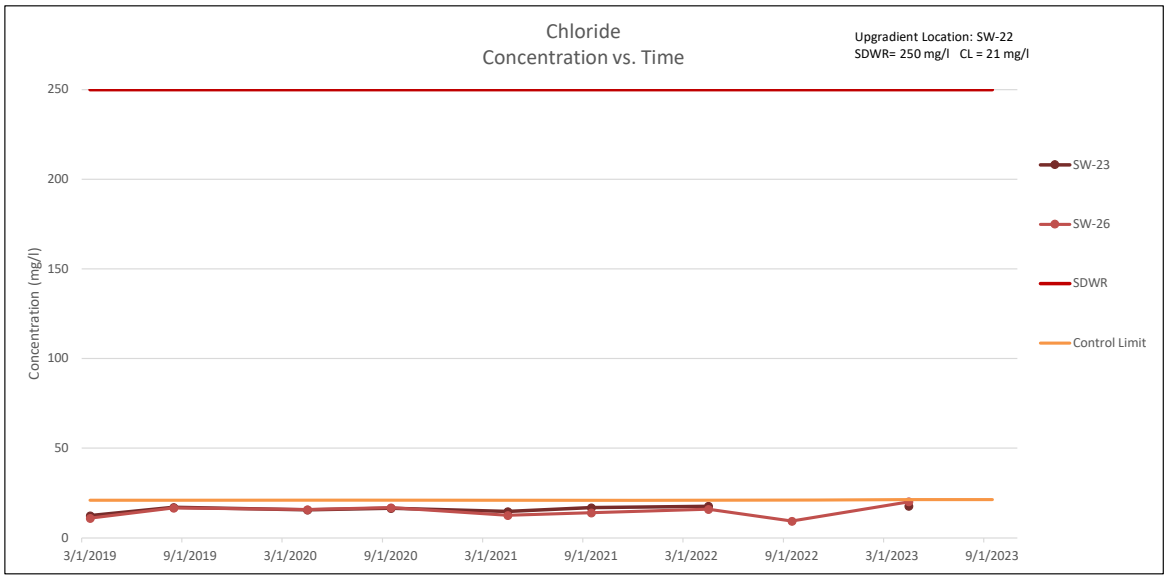

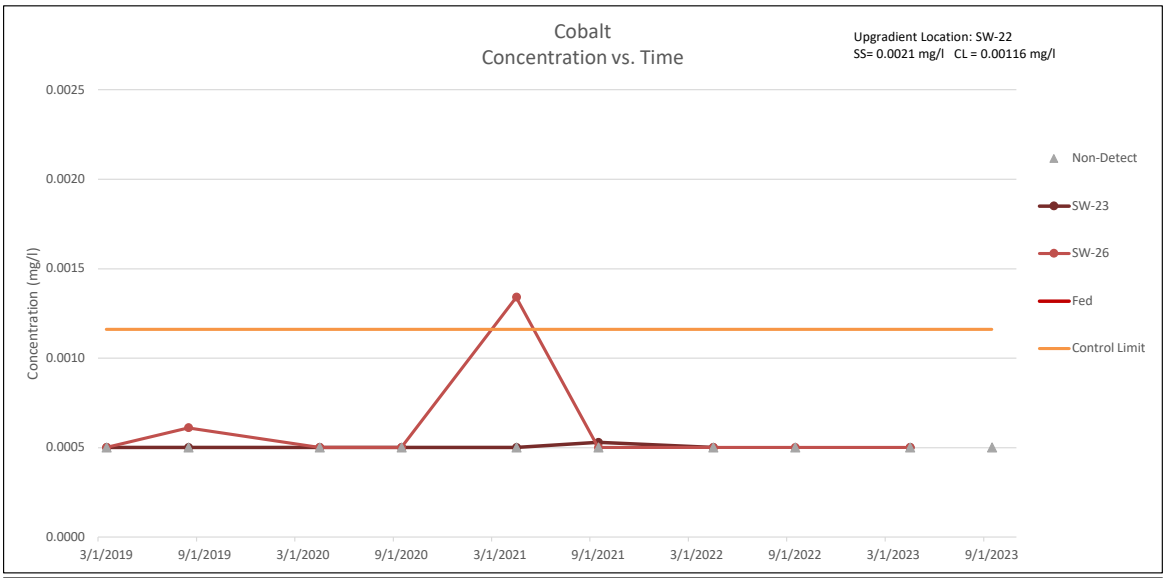

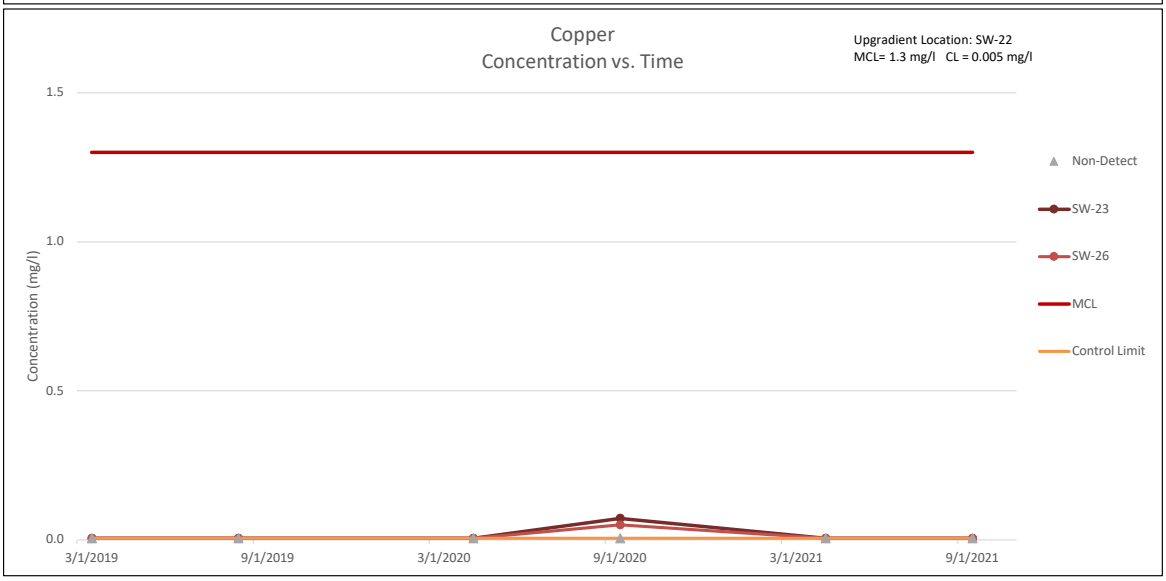

