

**2022 ANNUAL GROUNDWATER MONITORING
AND CORRECTIVE ACTION REPORT**

**COAL COMBUSTION RESIDUE (CCR) LANDFILL
PERMIT NO. #70-SDP-06-82P**

**MUSCATINE POWER & WATER
MUSCATINE, IOWA**

January 2023

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CERTIFICATION

**2022 ANNUAL GROUNDWATER MONITORING
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**CCR LANDFILL
Permit No. #70-SDP-06-82P**

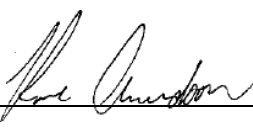
**MUSCATINE POWER & WATER
MUSCATINE, IOWA**

January 2023

	<p>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.</p>
	<p> _____ STACY EILEEN WOODSON, P.E. License No. 17389 My renewal date is December 31, 2024 Pages or sheets covered by this seal: <u>Entire Document</u></p> <p style="text-align: right;">Date: <u>1/30/2023</u></p>

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I. GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

Under Federal CCR Rule 40 CFR Part 257.90 – *Groundwater Monitoring and Corrective Action*, Muscatine Power and Water (MP&W) as the owner of an existing coal combustion residue (CCR) landfill must prepare annually a Groundwater Monitoring and Corrective Action Report. The report must, for the preceding calendar year, document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. The prepared annual report must be placed in the facility’s operating record as required under Part 257.105(h)(1).

The following sections cover the annual report’s content requirements under Part 257.90(e) for calendar year 2022.

A. LOCATION AND SITE MAPS – §257.90(e)(1)

MP&W maintains a private CCR landfill that provides for the controlled disposal of CCR originating at its power generating facility located at 1700 Dick Drake Way in Muscatine. The approximate 80-acre landfill site is located 7.5 miles west of the power plant in the SW¼ of Section 16, Township 76 North, Range 3 West in Muscatine County (Figure 1, Appendix A).

The landfill has been in continuous operation since 1985. The CCR includes a mixture of gypsum, fly ash, bottom ash, and slag materials. The overall planned landfill development area includes four phases encompassing approximately 34 acres (Figure 2, Appendix A). Phases I and II (22.7 acres) are currently permitted and under development. Phases III and IV are designated for future development. As of this reporting period, the operational status of Phases I and II are broken down as follows:

- Final Cover Constructed Pre-1991: 3.2 acres (Phase I)
- Final Cover Constructed 2019-2020: 7.7 acres (Phase I)
- Current Active Operations Area 2022: 5.2 acres (Phase I & II)
- Current Temporary Covered Area 2022: 6.6 acres (Phase I & II)

The site is regulated under Iowa Department of Natural Resources (DNR) Sanitary Disposal Project Permit No. 70-SDP-06-82P which was reissued on August 8, 2020. The permit expires August 8, 2030.

A comprehensive list of references for this facility is provided in Section II. Of primary interest herein is: *Groundwater Monitoring System and Sampling and Analysis Program, CCR Landfill* (HR Green, revised May 2, 2017). That document addresses the groundwater monitoring and corrective action requirements of the Federal CCR Rule Part 257.90-98 and is posted as a reference on MP&W’s publicly accessible Internet site at <https://www.mpw.org/utilities/electric/ccr-rule>.

B. IDENTIFICATION OF WELLS – §257.90(e)(2)

Table 1 provides a summary of the groundwater monitoring wells for the federal groundwater monitoring program under 257.90 (Appendix B).

There were no changes in the monitoring system program during the 2022 reporting period.

Well MW-22 was installed in 2018 to provide an additional background quality monitoring point. MW-23 added as a background well in 2020. These wells are incorporated into the statistical analysis and interpretations herein.

It was determined that well MW-13 was no longer an effective monitoring point and was abandoned in April 2019 following IDNR approval. In March 2019, bentonite was observed in the casing of MW-18A, indicating damage to the point where it could no longer be used and it was abandoned in August 2019. Prior to fall sampling MW-4A was damaged, abandoned, and replaced with MW-4B. No other monitoring wells under the federal monitoring program were decommissioned or abandoned since 2020.

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

C. SUMMARY OF SAMPLE COLLECTION AND ANALYSIS – §257.90(e)(3)

Sample Collection and Results

Under 40 CFR Part 257.93(a) the Groundwater Monitoring Program (GMP) includes the following groundwater monitoring points: Upgradient wells: MW-8, MW-10, MW-22, and MW-23 used to establish background quality; and Downgradient wells: MW-4A/MW-4B, MW-5B, MW-6A, MW-13, MW-14A, MW-15A, MW-18A, and MW-21 to monitor for downgradient impacts.

Table 1 provides a summary of the groundwater monitoring points (Appendix B), including:

- (1) Location coordinates (see also Figure 2),
- (2) Construction details,
- (3) Function as a monitoring well or water level measuring point,
- (4) Hydrogeologic unit monitored, and
- (5) Recent water level measurement used for the current evaluation of horizontal groundwater flow pattern and vertical gradients.

The monitoring wells are sampled for the constituents specified in Appendix III and Appendix IV of Part 257, as follows:

- Appendix III: boron, calcium, chloride, fluoride, pH, sulfates, and total dissolved solids.
- Appendix IV: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, fluoride, lead, lithium, mercury, molybdenum, selenium, thallium, and radium 226 & 228 combined.

Table 2 (Appendix B) provides the implementation schedule for the GMP, consisting of:

- (1) Well function as either an upgradient or downgradient monitoring point
- (2) Number of samples collected in each monitoring program,
- (3) Dates of completed sampling events, constituents tested, and reason for sampling including:
 - a. Establish background quality,
 - b. Detection monitoring,
 - c. Resampling events to verify an initial SSI,
 - d. Assessment monitoring, and
 - e. Corrective action monitoring.

Samples are collected and handled as described in *Procedure for Groundwater and Surface Water Sampling* (HR Green, updated November 2018). Samples are then analyzed for the Appendix III and/or Appendix IV lists by certified testing laboratory TestAmerica Laboratories, Inc. in Cedar Falls, Iowa.

A summary tabulation of the groundwater sampling data obtained under §257.90 through §257.98 is provided in Appendix C. This tabulation covers the period of June 2016 through December 2022, including 19 events used to establish background quality, the first detection (compliance) event, a resampling event, and the assessment monitoring events in 2022.

The laboratory's analytical reports, the field low-flow sampling forms, and the DNR Sampling Forms are also provided for the sampling events in Appendix C.

Analysis

The analyzed data were used to calculate statistical limits for each well/constituent pair. Statistical calculations were performed by Groundwater Stats Consulting using industry standard SANITAS™ Statistical Software, an EPA-compliant package (EPA 2009, Unified Guidance). The full procedure is as detailed in the document entitled: *Groundwater Monitoring System and Sampling and Analysis Program, CCR Landfill* (HR Green, revised May 2, 2017).

The statistical report dated November 17, 2022 incorporates data collected through 2022 and the corresponding statistical analyses, including narratives,

background limits, prediction limits, statistically significant increases (SSI), trend tests, confidence intervals, statistically significant Levels (SSL), and groundwater protection standards (GWPS), etc., and is provided herein for reference (Appendix D) and discussed below.

D. DISCUSSION OF FINDINGS – §257.90(e)(4)

The review was being conducted in accordance with the statistical methodologies presented in *Groundwater Monitoring System and Sampling and Analysis Program, CCR Landfill* (HR Green, May 2017; see Tables III-4, III-6, III-8, and III-9 in Appendix D).

The implementation schedule (Table 2) and monitoring program summary (Table 3) track the major milestones of the MP&W groundwater monitoring system and sampling and analysis program.

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

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

Year 2017

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

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

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

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

Years 2018-2022

Assessment monitoring commenced in 2018 with the analysis of Appendix III & IV constituents. The events were conducted in the spring and fall of each year. These events were intended to satisfy the requirements of both the initial scan and the semi-annual and assessment monitoring requirements. Specifically, assessment monitoring was initiated at the March 6, 2018 event, where the full Appendix III and Appendix IV constituent lists were tested.

Year 2022

Additional assessment monitoring and background collection was completed in 2022 for Appendix III & IV constituents. The events were conducted April 20 and September 14, 2022. These events are intended to satisfy the requirements of both the initial scan and the semi-annual and assessment monitoring requirements.¹

Assessment monitoring continued during the 2022 events, where the full Appendix III and Appendix IV constituent lists were tested. The Appendix IV constituents that were detected are shown below.

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

Table 3 (Appendix B) provides a groundwater monitoring program summary including:

- (1) The current monitoring program status,
- (2) Planned change in monitoring program status for the next sampling event,
- (3) Confirmed statistically significant increases (SSI) over background,
- (4) Statistically significant trends,
- (5) Statistically significant level (SSL) over a groundwater protection standard (GWPS), and

¹ Under §257.95(b), assessment monitoring requires an initial scan of Appendix IV constituents, followed under §257.95(d)(1) by semi-annual testing for Appendix III list plus detected Appendix IV constituents. To streamline the tracking of sampling requirements and results, and to align the federal and state sampling schedules, MP&W elects to test for full Appendix III and Appendix IV constituent lists during each sampling event, except for combined radium which has not been detected over a reporting limit.

- (6) Upcoming sampling dates and constituents (as best as can be determined at this point in time).

The information shown in Table 3 shows that the concentrations of several constituents remain at statistically significant levels above background (i.e., SSI), but that all confidence interval concentrations are below the GWPS, that is, there were no SSLs determined.

Because there were no SSL's determined during 2022, the facility is required to continue in assessment monitoring in 2023, as shown in Table 3.

The GWPS values are shown in Table 4 and were established as the appropriate Maximum Contaminant Level (MCL) or Regional Screening Level (RSL)². Also shown in Table 4 is the background statistical limit.

1. SUMMARY

In summary, the current-year review indicates:

1. Monitoring wells remain viable sampling points as they are physically intact, void of excessive sediment, and provide the anticipated recharge during sampling, with the exception of MW-13 and MW-18A which were abandoned in 2019, and MW-4A which was abandoned and replaced with MW-4B in 2020.
2. Horizontal and vertical groundwater flow gradients appear stable and consistent with historic observations. The primary groundwater flow path is lateral, with flow across the filled landfill area traveling from the southeast toward the northwest (Figure 2).
3. Analytical results indicate the landfill's primary impact on groundwater quality is from Appendix III constituents, including boron, calcium, chloride, sulfate, and TDS in the immediate area downgradient of the active landfill (MW-14A and MW-15A) and vicinity of the sediment runoff control pond (MW-5B and MW-21).

Statistical analysis indicates that the concentrations of multiple constituents remain above background limits (see SSI on Table 3), however, during 2022 there were no Appendix IV constituents that exhibited a statistically significant level (SSL) above a groundwater protection standard (GWPS). As such, under Assessment Monitoring Program §257.95(f) this site will continue in assessment monitoring.

² The RSL values under §257.95(h)(2) were set for cobalt, lithium and molybdenum in Federal Register Volume 83, No. 146 dated July 30, 2018. These four constituents do not have an established MCL.

E. SUPPLEMENTAL INFORMATION – §257.90(e)(5)

The following information is provided to fill in context for the MP&W CCR facility.

Monitored Hydrogeologic Unit

For a full discussion of the GMP, reference the document *Groundwater Monitoring System and Sampling and Analysis Program, CCR Landfill* (HR Green, Revised May 2, 2017, original May 18, 2016).

Of particular relevance herein is that the GMP wells monitor (1) water levels to determine horizontal and vertical groundwater flow paths, and (2) for downgradient groundwater quality impacts to the uppermost continuous aquifer beneath the site. The aquifer and gradients are discussed below.

Uppermost Continuous Aquifer:

As a whole, a deep un-weathered and un-oxidized clay-rich glacial till functions as a lower confining unit with field hydraulic conductivity values of less than $1 \times 10E-7$ cm/sec. Over most of the site, this underlying low permeability glacial till confining unit is overlain by a sequence of weathered oxidized till, sand, and clayey silt (loess) which collectively constitute the uppermost continuous aquifer beneath the site. This aquifer exhibits hydraulic conductivity values as great as $1.7 \times 10E-4$ cm/sec and which are two to three orders of magnitude greater than the underlying confining unit. Therefore, the assemblage of deposits generally at depths of less than 50 feet is interpreted to function as the uppermost continuous aquifer beneath the landfill. This is also the unit, within which the water table fluctuates, which means the uppermost continuous aquifer is one in the same hydrogeologic unit as the shallow water table aquifer. This uppermost continuous aquifer is the unit monitored by the GMP groundwater monitoring wells.

Groundwater Flow:

The pre-landfill groundwater flow direction in the uppermost aquifer was dominantly horizontal from the southeast toward the northwest with natural convergence along an ephemeral stream that formerly drained the undeveloped site.

Under current conditions the dominant flow direction remains the same except that convergence is now to the runoff control pond located west of the landfill in the area of the original ephemeral stream. The current year water table contours and primary flow path directions are depicted on Figure 2.

The observed vertical flow components are recharge (downward) in the upland area of the southeast corner of the site (MW-8/9) and slightly so in the upper aquifer (silt and till) in lowland area (MW-10/11) and discharge (upward) from the confining layer to the upper aquifer in lowland area along

the drainage way in the northeast corner of the site (MW-11/12 and MW-10/12) (see Table 1).

State Monitoring Requirements

Monitoring at this facility is also conducted under the State of Iowa Department of Natural Resources in accordance with Sanitary Disposal Permit #70-SDP-06-82P and per the approved Hydrologic Monitoring System Plan (HMSP).

The state's monitoring and analysis requirements are not addressed further herein but can be found in the Annual Water Quality Report to Iowa DNR (submitted to DNR annually by February 15).

Regulatory Status

The facility is regulated by the Iowa Department of Natural Resources (IDNR) under [567] Iowa Administrative Code (IAC) Chapter 103 and by state Sanitary Disposal Project Permit, issued August 8, 2020 with an expiration date of August 8, 2030.

The IDNR also regulates the site under the National Pollution Discharge Elimination System NPDES Permit #7000109. MP&W is authorized to discharge storm water runoff from the sediment runoff pond and two groundwater cut-off drains. Quarterly monitoring of the designated Farm Pond outfall and quarterly reporting are completed by MP&W in accordance with this permit.

II. REFERENCES CITED

- Green Environmental Services (GES), November 21, 1991. Coal Combustion Residue Landfill Development Plans and Supporting Documentation, Muscatine Power and Water; and Supplemental Plan Sheets 16 and 18 dated January 29, 1993.
- Green Environmental Services (GES), October 25, 1991. Hydrogeologic Evaluation of the Muscatine Power and Water Coal Combustion Residue Landfill.
- Green Environmental Services (GES), June, 1990. Hydrogeologic Evaluation Work Plan for the Muscatine Power and Water Coal Combustion Residue Landfill.
- Groundwater Stats Consulting, November 17, 2022. Summary of statistical analysis used to establish baseline water quality, SSI and SSL. Includes the analysis of 19 sample events conducted from June 2016 through September 2022.
- HR Green, January, 2021. Annual Water Quality Report, addressing State of Iowa [567] IAC Chapter 103 rule and landfill operating permit requirements.
- HR Green, December 23, 2022. Annual Inspection Report, Muscatine Power & Water, CCR Landfill.
- HR Green, December 19, 2022. Annual CCR Fugitive Dust Control Report, Muscatine Power & Water, CCR Landfill.
- HR Green, April 22, 2019. Existing Final Cover Verification Report, Muscatine Power & Water, CCR Landfill.
- HR Green, December 5, 2018. CCR Fugitive Dust Prevention and Control Plan, Muscatine Power & Water, CCR Landfill (original October 19, 2015).
- HR Green, June 2017. Procedure for Groundwater and Surface Water Sampling. (Updated November 2018.)
- HR Green, October 17, 2016. Closure and Post-Closure Plan, Muscatine Power & Water, CCR Landfill.
- HR Green, October 17, 2021. Run-On and Run-Off Control System Plan, Muscatine Power & Water, CCR Landfill.
- HR Green, May 2, 2017. Groundwater Monitoring System and Sampling and Analysis Program, CCR Landfill (original May 18, 2016).
- HR Green, January 17, 2012. CCR Landfill Cell Development – Phase II Expansion Plans, Muscatine Power and Water.

Iowa Administrative Code [567], Chapter 103 Sanitary Landfills: Coal Combustion Residue.

Iowa Department of Natural Resources (IDNR) Landfill Operating Permit No. 70-SDP-06-82P dated August 8, Muscatine Power and Water.

Iowa Geological Survey, 2010. The Iowa State-Wide Trace Element Soil Sampling Project: Design and Implementation: Iowa Department of Natural Resources, Iowa Geological and Water Survey, Open File Report 10-1, June 2010.

Muscatine Power and Water. Federal *CCR Rule Compliance Data and Information*, publicly accessible Internet site at <https://www.mpw.org/utilities/electric/ccr-rule>.

Muscatine Power and Water, October 2, 2008, December 17, 2009, and March 30, 2010. Supplemental Information relating to landfill development.

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* published in Federal Register Volume 80, No. 127 on July 2, 2015 (correcting the effective date); and Volume 83, No. 146 on July 30, 2018 (revising groundwater protection standards for four constituents which do not have an established MCL).

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

APPENDIX A

FIGURES

Figure 1: Location Map

Figure 2: Site Map

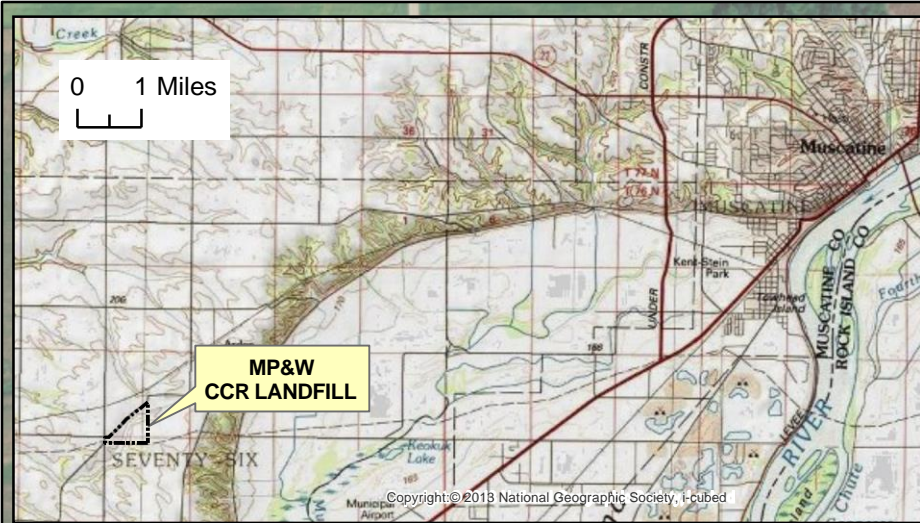
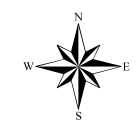


Figure 1
LOCATION MAP

CCR Landfill
Muscatine Power and Water

Legend

- Property Line (Approx.)
- Permitted Fill Area
- Phase II (2012)



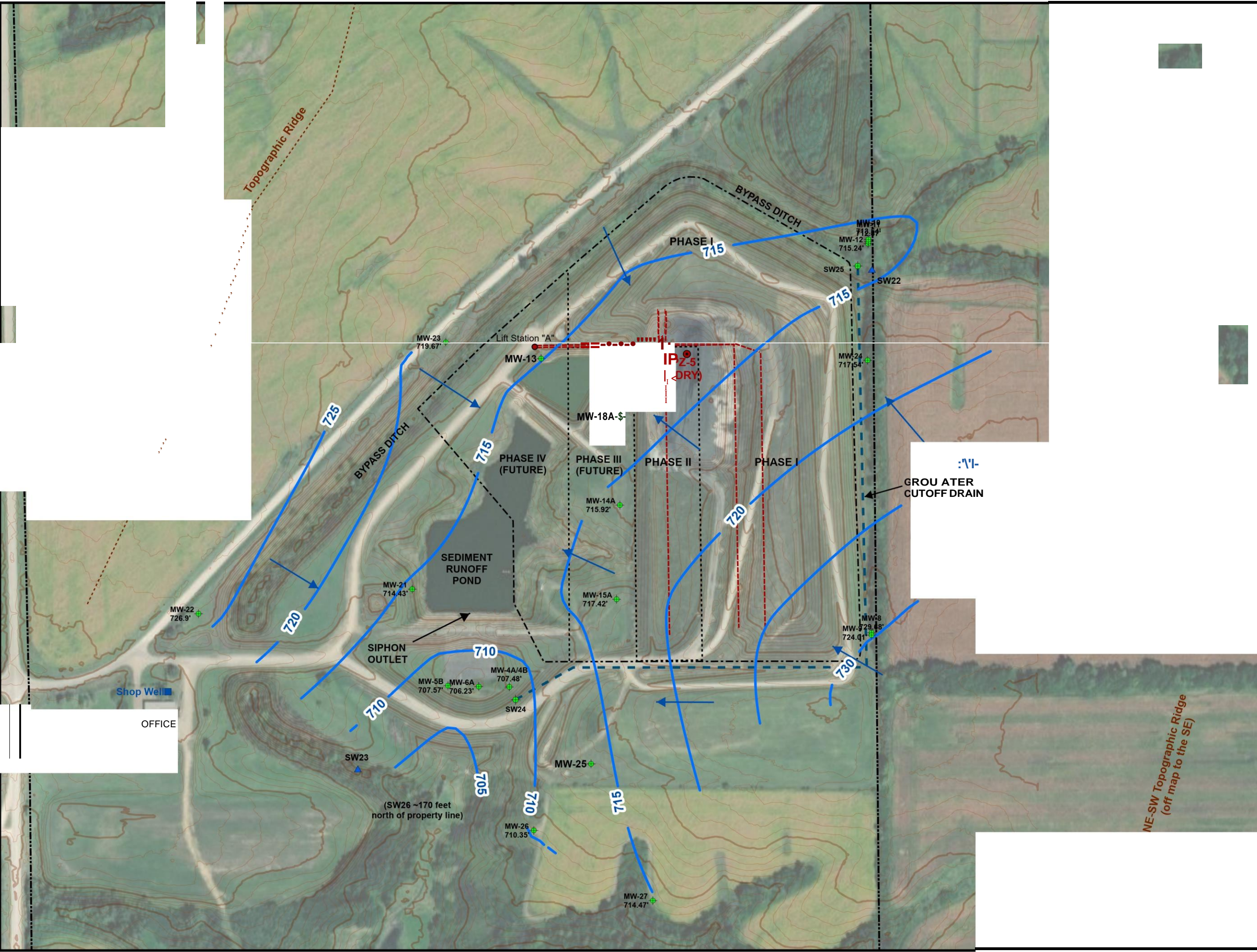
Projected Coordinate System:
NAD 1983 StatePlane Iowa_South



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 2
SITE MAP

CCR Landfill
Muscatine Power and Water



Legend

- Surface Water Points
- ◆ Groundwater Points
- Piezometers (Head, in feet)
- Shop Well
- - - Water Table (September 2022)
- - - Leachate Collection System
- - - Groundwater Cut-Off Drain
- - - Permitted Fill Area
- - - Phase Boundaries
- - - Property Line (Approx.)
- + - - Groundwater Flow Direction

MW-13, MW-18A, PZ-1, PZ-2, PZ-3, PZ-4 were abandoned in 2019 and MW-25 was abandoned in 2020



0 275 Feet

APPENDIX B

TABLES

Table 1	Summary of Monitoring Wells and Piezometers
Table 2	Implementation Schedule
Table 3	Groundwater Monitoring Program Summary
Table 4	Groundwater Protection Standards (GWPS)

**Summary of Monitoring Wells and Piezometers
2022 Groundwater Monitoring and Corrective Action Report
Muscatine Power & Water CCR Landfill
Permit No. #70-SDP-06-82P**

Well ID	State Plane ⁽¹⁾		WELL CONSTRUCTION ⁽²⁾					Function	Hydrogeologic Unit	WATER LEVELS (Feet, amsl) ⁽³⁾				
			Elevation		Well Depth	Screen Length	Screened Lithology			Low	High	Vertical Gradient 9/2022 ⁽⁴⁾	4/20/2022	9/14/2022
	Northing	Easting	Top of Well Casing	Ground										
PZ-5	511,495	2,269,505	729.63	727	10.00	1	CCR	Piezometer	CCR	DRY	DRY	N/A	DRY	DRY
MW-4B ⁽⁵⁾	510,484	2,268,975	715.87	712.04	24.70	10	Clay, Silt	Monitoring	Uppermost Aquifer	705.73	710.01	N/A	708.62	707.48
MW-5B	510,485	2,268,777	709.10	706.73	25.30	10	Silt, Clay	Monitoring	Uppermost Aquifer	704.07	708.31	N/A	707.60	707.57
MW-6A	510,482	2,268,871	708.92	706.49	25.35	10	Silt, Sand	Monitoring	Uppermost Aquifer	704.47	706.82	N/A	706.36	706.23
MW-8	510,639	2,270,068	747.36	744.37	42.95	10	Till	Monitoring	Uppermost Aquifer	728.06	737.74	0.359	732.43	729.68
MW-9	510,646	2,270,068	747.12	744.40	58.74	10	Till	Piezometer	Uppermost Aquifer	721.96	729.75	N/A	-	724.01
MW-10	511,846	2,270,058	718.51	716.32	20.32	10	Silt, Till	Monitoring	Uppermost Aquifer	710.89	715.10	0.019	714.83	713.54
MW-11	511,840	2,270,058	718.34	716.00	55.97	10	Till, Sand	Piezometer	Uppermost Aquifer	712.87	718.34	-0.072	-	712.87
MW-12	511,833	2,270,057	717.75	715.40	86.42	5	Till	Piezometer	Lower Confining Unit	713.13	717.75	N/A	-	715.24
MW-14A	511,035	2,269,301	729.00	726.19	20.50	10	Silt, Till, Clay	Monitoring	Uppermost Aquifer	712.59	719.55	N/A	716.62	715.92
MW-15A	510,748	2,269,291	729.99	727.12	20.50	10	Silt, Clay	Monitoring	Uppermost Aquifer	713.83	721.92	N/A	720.33	717.42
MW-21	510,779	2,268,668	725.75	722.81	22.20	10	Silt, Clay	Monitoring	Uppermost Aquifer	713.16	721.01	N/A	716.12	714.43
MW-22	510,704	2,268,017	744.27	741.13	41	10	Clay Till	Monitoring	Uppermost Aquifer	726.9	731.18	N/A	727.20	726.90
MW-23	511,532	2,268,770	726.90	723.73	25	10	Clay Till	Assessment	Uppermost Aquifer	719.37	723.02	N/A	722.45	719.67
MW-24	511,476	2,270,056	735.32	732.10	20	10	Clay Till	Assessment	Uppermost Aquifer	717.54	725.83	N/A	720.11	717.54
MW-26	510,044	2,269,037	731.08	727.35	38.27	10	Clay Till	Assessment	Uppermost Aquifer	710.35	712.91	N/A	710.90	710.35
MW-27	509,830	2,269,401	730.26	726.26	19.44	10	Sand Clay	Assessment	Uppermost Aquifer	714.47	718.43	N/A	715.44	714.47

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

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

(3) Period of record: 2002-2022 (for wells installed during a portion or the entire duration)

(4) Negative value is a discharge gradient; positive value is a recharge gradient. Well clusters are MW-8/MW-9 and MW-10/11/12.

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

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

NA not available; N/A not applicable; bold low or high recorded during 2022.

Table 2

Implementation Schedule
2022 Groundwater Monitoring and Corrective Action Report
Muscatine Power & Water CCR Landfill
Permit No. #70-SDP-06-82P

Monitoring Well	Well Function	Number Of Samples Collected In Each Monitoring Program June 2016 through 2019				Dates Of Completed Sampling Events And Constiuents Tested					
						Establish Background Levels (Initial 8 Events)		Detection Monitoring	Resampling Events To Verify Initial SSI Over Background	Assessment Monitoring ⁽¹⁾	Corrective Action
		Background	Detection	Assessment	Corrective Action	2016: Jun 6, Aug 15, Oct 10, Dec 12	2017: Feb 17, Apr 17, Jun 19, Aug 7	10/16/2017	11/28/2017	3/6, 6/19 & 8/29/2018 / 3/18 & 8/6/2019 / 4/7&9/24/2020 / 4/6&9/1/2021	None in 2022
MW-4A/MW-4B	Downgradient	19	1	11	N/A	Appendix III & IV	Appendix III & IV	Appendix III		Appendix III & IV	N/A
MW-5B	Downgradient	19	1	11	N/A	Appendix III & IV	Appendix III & IV	Appendix III	Chloride	Appendix III & IV	N/A
MW-6A	Downgradient	19	1	11	N/A	Appendix III & IV	Appendix III & IV	Appendix III		Appendix III & IV	N/A
MW-8	Upgradient	19	1	11	N/A	Appendix III & IV	Appendix III & IV	Appendix III		Appendix III & IV	N/A
MW-10	Upgradient	19	1	11	N/A	Appendix III & IV	Appendix III & IV	Appendix III		Appendix III & IV	N/A
MW-13 ⁽³⁾	Downgradient	11	1	3	N/A	Appendix III & IV	Appendix III & IV	Appendix III	Boron, calcium, sulfate, TDS	Appendix III & IV	N/A
MW-14A	Downgradient	19	1	11	N/A	Appendix III & IV	Appendix III & IV	Appendix III	Boron, calcium, chloride, sulfate, TDS	Appendix III & IV	N/A
MW-15A	Downgradient	19	1	11	N/A	Appendix III & IV	Appendix III & IV	Appendix III	Boron, calcium, chloride, sulfate, TDS	Appendix III & IV	N/A
MW-18A ⁽³⁾	Downgradient	11	1	3	N/A	Appendix III & IV	Appendix III & IV	Appendix III	Boron, calcium, chloride, sulfate, TDS	Appendix III & IV	N/A
MW-21	Downgradient	19	1	11	N/A	Appendix III & IV	Appendix III & IV	Appendix III	Boron, pH	Appendix III & IV	N/A
						2018: Mar 6, June 19, Aug 29 2019: Mar 18, Aug 6	2020: Apr 7, Sept 18 2021: Apr 6	9/1/2021		2022: Apr 20, Sept 14	
MW-22 ⁽²⁾	Upgradient	10	1	10	N/A	Appendix III & IV	Appendix III & IV	Appendix III	N/A	Appendix III & IV	N/A
						2018: Jun 30, Aug 30 2019: Mar 18, Aug 6	2020: Apr 7, Sept 18 2021: Apr 6, Sept 1	4/20/2022		9/14/2022	
MW-23 ⁽²⁾	Upgradient	9	1	9	N/A	Appendix III & IV	Appendix III & IV	Appendix III	N/A	Appendix III & IV	N/A

(1) Assessment monitoring: the full Appendix III & IV constituent lists are tested.
 (2) MW-22 installed in February 2018 as an additional background well.
 (3) MW-13 and MW-18A were closed in 2019 due to damage and site construction following IDNR approval.

Table 3

Groundwater Monitoring Program Summary
2022 Groundwater Monitoring and Corrective Action Report
Muscatine Power & Water CCR Landfill
Permit No. #70-SDP-06-82P

Monitoring Well	Current Monitoring Program Status	Planned Change in Monitoring Program Status For The Next Sampling Event	Confirmed Statistically Significant Increase (SSI) Over Background	Statistically Significant Trends	Statistically Significant Level (\$SL) Over GWPS	Upcoming Sampling Dates And Constituents			
						Resample	Semi-Annual Assessment Monitoring: March 2023	Semi-Annual Assessment Monitoring: September 2023	Others TBD, if needed
MW-4A / MW-4B	Assessment	None	None	None	None	N/A	Appendix III & IV	Appendix III & IV	
MW-5B	Assessment	None	Chloride	None	None	N/A	Appendix III & IV	Appendix III & IV	
MW-6A	Assessment	None	None	None	None	N/A	Appendix III & IV	Appendix III & IV	
MW-8	Background	None	None	Downward: Calcium, Sulfate, TDS	None	N/A	Appendix III & IV	Appendix III & IV	
MW-10	Background	None	None	Downward: TDS	None	N/A	Appendix III & IV	Appendix III & IV	
MW-13	Abandoned ⁽¹⁾	None	N/A	N/A	N/A	N/A	N/A	N/A	
MW-14A	Assessment	None	Boron, calcium, sulfate, TDS	Downward: TDS	None	N/A	Appendix III & IV	Appendix III & IV	
MW-15A	Assessment	None	Boron, TDS	Downward: Boron, TDS	None	N/A	Appendix III & IV	Appendix III & IV	
MW-18A	Abandoned ⁽¹⁾	None	N/A	N/A	N/A	N/A	N/A	N/A	
MW-21	Assessment	None	Boron	None	None	N/A	Appendix III & IV	Appendix III & IV	
MW-22	Background	None	None	Upward: Sulfate; Downward: Chloride	None	N/A	Appendix III & IV	Appendix III & IV	
MW-23	Background	None	None	Downward: Calcium	None	N/A	Appendix III & IV	Appendix III & IV	

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

To simplify the sampling program, MP&W elects to sample for Appendix III & IV constituents, except radium, during all events (as opposed to Appendix III + detected Appendix IV constituents).

SSI = Statistically Significant Increase above background

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

N/A = Not Applicable

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

Table 4

**Groundwater Protection Standards
 2022 Groundwater Monitoring and Corrective Action Report
 Muscatine Power & Water CCR Landfill
 Permit No. #70-SDP-06-82P**

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

All metals as Total recoverable.
 MCL: Maximum Contaminant Level
 RSL: Regional Screening Level
 Statistical Background Limit: Groundwater Stats Consulting, 11/17/2022
 GWPS: Ground Water Protection Standard

APPENDIX C

SAMPLING DATA

- April 20 and September 14, 2022 Sampling Events
 - Laboratory Analytical Reports
 - Ground water sampling forms
 - Low Flow Sampling Forms
- Summary Tabulations of Analytical Results

ANALYTICAL REPORT

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls, IA 50613
Tel: (319)277-2401

Laboratory Job ID: 310-229908-1

Client Project/Site: Muscatine Power & Water CCR Landfill

For:

Muscatine Power & Water
1700 Dick Drake Way
PO BOX 899
Muscatine, Iowa 52761

Attn: Sam Bennett



Authorized for release by:
5/17/2022 1:38:34 PM

Shawn Hayes, Senior Project Manager
(319)229-8211
Shawn.Hayes@et.eurofinsus.com

LINKS

Review your project
results through



Have a Question?



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www.eurofinsus.com/Env

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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

Job ID: 310-229908-1

Job ID: 310-229908-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-229908-1

Comments

No additional comments.

Receipt

The samples were received on 4/26/2022 9:05 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 was 1.4° C.

HPLC/IC

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

Metals

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

General Chemistry

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

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Sample Summary

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

Job ID: 310-229908-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-229908-1	MW-21	Ground Water	04/21/22 11:50	04/26/22 09:05
310-229908-2	MW-22	Ground Water	04/21/22 08:40	04/26/22 09:05
310-229908-3	MW-23	Ground Water	04/21/22 10:05	04/26/22 09:05
310-229908-4	MW-14A	Ground Water	04/21/22 14:30	04/26/22 09:05
310-229908-5	Duplicate-1	Ground Water	04/21/22 12:00	04/26/22 09:05

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- 10
- 11
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- 13
- 14

Detection Summary

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

Job ID: 310-229908-1

Client Sample ID: MW-21

Lab Sample ID: 310-229908-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	7.19		5.00		mg/L	5		9056A	Total/NA
Sulfate	293		5.00		mg/L	5		9056A	Total/NA
Barium	0.0360		0.00200		mg/L	1		6020A	Total/NA
Boron	3.57		0.100		mg/L	1		6020A	Total/NA
Calcium	97.5		0.500		mg/L	1		6020A	Total/NA
Chromium	0.00636		0.00500		mg/L	1		6020A	Total/NA
Lithium	0.0162		0.0100		mg/L	1		6020A	Total/NA
Selenium	0.00634		0.00500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	558		50.0		mg/L	1		SM 2540C	Total/NA
pH	6.9	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-22

Lab Sample ID: 310-229908-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	20.2		5.00		mg/L	5		9056A	Total/NA
Sulfate	158		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00340		0.00200		mg/L	1		6020A	Total/NA
Barium	0.239		0.00200		mg/L	1		6020A	Total/NA
Calcium	80.2		0.500		mg/L	1		6020A	Total/NA
Molybdenum	0.00420		0.00200		mg/L	1		6020A	Total/NA
Total Dissolved Solids	388		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.6	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-23

Lab Sample ID: 310-229908-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	16.9		5.00		mg/L	5		9056A	Total/NA
Sulfate	25.4		5.00		mg/L	5		9056A	Total/NA
Barium	0.0572		0.00200		mg/L	1		6020A	Total/NA
Calcium	54.0		0.500		mg/L	1		6020A	Total/NA
Cobalt	0.000561		0.000500		mg/L	1		6020A	Total/NA
Lead	0.000596		0.000500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	218		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.4	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-14A

Lab Sample ID: 310-229908-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	25.5		5.00		mg/L	5		9056A	Total/NA
Sulfate	1030		20.0		mg/L	20		9056A	Total/NA
Barium	0.0327		0.00200		mg/L	1		6020A	Total/NA
Boron	15.2		1.00		mg/L	10		6020A	Total/NA
Calcium	289		0.500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	1530		250		mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: Duplicate-1

Lab Sample ID: 310-229908-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	6.46		5.00		mg/L	5		9056A	Total/NA
Sulfate	278		5.00		mg/L	5		9056A	Total/NA
Barium	0.0354		0.00200		mg/L	1		6020A	Total/NA
Boron	3.51		0.100		mg/L	1		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Detection Summary

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

Job ID: 310-229908-1

Client Sample ID: Duplicate-1 (Continued)

Lab Sample ID: 310-229908-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	96.1		0.500		mg/L	1		6020A	Total/NA
Chromium	0.00617		0.00500		mg/L	1		6020A	Total/NA
Lithium	0.0167		0.0100		mg/L	1		6020A	Total/NA
Selenium	0.00673		0.00500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	520		50.0		mg/L	1		SM 2540C	Total/NA
pH	6.9	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

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

Job ID: 310-229908-1

Client Sample ID: MW-21

Lab Sample ID: 310-229908-1

Date Collected: 04/21/22 11:50

Matrix: Ground Water

Date Received: 04/26/22 09:05

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	7.19		5.00		mg/L			05/09/22 10:19	5
Fluoride	<0.500		0.500		mg/L			05/09/22 10:19	5
Sulfate	293		5.00		mg/L			05/09/22 10:19	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 23:00	1
Arsenic	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 23:00	1
Barium	0.0360		0.00200		mg/L		05/02/22 09:15	05/10/22 23:00	1
Beryllium	<0.00100		0.00100		mg/L		05/02/22 09:15	05/10/22 23:00	1
Boron	3.57		0.100		mg/L		05/02/22 09:15	05/10/22 23:00	1
Cadmium	<0.000100		0.000100		mg/L		05/02/22 09:15	05/10/22 23:00	1
Calcium	97.5		0.500		mg/L		05/02/22 09:15	05/10/22 23:00	1
Chromium	0.00636		0.00500		mg/L		05/02/22 09:15	05/10/22 23:00	1
Cobalt	<0.000500		0.000500		mg/L		05/02/22 09:15	05/10/22 23:00	1
Lead	<0.000500		0.000500		mg/L		05/02/22 09:15	05/10/22 23:00	1
Lithium	0.0162		0.0100		mg/L		05/02/22 09:15	05/10/22 23:00	1
Molybdenum	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 23:00	1
Selenium	0.00634		0.00500		mg/L		05/02/22 09:15	05/10/22 23:00	1
Thallium	<0.00100		0.00100		mg/L		05/02/22 09:15	05/10/22 23:00	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/05/22 13:40	05/06/22 15:39	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	558		50.0		mg/L			04/27/22 14:49	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.9	HF	0.1		SU			04/26/22 12:17	1

Client Sample Results

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

Job ID: 310-229908-1

Client Sample ID: MW-22

Lab Sample ID: 310-229908-2

Date Collected: 04/21/22 08:40

Matrix: Ground Water

Date Received: 04/26/22 09:05

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	20.2		5.00		mg/L			05/09/22 10:34	5
Fluoride	<0.500		0.500		mg/L			05/09/22 10:34	5
Sulfate	158		5.00		mg/L			05/09/22 10:34	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 23:04	1
Arsenic	0.00340		0.00200		mg/L		05/02/22 09:15	05/10/22 23:04	1
Barium	0.239		0.00200		mg/L		05/02/22 09:15	05/10/22 23:04	1
Beryllium	<0.00100		0.00100		mg/L		05/02/22 09:15	05/10/22 23:04	1
Boron	<0.100		0.100		mg/L		05/02/22 09:15	05/10/22 23:04	1
Cadmium	<0.000100		0.000100		mg/L		05/02/22 09:15	05/10/22 23:04	1
Calcium	80.2		0.500		mg/L		05/02/22 09:15	05/10/22 23:04	1
Chromium	<0.00500		0.00500		mg/L		05/02/22 09:15	05/10/22 23:04	1
Cobalt	<0.000500		0.000500		mg/L		05/02/22 09:15	05/10/22 23:04	1
Lead	<0.000500		0.000500		mg/L		05/02/22 09:15	05/10/22 23:04	1
Lithium	<0.0100		0.0100		mg/L		05/02/22 09:15	05/10/22 23:04	1
Molybdenum	0.00420		0.00200		mg/L		05/02/22 09:15	05/10/22 23:04	1
Selenium	<0.00500		0.00500		mg/L		05/02/22 09:15	05/10/22 23:04	1
Thallium	<0.00100		0.00100		mg/L		05/02/22 09:15	05/10/22 23:04	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/05/22 13:40	05/06/22 15:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	388		50.0		mg/L			04/27/22 14:49	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.6	HF	0.1		SU			04/26/22 12:19	1

Client Sample Results

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

Job ID: 310-229908-1

Client Sample ID: MW-23

Lab Sample ID: 310-229908-3

Date Collected: 04/21/22 10:05

Matrix: Ground Water

Date Received: 04/26/22 09:05

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	16.9		5.00		mg/L			05/09/22 11:21	5
Fluoride	<0.500		0.500		mg/L			05/09/22 11:21	5
Sulfate	25.4		5.00		mg/L			05/09/22 11:21	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 23:08	1
Arsenic	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 23:08	1
Barium	0.0572		0.00200		mg/L		05/02/22 09:15	05/10/22 23:08	1
Beryllium	<0.00100		0.00100		mg/L		05/02/22 09:15	05/10/22 23:08	1
Boron	<0.100		0.100		mg/L		05/02/22 09:15	05/10/22 23:08	1
Cadmium	<0.000100		0.000100		mg/L		05/02/22 09:15	05/10/22 23:08	1
Calcium	54.0		0.500		mg/L		05/02/22 09:15	05/10/22 23:08	1
Chromium	<0.00500		0.00500		mg/L		05/02/22 09:15	05/10/22 23:08	1
Cobalt	0.000561		0.000500		mg/L		05/02/22 09:15	05/10/22 23:08	1
Lead	0.000596		0.000500		mg/L		05/02/22 09:15	05/10/22 23:08	1
Lithium	<0.0100		0.0100		mg/L		05/02/22 09:15	05/10/22 23:08	1
Molybdenum	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 23:08	1
Selenium	<0.00500		0.00500		mg/L		05/02/22 09:15	05/10/22 23:08	1
Thallium	<0.00100		0.00100		mg/L		05/02/22 09:15	05/10/22 23:08	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/05/22 13:40	05/06/22 15:48	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	218		50.0		mg/L			04/27/22 14:49	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.4	HF	0.1		SU			04/26/22 12:14	1

Client Sample Results

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

Job ID: 310-229908-1

Client Sample ID: MW-14A

Lab Sample ID: 310-229908-4

Date Collected: 04/21/22 14:30

Matrix: Ground Water

Date Received: 04/26/22 09:05

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	25.5		5.00		mg/L			05/09/22 11:37	5
Fluoride	<0.500		0.500		mg/L			05/09/22 11:37	5
Sulfate	1030		20.0		mg/L			05/09/22 11:52	20

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 23:12	1
Arsenic	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 23:12	1
Barium	0.0327		0.00200		mg/L		05/02/22 09:15	05/10/22 23:12	1
Beryllium	<0.00100		0.00100		mg/L		05/02/22 09:15	05/10/22 23:12	1
Boron	15.2		1.00		mg/L		05/02/22 09:15	05/11/22 20:36	10
Cadmium	<0.000100		0.000100		mg/L		05/02/22 09:15	05/10/22 23:12	1
Calcium	289		0.500		mg/L		05/02/22 09:15	05/10/22 23:12	1
Chromium	<0.00500		0.00500		mg/L		05/02/22 09:15	05/10/22 23:12	1
Cobalt	<0.000500		0.000500		mg/L		05/02/22 09:15	05/10/22 23:12	1
Lead	<0.000500		0.000500		mg/L		05/02/22 09:15	05/10/22 23:12	1
Lithium	<0.0100		0.0100		mg/L		05/02/22 09:15	05/10/22 23:12	1
Molybdenum	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 23:12	1
Selenium	<0.00500		0.00500		mg/L		05/02/22 09:15	05/10/22 23:12	1
Thallium	<0.00100		0.00100		mg/L		05/02/22 09:15	05/10/22 23:12	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/05/22 13:40	05/06/22 15:50	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1530		250		mg/L			04/27/22 14:49	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.3	HF	0.1		SU			04/26/22 12:16	1

Client Sample Results

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

Job ID: 310-229908-1

Client Sample ID: Duplicate-1

Lab Sample ID: 310-229908-5

Date Collected: 04/21/22 12:00

Matrix: Ground Water

Date Received: 04/26/22 09:05

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	6.46		5.00		mg/L			05/09/22 12:08	5
Fluoride	<0.500		0.500		mg/L			05/09/22 12:08	5
Sulfate	278		5.00		mg/L			05/09/22 12:08	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 23:16	1
Arsenic	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 23:16	1
Barium	0.0354		0.00200		mg/L		05/02/22 09:15	05/10/22 23:16	1
Beryllium	<0.00100		0.00100		mg/L		05/02/22 09:15	05/10/22 23:16	1
Boron	3.51		0.100		mg/L		05/02/22 09:15	05/10/22 23:16	1
Cadmium	<0.000100		0.000100		mg/L		05/02/22 09:15	05/10/22 23:16	1
Calcium	96.1		0.500		mg/L		05/02/22 09:15	05/10/22 23:16	1
Chromium	0.00617		0.00500		mg/L		05/02/22 09:15	05/10/22 23:16	1
Cobalt	<0.000500		0.000500		mg/L		05/02/22 09:15	05/10/22 23:16	1
Lead	<0.000500		0.000500		mg/L		05/02/22 09:15	05/10/22 23:16	1
Lithium	0.0167		0.0100		mg/L		05/02/22 09:15	05/10/22 23:16	1
Molybdenum	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 23:16	1
Selenium	0.00673		0.00500		mg/L		05/02/22 09:15	05/10/22 23:16	1
Thallium	<0.00100		0.00100		mg/L		05/02/22 09:15	05/10/22 23:16	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/05/22 13:40	05/06/22 15:52	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	520		50.0		mg/L			04/27/22 14:49	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.9	HF	0.1		SU			04/26/22 12:15	1

Definitions/Glossary

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

Job ID: 310-229908-1

Qualifiers

General Chemistry

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

Glossary

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

QC Sample Results

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

Job ID: 310-229908-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-352419/3
Matrix: Water
Analysis Batch: 352419

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			05/06/22 13:56	1
Fluoride	<0.100		0.100		mg/L			05/06/22 13:56	1
Sulfate	<1.00		1.00		mg/L			05/06/22 13:56	1

Lab Sample ID: LCS 310-352419/4
Matrix: Water
Analysis Batch: 352419

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	10.48		mg/L		105	90 - 110
Fluoride	2.00	2.128		mg/L		106	90 - 110
Sulfate	10.0	10.93		mg/L		109	90 - 110

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-351512/1-A
Matrix: Water
Analysis Batch: 352699

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 351512

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 21:07	1
Arsenic	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 21:07	1
Barium	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 21:07	1
Beryllium	<0.00100		0.00100		mg/L		05/02/22 09:15	05/10/22 21:07	1
Boron	<0.100		0.100		mg/L		05/02/22 09:15	05/10/22 21:07	1
Cadmium	<0.000100		0.000100		mg/L		05/02/22 09:15	05/10/22 21:07	1
Calcium	<0.500		0.500		mg/L		05/02/22 09:15	05/10/22 21:07	1
Chromium	<0.00500		0.00500		mg/L		05/02/22 09:15	05/10/22 21:07	1
Cobalt	<0.000500		0.000500		mg/L		05/02/22 09:15	05/10/22 21:07	1
Lead	<0.000500		0.000500		mg/L		05/02/22 09:15	05/10/22 21:07	1
Molybdenum	<0.00200		0.00200		mg/L		05/02/22 09:15	05/10/22 21:07	1
Selenium	<0.00500		0.00500		mg/L		05/02/22 09:15	05/10/22 21:07	1
Thallium	<0.00100		0.00100		mg/L		05/02/22 09:15	05/10/22 21:07	1

Lab Sample ID: LCS 310-351512/2-A
Matrix: Water
Analysis Batch: 352699

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 351512

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	0.200	0.2243		mg/L		112	80 - 120
Arsenic	0.200	0.2028		mg/L		101	80 - 120
Barium	0.100	0.1082		mg/L		108	80 - 120
Beryllium	0.100	0.1077		mg/L		108	80 - 120
Boron	0.200	0.1961		mg/L		98	80 - 120
Cadmium	0.100	0.1075		mg/L		108	80 - 120
Calcium	2.00	1.837		mg/L		92	80 - 120
Chromium	0.100	0.1036		mg/L		104	80 - 120
Cobalt	0.100	0.1034		mg/L		103	80 - 120
Lead	0.200	0.2118		mg/L		106	80 - 120

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QC Sample Results

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

Job ID: 310-229908-1

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

Lab Sample ID: LCS 310-351512/2-A
 Matrix: Water
 Analysis Batch: 352699

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 351512

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Molybdenum	0.200	0.2055		mg/L		103	80 - 120
Selenium	0.400	0.3882		mg/L		97	80 - 120
Thallium	0.200	0.2119		mg/L		106	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-352134/1-A
 Matrix: Water
 Analysis Batch: 352309

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 352134

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/05/22 13:40	05/06/22 15:35	1

Lab Sample ID: LCS 310-352134/2-A
 Matrix: Water
 Analysis Batch: 352309

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 352134

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001587		mg/L		95	80 - 120

Lab Sample ID: 310-229908-1 MS
 Matrix: Ground Water
 Analysis Batch: 352309

Client Sample ID: MW-21
 Prep Type: Total/NA
 Prep Batch: 352134

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	<0.000200		0.00167	0.001460		mg/L		88	80 - 120

Lab Sample ID: 310-229908-1 MSD
 Matrix: Ground Water
 Analysis Batch: 352309

Client Sample ID: MW-21
 Prep Type: Total/NA
 Prep Batch: 352134

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Mercury	<0.000200		0.00167	0.001453		mg/L		87	80 - 120	0	20

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

Lab Sample ID: MB 310-351252/1
 Matrix: Water
 Analysis Batch: 351252

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			04/27/22 14:49	1

Lab Sample ID: LCS 310-351252/2
 Matrix: Water
 Analysis Batch: 351252

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	924.0		mg/L		92	90 - 110

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QC Sample Results

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

Job ID: 310-229908-1

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

Lab Sample ID: 310-229908-3 DU
 Matrix: Ground Water
 Analysis Batch: 351252

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

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	218		246.0		mg/L		12	20

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-351080/1
 Matrix: Water
 Analysis Batch: 351080

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

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

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

QC Association Summary

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

Job ID: 310-229908-1

HPLC/IC

Analysis Batch: 352419

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229908-1	MW-21	Total/NA	Ground Water	9056A	
310-229908-2	MW-22	Total/NA	Ground Water	9056A	
310-229908-3	MW-23	Total/NA	Ground Water	9056A	
310-229908-4	MW-14A	Total/NA	Ground Water	9056A	
310-229908-4	MW-14A	Total/NA	Ground Water	9056A	
310-229908-5	Duplicate-1	Total/NA	Ground Water	9056A	
MB 310-352419/3	Method Blank	Total/NA	Water	9056A	
LCS 310-352419/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 351512

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229908-1	MW-21	Total/NA	Ground Water	3005A	
310-229908-2	MW-22	Total/NA	Ground Water	3005A	
310-229908-3	MW-23	Total/NA	Ground Water	3005A	
310-229908-4	MW-14A	Total/NA	Ground Water	3005A	
310-229908-5	Duplicate-1	Total/NA	Ground Water	3005A	
MB 310-351512/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-351512/2-A	Lab Control Sample	Total/NA	Water	3005A	

Prep Batch: 352134

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229908-1	MW-21	Total/NA	Ground Water	7470A	
310-229908-2	MW-22	Total/NA	Ground Water	7470A	
310-229908-3	MW-23	Total/NA	Ground Water	7470A	
310-229908-4	MW-14A	Total/NA	Ground Water	7470A	
310-229908-5	Duplicate-1	Total/NA	Ground Water	7470A	
MB 310-352134/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-352134/2-A	Lab Control Sample	Total/NA	Water	7470A	
310-229908-1 MS	MW-21	Total/NA	Ground Water	7470A	
310-229908-1 MSD	MW-21	Total/NA	Ground Water	7470A	

Analysis Batch: 352309

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229908-1	MW-21	Total/NA	Ground Water	7470A	352134
310-229908-2	MW-22	Total/NA	Ground Water	7470A	352134
310-229908-3	MW-23	Total/NA	Ground Water	7470A	352134
310-229908-4	MW-14A	Total/NA	Ground Water	7470A	352134
310-229908-5	Duplicate-1	Total/NA	Ground Water	7470A	352134
MB 310-352134/1-A	Method Blank	Total/NA	Water	7470A	352134
LCS 310-352134/2-A	Lab Control Sample	Total/NA	Water	7470A	352134
310-229908-1 MS	MW-21	Total/NA	Ground Water	7470A	352134
310-229908-1 MSD	MW-21	Total/NA	Ground Water	7470A	352134

Analysis Batch: 352699

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229908-1	MW-21	Total/NA	Ground Water	6020A	351512
310-229908-2	MW-22	Total/NA	Ground Water	6020A	351512
310-229908-3	MW-23	Total/NA	Ground Water	6020A	351512
310-229908-4	MW-14A	Total/NA	Ground Water	6020A	351512

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QC Association Summary

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

Job ID: 310-229908-1

Metals (Continued)

Analysis Batch: 352699 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229908-5	Duplicate-1	Total/NA	Ground Water	6020A	351512
MB 310-351512/1-A	Method Blank	Total/NA	Water	6020A	351512
LCS 310-351512/2-A	Lab Control Sample	Total/NA	Water	6020A	351512

Analysis Batch: 352849

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229908-4	MW-14A	Total/NA	Ground Water	6020A	351512

General Chemistry

Analysis Batch: 351080

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229908-1	MW-21	Total/NA	Ground Water	SM 4500 H+ B	
310-229908-2	MW-22	Total/NA	Ground Water	SM 4500 H+ B	
310-229908-3	MW-23	Total/NA	Ground Water	SM 4500 H+ B	
310-229908-4	MW-14A	Total/NA	Ground Water	SM 4500 H+ B	
310-229908-5	Duplicate-1	Total/NA	Ground Water	SM 4500 H+ B	
LCS 310-351080/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 351252

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229908-1	MW-21	Total/NA	Ground Water	SM 2540C	
310-229908-2	MW-22	Total/NA	Ground Water	SM 2540C	
310-229908-3	MW-23	Total/NA	Ground Water	SM 2540C	
310-229908-4	MW-14A	Total/NA	Ground Water	SM 2540C	
310-229908-5	Duplicate-1	Total/NA	Ground Water	SM 2540C	
MB 310-351252/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-351252/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-229908-3 DU	MW-23	Total/NA	Ground Water	SM 2540C	

Lab Chronicle

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

Job ID: 310-229908-1

Client Sample ID: MW-21
Date Collected: 04/21/22 11:50
Date Received: 04/26/22 09:05

Lab Sample ID: 310-229908-1
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	352419	05/09/22 10:19	JNR	TAL CF
Total/NA	Prep	3005A			351512	05/02/22 09:15	ACM2	TAL CF
Total/NA	Analysis	6020A		1	352699	05/10/22 23:00	SAP	TAL CF
Total/NA	Prep	7470A			352134	05/05/22 13:40	EAM	TAL CF
Total/NA	Analysis	7470A		1	352309	05/06/22 15:39	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	351252	04/27/22 14:49	TGF	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	351080	04/26/22 12:17	JAJ	TAL CF

Client Sample ID: MW-22
Date Collected: 04/21/22 08:40
Date Received: 04/26/22 09:05

Lab Sample ID: 310-229908-2
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	352419	05/09/22 10:34	JNR	TAL CF
Total/NA	Prep	3005A			351512	05/02/22 09:15	ACM2	TAL CF
Total/NA	Analysis	6020A		1	352699	05/10/22 23:04	SAP	TAL CF
Total/NA	Prep	7470A			352134	05/05/22 13:40	EAM	TAL CF
Total/NA	Analysis	7470A		1	352309	05/06/22 15:46	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	351252	04/27/22 14:49	TGF	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	351080	04/26/22 12:19	JAJ	TAL CF

Client Sample ID: MW-23
Date Collected: 04/21/22 10:05
Date Received: 04/26/22 09:05

Lab Sample ID: 310-229908-3
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	352419	05/09/22 11:21	JNR	TAL CF
Total/NA	Prep	3005A			351512	05/02/22 09:15	ACM2	TAL CF
Total/NA	Analysis	6020A		1	352699	05/10/22 23:08	SAP	TAL CF
Total/NA	Prep	7470A			352134	05/05/22 13:40	EAM	TAL CF
Total/NA	Analysis	7470A		1	352309	05/06/22 15:48	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	351252	04/27/22 14:49	TGF	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	351080	04/26/22 12:14	JAJ	TAL CF

Client Sample ID: MW-14A
Date Collected: 04/21/22 14:30
Date Received: 04/26/22 09:05

Lab Sample ID: 310-229908-4
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	352419	05/09/22 11:37	JNR	TAL CF
Total/NA	Analysis	9056A		20	352419	05/09/22 11:52	JNR	TAL CF
Total/NA	Prep	3005A			351512	05/02/22 09:15	ACM2	TAL CF
Total/NA	Analysis	6020A		1	352699	05/10/22 23:12	SAP	TAL CF

Eurofins Cedar Falls

Lab Chronicle

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

Job ID: 310-229908-1

Client Sample ID: MW-14A

Date Collected: 04/21/22 14:30

Date Received: 04/26/22 09:05

Lab Sample ID: 310-229908-4

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			351512	05/02/22 09:15	ACM2	TAL CF
Total/NA	Analysis	6020A		10	352849	05/11/22 20:36	SAP	TAL CF
Total/NA	Prep	7470A			352134	05/05/22 13:40	EAM	TAL CF
Total/NA	Analysis	7470A		1	352309	05/06/22 15:50	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	351252	04/27/22 14:49	TGF	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	351080	04/26/22 12:16	JAJ	TAL CF

Client Sample ID: Duplicate-1

Date Collected: 04/21/22 12:00

Date Received: 04/26/22 09:05

Lab Sample ID: 310-229908-5

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	352419	05/09/22 12:08	JNR	TAL CF
Total/NA	Prep	3005A			351512	05/02/22 09:15	ACM2	TAL CF
Total/NA	Analysis	6020A		1	352699	05/10/22 23:16	SAP	TAL CF
Total/NA	Prep	7470A			352134	05/05/22 13:40	EAM	TAL CF
Total/NA	Analysis	7470A		1	352309	05/06/22 15:52	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	351252	04/27/22 14:49	TGF	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	351080	04/26/22 12:15	JAJ	TAL CF

Laboratory References:

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

Accreditation/Certification Summary

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

Job ID: 310-229908-1

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Colorado	Petroleum Storage Tank Program	IA100001 (OR)	09-29-22
Georgia	State	IA100001 (OR)	09-29-22
Illinois	NELAP	200024	11-29-22
Iowa	State	007	12-01-21 *
Kansas	NELAP	E-10341	01-31-23
Minnesota	NELAP	019-999-319	12-31-22
Minnesota (Petrofund)	State	3349	01-18-24
North Dakota	State	R-186	09-29-22
Oregon	NELAP	IA100001	09-29-22

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

Method Summary

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

Job ID: 310-229908-1

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

Protocol References:

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

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

Laboratory References:

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





Environment Testing
America



310-229908 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscatine Power & Water</u>			
City/State:	CITY	STATE	Project:
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>4/26/22</u>	<u>0905</u>	<u>[Signature]</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # ____ of ____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>N</u>	Correction Factor (°C):	<u>700</u>
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>1.4</u>	Corrected Temp (°C):	<u>1.4</u>
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE If yes, contact PM before proceeding If no, proceed with login			
Additional Comments			

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Eurofins Cedar Falls

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

Chain of Custody Record

Client Information		Lab PM		Carrier Tracking No(s):		COC No:	
Client Contact: Sam Bennett MP&W and Rose Amundson (HR Green)		Sam Bennett, Neil Hoskins		Hayes, Shawn M		Page:	
Company: Muscatine Power & Water		E-Mail: shawn.hayes@testamericainc.com		Job #:		Preservation Codes:	
Address: 1700 Dick Drake Way		Due Date Requested		Analysis Requested		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
City: Muscatine		TAT Requested (days):		Total Number of Containers		M - Hexane N - None O - AshNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - ph 4-5 Z - other (specify)	
State, Zip IA, 52761		PO #: 221607		Field Filtered Sample (Yes or No)		Special Instructions/Note:	
Phone:		WO #:		Perform MS/MSD (Yes or No)			
Email: sbennett@mpw.org and ramundson@hrgreen.com		TestAmerica Project #: 31007856		6020A CCR List, 7470A Mercury			
Project Name: Muscatine Power & Water CCR Landfill		Event:		2540C TDS, SM4500_H+PH			
Site: Iowa		Sample Date		9056A Chloride, Fluoride, Sulfate			
Sample Identification		Sample Time		Radium-226			
Matrix (W=water, S=solid, O=wastewater, BT=Tissue, A=Air)		Preservation Code:		Radium-228			
Sample Type (C=Comp, G=grab)		Sample Date		D N N			
Sample Time		Sample Date		X X X			
Preservation Code:		Sample Date		X X X			
MW-21		4/21/22		X X X			
MW-22		4/21/22		X X X			
MW-23		4/21/22		X X X			
MW-14A		4/21/22		X X X			
Duplicate-1		4/21/22		X X X			
Possible Hazard Identification		Date/Time		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)			
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Date/Time: 4/26/22 0615		<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months			
Deliverable Requested I, II, III, IV, Other (specify)		Date		Special Instructions/QC Requirements:			
Empty Kit Relinquished by		Date		Method of Shipment:			
Relinquished by: <i>Neil Hoskins</i>		Date/Time: 4/26/22 0615		Received by: <i>N</i>		Company	
Relinquished by:		Date/Time:		Received by:		Company	
Relinquished by:		Date/Time:		Received by:		Company	
Custody Seals Intact: Δ Yes Δ No		Custody Seal No		Cooler Temperature(s) °C and Other Remarks:			



Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-229908-1

Login Number: 229908

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	

ANALYTICAL REPORT

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls, IA 50613
Tel: (319)277-2401

Laboratory Job ID: 310-229908-2

Client Project/Site: Muscatine Power & Water CCR Landfill

For:

Muscatine Power & Water
1700 Dick Drake Way
PO BOX 899
Muscatine, Iowa 52761

Attn: Sam Bennett



Authorized for release by:
5/31/2022 1:39:30 PM

Shawn Hayes, Senior Project Manager
(319)229-8211
Shawn.Hayes@et.eurofinsus.com

LINKS

Review your project
results through



Have a Question?