Water Quality Results
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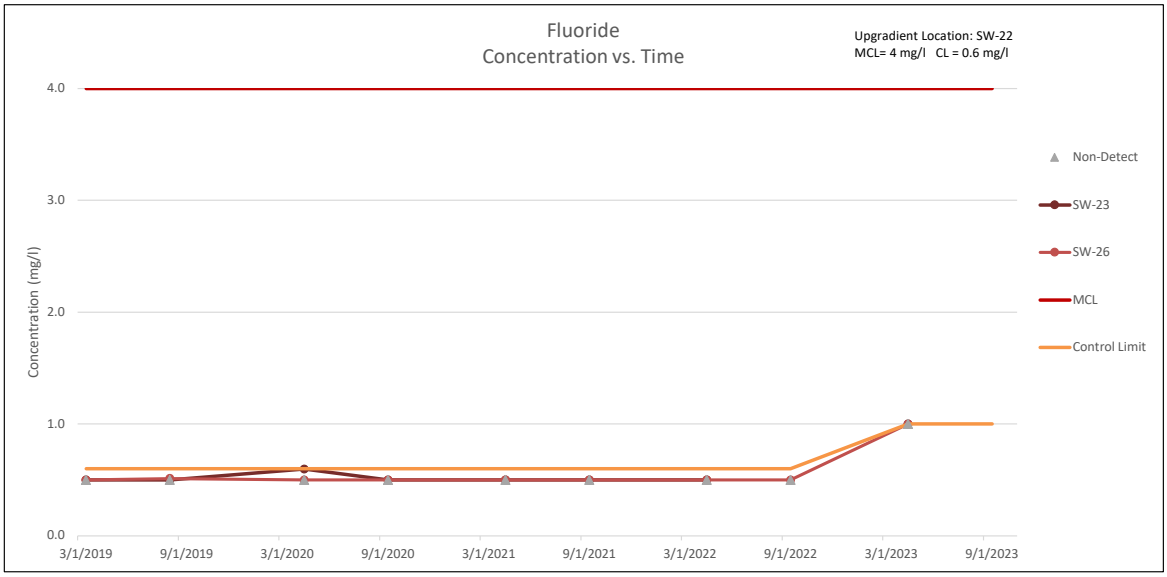