Visit us at:

www.eurofinsus.com/Env

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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

Job ID: 310-229908-2

Job ID: 310-229908-2

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-229908-2

Comments

No additional comments.

Receipt

The samples were received on 4/26/2022 9:05 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 was 1.4° C.

RAD

Method 9320: Radium-228 Batch 562879

The LCS recovered at (126%). The limits in our LIMS system at 75-125 reflect the requirements of a regulatory agency that represents a large amount of our work. However the samples associated with this LCS are not from this agency and are therefore held to our in-house statistical limits of (61-138%) per method requirements. The LCS passes, no further action is required (LCSD 160-562879/2-A)

Method 9320: Radium-228 Batch 562879

The detection goal was not met for the following sample. Sample was prepped at a reduced volume due to the presence of matrix interferences: MW-23 (310-229908-3). Analytical results are reported with the detection limit achieved.

Method PrecSep_0: Radium-228 Prep Batch 160-562879

The following sample was prepared at a reduced aliquot due to Matrix: MW-23 (310-229908-3).

Method PrecSep-21: Radium-226 Prep Batch 160-562872

The following sample was prepared at a reduced aliquot due to Matrix: MW-23 (310-229908-3).

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: 310-229908-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-229908-1	MW-21	Ground Water	04/21/22 11:50	04/26/22 09:05
310-229908-2	MW-22	Ground Water	04/21/22 08:40	04/26/22 09:05
310-229908-3	MW-23	Ground Water	04/21/22 10:05	04/26/22 09:05
310-229908-4	MW-14A	Ground Water	04/21/22 14:30	04/26/22 09:05
310-229908-5	Duplicate-1	Ground Water	04/21/22 12:00	04/26/22 09:05

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Detection Summary

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

Job ID: 310-229908-2

Client Sample ID: MW-21

Lab Sample ID: 310-229908-1

No Detections.

Client Sample ID: MW-22

Lab Sample ID: 310-229908-2

No Detections.

Client Sample ID: MW-23

Lab Sample ID: 310-229908-3

No Detections.

Client Sample ID: MW-14A

Lab Sample ID: 310-229908-4

No Detections.

Client Sample ID: Duplicate-1

Lab Sample ID: 310-229908-5

No Detections.

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This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

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

Job ID: 310-229908-2

Client Sample ID: MW-21

Lab Sample ID: 310-229908-1

Date Collected: 04/21/22 11:50

Matrix: Ground Water

Date Received: 04/26/22 09:05

Method: 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-226	0.0448	U	0.0605	0.0607	1.00	0.102	pCi/L	04/29/22 12:55	05/27/22 07:41	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.0		40 - 110					04/29/22 12:55	05/27/22 07:41	1

Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-228	0.126	U	0.235	0.236	1.00	0.409	pCi/L	04/29/22 13:26	05/19/22 12:48	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.0		40 - 110					04/29/22 13:26	05/19/22 12:48	1
Y Carrier	91.2		40 - 110					04/29/22 13:26	05/19/22 12:48	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Combined Radium 226 + 228	0.171	U	0.243	0.244	5.00	0.409	pCi/L		05/27/22 15:21	1

Client Sample Results

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

Job ID: 310-229908-2

Client Sample ID: MW-22

Lab Sample ID: 310-229908-2

Date Collected: 04/21/22 08:40

Matrix: Ground Water

Date Received: 04/26/22 09:05

Method: 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.222		0.0924	0.0946	1.00	0.0937	pCi/L	04/29/22 12:55	05/27/22 07:41	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	92.5		40 - 110					04/29/22 12:55	05/27/22 07:41	1

Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.272	U	0.296	0.298	1.00	0.483	pCi/L	04/29/22 13:26	05/19/22 12:49	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	92.5		40 - 110					04/29/22 13:26	05/19/22 12:49	1
Y Carrier	89.7		40 - 110					04/29/22 13:26	05/19/22 12:49	1

Method: 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	0.494		0.310	0.313	5.00	0.483	pCi/L		05/27/22 15:21	1

Client Sample Results

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

Job ID: 310-229908-2

Client Sample ID: MW-23

Lab Sample ID: 310-229908-3

Date Collected: 04/21/22 10:05

Matrix: Ground Water

Date Received: 04/26/22 09:05

Method: 9315 - Radium-226 (GFP)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0699	U	0.133	0.133	1.00	0.240	pCi/L	04/29/22 12:55	05/27/22 07:41	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	70.1		40 - 110					04/29/22 12:55	05/27/22 07:41	1

Method: 9320 - Radium-228 (GFP)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.20	U G	0.838	0.845	1.00	1.25	pCi/L	04/29/22 13:26	05/19/22 12:49	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	70.1		40 - 110					04/29/22 13:26	05/19/22 12:49	1
Y Carrier	84.1		40 - 110					04/29/22 13:26	05/19/22 12:49	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.27		0.848	0.855	5.00	1.25	pCi/L		05/27/22 15:21	1

Client Sample Results

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

Job ID: 310-229908-2

Client Sample ID: MW-14A

Lab Sample ID: 310-229908-4

Date Collected: 04/21/22 14:30

Matrix: Ground Water

Date Received: 04/26/22 09:05

Method: 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-226	0.101	U	0.0857	0.0862	1.00	0.129	pCi/L	04/29/22 12:55	05/26/22 21:26	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.3		40 - 110					04/29/22 12:55	05/26/22 21:26	1

Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-228	-0.0522	U	0.335	0.335	1.00	0.638	pCi/L	04/29/22 13:26	05/19/22 14:29	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.3		40 - 110					04/29/22 13:26	05/19/22 14:29	1
Y Carrier	84.9		40 - 110					04/29/22 13:26	05/19/22 14:29	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Combined Radium 226 + 228	0.0486	U	0.346	0.346	5.00	0.638	pCi/L		05/27/22 15:21	1

Client Sample Results

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

Job ID: 310-229908-2

Client Sample ID: Duplicate-1

Lab Sample ID: 310-229908-5

Date Collected: 04/21/22 12:00

Matrix: Ground Water

Date Received: 04/26/22 09:05

Method: 9315 - Radium-226 (GFP)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.206		0.111	0.112	1.00	0.139	pCi/L	04/29/22 12:55	05/27/22 07:41	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	72.8		40 - 110					04/29/22 12:55	05/27/22 07:41	1

Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.409	U	0.464	0.465	1.00	0.760	pCi/L	04/29/22 13:26	05/19/22 14:29	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	72.8		40 - 110					04/29/22 13:26	05/19/22 14:29	1
Y Carrier	87.5		40 - 110					04/29/22 13:26	05/19/22 14:29	1

Method: 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	0.614	U	0.477	0.478	5.00	0.760	pCi/L		05/27/22 15:21	1

Definitions/Glossary

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

Job ID: 310-229908-2

Qualifiers

Rad

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

Glossary

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

QC Sample Results

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

Job ID: 310-229908-2

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-562872/23-A
Matrix: Water
Analysis Batch: 567634

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 562872

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	Uncert.						
Radium-226	0.1008	U	0.0807	0.0812	1.00	0.120	pCi/L	04/29/22 12:55	05/27/22 07:38	1
Carrier	ME %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	97.8		40 - 110		04/29/22 12:55	05/27/22 07:38	1			

Lab Sample ID: LCS 160-562872/1-A
Matrix: Water
Analysis Batch: 567416

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 562872

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	11.72		1.26	1.00	0.120	pCi/L	103	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	85.5		40 - 110						

Lab Sample ID: LCSD 160-562872/2-A
Matrix: Water
Analysis Batch: 567416

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 562872

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER
				Uncert. (2σ+/-)							Limit
Radium-226	11.3	10.76		1.13	1.00	0.0974	pCi/L	95	75 - 125	0.40	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	90.0		40 - 110								

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-562879/23-A
Matrix: Water
Analysis Batch: 566434

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 562879

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	Uncert.						
Radium-228	0.03420	U	0.223	0.223	1.00	0.411	pCi/L	04/29/22 13:26	05/19/22 12:48	1
Carrier	ME %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	97.8		40 - 110		04/29/22 13:26	05/19/22 12:48	1			
Y Carrier	90.8		40 - 110		04/29/22 13:26	05/19/22 12:48	1			

QC Sample Results

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

Job ID: 310-229908-2

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

Lab Sample ID: LCS 160-562879/1-A

Matrix: Water

Analysis Batch: 566441

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 562879

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	
Radium-228	8.61	8.056		1.23	1.00	0.625	pCi/L	94	75 - 125	
Carrier	LCS %Yield	LCS Qualifier	Limits							
Ba Carrier	85.5		40 - 110							
Y Carrier	89.3		40 - 110							

Lab Sample ID: LCSD 160-562879/2-A

Matrix: Water

Analysis Batch: 566441

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 562879

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	Limit
Radium-228	8.61	10.81		1.46	1.00	0.624	pCi/L	126	75 - 125	1.03	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	90.0		40 - 110								
Y Carrier	90.5		40 - 110								

QC Association Summary

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

Job ID: 310-229908-2

Rad

Prep Batch: 562872

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229908-1	MW-21	Total/NA	Ground Water	PrecSep-21	
310-229908-2	MW-22	Total/NA	Ground Water	PrecSep-21	
310-229908-3	MW-23	Total/NA	Ground Water	PrecSep-21	
310-229908-4	MW-14A	Total/NA	Ground Water	PrecSep-21	
310-229908-5	Duplicate-1	Total/NA	Ground Water	PrecSep-21	
MB 160-562872/23-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-562872/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-562872/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 562879

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229908-1	MW-21	Total/NA	Ground Water	PrecSep_0	
310-229908-2	MW-22	Total/NA	Ground Water	PrecSep_0	
310-229908-3	MW-23	Total/NA	Ground Water	PrecSep_0	
310-229908-4	MW-14A	Total/NA	Ground Water	PrecSep_0	
310-229908-5	Duplicate-1	Total/NA	Ground Water	PrecSep_0	
MB 160-562879/23-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-562879/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-562879/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

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

Job ID: 310-229908-2

Client Sample ID: MW-21

Lab Sample ID: 310-229908-1

Date Collected: 04/21/22 11:50

Matrix: Ground Water

Date Received: 04/26/22 09:05

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			562872	04/29/22 12:55	MS	TAL SL
Total/NA	Analysis	9315		1	567633	05/27/22 07:41	JCB	TAL SL
Total/NA	Prep	PrecSep_0			562879	04/29/22 13:26	MS	TAL SL
Total/NA	Analysis	9320		1	566434	05/19/22 12:48	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	567649	05/27/22 15:21	CAH	TAL SL

Client Sample ID: MW-22

Lab Sample ID: 310-229908-2

Date Collected: 04/21/22 08:40

Matrix: Ground Water

Date Received: 04/26/22 09:05

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			562872	04/29/22 12:55	MS	TAL SL
Total/NA	Analysis	9315		1	567633	05/27/22 07:41	JCB	TAL SL
Total/NA	Prep	PrecSep_0			562879	04/29/22 13:26	MS	TAL SL
Total/NA	Analysis	9320		1	566434	05/19/22 12:49	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	567649	05/27/22 15:21	CAH	TAL SL

Client Sample ID: MW-23

Lab Sample ID: 310-229908-3

Date Collected: 04/21/22 10:05

Matrix: Ground Water

Date Received: 04/26/22 09:05

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			562872	04/29/22 12:55	MS	TAL SL
Total/NA	Analysis	9315		1	567633	05/27/22 07:41	JCB	TAL SL
Total/NA	Prep	PrecSep_0			562879	04/29/22 13:26	MS	TAL SL
Total/NA	Analysis	9320		1	566434	05/19/22 12:49	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	567649	05/27/22 15:21	CAH	TAL SL

Client Sample ID: MW-14A

Lab Sample ID: 310-229908-4

Date Collected: 04/21/22 14:30

Matrix: Ground Water

Date Received: 04/26/22 09:05

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			562872	04/29/22 12:55	MS	TAL SL
Total/NA	Analysis	9315		1	567417	05/26/22 21:26	MLK	TAL SL
Total/NA	Prep	PrecSep_0			562879	04/29/22 13:26	MS	TAL SL
Total/NA	Analysis	9320		1	566441	05/19/22 14:29	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	567649	05/27/22 15:21	CAH	TAL SL

Lab Chronicle

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

Job ID: 310-229908-2

Client Sample ID: Duplicate-1

Lab Sample ID: 310-229908-5

Date Collected: 04/21/22 12:00

Matrix: Ground Water

Date Received: 04/26/22 09:05

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			562872	04/29/22 12:55	MS	TAL SL
Total/NA	Analysis	9315		1	567633	05/27/22 07:41	JCB	TAL SL
Total/NA	Prep	PrecSep_0			562879	04/29/22 13:26	MS	TAL SL
Total/NA	Analysis	9320		1	566441	05/19/22 14:29	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	567649	05/27/22 15:21	CAH	TAL SL

Laboratory References:

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



Accreditation/Certification Summary

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

Job ID: 310-229908-2

Laboratory: Eurofins St. Louis

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	20-001	05-06-25
ANAB	Dept. of Defense ELAP	L2305	04-06-25
ANAB	Dept. of Energy	L2305.01	04-06-25
ANAB	ISO/IEC 17025	L2305	04-06-25
Arizona	State	AZ0813	12-08-22
California	Los Angeles County Sanitation Districts	10259	06-30-22
California	State	2886	07-01-22
Connecticut	State	PH-0241	03-31-23
Florida	NELAP	E87689	06-30-22
HI - RadChem Recognition	State	n/a	06-30-22
Illinois	NELAP	200023	11-30-22
Iowa	State	373	12-01-22
Kansas	NELAP	E-10236	10-31-22
Kentucky (DW)	State	KY90125	12-31-22
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-22
Louisiana	NELAP	04080	06-30-22
Louisiana (DW)	State	LA011	12-31-22
Maryland	State	310	09-30-22
MI - RadChem Recognition	State	9005	06-30-22
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-22
New Jersey	NELAP	MO002	06-30-22
New York	NELAP	11616	04-01-23
North Dakota	State	R-207	06-30-22
NRC	NRC	24-24817-01	12-31-22
Oklahoma	NELAP	9997	08-31-22
Oregon	NELAP	4157	09-01-22
Pennsylvania	NELAP	68-00540	02-28-23
South Carolina	State	85002001	06-30-22
Texas	NELAP	T104704193	07-31-22
US Fish & Wildlife	US Federal Programs	058448	07-31-22
USDA	US Federal Programs	P330-17-00028	03-11-23
Utah	NELAP	MO000542021-14	08-01-22
Virginia	NELAP	10310	06-14-22
Washington	State	C592	08-30-22
West Virginia DEP	State	381	10-31-22

Method Summary

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

Job ID: 310-229908-2

Method	Method Description	Protocol	Laboratory
9315	Radium-226 (GFPC)	SW846	TAL SL
9320	Radium-228 (GFPC)	SW846	TAL SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	TAL SL
PrecSep_0	Preparation, Precipitate Separation	None	TAL SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	TAL 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:

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

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Environment Testing
America



310-229908 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscatine Power Water</u>			
City/State:	CITY	STATE	Project:
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>4/26/22</u>	<u>0905</u>	<u>[Signature]</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # ____ of ____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>N</u>	Correction Factor (°C):	<u>700</u>
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>1.4</u>	Corrected Temp (°C):	<u>1.4</u>
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE If yes, contact PM before proceeding If no, proceed with login			
Additional Comments			

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Eurofins Cedar Falls

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

Chain of Custody Record

Client Information Muscatine Power & Water Address: 1700 Dick Drake Way City: Muscatine State, Zip: IA, 52761 Phone:		Lab PM: Hayes, Shawn M E-Mail: shawn.hayes@testamericainc.com		Carter Tracking No(s): COC No: Page: Job #:	
Due Date Requested: TAT Requested (days): PO #: 221607 WO #:		Analysis Requested: Radium 228 Radium-226 9056A Chloride, Fluoride, Sulfate 2640C TDS, SM4500_H+ pH 6020A CCR List, 7470A Mercury Perform MS/MSD (Yes or No) Field Filtered Sample (Yes or No)		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Email: sbennett@mpw.org and ramundson@hrgreen.com Project Name: Muscatine Power & Water CCR Landfill Site: Iowa		Sample Date: 4/21/22 Sample Time: 1150 Sample Type (C=Comp, G=grab): Matrix (W=water, S=solid, O=soil, BT=Tissue, A=air): GW		Special Instructions/Note: Total Number of Containers:	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		Special Instructions/QC Requirements:	
Empty Kit Relinquished by:		Date/Time: 4/26/22 0615 Company:		Method of Shipment:	
Relinquished by: <i>Nail Hayes</i>		Received by: <i>Nail Hayes</i> Date/Time: 4/26/22 0905 Company:		Date/Time:	
Relinquished by:		Received by:		Date/Time:	
Relinquished by:		Received by:		Date/Time:	
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: 310-229908-2

Login Number: 229908

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Homolar, Dana J

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

Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-229908-2

Login Number: 229908

List Number: 2

Creator: Worthington, Sierra M

List Source: Eurofins St. Louis

List Creation: 04/27/22 12:37 PM

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	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 $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Tracer/Carrier Summary

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

Job ID: 310-229908-2

Method: 9315 - Radium-226 (GFPC)

Matrix: Ground Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	
310-229908-1	MW-21	91.0	
310-229908-2	MW-22	92.5	
310-229908-3	MW-23	70.1	
310-229908-4	MW-14A	90.3	
310-229908-5	Duplicate-1	72.8	
Tracer/Carrier Legend			
Ba = Ba Carrier			

Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	
LCS 160-562872/1-A	Lab Control Sample	85.5	
LCSD 160-562872/2-A	Lab Control Sample Dup	90.0	
MB 160-562872/23-A	Method Blank	97.8	
Tracer/Carrier Legend			
Ba = Ba Carrier			

Method: 9320 - Radium-228 (GFPC)

Matrix: Ground Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
310-229908-1	MW-21	91.0	91.2
310-229908-2	MW-22	92.5	89.7
310-229908-3	MW-23	70.1	84.1
310-229908-4	MW-14A	90.3	84.9
310-229908-5	Duplicate-1	72.8	87.5
Tracer/Carrier Legend			
Ba = Ba Carrier			
Y = Y Carrier			

Method: 9320 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
LCS 160-562879/1-A	Lab Control Sample	85.5	89.3
LCSD 160-562879/2-A	Lab Control Sample Dup	90.0	90.5
MB 160-562879/23-A	Method Blank	97.8	90.8
Tracer/Carrier Legend			
Ba = Ba Carrier			
Y = Y Carrier			

ANALYTICAL REPORT

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls, IA 50613
Tel: (319)277-2401

Laboratory Job ID: 310-230049-1

Client Project/Site: Muscatine Power & Water CCR

For:

Muscatine Power & Water
1700 Dick Drake Way
PO BOX 899
Muscatine, Iowa 52761

Attn: Sam Bennett



Authorized for release by:

5/26/2022 6:21:35 PM

Shawn Hayes, Senior Project Manager
(319)229-8211

Shawn.Hayes@et.eurofinsus.com

LINKS

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results through



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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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

Job ID: 310-230049-1

Job ID: 310-230049-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-230049-1

Comments

No additional comments.

Receipt

The samples were received on 4/27/2022 9:15 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 was 1.2° C.

HPLC/IC

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

Metals

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

General Chemistry

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

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Sample Summary

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

Job ID: 310-230049-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-230049-1	MW-8	Ground Water	04/25/22 12:05	04/27/22 09:15
310-230049-2	MW-15A	Ground Water	04/25/22 08:20	04/27/22 09:15
310-230049-6	Duplicate-2	Ground Water	04/25/22 12:00	04/27/22 09:15

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- 10
- 11
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Detection Summary

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

Job ID: 310-230049-1

Client Sample ID: MW-8

Lab Sample ID: 310-230049-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	15.8		5.00		mg/L	5		9056A	Total/NA
Sulfate	72.8		5.00		mg/L	5		9056A	Total/NA
Barium	0.0631		0.00200		mg/L	1		6020A	Total/NA
Calcium	69.6		0.500		mg/L	1		6020A	Total/NA
Cobalt	0.00143		0.000500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	322		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.4	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-15A

Lab Sample ID: 310-230049-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	7.71		5.00		mg/L	5		9056A	Total/NA
Sulfate	297		5.00		mg/L	5		9056A	Total/NA
Barium	0.0443		0.00200		mg/L	1		6020A	Total/NA
Boron	6.98		0.400		mg/L	4		6020A	Total/NA
Calcium	127		0.500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	682		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: Duplicate-2

Lab Sample ID: 310-230049-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	9.29		5.00		mg/L	5		9056A	Total/NA
Sulfate	371		5.00		mg/L	5		9056A	Total/NA
Barium	0.0374		0.00200		mg/L	1		6020A	Total/NA
Boron	9.26		0.400		mg/L	4		6020A	Total/NA
Calcium	137		0.500		mg/L	1		6020A	Total/NA
pH	7.5	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

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

Job ID: 310-230049-1

Client Sample ID: MW-8

Lab Sample ID: 310-230049-1

Date Collected: 04/25/22 12:05

Matrix: Ground Water

Date Received: 04/27/22 09:15

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	15.8		5.00		mg/L			05/10/22 03:36	5
Fluoride	<0.500		0.500		mg/L			05/10/22 03:36	5
Sulfate	72.8		5.00		mg/L			05/10/22 03:36	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		05/03/22 09:30	05/21/22 20:43	1
Arsenic	<0.00200		0.00200		mg/L		05/03/22 09:30	05/21/22 20:43	1
Barium	0.0631		0.00200		mg/L		05/03/22 09:30	05/21/22 20:43	1
Beryllium	<0.00100		0.00100		mg/L		05/03/22 09:30	05/21/22 20:43	1
Boron	<0.100		0.100		mg/L		05/03/22 09:30	05/21/22 20:43	1
Cadmium	<0.000100		0.000100		mg/L		05/03/22 09:30	05/21/22 20:43	1
Calcium	69.6		0.500		mg/L		05/03/22 09:30	05/21/22 20:43	1
Chromium	<0.00500		0.00500		mg/L		05/03/22 09:30	05/21/22 20:43	1
Cobalt	0.00143		0.000500		mg/L		05/03/22 09:30	05/21/22 20:43	1
Lead	<0.000500		0.000500		mg/L		05/03/22 09:30	05/21/22 20:43	1
Lithium	<0.0100		0.0100		mg/L		05/03/22 09:30	05/21/22 20:43	1
Molybdenum	<0.00200		0.00200		mg/L		05/03/22 09:30	05/21/22 20:43	1
Selenium	<0.00500		0.00500		mg/L		05/03/22 09:30	05/21/22 20:43	1
Thallium	<0.00100		0.00100		mg/L		05/03/22 09:30	05/21/22 20:43	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/09/22 15:08	05/10/22 14:09	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	322		50.0		mg/L			04/29/22 15:44	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.4	HF	0.1		SU			04/27/22 14:52	1

Client Sample Results

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

Job ID: 310-230049-1

Client Sample ID: MW-15A

Lab Sample ID: 310-230049-2

Date Collected: 04/25/22 08:20

Matrix: Ground Water

Date Received: 04/27/22 09:15

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	7.71		5.00		mg/L			05/10/22 03:52	5
Fluoride	<0.500		0.500		mg/L			05/10/22 03:52	5
Sulfate	297		5.00		mg/L			05/10/22 03:52	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		05/03/22 09:30	05/21/22 20:47	1
Arsenic	<0.00200		0.00200		mg/L		05/03/22 09:30	05/21/22 20:47	1
Barium	0.0443		0.00200		mg/L		05/03/22 09:30	05/21/22 20:47	1
Beryllium	<0.00100		0.00100		mg/L		05/03/22 09:30	05/21/22 20:47	1
Boron	6.98		0.400		mg/L		05/03/22 09:30	05/23/22 15:26	4
Cadmium	<0.000100		0.000100		mg/L		05/03/22 09:30	05/21/22 20:47	1
Calcium	127		0.500		mg/L		05/03/22 09:30	05/21/22 20:47	1
Chromium	<0.00500		0.00500		mg/L		05/03/22 09:30	05/21/22 20:47	1
Cobalt	<0.000500		0.000500		mg/L		05/03/22 09:30	05/21/22 20:47	1
Lead	<0.000500		0.000500		mg/L		05/03/22 09:30	05/21/22 20:47	1
Lithium	<0.0100		0.0100		mg/L		05/03/22 09:30	05/21/22 20:47	1
Molybdenum	<0.00200		0.00200		mg/L		05/03/22 09:30	05/21/22 20:47	1
Selenium	<0.00500		0.00500		mg/L		05/03/22 09:30	05/21/22 20:47	1
Thallium	<0.00100		0.00100		mg/L		05/03/22 09:30	05/21/22 20:47	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/09/22 15:08	05/10/22 14:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	682		50.0		mg/L			04/29/22 15:44	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.5	HF	0.1		SU			04/27/22 14:53	1