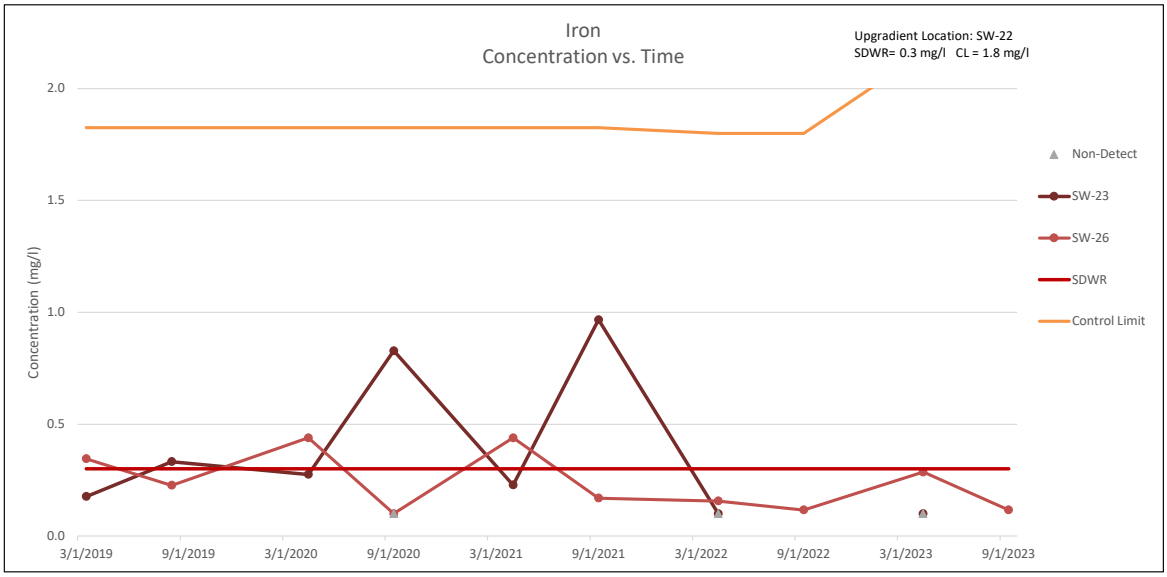
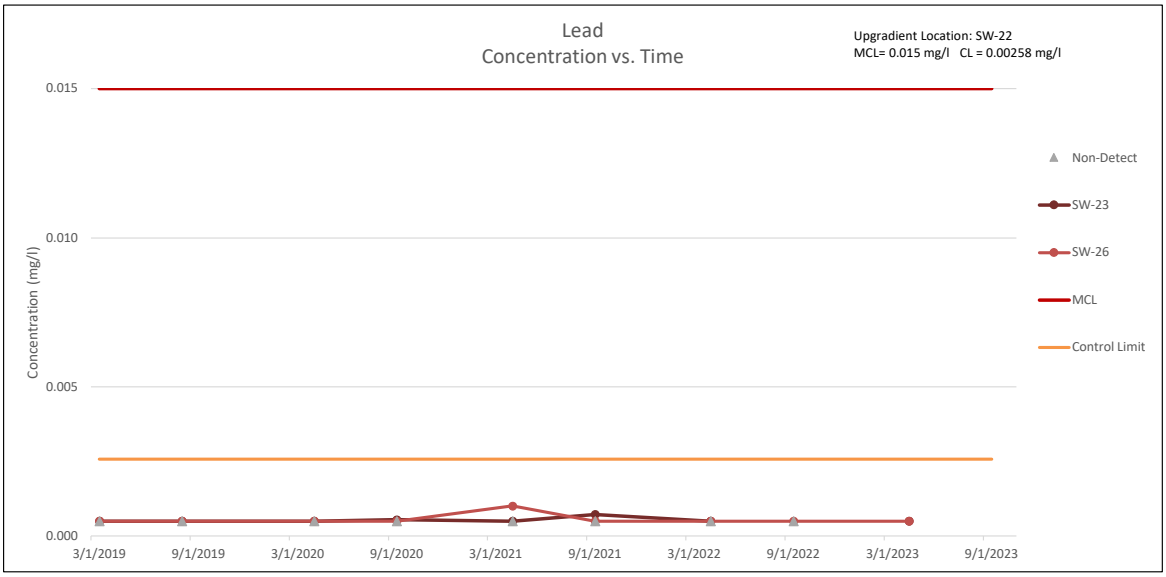
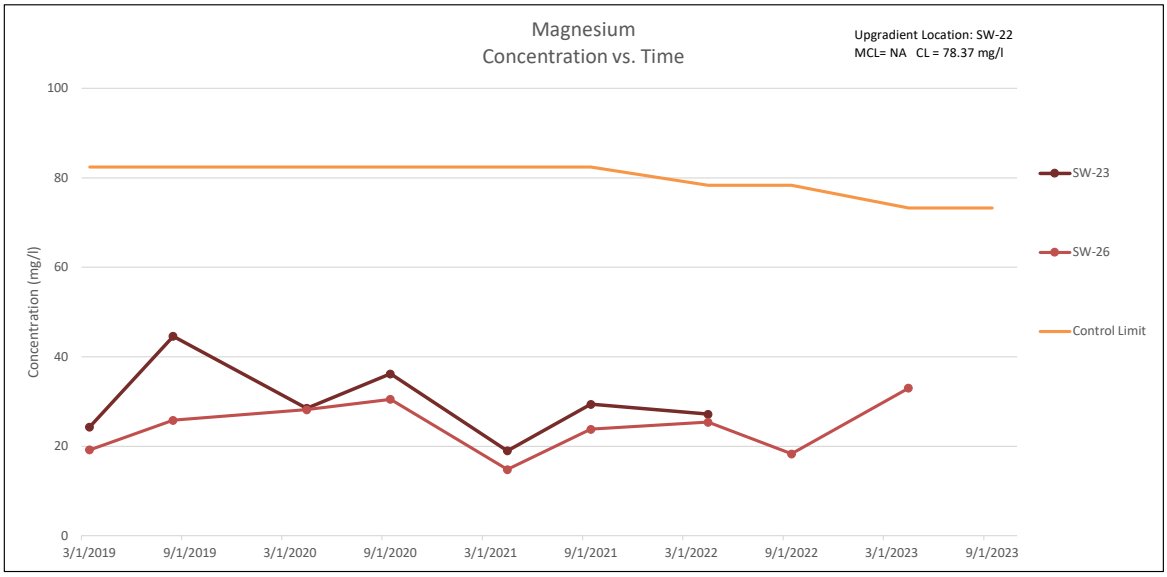
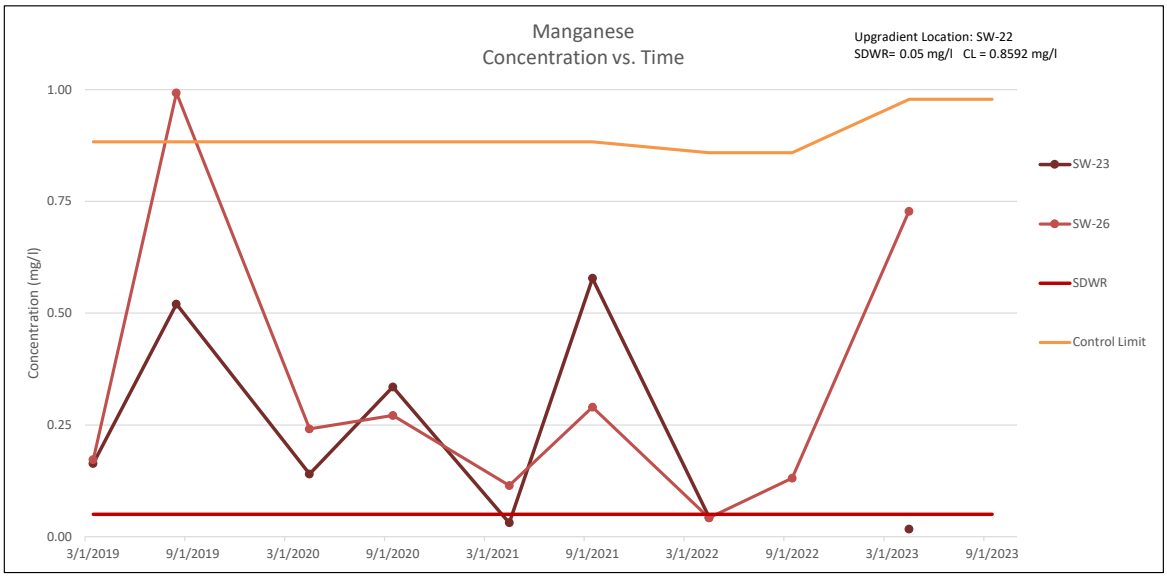


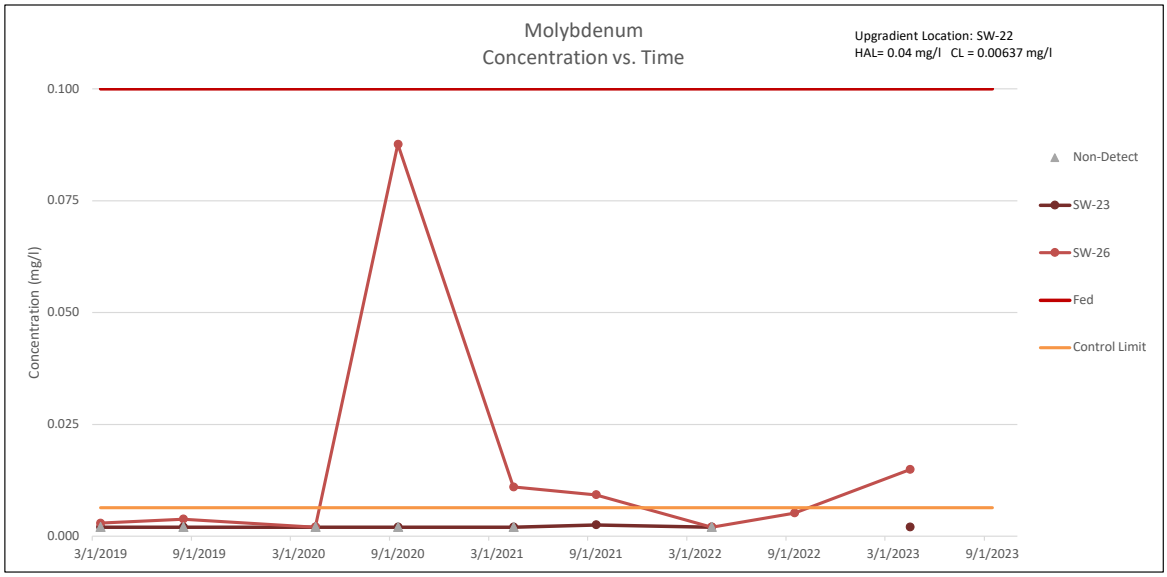