Client Sample Results

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

Job ID: 310-230049-1

Client Sample ID: Duplicate-2

Lab Sample ID: 310-230049-6

Date Collected: 04/25/22 12:00

Matrix: Ground Water

Date Received: 04/27/22 09:15

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	9.29		5.00		mg/L			05/10/22 04:58	5
Fluoride	<0.500		0.500		mg/L			05/10/22 04:58	5
Sulfate	371		5.00		mg/L			05/10/22 04:58	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		05/03/22 09:30	05/21/22 21:22	1
Arsenic	<0.00200		0.00200		mg/L		05/03/22 09:30	05/21/22 21:22	1
Barium	0.0374		0.00200		mg/L		05/03/22 09:30	05/21/22 21:22	1
Beryllium	<0.00100		0.00100		mg/L		05/03/22 09:30	05/21/22 21:22	1
Boron	9.26		0.400		mg/L		05/03/22 09:30	05/23/22 15:46	4
Cadmium	<0.000100		0.000100		mg/L		05/03/22 09:30	05/21/22 21:22	1
Calcium	137		0.500		mg/L		05/03/22 09:30	05/21/22 21:22	1
Chromium	<0.00500		0.00500		mg/L		05/03/22 09:30	05/21/22 21:22	1
Cobalt	<0.000500		0.000500		mg/L		05/03/22 09:30	05/21/22 21:22	1
Lead	<0.000500		0.000500		mg/L		05/03/22 09:30	05/21/22 21:22	1
Lithium	<0.0100		0.0100		mg/L		05/03/22 09:30	05/21/22 21:22	1
Molybdenum	<0.00200		0.00200		mg/L		05/03/22 09:30	05/21/22 21:22	1
Selenium	<0.00500		0.00500		mg/L		05/03/22 09:30	05/21/22 21:22	1
Thallium	<0.00100		0.00100		mg/L		05/03/22 09:30	05/21/22 21:22	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/09/22 15:08	05/10/22 14:13	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			04/29/22 15:44	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.5	HF	0.1		SU			04/27/22 14:57	1

Definitions/Glossary

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

Job ID: 310-230049-1

Qualifiers

General Chemistry

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

Glossary

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

QC Sample Results

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

Job ID: 310-230049-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-352752/28
Matrix: Water
Analysis Batch: 352752

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			05/10/22 22:47	1
Fluoride	<0.100		0.100		mg/L			05/10/22 22:47	1
Sulfate	<1.00		1.00		mg/L			05/10/22 22:47	1

Lab Sample ID: LCS 310-352752/45
Matrix: Water
Analysis Batch: 352752

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	10.56		mg/L		106	90 - 110
Fluoride	2.00	2.101		mg/L		105	90 - 110
Sulfate	10.0	10.94		mg/L		109	90 - 110

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-351728/1-A
Matrix: Water
Analysis Batch: 353956

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 351728

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		05/03/22 09:30	05/21/22 19:40	1
Arsenic	<0.00200		0.00200		mg/L		05/03/22 09:30	05/21/22 19:40	1
Barium	<0.00200		0.00200		mg/L		05/03/22 09:30	05/21/22 19:40	1
Beryllium	<0.00100		0.00100		mg/L		05/03/22 09:30	05/21/22 19:40	1
Boron	<0.100		0.100		mg/L		05/03/22 09:30	05/21/22 19:40	1
Cadmium	<0.000100		0.000100		mg/L		05/03/22 09:30	05/21/22 19:40	1
Calcium	<0.500		0.500		mg/L		05/03/22 09:30	05/21/22 19:40	1
Chromium	<0.00500		0.00500		mg/L		05/03/22 09:30	05/21/22 19:40	1
Cobalt	<0.000500		0.000500		mg/L		05/03/22 09:30	05/21/22 19:40	1
Lead	<0.000500		0.000500		mg/L		05/03/22 09:30	05/21/22 19:40	1
Lithium	<0.0100		0.0100		mg/L		05/03/22 09:30	05/21/22 19:40	1
Molybdenum	<0.00200		0.00200		mg/L		05/03/22 09:30	05/21/22 19:40	1
Selenium	<0.00500		0.00500		mg/L		05/03/22 09:30	05/21/22 19:40	1
Thallium	<0.00100		0.00100		mg/L		05/03/22 09:30	05/21/22 19:40	1

Lab Sample ID: LCS 310-351728/2-A
Matrix: Water
Analysis Batch: 353956

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 351728

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	0.200	0.2085		mg/L		104	80 - 120
Arsenic	0.200	0.1982		mg/L		99	80 - 120
Barium	0.100	0.1031		mg/L		103	80 - 120
Beryllium	0.100	0.1061		mg/L		106	80 - 120
Boron	0.200	0.2002		mg/L		100	80 - 120
Cadmium	0.100	0.1024		mg/L		102	80 - 120
Calcium	2.00	1.729		mg/L		86	80 - 120
Chromium	0.100	0.1041		mg/L		104	80 - 120
Cobalt	0.100	0.1011		mg/L		101	80 - 120

Eurofins Cedar Falls

QC Sample Results

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

Job ID: 310-230049-1

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

Lab Sample ID: LCS 310-351728/2-A
 Matrix: Water
 Analysis Batch: 353956

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 351728

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lead	0.200	0.2203		mg/L		110	80 - 120
Lithium	0.200	0.1990		mg/L		100	80 - 120
Molybdenum	0.200	0.2138		mg/L		107	80 - 120
Selenium	0.400	0.3985		mg/L		100	80 - 120
Thallium	0.200	0.2220		mg/L		111	80 - 120

Lab Sample ID: 310-230049-A-5-B DU
 Matrix: Ground Water
 Analysis Batch: 353956

Client Sample ID: 310-230049-A-5-B DU
 Prep Type: Total/NA
 Prep Batch: 351728

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	<0.00200		<0.00200		mg/L		NC	20
Arsenic	<0.00200		<0.00200		mg/L		NC	20
Barium	0.0498		0.05110		mg/L		3	20
Beryllium	<0.00100		<0.00100		mg/L		NC	20
Boron	0.549		0.5538		mg/L		0.9	20
Cadmium	<0.000100		<0.000100		mg/L		NC	20
Calcium	29.6		30.00		mg/L		2	20
Chromium	<0.00500		<0.00500		mg/L		NC	20
Cobalt	<0.000500		<0.000500		mg/L		NC	20
Lead	<0.000500		<0.000500		mg/L		NC	20
Lithium	<0.0100		<0.0100		mg/L		NC	20
Molybdenum	<0.00200		<0.00200		mg/L		NC	20
Selenium	<0.00500		<0.00500		mg/L		NC	20
Thallium	<0.00100		<0.00100		mg/L		NC	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-352446/1-A
 Matrix: Water
 Analysis Batch: 352628

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 352446

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/09/22 15:08	05/10/22 13:45	1

Lab Sample ID: LCS 310-352446/2-A
 Matrix: Water
 Analysis Batch: 352628

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 352446

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001664		mg/L		100	80 - 120

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

Lab Sample ID: MB 310-351551/1
 Matrix: Water
 Analysis Batch: 351551

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			04/29/22 15:44	1

Eurofins Cedar Falls

QC Sample Results

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

Job ID: 310-230049-1

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

Lab Sample ID: LCS 310-351551/2
 Matrix: Water
 Analysis Batch: 351551

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	938.0		mg/L		94	90 - 110

Lab Sample ID: 310-230049-2 DU
 Matrix: Ground Water
 Analysis Batch: 351551

Client Sample ID: MW-15A
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	682		678.0		mg/L		0.6	20

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-351244/27
 Matrix: Water
 Analysis Batch: 351244

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

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

QC Association Summary

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

Job ID: 310-230049-1

HPLC/IC

Analysis Batch: 352752

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230049-1	MW-8	Total/NA	Ground Water	9056A	
310-230049-2	MW-15A	Total/NA	Ground Water	9056A	
310-230049-6	Duplicate-2	Total/NA	Ground Water	9056A	
MB 310-352752/28	Method Blank	Total/NA	Water	9056A	
LCS 310-352752/45	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 351728

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230049-1	MW-8	Total/NA	Ground Water	3005A	
310-230049-2	MW-15A	Total/NA	Ground Water	3005A	
310-230049-6	Duplicate-2	Total/NA	Ground Water	3005A	
MB 310-351728/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-351728/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-230049-A-5-B DU	310-230049-A-5-B DU	Total/NA	Ground Water	3005A	

Prep Batch: 352446

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230049-1	MW-8	Total/NA	Ground Water	7470A	
310-230049-2	MW-15A	Total/NA	Ground Water	7470A	
310-230049-6	Duplicate-2	Total/NA	Ground Water	7470A	
MB 310-352446/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-352446/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 352628

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230049-1	MW-8	Total/NA	Ground Water	7470A	352446
310-230049-2	MW-15A	Total/NA	Ground Water	7470A	352446
310-230049-6	Duplicate-2	Total/NA	Ground Water	7470A	352446
MB 310-352446/1-A	Method Blank	Total/NA	Water	7470A	352446
LCS 310-352446/2-A	Lab Control Sample	Total/NA	Water	7470A	352446

Analysis Batch: 353956

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230049-1	MW-8	Total/NA	Ground Water	6020A	351728
310-230049-2	MW-15A	Total/NA	Ground Water	6020A	351728
310-230049-6	Duplicate-2	Total/NA	Ground Water	6020A	351728
MB 310-351728/1-A	Method Blank	Total/NA	Water	6020A	351728
LCS 310-351728/2-A	Lab Control Sample	Total/NA	Water	6020A	351728
310-230049-A-5-B DU	310-230049-A-5-B DU	Total/NA	Ground Water	6020A	351728

Analysis Batch: 354034

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230049-2	MW-15A	Total/NA	Ground Water	6020A	351728
310-230049-6	Duplicate-2	Total/NA	Ground Water	6020A	351728

General Chemistry

Analysis Batch: 351244

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230049-1	MW-8	Total/NA	Ground Water	SM 4500 H+ B	

Eurofins Cedar Falls

QC Association Summary

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

Job ID: 310-230049-1

General Chemistry (Continued)

Analysis Batch: 351244 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230049-2	MW-15A	Total/NA	Ground Water	SM 4500 H+ B	
310-230049-6	Duplicate-2	Total/NA	Ground Water	SM 4500 H+ B	
LCS 310-351244/27	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 351551

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230049-1	MW-8	Total/NA	Ground Water	SM 2540C	
310-230049-2	MW-15A	Total/NA	Ground Water	SM 2540C	
310-230049-6	Duplicate-2	Total/NA	Ground Water	SM 2540C	
MB 310-351551/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-351551/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-230049-2 DU	MW-15A	Total/NA	Ground Water	SM 2540C	

Lab Chronicle

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

Job ID: 310-230049-1

Client Sample ID: MW-8
Date Collected: 04/25/22 12:05
Date Received: 04/27/22 09:15

Lab Sample ID: 310-230049-1
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	352752	05/10/22 03:36	JNR	TAL CF
Total/NA	Prep	3005A			351728	05/03/22 09:30	ACM2	TAL CF
Total/NA	Analysis	6020A		1	353956	05/21/22 20:43	SAP	TAL CF
Total/NA	Prep	7470A			352446	05/09/22 15:08	EAM	TAL CF
Total/NA	Analysis	7470A		1	352628	05/10/22 14:09	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	351551	04/29/22 15:44	TGF	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	351244	04/27/22 14:52	ARG	TAL CF

Client Sample ID: MW-15A
Date Collected: 04/25/22 08:20
Date Received: 04/27/22 09:15

Lab Sample ID: 310-230049-2
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	352752	05/10/22 03:52	JNR	TAL CF
Total/NA	Prep	3005A			351728	05/03/22 09:30	ACM2	TAL CF
Total/NA	Analysis	6020A		1	353956	05/21/22 20:47	SAP	TAL CF
Total/NA	Prep	3005A			351728	05/03/22 09:30	ACM2	TAL CF
Total/NA	Analysis	6020A		4	354034	05/23/22 15:26	SAP	TAL CF
Total/NA	Prep	7470A			352446	05/09/22 15:08	EAM	TAL CF
Total/NA	Analysis	7470A		1	352628	05/10/22 14:11	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	351551	04/29/22 15:44	TGF	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	351244	04/27/22 14:53	ARG	TAL CF

Client Sample ID: Duplicate-2
Date Collected: 04/25/22 12:00
Date Received: 04/27/22 09:15

Lab Sample ID: 310-230049-6
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	352752	05/10/22 04:58	JNR	TAL CF
Total/NA	Prep	3005A			351728	05/03/22 09:30	ACM2	TAL CF
Total/NA	Analysis	6020A		1	353956	05/21/22 21:22	SAP	TAL CF
Total/NA	Prep	3005A			351728	05/03/22 09:30	ACM2	TAL CF
Total/NA	Analysis	6020A		4	354034	05/23/22 15:46	SAP	TAL CF
Total/NA	Prep	7470A			352446	05/09/22 15:08	EAM	TAL CF
Total/NA	Analysis	7470A		1	352628	05/10/22 14:13	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	351551	04/29/22 15:44	TGF	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	351244	04/27/22 14:57	ARG	TAL CF

Laboratory References:

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

Accreditation/Certification Summary

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

Job ID: 310-230049-1

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Colorado	Petroleum Storage Tank Program	IA100001 (OR)	09-29-22
Georgia	State	IA100001 (OR)	09-29-22
Illinois	NELAP	200024	11-29-22
Iowa	State	007	12-01-21 *
Kansas	NELAP	E-10341	01-31-23
Minnesota	NELAP	019-999-319	12-31-22
Minnesota (Petrofund)	State	3349	01-18-24
North Dakota	State	R-186	09-29-22
Oregon	NELAP	IA100001	09-29-22

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

Method Summary

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

Job ID: 310-230049-1

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

Protocol References:

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

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

Laboratory References:

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



Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <i>Muscatine Power + Water</i>			
City/State:	CITY <i>Muscatine</i>	STATE <i>IA</i>	Project:
Receipt Information			
Date/Time Received:	DATE <i>4-27-22</i>	TIME <i>9:15</i>	Received By: <i>[Signature]</i>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<i>R</i>	Correction Factor (°C):	<i>+0.2</i>
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<i>1.0</i>	Corrected Temp (°C):	<i>1.2</i>
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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Eurofins Cedar Falls

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

Chain of Custody Record

cooler

Client Information		Sampler: Sam Bennett		Lab PM: Hayes Shawn M		Carrier Tracking No(s)		COC No.	
Client Contact: Sam Bennett MP&W and Rose Amundson (HR Green)		Phone: 563-262-3582		E-Mail: shawn.hayes@testamcinc.com				Page:	
Company: Muscatine Power & Water		Address: 1700 Dick Drake Way		City: Muscatine		State Zip: IA, 52761		Job #:	
PO #: 221607		WO #: 31007856		Due Date Requested:		TAT Requested (days):		Preservation Codes:	
Email: sbennett@mpw.org and ramundson@hrgreen.com		Project Name: Muscatine Power & Water CCR Landfill		Site: Iowa		Event:		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Sample Identification		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)		Matrix (W=water, S=solid, O=wastewater, BT=tissue, A=AU)	
MW-4B								GW	
MW-5B								GW	
MW-6A								GW	
MW-8		4/25/22		1205		G		GW	
MW-10								GW	
MW-14A								GW	
MW-15A		4/25/22		0820		G		GW	
MW-21								GW	
MW-22								GW	
MW-23								GW	
Duplicate-1								GW	
Possible Hazard Identification		<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)		Special Instructions/Note:	
Deliverable Requested I, II, III, IV Other (specify)		Empty Kit Relinquished by		Date:		Method of Shipment:		Total Number of Containers	
Relinquished by: Sam Bennett		Date/Time: 4/26/22 0800		Company: MPW		Received by: Cherie Muehlenberg		Date/Time: 4/27/22 0915	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No		Cooler Temperature(s) °C and Other Remarks:					



Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-230049-1

Login Number: 230049

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Hayes, Shawn M

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	



ANALYTICAL REPORT

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls, IA 50613
Tel: (319)277-2401

Laboratory Job ID: 310-230049-2

Client Project/Site: Muscatine Power & Water CCR

For:

Muscatine Power & Water
1700 Dick Drake Way
PO BOX 899
Muscatine, Iowa 52761

Attn: Sam Bennett



Authorized for release by:
5/31/2022 1:46:18 PM

Shawn Hayes, Senior Project Manager
(319)229-8211
Shawn.Hayes@et.eurofinsus.com

LINKS

Review your project
results through



Have a Question?



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www.eurofinsus.com/Env

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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

Job ID: 310-230049-2

Job ID: 310-230049-2

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-230049-2

Comments

No additional comments.

Receipt

The samples were received on 4/27/2022 9:15 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 was 1.2° C.

RAD

Method 9320: Radium-228 Batch 562879

The LCSD recovered at (126%). The limits in our LIMS system at 75-125 reflect the requirements of a regulatory agency that represents a large amount of our work. However the samples associated with this LCS are not from this agency and are therefore held to our in-house statistical limits of (61-138%) per method requirements. The LCS passes, no further action is required. (LCSD 160-562879/2-A)

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

Job ID: 310-230049-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-230049-1	MW-8	Ground Water	04/25/22 12:05	04/27/22 09:15
310-230049-2	MW-15A	Ground Water	04/25/22 08:20	04/27/22 09:15
310-230049-6	Duplicate-2	Ground Water	04/25/22 12:00	04/27/22 09:15

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Client Sample Results

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

Job ID: 310-230049-2

Client Sample ID: MW-8

Lab Sample ID: 310-230049-1

Date Collected: 04/25/22 12:05

Matrix: Ground Water

Date Received: 04/27/22 09:15

Method: 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.194		0.0886	0.0903	1.00	0.0954	pCi/L	04/29/22 12:55	05/27/22 07:43	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.8		40 - 110					04/29/22 12:55	05/27/22 07:43	1

Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.123	U	0.311	0.311	1.00	0.549	pCi/L	04/29/22 13:26	05/19/22 14:30	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.8		40 - 110					04/29/22 13:26	05/19/22 14:30	1
Y Carrier	89.7		40 - 110					04/29/22 13:26	05/19/22 14:30	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Combined Radium 226 + 228	0.316	U	0.323	0.324	5.00	0.549	pCi/L		05/27/22 15:21	1

Client Sample Results

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

Job ID: 310-230049-2

Client Sample ID: MW-15A

Lab Sample ID: 310-230049-2

Date Collected: 04/25/22 08:20

Matrix: Ground Water

Date Received: 04/27/22 09:15

Method: 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-226	0.0866	U	0.0718	0.0722	1.00	0.105	pCi/L	04/29/22 12:55	05/27/22 07:43	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.0		40 - 110					04/29/22 12:55	05/27/22 07:43	1

Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-228	-0.0577	U	0.287	0.287	1.00	0.557	pCi/L	04/29/22 13:26	05/19/22 14:30	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.0		40 - 110					04/29/22 13:26	05/19/22 14:30	1
Y Carrier	88.6		40 - 110					04/29/22 13:26	05/19/22 14:30	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Combined Radium 226 + 228	0.0289	U	0.296	0.296	5.00	0.557	pCi/L		05/27/22 15:21	1

Client Sample Results

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

Job ID: 310-230049-2

Client Sample ID: Duplicate-2

Lab Sample ID: 310-230049-6

Date Collected: 04/25/22 12:00

Matrix: Ground Water

Date Received: 04/27/22 09:15

Method: 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-226	0.0605	U	0.0676	0.0678	1.00	0.109	pCi/L	04/29/22 12:55	05/27/22 07:45	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.3		40 - 110					04/29/22 12:55	05/27/22 07:45	1

Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-228	0.374	U	0.374	0.375	1.00	0.603	pCi/L	04/29/22 13:26	05/19/22 14:31	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.3		40 - 110					04/29/22 13:26	05/19/22 14:31	1
Y Carrier	88.2		40 - 110					04/29/22 13:26	05/19/22 14:31	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Combined Radium 226 + 228	0.435	U	0.380	0.381	5.00	0.603	pCi/L		05/27/22 15:21	1

Definitions/Glossary

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

Job ID: 310-230049-2

Qualifiers

Rad

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

Glossary

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

QC Sample Results

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

Job ID: 310-230049-2

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-562872/23-A
Matrix: Water
Analysis Batch: 567634

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 562872

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	Uncert.						
Radium-226	0.1008	U	0.0807	0.0812	1.00	0.120	pCi/L	04/29/22 12:55	05/27/22 07:38	1
Carrier	ME %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	97.8		40 - 110		04/29/22 12:55	05/27/22 07:38	1			

Lab Sample ID: LCS 160-562872/1-A
Matrix: Water
Analysis Batch: 567416

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 562872

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	11.72		1.26	1.00	0.120	pCi/L	103	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	85.5		40 - 110						

Lab Sample ID: LCSD 160-562872/2-A
Matrix: Water
Analysis Batch: 567416

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 562872

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER
				Uncert. (2σ+/-)							Limit
Radium-226	11.3	10.76		1.13	1.00	0.0974	pCi/L	95	75 - 125	0.40	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	90.0		40 - 110								

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-562879/23-A
Matrix: Water
Analysis Batch: 566434

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 562879

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	Uncert.						
Radium-228	0.03420	U	0.223	0.223	1.00	0.411	pCi/L	04/29/22 13:26	05/19/22 12:48	1
Carrier	ME %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	97.8		40 - 110		04/29/22 13:26	05/19/22 12:48	1			
Y Carrier	90.8		40 - 110		04/29/22 13:26	05/19/22 12:48	1			

QC Sample Results

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

Job ID: 310-230049-2

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

Lab Sample ID: LCS 160-562879/1-A

Matrix: Water

Analysis Batch: 566441

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 562879

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits																	
									75	125																
Radium-228	8.61	8.056		1.23	1.00	0.625	pCi/L	94	75 - 125																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">LCS</th> <th colspan="2">LCS</th> </tr> <tr> <th>Carrier</th> <th>%Yield</th> <th>Qualifier</th> <th>Limits</th> </tr> </thead> <tbody> <tr> <td>Ba Carrier</td> <td>85.5</td> <td></td> <td>40 - 110</td> </tr> <tr> <td>Y Carrier</td> <td>89.3</td> <td></td> <td>40 - 110</td> </tr> </tbody> </table>											LCS		LCS		Carrier	%Yield	Qualifier	Limits	Ba Carrier	85.5		40 - 110	Y Carrier	89.3		40 - 110
LCS		LCS																								
Carrier	%Yield	Qualifier	Limits																							
Ba Carrier	85.5		40 - 110																							
Y Carrier	89.3		40 - 110																							

Lab Sample ID: LCSD 160-562879/2-A

Matrix: Water

Analysis Batch: 566441

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 562879

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		RER	Limit																
									75	125	1.03	1																
Radium-228	8.61	10.81		1.46	1.00	0.624	pCi/L	126	75 - 125	1.03	1																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">LCSD</th> <th colspan="2">LCSD</th> </tr> <tr> <th>Carrier</th> <th>%Yield</th> <th>Qualifier</th> <th>Limits</th> </tr> </thead> <tbody> <tr> <td>Ba Carrier</td> <td>90.0</td> <td></td> <td>40 - 110</td> </tr> <tr> <td>Y Carrier</td> <td>90.5</td> <td></td> <td>40 - 110</td> </tr> </tbody> </table>													LCSD		LCSD		Carrier	%Yield	Qualifier	Limits	Ba Carrier	90.0		40 - 110	Y Carrier	90.5		40 - 110
LCSD		LCSD																										
Carrier	%Yield	Qualifier	Limits																									
Ba Carrier	90.0		40 - 110																									
Y Carrier	90.5		40 - 110																									

QC Association Summary

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

Job ID: 310-230049-2

Rad

Prep Batch: 562872

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230049-1	MW-8	Total/NA	Ground Water	PrecSep-21	
310-230049-2	MW-15A	Total/NA	Ground Water	PrecSep-21	
310-230049-6	Duplicate-2	Total/NA	Ground Water	PrecSep-21	
MB 160-562872/23-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-562872/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-562872/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 562879

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230049-1	MW-8	Total/NA	Ground Water	PrecSep_0	
310-230049-2	MW-15A	Total/NA	Ground Water	PrecSep_0	
310-230049-6	Duplicate-2	Total/NA	Ground Water	PrecSep_0	
MB 160-562879/23-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-562879/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-562879/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

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

Job ID: 310-230049-2

Client Sample ID: MW-8

Lab Sample ID: 310-230049-1

Date Collected: 04/25/22 12:05

Matrix: Ground Water

Date Received: 04/27/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			562872	04/29/22 12:55	MS	TAL SL
Total/NA	Analysis	9315		1	567633	05/27/22 07:43	JCB	TAL SL
Total/NA	Prep	PrecSep_0			562879	04/29/22 13:26	MS	TAL SL
Total/NA	Analysis	9320		1	566441	05/19/22 14:30	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	567649	05/27/22 15:21	CAH	TAL SL

Client Sample ID: MW-15A

Lab Sample ID: 310-230049-2

Date Collected: 04/25/22 08:20

Matrix: Ground Water

Date Received: 04/27/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			562872	04/29/22 12:55	MS	TAL SL
Total/NA	Analysis	9315		1	567633	05/27/22 07:43	JCB	TAL SL
Total/NA	Prep	PrecSep_0			562879	04/29/22 13:26	MS	TAL SL
Total/NA	Analysis	9320		1	566441	05/19/22 14:30	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	567649	05/27/22 15:21	CAH	TAL SL

Client Sample ID: Duplicate-2

Lab Sample ID: 310-230049-6

Date Collected: 04/25/22 12:00

Matrix: Ground Water

Date Received: 04/27/22 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			562872	04/29/22 12:55	MS	TAL SL
Total/NA	Analysis	9315		1	567634	05/27/22 07:45	SCB	TAL SL
Total/NA	Prep	PrecSep_0			562879	04/29/22 13:26	MS	TAL SL
Total/NA	Analysis	9320		1	566441	05/19/22 14:31	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	567649	05/27/22 15:21	CAH	TAL SL

Laboratory References:

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

Accreditation/Certification Summary

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

Job ID: 310-230049-2

Laboratory: Eurofins St. Louis

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	20-001	05-06-25
ANAB	Dept. of Defense ELAP	L2305	04-06-25
ANAB	Dept. of Energy	L2305.01	04-06-25
ANAB	ISO/IEC 17025	L2305	04-06-25
Arizona	State	AZ0813	12-08-22
California	Los Angeles County Sanitation Districts	10259	06-30-22
California	State	2886	07-01-22
Connecticut	State	PH-0241	03-31-23
Florida	NELAP	E87689	06-30-22
HI - RadChem Recognition	State	n/a	06-30-22
Illinois	NELAP	200023	11-30-22
Iowa	State	373	12-01-22
Kansas	NELAP	E-10236	10-31-22
Kentucky (DW)	State	KY90125	12-31-22
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-22
Louisiana	NELAP	04080	06-30-22
Louisiana (DW)	State	LA011	12-31-22
Maryland	State	310	09-30-22
MI - RadChem Recognition	State	9005	06-30-22
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-22
New Jersey	NELAP	MO002	06-30-22
New York	NELAP	11616	04-01-23
North Dakota	State	R-207	06-30-22
NRC	NRC	24-24817-01	12-31-22
Oklahoma	NELAP	9997	08-31-22
Oregon	NELAP	4157	09-01-22
Pennsylvania	NELAP	68-00540	02-28-23
South Carolina	State	85002001	06-30-22
Texas	NELAP	T104704193	07-31-22
US Fish & Wildlife	US Federal Programs	058448	07-31-22
USDA	US Federal Programs	P330-17-00028	03-11-23
Utah	NELAP	MO000542021-14	08-01-22
Virginia	NELAP	10310	06-14-22
Washington	State	C592	08-30-22
West Virginia DEP	State	381	10-31-22

Method Summary

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

Job ID: 310-230049-2

Method	Method Description	Protocol	Laboratory
9315	Radium-226 (GFPC)	SW846	TAL SL
9320	Radium-228 (GFPC)	SW846	TAL SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	TAL SL
PrecSep_0	Preparation, Precipitate Separation	None	TAL SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	TAL 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:

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





Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <i>Muscatine Power + Water</i>			
City/State:	CITY <i>Muscatine</i>	STATE <i>IA</i>	Project:
Receipt Information			
Date/Time Received:	DATE <i>4-27-22</i>	TIME <i>9:15</i>	Received By: <i>[Signature]</i>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<i>R</i>	Correction Factor (°C):	<i>+0.2</i>
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<i>1.0</i>	Corrected Temp (°C):	<i>1.2</i>
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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Eurofins Cedar Falls

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

Chain of Custody Record

Client Information
 Client Contact: Sam Bennett MP&W and Rose Amundson (HR Green)
 Company: Muscatine Power & Water
 Address: 1700 Dick Drake Way
 City: Muscatine
 State Zip: IA, 52761
 Phone: 221607
 Email: sbennett@mpw.org and ramundson@hrgreen.com
 Project Name: Muscatine Power & Water CCR Landfill
 Site: Iowa

Sampler: Sam Bennett
 Lab PM: Hayes Shawn M
 Phone: 563-262-3582
 E-Mail: shawn_hayes@testamcinc.com

COC No.
 Page:
 Job #:

Sample Identification	Sample Date	Sample Time (C=Comp, G=grab)	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=tissue, A=AU)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	620A CCR Lab, 7470 Mercury	2540C TDS, SM4500_H+ pH	9858A Chloride, Fluoride, Sulfate	Radium-226	Radium-228	Analysis Requested		Total Number of Containers	Special Instructions/Note:
												D	N		
MW-4B				GW	X	X	X	X	X	X	X				
MW-5B				GW	X	X	X	X	X	X	X				
MW-6A				GW	X	X	X	X	X	X	X				
MW-8	4/25/22	1205	G	GW	X	X	X	X	X	X	X				
MW-10				GW	X	X	X	X	X	X	X				
MW-14A				GW	X	X	X	X	X	X	X				
MW-15A	4/25/22	0820	G	GW	X	X	X	X	X	X	X				
MW-21				GW	X	X	X	X	X	X	X				
MW-22				GW	X	X	X	X	X	X	X				
MW-23				GW	X	X	X	X	X	X	X				
Duplicate-1				GW	X	X	X	X	X	X	X				

Possible Hazard Identification
 Non-Hazard Flammable Skin Irritant Poison B Unknown Radiological
 Deliverable Requested I, II, III, IV Other (specify)

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months
 Special Instructions/QC Requirements:

Empty Kit Relinquished by
 Relinquished by: *Sam Bennett* Date: _____
 Relinquished by: _____ Date: _____
 Relinquished by: _____ Date: _____

Relinquished by
 Relinquished by: *Cherie Muehler* Date: *4/26/22* Time: *0800*
 Relinquished by: _____ Date: _____ Time: _____
 Relinquished by: _____ Date: _____ Time: _____

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

Cooler



Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-230049-2

Login Number: 230049

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Hayes, Shawn M

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

Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-230049-2

Login Number: 230049

List Number: 2

Creator: Worthington, Sierra M

List Source: Eurofins St. Louis

List Creation: 04/28/22 11:58 AM

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	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 $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Tracer/Carrier Summary

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

Job ID: 310-230049-2

Method: 9315 - Radium-226 (GFPC)

Matrix: Ground Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	
310-230049-1	MW-8	95.8	
310-230049-2	MW-15A	94.0	
310-230049-6	Duplicate-2	94.3	
Tracer/Carrier Legend			
Ba = Ba Carrier			

Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	
LCS 160-562872/1-A	Lab Control Sample	85.5	
LCSD 160-562872/2-A	Lab Control Sample Dup	90.0	
MB 160-562872/23-A	Method Blank	97.8	
Tracer/Carrier Legend			
Ba = Ba Carrier			

Method: 9320 - Radium-228 (GFPC)

Matrix: Ground Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
310-230049-1	MW-8	95.8	89.7
310-230049-2	MW-15A	94.0	88.6
310-230049-6	Duplicate-2	94.3	88.2
Tracer/Carrier Legend			
Ba = Ba Carrier			
Y = Y Carrier			

Method: 9320 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
LCS 160-562879/1-A	Lab Control Sample	85.5	89.3
LCSD 160-562879/2-A	Lab Control Sample Dup	90.0	90.5
MB 160-562879/23-A	Method Blank	97.8	90.8
Tracer/Carrier Legend			
Ba = Ba Carrier			
Y = Y Carrier			

ANALYTICAL REPORT

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls, IA 50613
Tel: (319)277-2401

Laboratory Job ID: 310-230121-1

Client Project/Site: Muscatine Power & Water CCR

For:

Muscatine Power & Water
1700 Dick Drake Way
PO BOX 899
Muscatine, Iowa 52761

Attn: Sam Bennett



Authorized for release by:
5/27/2022 4:09:01 PM

Shawn Hayes, Senior Project Manager
(319)229-8211
Shawn.Hayes@et.eurofinsus.com

LINKS

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results through



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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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

Job ID: 310-230121-1

Job ID: 310-230121-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-230121-1

Comments

No additional comments.

Receipt

The samples were received on 4/28/2022 9:35 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 was 1.0° C.

HPLC/IC

Method 9056A: The laboratory control sample (LCS) for analytical batch 310-353187 recovered outside control limits for the following analyte: fluoride. This analyte was biased high in the LCS and was 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.

Metals

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

General Chemistry

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



Sample Summary

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

Job ID: 310-230121-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-230121-1	MW-4B	Water	04/26/22 09:35	04/28/22 11:06
310-230121-2	MW-5B	Water	04/26/22 12:35	04/28/22 11:06
310-230121-3	MW-6A	Water	04/26/22 11:05	04/28/22 11:06
310-230121-4	MW-10	Water	04/26/22 14:40	04/28/22 11:06

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

Detection Summary

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

Job ID: 310-230121-1

Client Sample ID: MW-4B

Lab Sample ID: 310-230121-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	20.8		5.00		mg/L	5		9056A	Total/NA
Sulfate	58.4		5.00		mg/L	5		9056A	Total/NA
Barium	0.191		0.00200		mg/L	1		6020A	Total/NA
Calcium	106		0.500		mg/L	1		6020A	Total/NA
Cobalt	0.00135		0.000500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	370		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.6	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-5B

Lab Sample ID: 310-230121-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	38.1		5.00		mg/L	5		9056A	Total/NA
Sulfate	44.7		5.00		mg/L	5		9056A	Total/NA
Barium	0.258		0.00200		mg/L	1		6020A	Total/NA
Calcium	117		0.500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	428		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.4	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-6A

Lab Sample ID: 310-230121-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	14.2		5.00		mg/L	5		9056A	Total/NA
Sulfate	18.9		5.00		mg/L	5		9056A	Total/NA
Barium	0.249		0.00200		mg/L	1		6020A	Total/NA
Calcium	96.5		0.500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	336		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-10

Lab Sample ID: 310-230121-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	48.3		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00371		0.00200		mg/L	1		6020A	Total/NA
Barium	0.208		0.00200		mg/L	1		6020A	Total/NA
Calcium	90.4		0.500		mg/L	1		6020A	Total/NA
Cobalt	0.00104		0.000500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	344		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.4	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

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

Job ID: 310-230121-1

Client Sample ID: MW-4B

Lab Sample ID: 310-230121-1

Date Collected: 04/26/22 09:35

Matrix: Water

Date Received: 04/28/22 11:06

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	20.8		5.00		mg/L			05/14/22 02:40	5
Fluoride	<0.500		0.500		mg/L			05/14/22 02:40	5
Sulfate	58.4		5.00		mg/L			05/14/22 02:40	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		05/05/22 09:00	05/23/22 18:45	1
Arsenic	<0.00200		0.00200		mg/L		05/05/22 09:00	05/23/22 18:45	1
Barium	0.191		0.00200		mg/L		05/05/22 09:00	05/23/22 18:45	1
Beryllium	<0.00100		0.00100		mg/L		05/05/22 09:00	05/23/22 18:45	1
Boron	<0.100		0.100		mg/L		05/05/22 09:00	05/23/22 18:45	1
Cadmium	<0.000100		0.000100		mg/L		05/05/22 09:00	05/23/22 18:45	1
Calcium	106		0.500		mg/L		05/05/22 09:00	05/23/22 18:45	1
Chromium	<0.00500		0.00500		mg/L		05/05/22 09:00	05/23/22 18:45	1
Cobalt	0.00135		0.000500		mg/L		05/05/22 09:00	05/23/22 18:45	1
Lead	<0.000500		0.000500		mg/L		05/05/22 09:00	05/24/22 21:13	1
Lithium	<0.0100		0.0100		mg/L		05/05/22 09:00	05/23/22 18:45	1
Molybdenum	<0.00200		0.00200		mg/L		05/05/22 09:00	05/23/22 18:45	1
Selenium	<0.00500		0.00500		mg/L		05/05/22 09:00	05/23/22 18:45	1
Thallium	<0.00100		0.00100		mg/L		05/05/22 09:00	05/23/22 18:45	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/10/22 14:04	05/11/22 14:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	370		50.0		mg/L			04/29/22 15:44	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.6	HF	0.1		SU			04/28/22 13:10	1

Client Sample Results

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

Job ID: 310-230121-1

Client Sample ID: MW-5B

Lab Sample ID: 310-230121-2

Date Collected: 04/26/22 12:35

Matrix: Water

Date Received: 04/28/22 11:06

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	38.1		5.00		mg/L			05/14/22 03:29	5
Fluoride	<0.500		0.500		mg/L			05/14/22 03:29	5
Sulfate	44.7		5.00		mg/L			05/14/22 03:29	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		05/05/22 09:00	05/23/22 18:48	1
Arsenic	<0.00200		0.00200		mg/L		05/05/22 09:00	05/23/22 18:48	1
Barium	0.258		0.00200		mg/L		05/05/22 09:00	05/23/22 18:48	1
Beryllium	<0.00100		0.00100		mg/L		05/05/22 09:00	05/23/22 18:48	1
Boron	<0.100		0.100		mg/L		05/05/22 09:00	05/23/22 18:48	1
Cadmium	<0.000100		0.000100		mg/L		05/05/22 09:00	05/23/22 18:48	1
Calcium	117		0.500		mg/L		05/05/22 09:00	05/23/22 18:48	1
Chromium	<0.00500		0.00500		mg/L		05/05/22 09:00	05/23/22 18:48	1
Cobalt	<0.000500		0.000500		mg/L		05/05/22 09:00	05/23/22 18:48	1
Lead	<0.000500		0.000500		mg/L		05/05/22 09:00	05/24/22 21:29	1
Lithium	<0.0100		0.0100		mg/L		05/05/22 09:00	05/23/22 18:48	1
Molybdenum	<0.00200		0.00200		mg/L		05/05/22 09:00	05/23/22 18:48	1
Selenium	<0.00500		0.00500		mg/L		05/05/22 09:00	05/23/22 18:48	1
Thallium	<0.00100		0.00100		mg/L		05/05/22 09:00	05/23/22 18:48	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/10/22 14:04	05/11/22 14:32	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	428		50.0		mg/L			04/29/22 15:44	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.4	HF	0.1		SU			04/28/22 13:11	1

Client Sample Results

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

Job ID: 310-230121-1

Client Sample ID: MW-6A

Lab Sample ID: 310-230121-3

Date Collected: 04/26/22 11:05

Matrix: Water

Date Received: 04/28/22 11:06

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	14.2		5.00		mg/L			05/14/22 03:45	5
Fluoride	<0.500		0.500		mg/L			05/14/22 03:45	5
Sulfate	18.9		5.00		mg/L			05/14/22 03:45	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		05/05/22 09:00	05/23/22 19:04	1
Arsenic	<0.00200		0.00200		mg/L		05/05/22 09:00	05/23/22 19:04	1
Barium	0.249		0.00200		mg/L		05/05/22 09:00	05/23/22 19:04	1
Beryllium	<0.00100		0.00100		mg/L		05/05/22 09:00	05/23/22 19:04	1
Boron	<0.100		0.100		mg/L		05/05/22 09:00	05/23/22 19:04	1
Cadmium	<0.000100		0.000100		mg/L		05/05/22 09:00	05/23/22 19:04	1
Calcium	96.5		0.500		mg/L		05/05/22 09:00	05/23/22 19:04	1
Chromium	<0.00500		0.00500		mg/L		05/05/22 09:00	05/23/22 19:04	1
Cobalt	<0.000500		0.000500		mg/L		05/05/22 09:00	05/23/22 19:04	1
Lead	<0.000500		0.000500		mg/L		05/05/22 09:00	05/24/22 21:32	1
Lithium	<0.0100		0.0100		mg/L		05/05/22 09:00	05/23/22 19:04	1
Molybdenum	<0.00200		0.00200		mg/L		05/05/22 09:00	05/23/22 19:04	1
Selenium	<0.00500		0.00500		mg/L		05/05/22 09:00	05/23/22 19:04	1
Thallium	<0.00100		0.00100		mg/L		05/05/22 09:00	05/23/22 19:04	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/10/22 14:07	05/11/22 14:43	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	336		50.0		mg/L			05/02/22 15:50	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.3	HF	0.1		SU			04/28/22 13:09	1

Client Sample Results

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

Job ID: 310-230121-1

Client Sample ID: MW-10

Lab Sample ID: 310-230121-4

Date Collected: 04/26/22 14:40

Matrix: Water

Date Received: 04/28/22 11:06

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			05/14/22 04:02	5
Fluoride	<0.500		0.500		mg/L			05/14/22 04:02	5
Sulfate	48.3		5.00		mg/L			05/14/22 04:02	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		05/05/22 09:00	05/23/22 19:07	1
Arsenic	0.00371		0.00200		mg/L		05/05/22 09:00	05/23/22 19:07	1
Barium	0.208		0.00200		mg/L		05/05/22 09:00	05/23/22 19:07	1
Beryllium	<0.00100		0.00100		mg/L		05/05/22 09:00	05/23/22 19:07	1
Boron	<0.100		0.100		mg/L		05/05/22 09:00	05/23/22 19:07	1
Cadmium	<0.000100		0.000100		mg/L		05/05/22 09:00	05/23/22 19:07	1
Calcium	90.4		0.500		mg/L		05/05/22 09:00	05/23/22 19:07	1
Chromium	<0.00500		0.00500		mg/L		05/05/22 09:00	05/23/22 19:07	1
Cobalt	0.00104		0.000500		mg/L		05/05/22 09:00	05/23/22 19:07	1
Lead	<0.000500		0.000500		mg/L		05/05/22 09:00	05/24/22 21:36	1
Lithium	<0.0100		0.0100		mg/L		05/05/22 09:00	05/23/22 19:07	1
Molybdenum	<0.00200		0.00200		mg/L		05/05/22 09:00	05/23/22 19:07	1
Selenium	<0.00500		0.00500		mg/L		05/05/22 09:00	05/23/22 19:07	1
Thallium	<0.00100		0.00100		mg/L		05/05/22 09:00	05/23/22 19:07	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/10/22 14:07	05/11/22 14:45	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	344		50.0		mg/L			05/02/22 15:50	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.4	HF	0.1		SU			04/28/22 13:12	1

Definitions/Glossary

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

Job ID: 310-230121-1

Qualifiers

General Chemistry

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

Glossary

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

QC Sample Results

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

Job ID: 310-230121-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-353187/3
Matrix: Water
Analysis Batch: 353187

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			05/14/22 01:34	1
Fluoride	<0.100		0.100		mg/L			05/14/22 01:34	1
Sulfate	<1.00		1.00		mg/L			05/14/22 01:34	1

Lab Sample ID: LCS 310-353187/18
Matrix: Water
Analysis Batch: 353187

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	2.00	1.986		mg/L		99	90 - 110

Lab Sample ID: LCS 310-353187/4
Matrix: Water
Analysis Batch: 353187

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	12.5	11.36		mg/L		91	90 - 110
Sulfate	12.5	11.79		mg/L		94	90 - 110

Lab Sample ID: 310-230121-1 MS
Matrix: Water
Analysis Batch: 353187

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	20.8		25.0	45.79		mg/L		100	80 - 120
Fluoride	<0.500		5.00	5.294		mg/L		98	80 - 120
Sulfate	58.4		25.0	85.24		mg/L		108	80 - 120

Lab Sample ID: 310-230121-1 MSD
Matrix: Water
Analysis Batch: 353187

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	20.8		25.0	45.82		mg/L		100	80 - 120	0	15
Fluoride	<0.500		5.00	5.322		mg/L		98	80 - 120	1	15
Sulfate	58.4		25.0	85.39		mg/L		108	80 - 120	0	15

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-352017/1-A
Matrix: Water
Analysis Batch: 354100

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 352017

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		05/05/22 09:00	05/23/22 16:45	1
Arsenic	<0.00200		0.00200		mg/L		05/05/22 09:00	05/23/22 16:45	1
Barium	<0.00200		0.00200		mg/L		05/05/22 09:00	05/23/22 16:45	1
Beryllium	<0.00100		0.00100		mg/L		05/05/22 09:00	05/23/22 16:45	1
Boron	<0.100		0.100		mg/L		05/05/22 09:00	05/23/22 16:45	1
Cadmium	<0.000100		0.000100		mg/L		05/05/22 09:00	05/23/22 16:45	1

Eurofins Cedar Falls

QC Sample Results

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

Job ID: 310-230121-1

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

Lab Sample ID: MB 310-352017/1-A
Matrix: Water
Analysis Batch: 354100

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 352017

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Calcium	<0.500		0.500		mg/L		05/05/22 09:00	05/23/22 16:45	1
Chromium	<0.00500		0.00500		mg/L		05/05/22 09:00	05/23/22 16:45	1
Cobalt	<0.000500		0.000500		mg/L		05/05/22 09:00	05/23/22 16:45	1
Lithium	<0.0100		0.0100		mg/L		05/05/22 09:00	05/23/22 16:45	1
Molybdenum	<0.00200		0.00200		mg/L		05/05/22 09:00	05/23/22 16:45	1
Selenium	<0.00500		0.00500		mg/L		05/05/22 09:00	05/23/22 16:45	1
Thallium	<0.00100		0.00100		mg/L		05/05/22 09:00	05/23/22 16:45	1

Lab Sample ID: MB 310-352017/1-A
Matrix: Water
Analysis Batch: 354250

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 352017

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Lead	<0.000500		0.000500		mg/L		05/05/22 09:00	05/24/22 19:42	1

Lab Sample ID: LCS 310-352017/2-A
Matrix: Water
Analysis Batch: 354100

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 352017

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Antimony	0.200	0.2391		mg/L		120	80 - 120
Arsenic	0.200	0.1907		mg/L		95	80 - 120
Barium	0.100	0.1064		mg/L		106	80 - 120
Beryllium	0.100	0.09562		mg/L		96	80 - 120
Boron	0.200	0.1889		mg/L		94	80 - 120
Cadmium	0.100	0.1010		mg/L		101	80 - 120
Calcium	2.00	1.842		mg/L		92	80 - 120
Chromium	0.100	0.09775		mg/L		98	80 - 120
Cobalt	0.100	0.1071		mg/L		107	80 - 120
Lithium	0.200	0.1930		mg/L		96	80 - 120
Molybdenum	0.200	0.2091		mg/L		105	80 - 120
Selenium	0.400	0.3632		mg/L		91	80 - 120
Thallium	0.200	0.2322		mg/L		116	80 - 120

Lab Sample ID: LCS 310-352017/2-A
Matrix: Water
Analysis Batch: 354250

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 352017

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Lead	0.200	0.2262		mg/L		113	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-352599/1-A
Matrix: Water
Analysis Batch: 352784

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 352599

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Mercury	<0.000200		0.000200		mg/L		05/10/22 14:04	05/11/22 13:34	1

Eurofins Cedar Falls

QC Sample Results

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

Job ID: 310-230121-1

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

Lab Sample ID: LCS 310-352599/2-A
Matrix: Water
Analysis Batch: 352784

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 352599

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001734		mg/L		104	80 - 120

Lab Sample ID: MB 310-352600/1-A
Matrix: Water
Analysis Batch: 352784

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 352600

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		05/10/22 14:07	05/11/22 14:34	1

Lab Sample ID: LCS 310-352600/2-A
Matrix: Water
Analysis Batch: 352784

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 352600

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001788		mg/L		107	80 - 120

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

Lab Sample ID: MB 310-351551/1
Matrix: Water
Analysis Batch: 351551

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			04/29/22 15:44	1

Lab Sample ID: LCS 310-351551/2
Matrix: Water
Analysis Batch: 351551

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	938.0		mg/L		94	90 - 110

Lab Sample ID: MB 310-351726/1
Matrix: Water
Analysis Batch: 351726

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			05/02/22 15:50	1

Lab Sample ID: LCS 310-351726/2
Matrix: Water
Analysis Batch: 351726

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	944.0		mg/L		94	90 - 110

QC Sample Results

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

Job ID: 310-230121-1

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-351392/1
Matrix: Water
Analysis Batch: 351392

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

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

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

QC Association Summary

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

Job ID: 310-230121-1

HPLC/IC

Analysis Batch: 353187

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230121-1	MW-4B	Total/NA	Water	9056A	
310-230121-2	MW-5B	Total/NA	Water	9056A	
310-230121-3	MW-6A	Total/NA	Water	9056A	
310-230121-4	MW-10	Total/NA	Water	9056A	
MB 310-353187/3	Method Blank	Total/NA	Water	9056A	
LCS 310-353187/18	Lab Control Sample	Total/NA	Water	9056A	
LCS 310-353187/4	Lab Control Sample	Total/NA	Water	9056A	
310-230121-1 MS	MW-4B	Total/NA	Water	9056A	
310-230121-1 MSD	MW-4B	Total/NA	Water	9056A	

Metals

Prep Batch: 352017

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230121-1	MW-4B	Total/NA	Water	3005A	
310-230121-2	MW-5B	Total/NA	Water	3005A	
310-230121-3	MW-6A	Total/NA	Water	3005A	
310-230121-4	MW-10	Total/NA	Water	3005A	
MB 310-352017/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-352017/2-A	Lab Control Sample	Total/NA	Water	3005A	

Prep Batch: 352599

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230121-1	MW-4B	Total/NA	Water	7470A	
310-230121-2	MW-5B	Total/NA	Water	7470A	
MB 310-352599/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-352599/2-A	Lab Control Sample	Total/NA	Water	7470A	

Prep Batch: 352600

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230121-3	MW-6A	Total/NA	Water	7470A	
310-230121-4	MW-10	Total/NA	Water	7470A	
MB 310-352600/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-352600/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 352784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230121-1	MW-4B	Total/NA	Water	7470A	352599
310-230121-2	MW-5B	Total/NA	Water	7470A	352599
310-230121-3	MW-6A	Total/NA	Water	7470A	352600
310-230121-4	MW-10	Total/NA	Water	7470A	352600
MB 310-352599/1-A	Method Blank	Total/NA	Water	7470A	352599
MB 310-352600/1-A	Method Blank	Total/NA	Water	7470A	352600
LCS 310-352599/2-A	Lab Control Sample	Total/NA	Water	7470A	352599
LCS 310-352600/2-A	Lab Control Sample	Total/NA	Water	7470A	352600

Analysis Batch: 354100

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230121-1	MW-4B	Total/NA	Water	6020A	352017
310-230121-2	MW-5B	Total/NA	Water	6020A	352017
310-230121-3	MW-6A	Total/NA	Water	6020A	352017

QC Association Summary

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

Job ID: 310-230121-1

Metals (Continued)

Analysis Batch: 354100 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230121-4	MW-10	Total/NA	Water	6020A	352017
MB 310-352017/1-A	Method Blank	Total/NA	Water	6020A	352017
LCS 310-352017/2-A	Lab Control Sample	Total/NA	Water	6020A	352017

Analysis Batch: 354250

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230121-1	MW-4B	Total/NA	Water	6020A	352017
310-230121-2	MW-5B	Total/NA	Water	6020A	352017
310-230121-3	MW-6A	Total/NA	Water	6020A	352017
310-230121-4	MW-10	Total/NA	Water	6020A	352017
MB 310-352017/1-A	Method Blank	Total/NA	Water	6020A	352017
LCS 310-352017/2-A	Lab Control Sample	Total/NA	Water	6020A	352017

General Chemistry

Analysis Batch: 351392

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230121-1	MW-4B	Total/NA	Water	SM 4500 H+ B	
310-230121-2	MW-5B	Total/NA	Water	SM 4500 H+ B	
310-230121-3	MW-6A	Total/NA	Water	SM 4500 H+ B	
310-230121-4	MW-10	Total/NA	Water	SM 4500 H+ B	
LCS 310-351392/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 351551

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230121-1	MW-4B	Total/NA	Water	SM 2540C	
310-230121-2	MW-5B	Total/NA	Water	SM 2540C	
MB 310-351551/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-351551/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Analysis Batch: 351726

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230121-3	MW-6A	Total/NA	Water	SM 2540C	
310-230121-4	MW-10	Total/NA	Water	SM 2540C	
MB 310-351726/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-351726/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Lab Chronicle

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

Job ID: 310-230121-1

Client Sample ID: MW-4B
Date Collected: 04/26/22 09:35
Date Received: 04/28/22 11:06

Lab Sample ID: 310-230121-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	353187	05/14/22 02:40	JNR	TAL CF
Total/NA	Prep	3005A			352017	05/05/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	354100	05/23/22 18:45	SAP	TAL CF
Total/NA	Prep	3005A			352017	05/05/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	354250	05/24/22 21:13	A6US	TAL CF
Total/NA	Prep	7470A			352599	05/10/22 14:04	EAM	TAL CF
Total/NA	Analysis	7470A		1	352784	05/11/22 14:30	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	351551	04/29/22 15:44	TGF	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	351392	04/28/22 13:10	JAJ	TAL CF

Client Sample ID: MW-5B
Date Collected: 04/26/22 12:35
Date Received: 04/28/22 11:06

Lab Sample ID: 310-230121-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	353187	05/14/22 03:29	JNR	TAL CF
Total/NA	Prep	3005A			352017	05/05/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	354100	05/23/22 18:48	SAP	TAL CF
Total/NA	Prep	3005A			352017	05/05/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	354250	05/24/22 21:29	A6US	TAL CF
Total/NA	Prep	7470A			352599	05/10/22 14:04	EAM	TAL CF
Total/NA	Analysis	7470A		1	352784	05/11/22 14:32	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	351551	04/29/22 15:44	TGF	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	351392	04/28/22 13:11	JAJ	TAL CF

Client Sample ID: MW-6A
Date Collected: 04/26/22 11:05
Date Received: 04/28/22 11:06

Lab Sample ID: 310-230121-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	353187	05/14/22 03:45	JNR	TAL CF
Total/NA	Prep	3005A			352017	05/05/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	354100	05/23/22 19:04	SAP	TAL CF
Total/NA	Prep	3005A			352017	05/05/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	354250	05/24/22 21:32	A6US	TAL CF
Total/NA	Prep	7470A			352600	05/10/22 14:07	EAM	TAL CF
Total/NA	Analysis	7470A		1	352784	05/11/22 14:43	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	351726	05/02/22 15:50	TGF	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	351392	04/28/22 13:09	JAJ	TAL CF

Lab Chronicle

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

Job ID: 310-230121-1

Client Sample ID: MW-10
Date Collected: 04/26/22 14:40
Date Received: 04/28/22 11:06

Lab Sample ID: 310-230121-4
Matrix: Water

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Prepared or Analyzed</u>	<u>Analyst</u>	<u>Lab</u>
Total/NA	Analysis	9056A		5	353187	05/14/22 04:02	JNR	TAL CF
Total/NA	Prep	3005A			352017	05/05/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	354100	05/23/22 19:07	SAP	TAL CF
Total/NA	Prep	3005A			352017	05/05/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	354250	05/24/22 21:36	A6US	TAL CF
Total/NA	Prep	7470A			352600	05/10/22 14:07	EAM	TAL CF
Total/NA	Analysis	7470A		1	352784	05/11/22 14:45	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	351726	05/02/22 15:50	TGF	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	351392	04/28/22 13:12	JAJ	TAL CF

Laboratory References:

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



Accreditation/Certification Summary

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

Job ID: 310-230121-1

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Colorado	Petroleum Storage Tank Program	IA100001 (OR)	09-29-22
Georgia	State	IA100001 (OR)	09-29-22
Illinois	NELAP	200024	11-29-22
Iowa	State	007	12-01-21 *
Kansas	NELAP	E-10341	01-31-23
Minnesota	NELAP	019-999-319	12-31-22
Minnesota (Petrofund)	State	3349	01-18-24
North Dakota	State	R-186	09-29-22
Oregon	NELAP	IA100001	09-29-22

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

Method Summary

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

Job ID: 310-230121-1

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

Protocol References:

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

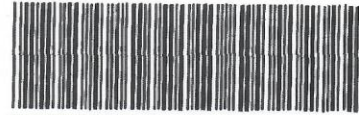
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

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



Environment Testing
America



310-230121 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <i>Muscatine PS</i>			
City/State:	CITY: <i>"</i>	STATE: <i>IA</i>	Project:
Receipt Information			
Date/Time Received:	DATE: <i>4-28-22</i>	TIME: <i>9:35</i>	Received By: <i>AC</i>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____	<input type="checkbox"/> NONE	
Thermometer ID:	<i>N</i>	Correction Factor (°C):	<i>0</i>
• Temp Blank Temperature ↓ If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<i>1.0</i>	Corrected Temp (°C):	<i>1.0</i>
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling?		<input type="checkbox"/> Yes	<input type="checkbox"/> No
a) If yes: Is there evidence that the chilling process began?		<input type="checkbox"/> Yes	<input type="checkbox"/> No
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?)		<input type="checkbox"/> Yes	<input type="checkbox"/> No
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Eurofins Cedar Falls

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

Chain of Custody Record

Client Information
 Client Contact: Sam Bennett MP&W and Rose Arundson (HR Green)
 Company: Muscatine Power & Water
 Address: 1700 Dick Drake Way
 City: Muscatine
 State Zip: IA, 52761
 Phone:
 Email: sbennett@mpw.org and ramundson@hrgreen.com
 Project Name: Muscatine Power & Water CCR Landfill
 Site: Iowa

Sampler: Neil Hoskins
 Lab PM: Hayes, Shawn M
 E-Mail: shawn.hayes@testamencainc.com

Analysis Requested
 Due Date Requested:
 TAT Requested (days):
 PO #: 221607
 WO #:
 TestAmerica Project #: 31007856
 Event:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (Water, Solid, Other)	Preservation Code:	Field Filtered Sample (Yes or No)				Perform MS/MSD (Yes or No)				Total Number of Containers				Special Instructions/Note:
						6020A CCR Lat, 7470A Mercury	2640C TDS, 3M4600_H+ pH	9066A Chloride, Fluoride, Sulfate	Radium-226	Radium-228	D	N	N	N	N	N	N	
MW-4B	4/26/22	0935	G	GW		X	X	X	X	X	X	X	X	X	X	X	X	
MW-5B	4/26/22	1235	G	GW		X	X	X	X	X	X	X	X	X	X	X	X	
MW-6A	4/26/22	1105	G	GW		X	X	X	X	X	X	X	X	X	X	X	X	
MW-8				GW		X	X	X	X	X	X	X	X	X	X	X	X	
MW-10	4/26/22	1440	G	GW		X	X	X	X	X	X	X	X	X	X	X	X	
MW-14A				GW		X	X	X	X	X	X	X	X	X	X	X	X	
MW-15A				GW		X	X	X	X	X	X	X	X	X	X	X	X	
MW-21				GW		X	X	X	X	X	X	X	X	X	X	X	X	
MW-22				GW		X	X	X	X	X	X	X	X	X	X	X	X	
MW-23				GW		X	X	X	X	X	X	X	X	X	X	X	X	
Duplicate-1				GW		X	X	X	X	X	X	X	X	X	X	X	X	

Possible Hazard Identification
 Non-Hazard Flammable Skin Irritant Poison B Unknown Radiological
 Deliverable Requested I, II, III, IV Other (specify):
 Empty Kit Relinquished by:
 Relinquished by: *Neil Hoskins*
 Date/Time: 4/27 00
 Relinquished by:
 Date/Time:
 Relinquished by:
 Date/Time:
 Relinquished by:
 Date/Time:
 Method of Shipment:
 Received by: *NR*
 Date/Time: 4/28/22 0935
 Company:
 Received by:
 Date/Time:
 Company:
 Received by:
 Date/Time:
 Company:
 Cooler Temperature(s) °C and Other Remarks:



Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-230121-1

SDG Number:

Login Number: 230121

List Number: 1

Creator: Hayes, Shawn M

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	

ANALYTICAL REPORT

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls, IA 50613
Tel: (319)277-2401

Laboratory Job ID: 310-230121-2

Client Project/Site: Muscatine Power & Water CCR

For:

Muscatine Power & Water
1700 Dick Drake Way
PO BOX 899
Muscatine, Iowa 52761

Attn: Sam Bennett



Authorized for release by:
5/31/2022 1:51:47 PM

Shawn Hayes, Senior Project Manager
(319)229-8211
Shawn.Hayes@et.eurofinsus.com

LINKS

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results through



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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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

Job ID: 310-230121-2

Job ID: 310-230121-2

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-230121-2

Comments

No additional comments.