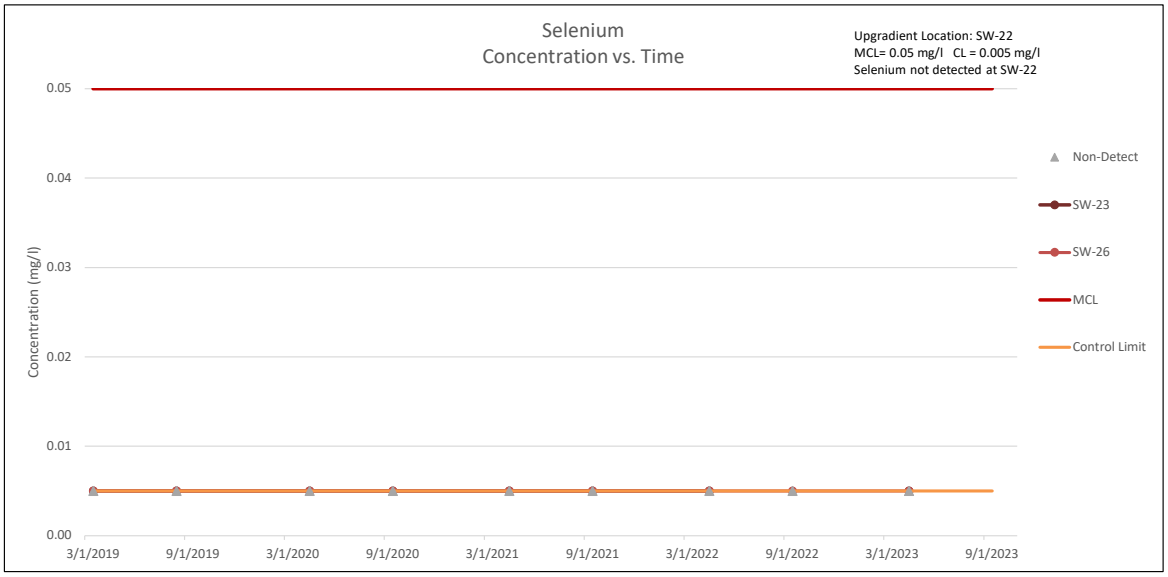
Water Quality Results
2016 - 2023

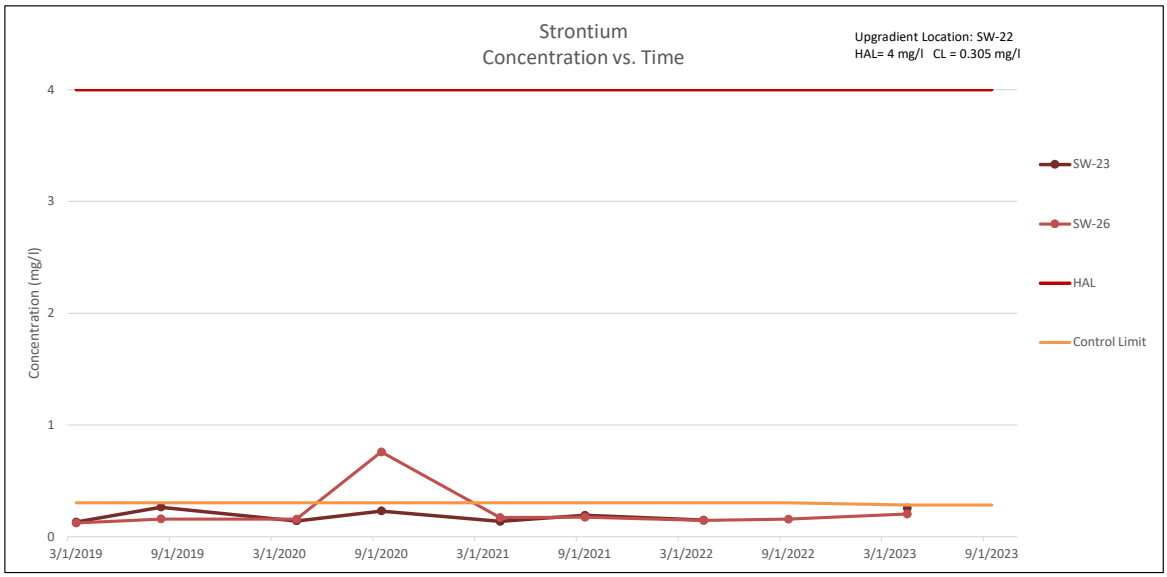


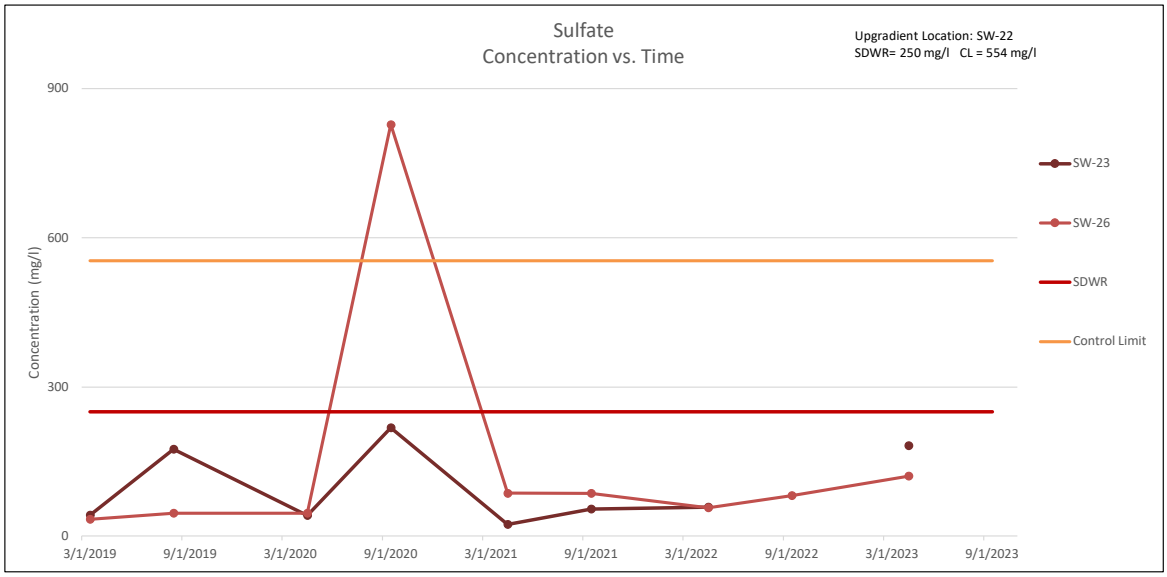




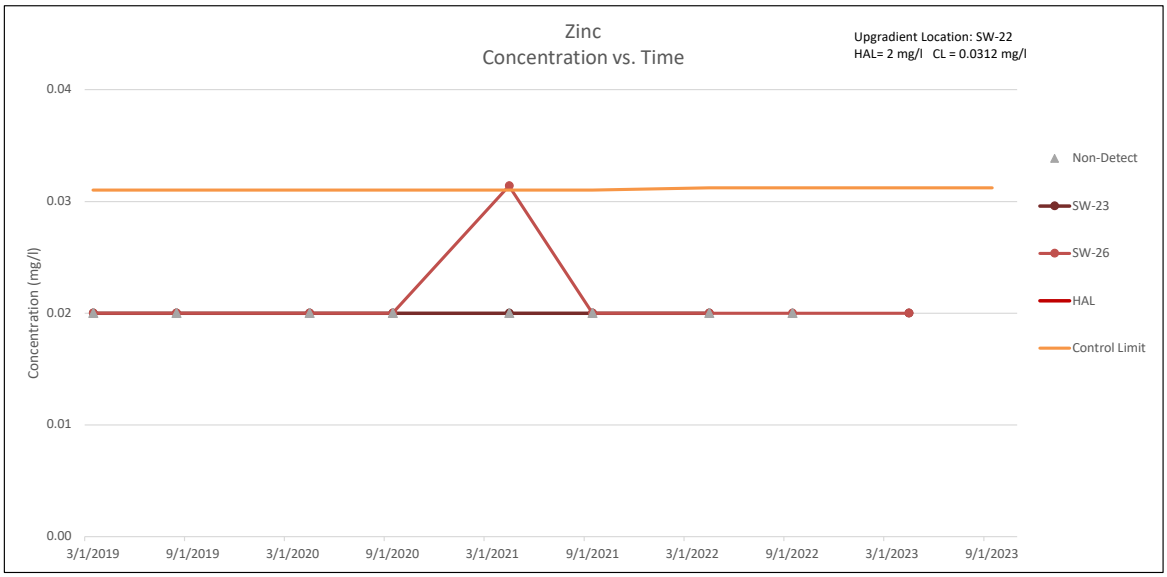
Water Quality Results
2016 - 2023







Water Quality Results
2016 - 2023



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