Receipt

The samples were received on 4/28/2022 9:35 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 was 1.0° C.

RAD

Method 9320: Radium-228 prep batch 160-563242:

The LCS recovered at 127%. The limits in our LIMS system at 75-125 reflect the requirements of a regulatory agency that represents a large amount of our work. However the samples associated with this LCS are not from this agency and are therefore held to our in-house statistical limits of 61-138% per method requirements. The LCS passes, no further action is required. (LCS 160-563242/1-A)

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

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Sample Summary

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

Job ID: 310-230121-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-230121-1	MW-4B	Water	04/26/22 09:35	04/28/22 11:06
310-230121-2	MW-5B	Water	04/26/22 12:35	04/28/22 11:06
310-230121-3	MW-6A	Water	04/26/22 11:05	04/28/22 11:06
310-230121-4	MW-10	Water	04/26/22 14:40	04/28/22 11:06

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- 10
- 11
- 12
- 13
- 14

Client Sample Results

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

Job ID: 310-230121-2

Client Sample ID: MW-4B

Lab Sample ID: 310-230121-1

Date Collected: 04/26/22 09:35

Matrix: Water

Date Received: 04/28/22 11:06

Method: 9315 - Radium-226 (GFP)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0562	U	0.102	0.102	1.00	0.183	pCi/L	05/02/22 10:13	05/26/22 07:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	63.6		40 - 110					05/02/22 10:13	05/26/22 07:36	1

Method: 9320 - Radium-228 (GFP)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.494	U	0.416	0.419	1.00	0.651	pCi/L	05/02/22 10:51	05/23/22 13:06	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	63.6		40 - 110					05/02/22 10:51	05/23/22 13:06	1
Y Carrier	90.8		40 - 110					05/02/22 10:51	05/23/22 13:06	1

Method: 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	0.550	U	0.428	0.431	5.00	0.651	pCi/L		05/26/22 22:23	1

Client Sample Results

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

Job ID: 310-230121-2

Client Sample ID: MW-5B

Lab Sample ID: 310-230121-2

Date Collected: 04/26/22 12:35

Matrix: Water

Date Received: 04/28/22 11:06

Method: 9315 - Radium-226 (GFP)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.195		0.125	0.126	1.00	0.157	pCi/L	05/02/22 10:13	05/25/22 21:44	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	82.8		40 - 110					05/02/22 10:13	05/25/22 21:44	1

Method: 9320 - Radium-228 (GFP)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.718		0.393	0.399	1.00	0.563	pCi/L	05/02/22 10:51	05/23/22 13:02	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	82.8		40 - 110					05/02/22 10:51	05/23/22 13:02	1
Y Carrier	83.0		40 - 110					05/02/22 10:51	05/23/22 13:02	1

Method: 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	0.913		0.412	0.418	5.00	0.563	pCi/L		05/26/22 22:23	1

Client Sample Results

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

Job ID: 310-230121-2

Client Sample ID: MW-6A

Lab Sample ID: 310-230121-3

Date Collected: 04/26/22 11:05

Matrix: Water

Date Received: 04/28/22 11:06

Method: 9315 - Radium-226 (GFP)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.521		0.170	0.177	1.00	0.147	pCi/L	05/02/22 10:13	05/26/22 07:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.8		40 - 110					05/02/22 10:13	05/26/22 07:36	1

Method: 9320 - Radium-228 (GFP)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.380	U	0.279	0.281	1.00	0.424	pCi/L	05/02/22 10:51	05/23/22 13:06	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.8		40 - 110					05/02/22 10:51	05/23/22 13:06	1
Y Carrier	92.7		40 - 110					05/02/22 10:51	05/23/22 13:06	1

Method: 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	0.901		0.327	0.332	5.00	0.424	pCi/L		05/26/22 22:23	1

Client Sample Results

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

Job ID: 310-230121-2

Client Sample ID: MW-10

Lab Sample ID: 310-230121-4

Date Collected: 04/26/22 14:40

Matrix: Water

Date Received: 04/28/22 11:06

Method: 9315 - Radium-226 (GFP)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.250		0.129	0.131	1.00	0.154	pCi/L	05/02/22 10:13	05/26/22 07:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	96.0		40 - 110					05/02/22 10:13	05/26/22 07:36	1

Method: 9320 - Radium-228 (GFP)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.443	U	0.305	0.307	1.00	0.459	pCi/L	05/02/22 10:51	05/23/22 13:06	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	96.0		40 - 110					05/02/22 10:51	05/23/22 13:06	1
Y Carrier	86.7		40 - 110					05/02/22 10:51	05/23/22 13:06	1

Method: 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	0.693		0.331	0.334	5.00	0.459	pCi/L		05/26/22 22:23	1

Definitions/Glossary

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

Job ID: 310-230121-2

Qualifiers

Rad

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

Glossary

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

QC Sample Results

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

Job ID: 310-230121-2

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-563228/24-A
Matrix: Water
Analysis Batch: 567416

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 563228

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	Uncert.						
Radium-226	-0.05280	U	0.0612	0.0614	1.00	0.169	pCi/L	05/02/22 10:13	05/26/22 07:37	1
Carrier	ME %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	84.5		40 - 110		05/02/22 10:13	05/26/22 07:37	1			

Lab Sample ID: LCS 160-563228/1-A
Matrix: Water
Analysis Batch: 567255

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 563228

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	9.945		1.16	1.00	0.168	pCi/L	88	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits		Prepared	Analyzed	Dil Fac		
Ba Carrier	81.5		40 - 110						

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-563242/24-A
Matrix: Water
Analysis Batch: 566898

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 563242

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	Uncert.						
Radium-228	0.5973		0.325	0.330	1.00	0.457	pCi/L	05/02/22 10:51	05/23/22 13:06	1
Carrier	ME %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	84.5		40 - 110		05/02/22 10:51	05/23/22 13:06	1			
Y Carrier	91.6		40 - 110		05/02/22 10:51	05/23/22 13:06	1			

Lab Sample ID: LCS 160-563242/1-A
Matrix: Water
Analysis Batch: 566897

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 563242

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium-228	8.60	10.93		1.43	1.00	0.560	pCi/L	127	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits		Prepared	Analyzed	Dil Fac		
Ba Carrier	81.5		40 - 110						
Y Carrier	84.5		40 - 110						

QC Association Summary

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

Job ID: 310-230121-2

Rad

Prep Batch: 563228

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230121-1	MW-4B	Total/NA	Water	PrecSep-21	
310-230121-2	MW-5B	Total/NA	Water	PrecSep-21	
310-230121-3	MW-6A	Total/NA	Water	PrecSep-21	
310-230121-4	MW-10	Total/NA	Water	PrecSep-21	
MB 160-563228/24-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-563228/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	

Prep Batch: 563242

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-230121-1	MW-4B	Total/NA	Water	PrecSep_0	
310-230121-2	MW-5B	Total/NA	Water	PrecSep_0	
310-230121-3	MW-6A	Total/NA	Water	PrecSep_0	
310-230121-4	MW-10	Total/NA	Water	PrecSep_0	
MB 160-563242/24-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-563242/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	

Lab Chronicle

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

Job ID: 310-230121-2

Client Sample ID: MW-4B

Lab Sample ID: 310-230121-1

Date Collected: 04/26/22 09:35

Matrix: Water

Date Received: 04/28/22 11:06

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			563228	05/02/22 10:13	MS	TAL SL
Total/NA	Analysis	9315		1	567416	05/26/22 07:36	CLP	TAL SL
Total/NA	Prep	PrecSep_0			563242	05/02/22 10:51	MS	TAL SL
Total/NA	Analysis	9320		1	566898	05/23/22 13:06	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	567530	05/26/22 22:23	EMH	TAL SL

Client Sample ID: MW-5B

Lab Sample ID: 310-230121-2

Date Collected: 04/26/22 12:35

Matrix: Water

Date Received: 04/28/22 11:06

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			563228	05/02/22 10:13	MS	TAL SL
Total/NA	Analysis	9315		1	567255	05/25/22 21:44	SCB	TAL SL
Total/NA	Prep	PrecSep_0			563242	05/02/22 10:51	MS	TAL SL
Total/NA	Analysis	9320		1	566897	05/23/22 13:02	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	567530	05/26/22 22:23	EMH	TAL SL

Client Sample ID: MW-6A

Lab Sample ID: 310-230121-3

Date Collected: 04/26/22 11:05

Matrix: Water

Date Received: 04/28/22 11:06

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			563228	05/02/22 10:13	MS	TAL SL
Total/NA	Analysis	9315		1	567416	05/26/22 07:36	CLP	TAL SL
Total/NA	Prep	PrecSep_0			563242	05/02/22 10:51	MS	TAL SL
Total/NA	Analysis	9320		1	566898	05/23/22 13:06	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	567530	05/26/22 22:23	EMH	TAL SL

Client Sample ID: MW-10

Lab Sample ID: 310-230121-4

Date Collected: 04/26/22 14:40

Matrix: Water

Date Received: 04/28/22 11:06

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			563228	05/02/22 10:13	MS	TAL SL
Total/NA	Analysis	9315		1	567416	05/26/22 07:36	CLP	TAL SL
Total/NA	Prep	PrecSep_0			563242	05/02/22 10:51	MS	TAL SL
Total/NA	Analysis	9320		1	566898	05/23/22 13:06	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228		1	567530	05/26/22 22:23	EMH	TAL SL

Laboratory References:

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

Accreditation/Certification Summary

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

Job ID: 310-230121-2

Laboratory: Eurofins St. Louis

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	20-001	05-06-25
ANAB	Dept. of Defense ELAP	L2305	04-06-25
ANAB	Dept. of Energy	L2305.01	04-06-25
ANAB	ISO/IEC 17025	L2305	04-06-25
Arizona	State	AZ0813	12-08-22
California	Los Angeles County Sanitation Districts	10259	06-30-22
California	State	2886	07-01-22
Connecticut	State	PH-0241	03-31-23
Florida	NELAP	E87689	06-30-22
HI - RadChem Recognition	State	n/a	06-30-22
Illinois	NELAP	200023	11-30-22
Iowa	State	373	12-01-22
Kansas	NELAP	E-10236	10-31-22
Kentucky (DW)	State	KY90125	12-31-22
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-22
Louisiana	NELAP	04080	06-30-22
Louisiana (DW)	State	LA011	12-31-22
Maryland	State	310	09-30-22
MI - RadChem Recognition	State	9005	06-30-22
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-22
New Jersey	NELAP	MO002	06-30-22
New York	NELAP	11616	04-01-23
North Dakota	State	R-207	06-30-22
NRC	NRC	24-24817-01	12-31-22
Oklahoma	NELAP	9997	08-31-22
Oregon	NELAP	4157	09-01-22
Pennsylvania	NELAP	68-00540	02-28-23
South Carolina	State	85002001	06-30-22
Texas	NELAP	T104704193	07-31-22
US Fish & Wildlife	US Federal Programs	058448	07-31-22
USDA	US Federal Programs	P330-17-00028	03-11-23
Utah	NELAP	MO000542021-14	08-01-22
Virginia	NELAP	10310	06-14-22
Washington	State	C592	08-30-22
West Virginia DEP	State	381	10-31-22

Method Summary

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

Job ID: 310-230121-2

Method	Method Description	Protocol	Laboratory
9315	Radium-226 (GFPC)	SW846	TAL SL
9320	Radium-228 (GFPC)	SW846	TAL SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	TAL SL
PrecSep_0	Preparation, Precipitate Separation	None	TAL SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	TAL 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:

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



Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-230121-2

Login Number: 230121

List Number: 1

Creator: Hayes, Shawn M

List Source: Eurofins Cedar Falls

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

Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-230121-2

Login Number: 230121

List Number: 2

Creator: Worthington, Sierra M

List Source: Eurofins St. Louis

List Creation: 04/29/22 02:13 PM

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	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 $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Tracer/Carrier Summary

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

Job ID: 310-230121-2

Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	
310-230121-1	MW-4B	63.6	
310-230121-2	MW-5B	82.8	
310-230121-3	MW-6A	91.8	
310-230121-4	MW-10	96.0	
LCS 160-563228/1-A	Lab Control Sample	81.5	
MB 160-563228/24-A	Method Blank	84.5	
Tracer/Carrier Legend			
Ba = Ba Carrier			

Method: 9320 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
310-230121-1	MW-4B	63.6	90.8
310-230121-2	MW-5B	82.8	83.0
310-230121-3	MW-6A	91.8	92.7
310-230121-4	MW-10	96.0	86.7
LCS 160-563242/1-A	Lab Control Sample	81.5	84.5
MB 160-563242/24-A	Method Blank	84.5	91.6
Tracer/Carrier Legend			
Ba = Ba Carrier			
Y = Y Carrier			

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 24.55 **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	4/26/2022 08:45	7.25	708.62
*After Purging	4/26/2022 09:35	8.85	707.02
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 1.32

No. of Well Volumes (based on current water level) 0.46

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 Clear, 38dF, NW wind 9 mph

Field Measurements (after stabilization):

Temperature 8.02 **Units** C

Equipment Used Horiba U-50

pH 7.04

Equipment Used Horiba U-50

Specific Conductance 0.786 **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** 5/2/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name _____ Permit No. _____

Monitoring Well/Piezometer No. _____

Upgradient _____ Downgradient _____

Name of person sampling _____

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 _____ Ground Elevation _____

Depth of Well _____ Inside Casing Diameter (in inches) _____

Equipment Used _____

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging			
*After Purging			
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) _____

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

Was well pumped/bailed dry? _____

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type _____ Dedicated Pump? _____

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 Clear, 41dF, WNW wind 15 mph

Field Measurements (after stabilization):

Temperature 13.18 **Units** C

Equipment Used Horiba U-50

pH 7.37

Equipment Used Horiba U-50

Specific Conductance 0.802 **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** 5/2/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

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

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

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name _____ Permit No. _____

Monitoring Well/Piezometer No. _____

Upgradient _____ Downgradient _____

Name of person sampling _____

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 _____ Ground Elevation _____

Depth of Well _____ Inside Casing Diameter (in inches) _____

Equipment Used _____

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging			
*After Purging			
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) _____

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

Was well pumped/bailed dry? _____

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type _____ Dedicated Pump? _____

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 Clear, 42dF, NW wind 13 mph

Field Measurements (after stabilization):

Temperature 12.17 **Units** C

Equipment Used Horiba U-50

pH 7.35

Equipment Used Horiba U-50

Specific Conductance 0.688 **Units** mS/m

Equipment Used Horiba U-50

Comments

CERTIFICATION

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

Signature Neil Hoskins **Date** 5/2/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

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

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

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name _____ Permit No. _____

Monitoring Well/Piezometer No. _____

Upgradient _____ Downgradient _____

Name of person sampling _____

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 _____ Ground Elevation _____

Depth of Well _____ Inside Casing Diameter (in inches) _____

Equipment Used _____

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging			
*After Purging			
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) _____

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

Was well pumped/bailed dry? _____

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type _____ Dedicated Pump? _____

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 Cloudy, 45dF W wind 15 mph

Field Measurements (after stabilization):

Temperature 11.02 **Units** C

Equipment Used Horiba U-50

pH 7.35

Equipment Used Horiba U-50

Specific Conductance 0.644 **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** 5/2/2022

Telephone 563-262-3582 **Fax** **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

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

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO
 If no, explain _____
 Standing Water or Litter? (please check) YES NO
 If yes, explain _____

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

Elevation:
 Top of inner well casing 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 (±0.01foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/26/2022 14:10	3.68	714.83
*After Purging	4/26/2022 14:40	3.77	714.74
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.79
 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 _____

***D. FIELD MEASUREMENT**

Weather Conditions Clear, 54dF, WNW wind 14 mp h

Field Measurements (after stabilization):

Temperature 13.02 **Units** C

Equipment Used Horiba U-50

pH 7.35

Equipment Used Horiba U-50

Specific Conductance 0.653 **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** 5/2/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name _____ Permit No. _____

Monitoring Well/Piezometer No. _____

Upgradient _____ Downgradient _____

Name of person sampling _____

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 _____ Ground Elevation _____

Depth of Well _____ Inside Casing Diameter (in inches) _____

Equipment Used _____

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging			
*After Purging			
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) _____

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

Was well pumped/bailed dry? _____

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type _____ Dedicated Pump? _____

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 Clear, 65dF, W wind 13 mph

Field Measurements (after stabilization):

Temperature 20.10 **Units** C

Equipment Used Horiba U-50

pH 7.13

Equipment Used Horiba U-50

Specific Conductance 1.73 **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** 5/2/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name _____ Permit No. _____

Monitoring Well/Piezometer No. _____

Upgradient _____ Downgradient _____

Name of person sampling _____

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 _____ Ground Elevation _____

Depth of Well _____ Inside Casing Diameter (in inches) _____

Equipment Used _____

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging			
*After Purging			
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) _____

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

Was well pumped/bailed dry? _____

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type _____ Dedicated Pump? _____

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.

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***D. FIELD MEASUREMENT**

Weather Conditions Cloudy, 45dF, NW wind 5-10 mph

Field Measurements (after stabilization):

Temperature 9.41 **Units** C

Equipment Used Horiba U-50

pH 6.83

Equipment Used Horiba U-50

Specific Conductance 1.36 **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** 5/2/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

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

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES D NO
 If no, explain _____
 Standing Water or Litter? (please check) D 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 (±0.01foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/21/2022 11:10	9.63	716.12
*After Purging	4/21/2022 11:50	9.93	715.82
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 1.06
 No. of Well Volumes (based on current water level) 0.52
 Was well pumped/bailed dry? No
 Equipment used:
 Bailer type _____ Dedicated Bailer? _____
 Pump type Peristaltic Dedicated Pump? Yes
 If not dedicated, method of cleaning _____

***D. FIELD MEASUREMENT**

Weather Conditions Clear, 60dF, NW wind 10 m ph

Field Measurements (after stabilization):

Temperature 16.72 **Units** C

Equipment Used Horiba U-50

pH 6.69

Equipment Used Horiba U-50

Specific Conductance 0.865 **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** 5/2/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

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

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

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name _____ Permit No. _____

Monitoring Well/Piezometer No. _____

Upgradient _____ Downgradient _____

Name of person sampling _____

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 _____ Ground Elevation _____

Depth of Well _____ Inside Casing Diameter (in inches) _____

Equipment Used _____

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging			
*After Purging			
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) _____

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

Was well pumped/bailed dry? _____

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type _____ Dedicated Pump? _____

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 Clear, 50dF, NW wind 5-10 mph

Field Measurements (after stabilization):

Temperature 11.24 **Units** C

Equipment Used Horiba U-50

pH 7.23

Equipment Used Horiba U-50

Specific Conductance 0.712 **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** 5/2/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name _____ Permit No. _____

Monitoring Well/Piezometer No. _____

Upgradient _____ Downgradient _____

Name of person sampling _____

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 _____ Ground Elevation _____

Depth of Well _____ Inside Casing Diameter (in inches) _____

Equipment Used _____

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging			
*After Purging			
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) _____

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

Was well pumped/bailed dry? _____

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type _____ Dedicated Pump? _____

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 Clear, 55dF S wind 3-5 mph

Field Measurements (after stabilization):

Temperature 14.66 **Units** C

Equipment Used Horiba U-50

pH 7.39

Equipment Used Horiba U-50

Specific Conductance 0.470 **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** 5/2/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name _____ Permit No. _____

Monitoring Well/Piezometer No. _____

Upgradient _____ Downgradient _____

Name of person sampling _____

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 _____ Ground Elevation _____

Depth of Well _____ Inside Casing Diameter (in inches) _____

Equipment Used _____

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging			
*After Purging			
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) _____

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

Was well pumped/bailed dry? _____

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type _____ Dedicated Pump? _____

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 Cloudy, 45dF, NW wind 5-10 mph

Field Measurements (after stabilization):

Temperature 9.14 **Units** C

Equipment Used Horiba U-50

pH 7.49

Equipment Used Horiba U-50

Specific Conductance 0.637 **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** 5/2/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

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

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO
 If no, explain _____
 Standing Water or Litter? (please check) YES NO
 If yes, explain _____

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

Elevation:
 Top of inner well casing 731.08 Ground Elevation 727.35
 Depth of Well 38.2? Inside Casing Diameter (in inches) 2"
 Equipment Used Slope Indicator Co. Water level indicator Model 51453

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/25/2022 14:05	20.18	718.94
*After Purging	4/25/2022 14:30	22.48	716.64
*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 _____

***D. FIELD MEASUREMENT**

Weather Conditions Cloudy, 40dF, W wind 15-20 mph

Field Measurements (after stabilization):

Temperature 10.18 **Units** C

Equipment Used Horiba U-50

pH 7.69

Equipment Used Horiba U-50

Specific Conductance 1.080 **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** 5/2/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name _____ Permit No. _____

Monitoring Well/Piezometer No. _____

Upgradient _____ Downgradient _____

Name of person sampling _____

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 _____ Ground Elevation _____

Depth of Well _____ Inside Casing Diameter (in inches) _____

Equipment Used _____

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging			
*After Purging			
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) _____

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

Was well pumped/bailed dry? _____

Equipment used:

Bailer type _____ Dedicated Bailer? _____

Pump type _____ Dedicated Pump? _____

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 Cloudy, 40dF, W wind 15-20 mph

Field Measurements (after stabilization):

Temperature 9.69 **Units** C

Equipment Used Horiba U-50

pH 6.76

Equipment Used Horiba U-50

Specific Conductance 0.348 **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** 5/2/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

LOW FLOW SAMPLING FORM

DATE 4/21/2022 WELL ID MW-21 SAMPLE DATE / TIME 4/21/22 1150
 SITE Muscatine Power & Water DTW 9.63 NOTE Duplicate 1 - marked 4/21/22 1200
 PROJECT # Spring 2022 WELL DEPTH 22.20
 WEATHER Clear, 60dF, NW wind 10 mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 17'

TIME	PURGE RATE(ml)	VOL REMOVED(nl)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES
11:10			9.63							
11:15	100	500	9.88	15.41	7.11	230	0.861	1.7	6.35	
11:20	100	1000	9.91	14.94	6.77	259	0.890	0.0	5.39	
11:25	100	1500	9.91	14.97	6.75	262	0.905	0.0	5.19	
11:30	100	2000	9.91	15.00	6.73	264	0.908	0.0	5.16	
11:35	100	2500	9.91	15.68	6.72	265	0.895	0.0	5.05	
11:40	100	3000	9.92	16.46	6.71	269	0.869	0.0	4.84	
11:45	100	3500	9.92	16.59	6.70	271	0.87	0.0	4.75	
11:50	100	4000	9.93	16.72	6.69	274	0.865	0.0	4.69	Sample Start
12:20			9.93							Sample End/Duplicate Start
12:50			9.94							Duplicate End
										Preservative
										# of Containers
										HCl
										HNO ₃
										NaOH
										None

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

LOW FLOW SAMPLING FORM

DATE 4/21/2022 WELL ID MW-22 SAMPLE DATE / TIME 4/21/22 0840
 SITE Muscatine Power & Water DTW 17.07 NOTE _____
 PROJECT # Spring 2022 WELL DEPTH 43.33 _____
 WEATHER Clear, 50dF, NW wind 5-10 mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 38'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES										
7:50			17.07																	
7:55	100	500	18.31	10.85	5.93	213	0.736	0.0	3.51											
8:00	100	1000	19.28	10.76	6.50	179	0.770	0.0	4.89											
8:05	100	1500	20.18	10.87	6.75	167	0.717	0.0	4.13											
8:10	100	2000	20.96	10.80	6.85	160	0.716	0.0	2.09											
8:15	100	2500	21.66	10.41	6.97	140	0.716	0.0	2.99											
8:20	100	3000	22.32	10.47	7.06	132	0.726	0.0	2.25											
8:25	100	3500	22.92	10.77	7.12	127	0.719	0.0	1.83											
8:30	100	4000	23.52	10.96	7.16	116	0.716	0.0	1.63											
8:35	100	4500	24.10	10.18	7.20	118	0.712	0.0	1.73											
8:40	100	5000	24.32	11.24	7.23	124	0.712	0.0	1.63	Sample Start										
9:20			26.10							Sample End										
										<table border="1"> <thead> <tr> <th>Preservative</th> <th># of Containers</th> </tr> </thead> <tbody> <tr> <td>HCl</td> <td></td> </tr> <tr> <td>HNO₃</td> <td>3</td> </tr> <tr> <td>NaOH</td> <td></td> </tr> <tr> <td>None</td> <td>1</td> </tr> </tbody> </table>	Preservative	# of Containers	HCl		HNO ₃	3	NaOH		None	1
Preservative	# of Containers																			
HCl																				
HNO ₃	3																			
NaOH																				
None	1																			

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

LOW FLOW SAMPLING FORM

DATE 4/25/2022 WELL ID MW-24 SAMPLE DATE / TIME 4/25/22 1025
 SITE Muscatine Power & Water DTW 15.21 NOTE _____
 PROJECT # Spring 2022 WELL DEPTH 43.33 _____
 WEATHER Cloudy, 45dF, NW wind 5-10 mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 38'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
10:00			15.21									
10:05	100	500	15.48	8.47	7.24	163	0.659	3.9	4.60			
10:10	100	1000	15.58	8.64	7.32	159	0.656	3.1	3.54			
10:15	100	1500	15.72	8.71	7.52	151	0.644	3.8	3.50			
10:20	100	2000	15.78	8.90	7.51	155	0.642	3.9	3.68			
10:25	100	2500	15.79	9.14	7.49	159	0.637	4.0	3.59	Sample Start		
10:35			15.79							Sample End		
										Preservative	# of Containers	
										HCl		
										HNO ₃	1	
										NaOH		
										None	1	

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

LOW FLOW SAMPLING FORM

DATE 4/25/2022 WELL ID MW-26 SAMPLE DATE / TIME 4/25/22 1430
 SITE Muscatine Power & Water DTW 20.18 NOTE _____
 PROJECT # Spring 2022 WELL DEPTH 38.27 _____
 WEATHER Cloudy, 40dF, W wind 15-20 mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 35'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
14:05			20.18									
14:10	100	500	21.13	10.44	7.51	-14	1.060	0.0	2.42			
14:15	100	1000	21.57	10.33	7.61	-7	1.070	2.0	0.00			
14:20	100	1500	21.92	10.27	7.65	-2	1.080	1.9	0.00			
14:25	100	2000	22.24	10.22	7.67	1	1.080	1.8	0.00			
14:30	100	2500	22.48	10.18	7.69	6	1.080	1.8	0.00	Sample Start		
14:40			22.82							Sample End		
										Preservative	# of Containers	
										HCl		
										HNO ₃	1	
										NaOH		
										None	1	

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

LOW FLOW SAMPLING FORM

DATE 4/25/2022 WELL ID MW-27 SAMPLE DATE / TIME 4/25/22 1530
 SITE Muscatine Power & Water DTW 14.82 NOTE _____
 PROJECT # Spring 2022 WELL DEPTH 19.44 _____
 WEATHER Cloudy, 40dF, W wind 15-20 mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 18'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
15:05			14.82									
15:10	100	500	15.81	9.48	7.62	96	0.379	0.3	6.91			
15:15	100	1000	16.47	9.55	7.27	99	0.364	0.5	6.23			
15:20	100	1500	16.97	9.63	7.02	102	0.358	2.5	6.12			
15:25	100	2000	17.51	9.70	6.87	106	0.353	3.0	6.03			
15:30	100	2500	18.10	9.69	6.76	112	0.348	2.8	6.19	Sample Start		
15:40			18.10							Sample End		
										Preservative	# of Containers	
										HCl		
										HNO ₃	1	
										NaOH		
										None	1	

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

ANALYTICAL REPORT

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls, IA 50613
Tel: (319)277-2401

Laboratory Job ID: 310-240284-1

Client Project/Site: Muscatine Power & Water CCR

For:

Muscatine Power & Water
1700 Dick Drake Way
PO BOX 899
Muscatine, Iowa 52761

Attn: Sam Bennett



Authorized for release by:

10/6/2022 2:59:19 PM

Shirley Thompson, Client Service Manager
(319)277-2401

Shirley.Thompson@et.eurofinsus.com

Designee for

Shawn Hayes, Senior Project Manager
(319)229-8211

Shawn.Hayes@et.eurofinsus.com

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www.eurofinsus.com/Env

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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

Job ID: 310-240284-1

Job ID: 310-240284-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-240284-1

Comments

No additional comments.

Receipt

The samples were received on 9/16/2022 8:50 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 0.7° C, 1.1° C and 1.4° C.

HPLC/IC

Method 9056A: The following samples were diluted due to the nature of the sample matrix: MW-4B (310-240284-1), MW-5B (310-240284-2), MW-6A (310-240284-3), MW-8 (310-240284-4), MW-10 (310-240284-5), MW-14A (310-240284-6), MW-15A (310-240284-7), MW-21 (310-240284-8), MW-22 (310-240284-9), MW-23 (310-240284-10), MW-24 (310-240284-11), MW-26 (310-240284-12), MW-27 (310-240284-13), QA-A (310-240284-14) and QA-B DUP (310-240284-15). 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 3005A: The reference method requires samples to be preserved to a pH of <2. The following sample was received with insufficient preservation at a pH of >2: MW-14A (310-240284-6). The sample(s) was preserved to the appropriate pH in the laboratory.

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

General Chemistry

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

Sample Summary

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

Job ID: 310-240284-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-240284-1	MW-4B	Ground Water	09/14/22 11:45	09/16/22 08:50
310-240284-2	MW-5B	Ground Water	09/14/22 13:45	09/16/22 08:50
310-240284-3	MW-6A	Ground Water	09/14/22 12:45	09/16/22 08:50
310-240284-4	MW-8	Ground Water	09/13/22 13:30	09/16/22 08:50
310-240284-5	MW-10	Ground Water	09/14/22 14:50	09/16/22 08:50
310-240284-6	MW-14A	Ground Water	09/13/22 10:25	09/16/22 08:50
310-240284-7	MW-15A	Ground Water	09/13/22 11:30	09/16/22 08:50
310-240284-8	MW-21	Ground Water	09/12/22 13:45	09/16/22 08:50
310-240284-9	MW-22	Ground Water	09/12/22 11:30	09/16/22 08:50
310-240284-10	MW-23	Ground Water	09/13/22 09:10	09/16/22 08:50
310-240284-14	QA-A	Ground Water	09/12/22 12:00	09/16/22 08:50
310-240284-15	QA-B DUP	Ground Water	09/13/22 12:00	09/16/22 08:50

- 1
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Detection Summary

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

Job ID: 310-240284-1

Client Sample ID: MW-4B

Lab Sample ID: 310-240284-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	16.8		5.00		mg/L	5		9056A	Total/NA
Sulfate	49.5		5.00		mg/L	5		9056A	Total/NA
Barium	0.188		0.00200		mg/L	1		6020A	Total/NA
Calcium	92.3		0.500		mg/L	1		6020A	Total/NA
Cobalt	0.00459		0.000500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	358		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-5B

Lab Sample ID: 310-240284-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	39.0		5.00		mg/L	5		9056A	Total/NA
Sulfate	49.9		5.00		mg/L	5		9056A	Total/NA
Barium	0.253		0.00200		mg/L	1		6020A	Total/NA
Calcium	117		0.500		mg/L	1		6020A	Total/NA
Mercury	0.000813		0.000200		mg/L	1		7470A	Total/NA
Total Dissolved Solids	484		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.2	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-6A

Lab Sample ID: 310-240284-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	13.3		5.00		mg/L	5		9056A	Total/NA
Sulfate	16.4		5.00		mg/L	5		9056A	Total/NA
Barium	0.229		0.00200		mg/L	1		6020A	Total/NA
Calcium	89.0		0.500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	334		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-8

Lab Sample ID: 310-240284-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	16.7		5.00		mg/L	5		9056A	Total/NA
Sulfate	67.1		5.00		mg/L	5		9056A	Total/NA
Barium	0.0703		0.00200		mg/L	1		6020A	Total/NA
Calcium	76.8		0.500		mg/L	1		6020A	Total/NA
Cobalt	0.00164		0.000500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	350		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-10

Lab Sample ID: 310-240284-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	31.2		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00497		0.00200		mg/L	1		6020A	Total/NA
Barium	0.223		0.00200		mg/L	1		6020A	Total/NA
Calcium	82.0		0.500		mg/L	1		6020A	Total/NA
Cobalt	0.00109		0.000500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	340		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Detection Summary

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

Job ID: 310-240284-1

Client Sample ID: MW-14A

Lab Sample ID: 310-240284-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	22.4		5.00		mg/L	5		9056A	Total/NA
Sulfate	978		20.0		mg/L	20		9056A	Total/NA
Barium	0.0340		0.00200		mg/L	1		6020A	Total/NA
Boron	15.1		0.400		mg/L	4		6020A	Total/NA
Calcium	301		0.500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	1710		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.2	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-15A

Lab Sample ID: 310-240284-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	8.29		5.00		mg/L	5		9056A	Total/NA
Sulfate	319		5.00		mg/L	5		9056A	Total/NA
Barium	0.0327		0.00200		mg/L	1		6020A	Total/NA
Boron	10.4		0.400		mg/L	4		6020A	Total/NA
Calcium	132		0.500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	796		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.4	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-21

Lab Sample ID: 310-240284-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	18.0		5.00		mg/L	5		9056A	Total/NA
Sulfate	151		5.00		mg/L	5		9056A	Total/NA
Barium	0.0447		0.00200		mg/L	1		6020A	Total/NA
Boron	3.69		0.100		mg/L	1		6020A	Total/NA
Calcium	88.2		0.500		mg/L	1		6020A	Total/NA
Chromium	0.00505		0.00500		mg/L	1		6020A	Total/NA
Lithium	0.0180		0.0100		mg/L	1		6020A	Total/NA
Total Dissolved Solids	524		50.0		mg/L	1		SM 2540C	Total/NA
pH	6.9	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-22

Lab Sample ID: 310-240284-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	7.04		5.00		mg/L	5		9056A	Total/NA
Sulfate	220		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00285		0.00200		mg/L	1		6020A	Total/NA
Barium	0.243		0.00200		mg/L	1		6020A	Total/NA
Boron	0.322		0.100		mg/L	1		6020A	Total/NA
Calcium	79.6		0.500		mg/L	1		6020A	Total/NA
Molybdenum	0.00446		0.00200		mg/L	1		6020A	Total/NA
Total Dissolved Solids	390		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.6	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-23

Lab Sample ID: 310-240284-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	16.2		5.00		mg/L	5		9056A	Total/NA
Sulfate	23.0		5.00		mg/L	5		9056A	Total/NA
Barium	0.0507		0.00200		mg/L	1		6020A	Total/NA
Boron	0.204		0.100		mg/L	1		6020A	Total/NA
Calcium	54.5		0.500		mg/L	1		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Detection Summary

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

Job ID: 310-240284-1

Client Sample ID: MW-23 (Continued)

Lab Sample ID: 310-240284-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	278		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.6	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: QA-A

Lab Sample ID: 310-240284-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	17.2		5.00		mg/L	5		9056A	Total/NA
Sulfate	149		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00418		0.00200		mg/L	1		6020A	Total/NA
Barium	0.261		0.00200		mg/L	1		6020A	Total/NA
Boron	0.130		0.100		mg/L	1		6020A	Total/NA
Calcium	81.2		0.500		mg/L	1		6020A	Total/NA
Molybdenum	0.00527		0.00200		mg/L	1		6020A	Total/NA
Total Dissolved Solids	394		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: QA-B DUP

Lab Sample ID: 310-240284-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	9.05		5.00		mg/L	5		9056A	Total/NA
Sulfate	338		5.00		mg/L	5		9056A	Total/NA
Barium	0.0325		0.00200		mg/L	1		6020A	Total/NA
Boron	10.7		0.400		mg/L	4		6020A	Total/NA
Calcium	143		0.500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	802		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

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

Job ID: 310-240284-1

Client Sample ID: MW-4B

Lab Sample ID: 310-240284-1

Date Collected: 09/14/22 11:45

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	16.8		5.00		mg/L			09/29/22 17:24	5
Fluoride	<0.500		0.500		mg/L			09/29/22 17:24	5
Sulfate	49.5		5.00		mg/L			09/29/22 17:24	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 00:25	1
Arsenic	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 00:25	1
Barium	0.188		0.00200		mg/L		09/19/22 09:00	09/28/22 00:25	1
Beryllium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 00:25	1
Boron	<0.100		0.100		mg/L		09/19/22 09:00	09/28/22 00:25	1
Cadmium	<0.000100		0.000100		mg/L		09/19/22 09:00	09/28/22 00:25	1
Calcium	92.3		0.500		mg/L		09/19/22 09:00	09/28/22 00:25	1
Chromium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 00:25	1
Cobalt	0.00459		0.000500		mg/L		09/19/22 09:00	09/28/22 00:25	1
Lead	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 00:25	1
Lithium	<0.0100		0.0100		mg/L		09/19/22 09:00	09/28/22 00:25	1
Molybdenum	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 00:25	1
Selenium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 00:25	1
Thallium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 00:25	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/23/22 13:47	09/26/22 12:53	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	358		50.0		mg/L			09/20/22 16:03	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.5	HF	0.1		SU			09/16/22 11:45	1

Client Sample Results

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

Job ID: 310-240284-1

Client Sample ID: MW-5B

Lab Sample ID: 310-240284-2

Date Collected: 09/14/22 13:45

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	39.0		5.00		mg/L			09/29/22 18:15	5
Fluoride	<0.500		0.500		mg/L			09/29/22 18:15	5
Sulfate	49.9		5.00		mg/L			09/29/22 18:15	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 00:29	1
Arsenic	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 00:29	1
Barium	0.253		0.00200		mg/L		09/19/22 09:00	09/28/22 00:29	1
Beryllium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 00:29	1
Boron	<0.100		0.100		mg/L		09/19/22 09:00	09/28/22 00:29	1
Cadmium	<0.000100		0.000100		mg/L		09/19/22 09:00	09/28/22 00:29	1
Calcium	117		0.500		mg/L		09/19/22 09:00	09/28/22 00:29	1
Chromium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 00:29	1
Cobalt	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 00:29	1
Lead	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 00:29	1
Lithium	<0.0100		0.0100		mg/L		09/19/22 09:00	09/28/22 00:29	1
Molybdenum	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 00:29	1
Selenium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 00:29	1
Thallium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 00:29	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.000813		0.000200		mg/L		09/23/22 13:47	09/26/22 12:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	484		50.0		mg/L			09/20/22 16:03	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.2	HF	0.1		SU			09/16/22 11:46	1

Client Sample Results

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

Job ID: 310-240284-1

Client Sample ID: MW-6A

Lab Sample ID: 310-240284-3

Date Collected: 09/14/22 12:45

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	13.3		5.00		mg/L			09/30/22 19:07	5
Fluoride	<0.500		0.500		mg/L			09/30/22 19:07	5
Sulfate	16.4		5.00		mg/L			09/30/22 19:07	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 00:33	1
Arsenic	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 00:33	1
Barium	0.229		0.00200		mg/L		09/19/22 09:00	09/28/22 00:33	1
Beryllium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 00:33	1
Boron	<0.100		0.100		mg/L		09/19/22 09:00	09/28/22 00:33	1
Cadmium	<0.000100		0.000100		mg/L		09/19/22 09:00	09/28/22 00:33	1
Calcium	89.0		0.500		mg/L		09/19/22 09:00	09/28/22 00:33	1
Chromium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 00:33	1
Cobalt	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 00:33	1
Lead	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 00:33	1
Lithium	<0.0100		0.0100		mg/L		09/19/22 09:00	09/28/22 00:33	1
Molybdenum	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 00:33	1
Selenium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 00:33	1
Thallium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 00:33	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/23/22 13:47	09/26/22 12:58	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	334		50.0		mg/L			09/20/22 16:03	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.3	HF	0.1		SU			09/16/22 11:47	1

Client Sample Results

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

Job ID: 310-240284-1

Client Sample ID: MW-8
Date Collected: 09/13/22 13:30
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-4
Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	16.7		5.00		mg/L			09/29/22 19:24	5
Fluoride	<0.500		0.500		mg/L			09/29/22 19:24	5
Sulfate	67.1		5.00		mg/L			09/29/22 19:24	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 00:36	1
Arsenic	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 00:36	1
Barium	0.0703		0.00200		mg/L		09/19/22 09:00	09/28/22 00:36	1
Beryllium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 00:36	1
Boron	<0.100		0.100		mg/L		09/19/22 09:00	09/28/22 00:36	1
Cadmium	<0.000100		0.000100		mg/L		09/19/22 09:00	09/28/22 00:36	1
Calcium	76.8		0.500		mg/L		09/19/22 09:00	09/28/22 00:36	1
Chromium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 00:36	1
Cobalt	0.00164		0.000500		mg/L		09/19/22 09:00	09/28/22 00:36	1
Lead	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 00:36	1
Lithium	<0.0100		0.0100		mg/L		09/19/22 09:00	09/28/22 00:36	1
Molybdenum	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 00:36	1
Selenium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 00:36	1
Thallium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 00:36	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/23/22 13:47	09/26/22 13:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	350		50.0		mg/L			09/19/22 13:49	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.3	HF	0.1		SU			09/16/22 11:48	1

Client Sample Results

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

Job ID: 310-240284-1

Client Sample ID: MW-10

Lab Sample ID: 310-240284-5

Date Collected: 09/14/22 14:50

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			09/29/22 19:41	5
Fluoride	<0.500		0.500		mg/L			09/29/22 19:41	5
Sulfate	31.2		5.00		mg/L			09/29/22 19:41	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 00:40	1
Arsenic	0.00497		0.00200		mg/L		09/19/22 09:00	09/28/22 00:40	1
Barium	0.223		0.00200		mg/L		09/19/22 09:00	09/28/22 00:40	1
Beryllium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 00:40	1
Boron	<0.100		0.100		mg/L		09/19/22 09:00	09/28/22 00:40	1
Cadmium	<0.000100		0.000100		mg/L		09/19/22 09:00	09/28/22 00:40	1
Calcium	82.0		0.500		mg/L		09/19/22 09:00	09/28/22 00:40	1
Chromium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 00:40	1
Cobalt	0.00109		0.000500		mg/L		09/19/22 09:00	09/28/22 00:40	1
Lead	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 00:40	1
Lithium	<0.0100		0.0100		mg/L		09/19/22 09:00	09/28/22 00:40	1
Molybdenum	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 00:40	1
Selenium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 00:40	1
Thallium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 00:40	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/23/22 13:47	09/26/22 13:02	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	340		50.0		mg/L			09/20/22 16:03	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.3	HF	0.1		SU			09/16/22 11:49	1

Client Sample Results

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

Job ID: 310-240284-1

Client Sample ID: MW-14A
Date Collected: 09/13/22 10:25
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-6
Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	22.4		5.00		mg/L			09/29/22 19:58	5
Fluoride	<0.500		0.500		mg/L			09/29/22 19:58	5
Sulfate	978		20.0		mg/L			09/29/22 20:15	20

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 01:05	1
Arsenic	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 01:05	1
Barium	0.0340		0.00200		mg/L		09/19/22 09:00	09/28/22 01:05	1
Beryllium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 01:05	1
Boron	15.1		0.400		mg/L		09/19/22 09:00	09/28/22 12:38	4
Cadmium	<0.000100		0.000100		mg/L		09/19/22 09:00	09/28/22 01:05	1
Calcium	301		0.500		mg/L		09/19/22 09:00	09/28/22 01:05	1
Chromium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 01:05	1
Cobalt	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 01:05	1
Lead	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 01:05	1
Lithium	<0.0100		0.0100		mg/L		09/19/22 09:00	09/28/22 01:05	1
Molybdenum	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 01:05	1
Selenium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 01:05	1
Thallium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 01:05	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/23/22 13:47	09/26/22 13:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	1710		50.0		mg/L			09/19/22 13:49	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.2	HF	0.1		SU			09/16/22 11:50	1

Client Sample Results

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

Job ID: 310-240284-1

Client Sample ID: MW-15A
Date Collected: 09/13/22 11:30
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-7
Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	8.29		5.00		mg/L			09/29/22 20:32	5
Fluoride	<0.500		0.500		mg/L			09/29/22 20:32	5
Sulfate	319		5.00		mg/L			09/29/22 20:32	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 01:09	1
Arsenic	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 01:09	1
Barium	0.0327		0.00200		mg/L		09/19/22 09:00	09/28/22 01:09	1
Beryllium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 01:09	1
Boron	10.4		0.400		mg/L		09/19/22 09:00	09/28/22 12:41	4
Cadmium	<0.000100		0.000100		mg/L		09/19/22 09:00	09/28/22 01:09	1
Calcium	132		0.500		mg/L		09/19/22 09:00	09/28/22 01:09	1
Chromium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 01:09	1
Cobalt	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 01:09	1
Lead	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 01:09	1
Lithium	<0.0100		0.0100		mg/L		09/19/22 09:00	09/28/22 01:09	1
Molybdenum	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 01:09	1
Selenium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 01:09	1
Thallium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 01:09	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/23/22 13:47	09/26/22 13:10	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	796		50.0		mg/L			09/19/22 13:49	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.4	HF	0.1		SU			09/16/22 11:51	1

Client Sample Results

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

Job ID: 310-240284-1

Client Sample ID: MW-21

Lab Sample ID: 310-240284-8

Date Collected: 09/12/22 13:45

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	18.0		5.00		mg/L			09/29/22 21:06	5
Fluoride	<0.500		0.500		mg/L			09/29/22 21:06	5
Sulfate	151		5.00		mg/L			09/29/22 21:06	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 01:16	1
Arsenic	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 01:16	1
Barium	0.0447		0.00200		mg/L		09/19/22 09:00	09/28/22 01:16	1
Beryllium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 01:16	1
Boron	3.69		0.100		mg/L		09/19/22 09:00	09/28/22 01:16	1
Cadmium	<0.000100		0.000100		mg/L		09/19/22 09:00	09/28/22 01:16	1
Calcium	88.2		0.500		mg/L		09/19/22 09:00	09/28/22 01:16	1
Chromium	0.00505		0.00500		mg/L		09/19/22 09:00	09/28/22 01:16	1
Cobalt	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 01:16	1
Lead	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 01:16	1
Lithium	0.0180		0.0100		mg/L		09/19/22 09:00	09/28/22 01:16	1
Molybdenum	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 01:16	1
Selenium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 01:16	1
Thallium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 01:16	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/23/22 13:47	09/26/22 13:13	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	524		50.0		mg/L			09/16/22 15:35	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	6.9	HF	0.1		SU			09/16/22 11:52	1

Client Sample Results

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

Job ID: 310-240284-1

Client Sample ID: MW-22

Lab Sample ID: 310-240284-9

Date Collected: 09/12/22 11:30

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	7.04		5.00		mg/L			09/29/22 20:49	5
Fluoride	<0.500		0.500		mg/L			09/29/22 20:49	5
Sulfate	220		5.00		mg/L			09/29/22 20:49	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 01:20	1
Arsenic	0.00285		0.00200		mg/L		09/19/22 09:00	09/28/22 01:20	1
Barium	0.243		0.00200		mg/L		09/19/22 09:00	09/28/22 01:20	1
Beryllium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 01:20	1
Boron	0.322		0.100		mg/L		09/19/22 09:00	09/28/22 01:20	1
Cadmium	<0.000100		0.000100		mg/L		09/19/22 09:00	09/28/22 01:20	1
Calcium	79.6		0.500		mg/L		09/19/22 09:00	09/28/22 01:20	1
Chromium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 01:20	1
Cobalt	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 01:20	1
Lead	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 01:20	1
Lithium	<0.0100		0.0100		mg/L		09/19/22 09:00	09/28/22 01:20	1
Molybdenum	0.00446		0.00200		mg/L		09/19/22 09:00	09/28/22 01:20	1
Selenium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 01:20	1
Thallium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 01:20	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/23/22 13:47	09/26/22 13:15	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	390		50.0		mg/L			09/16/22 15:35	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.6	HF	0.1		SU			09/16/22 11:55	1

Client Sample Results

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

Job ID: 310-240284-1

Client Sample ID: MW-23

Lab Sample ID: 310-240284-10

Date Collected: 09/13/22 09:10

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	16.2		5.00		mg/L			09/29/22 21:23	5
Fluoride	<0.500		0.500		mg/L			09/29/22 21:23	5
Sulfate	23.0		5.00		mg/L			09/29/22 21:23	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 01:24	1
Arsenic	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 01:24	1
Barium	0.0507		0.00200		mg/L		09/19/22 09:00	09/28/22 01:24	1
Beryllium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 01:24	1
Boron	0.204		0.100		mg/L		09/19/22 09:00	09/28/22 01:24	1
Cadmium	<0.000100		0.000100		mg/L		09/19/22 09:00	09/28/22 01:24	1
Calcium	54.5		0.500		mg/L		09/19/22 09:00	09/28/22 01:24	1
Chromium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 01:24	1
Cobalt	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 01:24	1
Lead	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 01:24	1
Lithium	<0.0100		0.0100		mg/L		09/19/22 09:00	09/28/22 01:24	1
Molybdenum	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 01:24	1
Selenium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 01:24	1
Thallium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 01:24	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/23/22 13:47	09/26/22 13:17	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	278		50.0		mg/L			09/19/22 13:49	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.6	HF	0.1		SU			09/16/22 11:57	1

Client Sample Results

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

Job ID: 310-240284-1

Client Sample ID: QA-A
Date Collected: 09/12/22 12:00
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-14
Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	17.2		5.00		mg/L			09/29/22 23:06	5
Fluoride	<0.500		0.500		mg/L			09/29/22 23:06	5
Sulfate	149		5.00		mg/L			09/29/22 23:06	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 01:39	1
Arsenic	0.00418		0.00200		mg/L		09/19/22 09:00	09/28/22 01:39	1
Barium	0.261		0.00200		mg/L		09/19/22 09:00	09/28/22 01:39	1
Beryllium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 01:39	1
Boron	0.130		0.100		mg/L		09/19/22 09:00	09/28/22 01:39	1
Cadmium	<0.000100		0.000100		mg/L		09/19/22 09:00	09/28/22 01:39	1
Calcium	81.2		0.500		mg/L		09/19/22 09:00	09/28/22 01:39	1
Chromium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 01:39	1
Cobalt	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 01:39	1
Lead	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 01:39	1
Lithium	<0.0100		0.0100		mg/L		09/19/22 09:00	09/28/22 01:39	1
Molybdenum	0.00527		0.00200		mg/L		09/19/22 09:00	09/28/22 01:39	1
Selenium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 01:39	1
Thallium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 01:39	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/23/22 13:47	09/26/22 13:19	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	394		50.0		mg/L			09/16/22 15:35	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.5	HF	0.1		SU			09/16/22 11:58	1

Client Sample Results

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

Job ID: 310-240284-1

Client Sample ID: QA-B DUP

Lab Sample ID: 310-240284-15

Date Collected: 09/13/22 12:00

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	9.05		5.00		mg/L			09/29/22 23:24	5
Fluoride	<0.500		0.500		mg/L			09/29/22 23:24	5
Sulfate	338		5.00		mg/L			09/29/22 23:24	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 02:04	1
Arsenic	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 02:04	1
Barium	0.0325		0.00200		mg/L		09/19/22 09:00	09/28/22 02:04	1
Beryllium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 02:04	1
Boron	10.7		0.400		mg/L		09/19/22 09:00	09/28/22 12:49	4
Cadmium	<0.000100		0.000100		mg/L		09/19/22 09:00	09/28/22 02:04	1
Calcium	143		0.500		mg/L		09/19/22 09:00	09/28/22 02:04	1
Chromium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 02:04	1
Cobalt	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 02:04	1
Lead	<0.000500		0.000500		mg/L		09/19/22 09:00	09/28/22 02:04	1
Lithium	<0.0100		0.0100		mg/L		09/19/22 09:00	09/28/22 02:04	1
Molybdenum	<0.00200		0.00200		mg/L		09/19/22 09:00	09/28/22 02:04	1
Selenium	<0.00500		0.00500		mg/L		09/19/22 09:00	09/28/22 02:04	1
Thallium	<0.00100		0.00100		mg/L		09/19/22 09:00	09/28/22 02:04	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/23/22 13:47	09/26/22 13:21	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	802		50.0		mg/L			09/19/22 13:49	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	7.3	HF	0.1		SU			09/16/22 11:59	1

Definitions/Glossary

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

Job ID: 310-240284-1

Qualifiers

General Chemistry

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

Glossary

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

QC Sample Results

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

Job ID: 310-240284-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-367167/3
Matrix: Water
Analysis Batch: 367167

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			09/29/22 16:50	1
Fluoride	<0.100		0.100		mg/L			09/29/22 16:50	1
Sulfate	<1.00		1.00		mg/L			09/29/22 16:50	1

Lab Sample ID: LCS 310-367167/4
Matrix: Water
Analysis Batch: 367167

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	9.934		mg/L		99	90 - 110
Fluoride	2.00	2.006		mg/L		100	90 - 110
Sulfate	10.0	10.17		mg/L		102	90 - 110

Lab Sample ID: 310-240284-1 MS
Matrix: Ground Water
Analysis Batch: 367167

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	16.8		25.0	40.72		mg/L		96	80 - 120
Fluoride	<0.500		5.00	5.534		mg/L		111	80 - 120
Sulfate	49.5		25.0	74.80		mg/L		101	80 - 120

Lab Sample ID: 310-240284-1 MSD
Matrix: Ground Water
Analysis Batch: 367167

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	16.8		25.0	40.46		mg/L		95	80 - 120	1	15
Fluoride	<0.500		5.00	5.235		mg/L		105	80 - 120	6	15
Sulfate	49.5		25.0	74.34		mg/L		99	80 - 120	1	15

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: 310-240284-7 DU
Matrix: Ground Water
Analysis Batch: 366891

Client Sample ID: MW-15A
Prep Type: Total/NA
Prep Batch: 365810

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	<0.0500		<0.0500		mg/L		NC	20
Antimony	<0.00200		<0.00200		mg/L		NC	20
Arsenic	<0.00200		<0.00200		mg/L		NC	20
Barium	0.0327		0.03383		mg/L		3	20
Beryllium	<0.00100		<0.00100		mg/L		NC	20
Cadmium	<0.000100		<0.000100		mg/L		NC	20
Calcium	132		137.8		mg/L		4	20
Copper	<0.00500		<0.00500		mg/L		NC	20
Chromium	<0.00500		<0.00500		mg/L		NC	20
Iron	<0.100		<0.100		mg/L		NC	20
Cobalt	<0.000500		<0.000500		mg/L		NC	20
Magnesium	56.1		58.55		mg/L		4	20

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QC Sample Results

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

Job ID: 310-240284-1

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

Lab Sample ID: 310-240284-7 DU
 Matrix: Ground Water
 Analysis Batch: 366891

Client Sample ID: MW-15A
 Prep Type: Total/NA
 Prep Batch: 365810

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Manganese	<0.0100		<0.0100		mg/L		NC	20
Lead	<0.000500		<0.000500		mg/L		NC	20
Lithium	<0.0100		<0.0100		mg/L		NC	20
Nickel	<0.00500		<0.00500		mg/L		NC	20
Strontium	0.127		0.1316		mg/L		4	20
Molybdenum	<0.00200		<0.00200		mg/L		NC	20
Vanadium	<0.00500		<0.00500		mg/L		NC	20
Zinc	<0.0200		<0.0200		mg/L		NC	20
Selenium	<0.00500		<0.00500		mg/L		NC	20
Thallium	<0.00100		<0.00100		mg/L		NC	20

Lab Sample ID: 310-240284-7 DU
 Matrix: Ground Water
 Analysis Batch: 366965

Client Sample ID: MW-15A
 Prep Type: Total/NA
 Prep Batch: 365810

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Boron	10.4		10.97		mg/L		6	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-366489/1-A
 Matrix: Water
 Analysis Batch: 366674

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 366489

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil	Fac
	Result	Qualifier								
Mercury	<0.000200		0.000200		mg/L		09/23/22 13:47	09/26/22 12:24		1

Lab Sample ID: LCS 310-366489/2-A
 Matrix: Water
 Analysis Batch: 366674

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 366489

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits

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

Lab Sample ID: MB 310-365817/1
 Matrix: Water
 Analysis Batch: 365817

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

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil	Fac
	Result	Qualifier								
Total Dissolved Solids	<50.0		50.0		mg/L			09/16/22 15:35		1

Lab Sample ID: LCS 310-365817/2
 Matrix: Water
 Analysis Batch: 365817

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits

QC Sample Results

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

Job ID: 310-240284-1

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

Lab Sample ID: MB 310-365964/1
Matrix: Water
Analysis Batch: 365964

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			09/19/22 13:49	1

Lab Sample ID: LCS 310-365964/2
Matrix: Water
Analysis Batch: 365964

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	972.0		mg/L		97	90 - 110

Lab Sample ID: MB 310-366118/1
Matrix: Water
Analysis Batch: 366118

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			09/20/22 16:03	1

Lab Sample ID: LCS 310-366118/2
Matrix: Water
Analysis Batch: 366118

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

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

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-365782/1
Matrix: Water
Analysis Batch: 365782

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

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

Lab Sample ID: 310-240284-9 DU
Matrix: Ground Water
Analysis Batch: 365782

Client Sample ID: MW-22
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.6	HF	7.6		SU		0.3	20

QC Association Summary

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

Job ID: 310-240284-1

HPLC/IC

Analysis Batch: 367167

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-240284-1	MW-4B	Total/NA	Ground Water	9056A	
310-240284-2	MW-5B	Total/NA	Ground Water	9056A	
310-240284-3	MW-6A	Total/NA	Ground Water	9056A	
310-240284-4	MW-8	Total/NA	Ground Water	9056A	
310-240284-5	MW-10	Total/NA	Ground Water	9056A	
310-240284-6	MW-14A	Total/NA	Ground Water	9056A	
310-240284-6	MW-14A	Total/NA	Ground Water	9056A	
310-240284-7	MW-15A	Total/NA	Ground Water	9056A	
310-240284-8	MW-21	Total/NA	Ground Water	9056A	
310-240284-9	MW-22	Total/NA	Ground Water	9056A	
310-240284-10	MW-23	Total/NA	Ground Water	9056A	
310-240284-14	QA-A	Total/NA	Ground Water	9056A	
310-240284-15	QA-B DUP	Total/NA	Ground Water	9056A	

Metals

Prep Batch: 365810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-240284-1	MW-4B	Total/NA	Ground Water	3005A	
310-240284-2	MW-5B	Total/NA	Ground Water	3005A	
310-240284-3	MW-6A	Total/NA	Ground Water	3005A	
310-240284-4	MW-8	Total/NA	Ground Water	3005A	
310-240284-5	MW-10	Total/NA	Ground Water	3005A	
310-240284-6	MW-14A	Total/NA	Ground Water	3005A	
310-240284-7	MW-15A	Total/NA	Ground Water	3005A	
310-240284-8	MW-21	Total/NA	Ground Water	3005A	
310-240284-9	MW-22	Total/NA	Ground Water	3005A	
310-240284-10	MW-23	Total/NA	Ground Water	3005A	
310-240284-14	QA-A	Total/NA	Ground Water	3005A	
310-240284-15	QA-B DUP	Total/NA	Ground Water	3005A	

Prep Batch: 366489

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-240284-1	MW-4B	Total/NA	Ground Water	7470A	
310-240284-2	MW-5B	Total/NA	Ground Water	7470A	
310-240284-3	MW-6A	Total/NA	Ground Water	7470A	
310-240284-4	MW-8	Total/NA	Ground Water	7470A	
310-240284-5	MW-10	Total/NA	Ground Water	7470A	
310-240284-6	MW-14A	Total/NA	Ground Water	7470A	
310-240284-7	MW-15A	Total/NA	Ground Water	7470A	
310-240284-8	MW-21	Total/NA	Ground Water	7470A	
310-240284-9	MW-22	Total/NA	Ground Water	7470A	
310-240284-10	MW-23	Total/NA	Ground Water	7470A	
310-240284-14	QA-A	Total/NA	Ground Water	7470A	
310-240284-15	QA-B DUP	Total/NA	Ground Water	7470A	

Analysis Batch: 366674

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-240284-1	MW-4B	Total/NA	Ground Water	7470A	366489
310-240284-2	MW-5B	Total/NA	Ground Water	7470A	366489
310-240284-3	MW-6A	Total/NA	Ground Water	7470A	366489

QC Association Summary

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

Job ID: 310-240284-1

Metals (Continued)

Analysis Batch: 366674 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-240284-4	MW-8	Total/NA	Ground Water	7470A	366489
310-240284-5	MW-10	Total/NA	Ground Water	7470A	366489
310-240284-6	MW-14A	Total/NA	Ground Water	7470A	366489
310-240284-7	MW-15A	Total/NA	Ground Water	7470A	366489
310-240284-8	MW-21	Total/NA	Ground Water	7470A	366489
310-240284-9	MW-22	Total/NA	Ground Water	7470A	366489
310-240284-10	MW-23	Total/NA	Ground Water	7470A	366489
310-240284-14	QA-A	Total/NA	Ground Water	7470A	366489
310-240284-15	QA-B DUP	Total/NA	Ground Water	7470A	366489

Analysis Batch: 366891

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-240284-1	MW-4B	Total/NA	Ground Water	6020A	365810
310-240284-2	MW-5B	Total/NA	Ground Water	6020A	365810
310-240284-3	MW-6A	Total/NA	Ground Water	6020A	365810
310-240284-4	MW-8	Total/NA	Ground Water	6020A	365810
310-240284-5	MW-10	Total/NA	Ground Water	6020A	365810
310-240284-6	MW-14A	Total/NA	Ground Water	6020A	365810
310-240284-7	MW-15A	Total/NA	Ground Water	6020A	365810
310-240284-8	MW-21	Total/NA	Ground Water	6020A	365810
310-240284-9	MW-22	Total/NA	Ground Water	6020A	365810
310-240284-10	MW-23	Total/NA	Ground Water	6020A	365810
310-240284-14	QA-A	Total/NA	Ground Water	6020A	365810
310-240284-15	QA-B DUP	Total/NA	Ground Water	6020A	365810

Analysis Batch: 366965

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-240284-6	MW-14A	Total/NA	Ground Water	6020A	365810
310-240284-7	MW-15A	Total/NA	Ground Water	6020A	365810
310-240284-15	QA-B DUP	Total/NA	Ground Water	6020A	365810

General Chemistry

Analysis Batch: 365782

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-240284-1	MW-4B	Total/NA	Ground Water	SM 4500 H+ B	
310-240284-2	MW-5B	Total/NA	Ground Water	SM 4500 H+ B	
310-240284-3	MW-6A	Total/NA	Ground Water	SM 4500 H+ B	
310-240284-4	MW-8	Total/NA	Ground Water	SM 4500 H+ B	
310-240284-5	MW-10	Total/NA	Ground Water	SM 4500 H+ B	
310-240284-6	MW-14A	Total/NA	Ground Water	SM 4500 H+ B	
310-240284-7	MW-15A	Total/NA	Ground Water	SM 4500 H+ B	
310-240284-8	MW-21	Total/NA	Ground Water	SM 4500 H+ B	
310-240284-9	MW-22	Total/NA	Ground Water	SM 4500 H+ B	
310-240284-10	MW-23	Total/NA	Ground Water	SM 4500 H+ B	
310-240284-14	QA-A	Total/NA	Ground Water	SM 4500 H+ B	
310-240284-15	QA-B DUP	Total/NA	Ground Water	SM 4500 H+ B	

Analysis Batch: 365817

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-240284-8	MW-21	Total/NA	Ground Water	SM 2540C	

Eurofins Cedar Falls

QC Association Summary

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

Job ID: 310-240284-1

General Chemistry (Continued)

Analysis Batch: 365817 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-240284-9	MW-22	Total/NA	Ground Water	SM 2540C	
310-240284-14	QA-A	Total/NA	Ground Water	SM 2540C	

Analysis Batch: 365964

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-240284-4	MW-8	Total/NA	Ground Water	SM 2540C	
310-240284-6	MW-14A	Total/NA	Ground Water	SM 2540C	
310-240284-7	MW-15A	Total/NA	Ground Water	SM 2540C	
310-240284-10	MW-23	Total/NA	Ground Water	SM 2540C	
310-240284-15	QA-B DUP	Total/NA	Ground Water	SM 2540C	

Analysis Batch: 366118

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-240284-1	MW-4B	Total/NA	Ground Water	SM 2540C	
310-240284-2	MW-5B	Total/NA	Ground Water	SM 2540C	
310-240284-3	MW-6A	Total/NA	Ground Water	SM 2540C	
310-240284-5	MW-10	Total/NA	Ground Water	SM 2540C	

Lab Chronicle

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

Job ID: 310-240284-1

Client Sample ID: MW-4B
Date Collected: 09/14/22 11:45
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-1
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	367167	J7CK	EET CF	09/29/22 17:24
Total/NA	Prep	3005A			365810	QTZ5	EET CF	09/19/22 09:00
Total/NA	Analysis	6020A		1	366891	A6US	EET CF	09/28/22 00:25
Total/NA	Prep	7470A			366489	XXW3	EET CF	09/23/22 13:47
Total/NA	Analysis	7470A		1	366674	XXW3	EET CF	09/26/22 12:53
Total/NA	Analysis	SM 2540C		1	366118	ENB7	EET CF	09/20/22 16:03
Total/NA	Analysis	SM 4500 H+ B		1	365782	W9YR	EET CF	09/16/22 11:45

Client Sample ID: MW-5B
Date Collected: 09/14/22 13:45
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-2
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	367167	J7CK	EET CF	09/29/22 18:15
Total/NA	Prep	3005A			365810	QTZ5	EET CF	09/19/22 09:00
Total/NA	Analysis	6020A		1	366891	A6US	EET CF	09/28/22 00:29
Total/NA	Prep	7470A			366489	XXW3	EET CF	09/23/22 13:47
Total/NA	Analysis	7470A		1	366674	XXW3	EET CF	09/26/22 12:55
Total/NA	Analysis	SM 2540C		1	366118	ENB7	EET CF	09/20/22 16:03
Total/NA	Analysis	SM 4500 H+ B		1	365782	W9YR	EET CF	09/16/22 11:46

Client Sample ID: MW-6A
Date Collected: 09/14/22 12:45
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-3
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	367167	J7CK	EET CF	09/30/22 19:07
Total/NA	Prep	3005A			365810	QTZ5	EET CF	09/19/22 09:00
Total/NA	Analysis	6020A		1	366891	A6US	EET CF	09/28/22 00:33
Total/NA	Prep	7470A			366489	XXW3	EET CF	09/23/22 13:47
Total/NA	Analysis	7470A		1	366674	XXW3	EET CF	09/26/22 12:58
Total/NA	Analysis	SM 2540C		1	366118	ENB7	EET CF	09/20/22 16:03
Total/NA	Analysis	SM 4500 H+ B		1	365782	W9YR	EET CF	09/16/22 11:47

Client Sample ID: MW-8
Date Collected: 09/13/22 13:30
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-4
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	367167	J7CK	EET CF	09/29/22 19:24
Total/NA	Prep	3005A			365810	QTZ5	EET CF	09/19/22 09:00
Total/NA	Analysis	6020A		1	366891	A6US	EET CF	09/28/22 00:36
Total/NA	Prep	7470A			366489	XXW3	EET CF	09/23/22 13:47
Total/NA	Analysis	7470A		1	366674	XXW3	EET CF	09/26/22 13:00

Eurofins Cedar Falls

Lab Chronicle

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

Job ID: 310-240284-1

Client Sample ID: MW-8
Date Collected: 09/13/22 13:30
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-4
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 2540C		1	365964	HE7K	EET CF	09/19/22 13:49
Total/NA	Analysis	SM 4500 H+ B		1	365782	W9YR	EET CF	09/16/22 11:48

Client Sample ID: MW-10
Date Collected: 09/14/22 14:50
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-5
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	367167	J7CK	EET CF	09/29/22 19:41
Total/NA	Prep	3005A			365810	QTZ5	EET CF	09/19/22 09:00
Total/NA	Analysis	6020A		1	366891	A6US	EET CF	09/28/22 00:40
Total/NA	Prep	7470A			366489	XXW3	EET CF	09/23/22 13:47
Total/NA	Analysis	7470A		1	366674	XXW3	EET CF	09/26/22 13:02
Total/NA	Analysis	SM 2540C		1	366118	ENB7	EET CF	09/20/22 16:03
Total/NA	Analysis	SM 4500 H+ B		1	365782	W9YR	EET CF	09/16/22 11:49

Client Sample ID: MW-14A
Date Collected: 09/13/22 10:25
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-6
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	367167	J7CK	EET CF	09/29/22 19:58
Total/NA	Analysis	9056A		20	367167	J7CK	EET CF	09/29/22 20:15
Total/NA	Prep	3005A			365810	QTZ5	EET CF	09/19/22 09:00
Total/NA	Analysis	6020A		1	366891	A6US	EET CF	09/28/22 01:05
Total/NA	Prep	3005A			365810	QTZ5	EET CF	09/19/22 09:00
Total/NA	Analysis	6020A		4	366965	A6US	EET CF	09/28/22 12:38
Total/NA	Prep	7470A			366489	XXW3	EET CF	09/23/22 13:47
Total/NA	Analysis	7470A		1	366674	XXW3	EET CF	09/26/22 13:04
Total/NA	Analysis	SM 2540C		1	365964	HE7K	EET CF	09/19/22 13:49
Total/NA	Analysis	SM 4500 H+ B		1	365782	W9YR	EET CF	09/16/22 11:50

Client Sample ID: MW-15A
Date Collected: 09/13/22 11:30
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-7
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	367167	J7CK	EET CF	09/29/22 20:32
Total/NA	Prep	3005A			365810	QTZ5	EET CF	09/19/22 09:00
Total/NA	Analysis	6020A		1	366891	A6US	EET CF	09/28/22 01:09
Total/NA	Prep	3005A			365810	QTZ5	EET CF	09/19/22 09:00
Total/NA	Analysis	6020A		4	366965	A6US	EET CF	09/28/22 12:41
Total/NA	Prep	7470A			366489	XXW3	EET CF	09/23/22 13:47
Total/NA	Analysis	7470A		1	366674	XXW3	EET CF	09/26/22 13:10

Lab Chronicle

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

Job ID: 310-240284-1

Client Sample ID: MW-15A
Date Collected: 09/13/22 11:30
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-7
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	SM 2540C		1	365964	HE7K	EET CF	09/19/22 13:49
Total/NA	Analysis	SM 4500 H+ B		1	365782	W9YR	EET CF	09/16/22 11:51

Client Sample ID: MW-21
Date Collected: 09/12/22 13:45
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-8
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	367167	J7CK	EET CF	09/29/22 21:06
Total/NA	Prep	3005A			365810	QTZ5	EET CF	09/19/22 09:00
Total/NA	Analysis	6020A		1	366891	A6US	EET CF	09/28/22 01:16
Total/NA	Prep	7470A			366489	XXW3	EET CF	09/23/22 13:47
Total/NA	Analysis	7470A		1	366674	XXW3	EET CF	09/26/22 13:13
Total/NA	Analysis	SM 2540C		1	365817	ENB7	EET CF	09/16/22 15:35
Total/NA	Analysis	SM 4500 H+ B		1	365782	W9YR	EET CF	09/16/22 11:52

Client Sample ID: MW-22
Date Collected: 09/12/22 11:30
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-9
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	367167	J7CK	EET CF	09/29/22 20:49
Total/NA	Prep	3005A			365810	QTZ5	EET CF	09/19/22 09:00
Total/NA	Analysis	6020A		1	366891	A6US	EET CF	09/28/22 01:20
Total/NA	Prep	7470A			366489	XXW3	EET CF	09/23/22 13:47
Total/NA	Analysis	7470A		1	366674	XXW3	EET CF	09/26/22 13:15
Total/NA	Analysis	SM 2540C		1	365817	ENB7	EET CF	09/16/22 15:35
Total/NA	Analysis	SM 4500 H+ B		1	365782	W9YR	EET CF	09/16/22 11:55

Client Sample ID: MW-23
Date Collected: 09/13/22 09:10
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-10
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	367167	J7CK	EET CF	09/29/22 21:23
Total/NA	Prep	3005A			365810	QTZ5	EET CF	09/19/22 09:00
Total/NA	Analysis	6020A		1	366891	A6US	EET CF	09/28/22 01:24
Total/NA	Prep	7470A			366489	XXW3	EET CF	09/23/22 13:47
Total/NA	Analysis	7470A		1	366674	XXW3	EET CF	09/26/22 13:17
Total/NA	Analysis	SM 2540C		1	365964	HE7K	EET CF	09/19/22 13:49
Total/NA	Analysis	SM 4500 H+ B		1	365782	W9YR	EET CF	09/16/22 11:57

Lab Chronicle

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

Job ID: 310-240284-1

Client Sample ID: QA-A
Date Collected: 09/12/22 12:00
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-14
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	367167	J7CK	EET CF	09/29/22 23:06
Total/NA	Prep	3005A			365810	QTZ5	EET CF	09/19/22 09:00
Total/NA	Analysis	6020A		1	366891	A6US	EET CF	09/28/22 01:39
Total/NA	Prep	7470A			366489	XXW3	EET CF	09/23/22 13:47
Total/NA	Analysis	7470A		1	366674	XXW3	EET CF	09/26/22 13:19
Total/NA	Analysis	SM 2540C		1	365817	ENB7	EET CF	09/16/22 15:35
Total/NA	Analysis	SM 4500 H+ B		1	365782	W9YR	EET CF	09/16/22 11:58

Client Sample ID: QA-B DUP
Date Collected: 09/13/22 12:00
Date Received: 09/16/22 08:50

Lab Sample ID: 310-240284-15
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	367167	J7CK	EET CF	09/29/22 23:24
Total/NA	Prep	3005A			365810	QTZ5	EET CF	09/19/22 09:00
Total/NA	Analysis	6020A		1	366891	A6US	EET CF	09/28/22 02:04
Total/NA	Prep	3005A			365810	QTZ5	EET CF	09/19/22 09:00
Total/NA	Analysis	6020A		4	366965	A6US	EET CF	09/28/22 12:49
Total/NA	Prep	7470A			366489	XXW3	EET CF	09/23/22 13:47
Total/NA	Analysis	7470A		1	366674	XXW3	EET CF	09/26/22 13:21
Total/NA	Analysis	SM 2540C		1	365964	HE7K	EET CF	09/19/22 13:49
Total/NA	Analysis	SM 4500 H+ B		1	365782	W9YR	EET CF	09/16/22 11:59

Laboratory References:

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

Accreditation/Certification Summary

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

Job ID: 310-240284-1

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Colorado	Petroleum Storage Tank Program	IA100001 (OR)	09-29-23
Georgia	State	IA100001 (OR)	09-29-23
Illinois	NELAP	200024	11-29-22
Iowa	State	007	12-02-22
Kansas	NELAP	E-10341	01-31-23
Minnesota	NELAP	019-999-319	12-31-22
Minnesota (Petrofund)	State	3349	01-18-24
North Dakota	State	R-186	09-29-22 *
Oregon	NELAP	IA100001	09-29-23

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

Method Summary

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

Job ID: 310-240284-1

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

Protocol References:

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

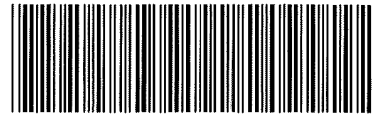
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

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



Environment Testing
America



310-240284 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscantine Power + Water</u>			
City/State:	CITY	STATE	Project:
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>9-16-22</u>	<u>850</u>	<u>ML</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>3</u>	
Cooler Custody Seals Present? No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present? No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID:	<u>T</u>	Correction Factor (°C):	<u>0</u>
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>0.7</u>	Corrected Temp (°C):	<u>0.7</u>
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE. If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			





Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscantine Power + Water</u>			
City/State	CITY	STATE	Project.
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>9-16-22</u>	<u>850</u>	<u>ML</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee			
<input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>2</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID:	<u>T</u>	Correction Factor (°C):	<u>0</u>
* Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>1.1</u>	Corrected Temp (°C):	<u>1.1</u>
* Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			





Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscantine Power + Water</u>			
City/State:	CITY	STATE	Project
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>9-16-22</u>	<u>850</u>	<u>ML</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>3</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>T</u>	Correction Factor (°C):	<u>0</u>
• Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>1.4</u>	Corrected Temp (°C):	<u>1.4</u>
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Eurofins Cedar Falls

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

Chain of Custody Record

Client Information Client Contact: Sam Bennett Phone: 563-262-3583 E-Mail: shawn_hayes@testamericainc.com Carrier Tracking No(s):		Lab PM: Hayes, Shawn M E-Mail: shawn_hayes@testamericainc.com	
Company: Muscatine Power & Water Address: 1700 Dick Drake Way City: Muscatine State: IA, Zip: 52761 Phone: 224383 Email: sbernnett@mpw.org and ramundson@hrgreen.com Project Name: Muscatine Power & Water State Landfill Site: Iowa		Due Date Requested: TAT Requested (days): PO #: WO #: TestAmerica Project #: Event:	
Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:		Preservation Codes: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - ph 4-5 Z - other (specify)	
Total Number of containers:		Special Instructions/Note:	
Perform MS/MSD (Yes or No)		Field Filtered Sample (Yes or No)	
602A State Metals List		9056A Chloride, Fluoride, Sulfate	
Sample Identification		Matrix (W=water, S=solid, O=waste/oil, ST=titania, A=air)	
MW-4B	9/14/22	1145	G
MW-5B	9/14/22	1345	G
MW-6A	9/14/22	1245	G
MW-8	9/13/22	1330	G
MW-10	9/14/22	1450	G
MW-14A	9/13/22	1025	G
MW-15A	9/13/22	1130	G
MW-21	9/12/22	1345	G
MW-22	9/12/22	1130	G
MW-23	9/13/22	0910	G
MW-24	9/13/22	1450	G
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological			
Deliverable Requested I, II, III, IV, Other (specify)			
Empty Kit Relinquished by:			
Relinquished by: Sam Bennett		Date: 9/15/22 0900	
Relinquished by:		Date/Time:	
Relinquished by:		Date/Time:	
Relinquished by:		Date/Time:	
Custody Seals Intact:		Custody Seal No:	
Δ Yes A 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		Lab PM: Hayes, Shawn M		Carrier Tracking No(s):	
Client Contact: Sam Bennett		E-Mail: shawn.hayes@testamericainc.com		COC No:	
Company: Muscatine Power & Water		Phone: 563-262-3583		Page:	
Address: 1700 Dick Drake Way		PO #: 224383		Job #:	
City: Muscatine		WO #:		Preservation Codes:	
State Zip: IA, 52761		TestAmerica Project #:		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other	
Email: sbennett@mpw.org and ramundson@hrgreen.com		Event: Fall 2022 Sample		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)	
Project Name: Muscatine Power & Water CCR Landfill		Site: Iowa		Special Instructions/Note:	
Due Date Requested		Field Filtered Sample (Yes or No)		Total Number of Containers	
TAT Requested (days):		Perform MS/MSD (Yes or No)		X	
PO #:		6024 CCR Lit, 7470A Mercury		X	
WO #:		2540C TD, SM4500 H+ PH		X	
TestAmerica Project #:		9056A Chloride, Fluoride, Sulfate		X	
Event:		6024 CCR Lit, 7470A Mercury		X	
Fall 2022 Sample		Field Filtered Sample (Yes or No)		X	
Sample Date		Sample Time		Sample Date	
Sample Type (C=comp, G=grab)		Sample Time		Sample Date	
Matrix (W=water, S=solid, O=oil, A=air)		Sample Time		Sample Date	
Preservation Code:		Sample Time		Sample Date	
G		1145		9/14/22	
G		1345		9/14/22	
G		1245		9/14/22	
G		1330		9/13/22	
G		1450		9/14/22	
G		1025		9/13/22	
G		1130		9/13/22	
G		1345		9/12/22	
G		1130		9/12/22	
G		0910		9/13/22	
G		1200		9/12/22	
Duplicate-1					
Possible Hazard Identification		Date/Time: 9/15/22 0900		Date/Time: 9/16-22 850	
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Company: mpw		Company: MC	
Deliverable Requested: I, II, III, IV, Other (specify)		Date/Time: 9/15/22 0900		Date/Time: 9/16-22 850	
Empty Kit Relinquished by: Sam Bennett		Company: mpw		Company: MC	
Relinquished by: Sam Bennett		Date/Time: 9/15/22 0900		Date/Time: 9/16-22 850	
Relinquished by:		Company:		Company:	
Custody Seals Intact: Custody Seal No		Date/Time:		Date/Time:	
Δ Yes Δ No		Cooler Temperature(s) °C and Other Remarks:			



Eurofins Cedar Falls

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

Chain of Custody Record

Client Information Client Contact: Sam Bennett Phone: 563-262-3583 E-Mail: shawn.hayes@testamericainc.com Company: Muscatine Power & Water		Lab PM: Hayes, Shawn M E-Mail: shawn.hayes@testamericainc.com Carrier Tracking No(s):		COC No: Page: Job #:	
Address: 1700 Dick Drake Way City: Muscatine State, Zip: IA, 52761 Phone: PO #: 224383 WO #: Email: sbennett@mpw.org and ramundson@hrgreen.com Project Name: Muscatine Power & Water CCR Landfill Site: Iowa		Due Date Requested: TAT Requested (days): PO #: WO #: TestAmerica Project #: Event: Federal List		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - ph 4-5 Z - other (specify)	
Sample Identification Duplicate-2		Sample Date: 9/13/22 Sample Time: 1200 Sample Type (C=comp, G=grab): G Matrix (Water, Solid, Other): GW		Analysis Requested: 602A CCR List, 747A Mercury 2540C TDS, SM4500 H+ pH 9056A Chloride, Fluoride, Sulfate Radium-226 Radium-228	
Sample ID: _____ Date: _____ Time: _____ Location: _____ Sampler: _____ Matrix: _____ Preservation Code: _____ Special Instructions/Note:		Perform MS/MSD (Yes or No): <input checked="" type="checkbox"/> Field Filtered Sample (Yes or No): <input checked="" type="checkbox"/> Total Number of Containers: <input checked="" type="checkbox"/>		Special Instructions/Note:	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological					
Deliverable Requested I II III, IV Other (specify)					
Empty Kit Relinquished by:					
Relinquished by: Sam Bennett Date/Time: 9/15/22 0900 Company: MPW		Received by: MC Date/Time: 9-16-22 850 Company:		Method of Shipment:	
Relinquished by:		Received by:		Date/Time:	
Relinquished by:		Received by:		Date/Time:	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Cooler Temperature(s) °C and Other Remarks:		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	



Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-240284-1

Login Number: 240284

List Number: 1

Creator: Costello, Mackenzie K

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	QA-A and QA-B DUP not listed on COC. Same date/time as duplicate samples.
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	

ANALYTICAL REPORT

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls, IA 50613
Tel: (319)277-2401

Laboratory Job ID: 310-240284-2

Client Project/Site: Muscatine Power & Water CCR

For:

Muscatine Power & Water
1700 Dick Drake Way
PO BOX 899
Muscatine, Iowa 52761

Attn: Sam Bennett



Authorized for release by:
10/26/2022 5:53:25 PM

Shirley Thompson, Client Service Manager
(319)277-2401
Shirley.Thompson@et.eurofinsus.com

LINKS

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results through



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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Case Narrative

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

Job ID: 310-240284-2

Job ID: 310-240284-2

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-240284-2

Comments

No additional comments.

Receipt

The samples were received on 9/16/2022 8:50 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 0.7° C, 1.1° C and 1.4° C.

RAD

Method 9315: Radium 226 Batch 160-583477: Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-4B (310-240284-1), MW-5B (310-240284-2), MW-6A (310-240284-3), MW-8 (310-240284-4), MW-10 (310-240284-5), MW-14A (310-240284-6), MW-15A (310-240284-7), MW-21 (310-240284-8), MW-22 (310-240284-9), MW-23 (310-240284-10), QA-A (310-240284-14), QA-B DUP (310-240284-15), (LCS 160-583477/2-A), (MB 160-583477/1-A) and (310-240284-D-1-A DU)

Method 9320: Radium 228 Batch 160-583478: Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-4B (310-240284-1), MW-5B (310-240284-2), MW-6A (310-240284-3), MW-8 (310-240284-4), MW-10 (310-240284-5), MW-14A (310-240284-6), MW-15A (310-240284-7), MW-21 (310-240284-8), MW-22 (310-240284-9), MW-23 (310-240284-10), QA-A (310-240284-14), QA-B DUP (310-240284-15), (LCS 160-583478/2-A), (MB 160-583478/1-A) and (310-240284-D-1-B DU)

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

Sample Summary

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

Job ID: 310-240284-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-240284-1	MW-4B	Ground Water	09/14/22 11:45	09/16/22 08:50
310-240284-2	MW-5B	Ground Water	09/14/22 13:45	09/16/22 08:50
310-240284-3	MW-6A	Ground Water	09/14/22 12:45	09/16/22 08:50
310-240284-4	MW-8	Ground Water	09/13/22 13:30	09/16/22 08:50
310-240284-5	MW-10	Ground Water	09/14/22 14:50	09/16/22 08:50
310-240284-6	MW-14A	Ground Water	09/13/22 10:25	09/16/22 08:50
310-240284-7	MW-15A	Ground Water	09/13/22 11:30	09/16/22 08:50
310-240284-8	MW-21	Ground Water	09/12/22 13:45	09/16/22 08:50
310-240284-9	MW-22	Ground Water	09/12/22 11:30	09/16/22 08:50
310-240284-10	MW-23	Ground Water	09/13/22 09:10	09/16/22 08:50
310-240284-14	QA-A	Ground Water	09/12/22 12:00	09/16/22 08:50
310-240284-15	QA-B DUP	Ground Water	09/13/22 12:00	09/16/22 08:50

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Detection Summary

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

Job ID: 310-240284-2

Client Sample ID: MW-4B	Lab Sample ID: 310-240284-1
No Detections.	
Client Sample ID: MW-5B	Lab Sample ID: 310-240284-2
No Detections.	
Client Sample ID: MW-6A	Lab Sample ID: 310-240284-3
No Detections.	
Client Sample ID: MW-8	Lab Sample ID: 310-240284-4
No Detections.	
Client Sample ID: MW-10	Lab Sample ID: 310-240284-5
No Detections.	
Client Sample ID: MW-14A	Lab Sample ID: 310-240284-6
No Detections.	
Client Sample ID: MW-15A	Lab Sample ID: 310-240284-7
No Detections.	
Client Sample ID: MW-21	Lab Sample ID: 310-240284-8
No Detections.	
Client Sample ID: MW-22	Lab Sample ID: 310-240284-9
No Detections.	
Client Sample ID: MW-23	Lab Sample ID: 310-240284-10
No Detections.	
Client Sample ID: QA-A	Lab Sample ID: 310-240284-14
No Detections.	
Client Sample ID: QA-B DUP	Lab Sample ID: 310-240284-15
No Detections.	

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

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

Job ID: 310-240284-2

Client Sample ID: MW-4B

Lab Sample ID: 310-240284-1

Date Collected: 09/14/22 11:45

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-226	0.0958	U	0.0827	0.0832	1.00	0.123	pCi/L	09/26/22 10:08	10/20/22 07:18	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	81.1		40 - 110					09/26/22 10:08	10/20/22 07:18	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-228	0.740	U	0.509	0.513	1.00	0.763	pCi/L	09/26/22 10:10	10/13/22 18:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	81.1		40 - 110					09/26/22 10:10	10/13/22 18:35	1
Y Carrier	78.5		40 - 110					09/26/22 10:10	10/13/22 18:35	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Combined Radium 226 + 228	0.836		0.516	0.520	5.00	0.763	pCi/L		10/26/22 09:28	1

Client Sample Results

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

Job ID: 310-240284-2

Client Sample ID: MW-5B

Lab Sample ID: 310-240284-2

Date Collected: 09/14/22 13:45

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9315 - Radium-22 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.274		0.115	0.118	1.00	0.135	pCi/L	09/26/22 10:08	10/20/22 07:18	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.1		40 - 110					09/26/22 10:08	10/20/22 07:18	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	0.0895	U	0.335	0.335	1.00	0.606	pCi/L	09/26/22 10:10	10/13/22 18:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.1		40 - 110					09/26/22 10:10	10/13/22 18:35	1
Y Carrier	82.6		40 - 110					09/26/22 10:10	10/13/22 18:35	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	0.363	U	0.354	0.355	5.00	0.606	pCi/L		10/26/22 09:28	1

Client Sample Results

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

Job ID: 310-240284-2

Client Sample ID: MW-6A

Lab Sample ID: 310-240284-3

Date Collected: 09/14/22 12:45

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.244		0.0996	0.102	1.00	0.0996	pCi/L	09/26/22 10:08	10/20/22 07:19	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.2		40 - 110					09/26/22 10:08	10/20/22 07:19	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	0.355	U	0.353	0.354	1.00	0.563	pCi/L	09/26/22 10:10	10/13/22 18:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.2		40 - 110					09/26/22 10:10	10/13/22 18:35	1
Y Carrier	81.9		40 - 110					09/26/22 10:10	10/13/22 18:35	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	0.599		0.367	0.368	5.00	0.563	pCi/L		10/26/22 09:28	1

Client Sample Results

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

Job ID: 310-240284-2

Client Sample ID: MW-8

Lab Sample ID: 310-240284-4

Date Collected: 09/13/22 13:30

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-226	0.0635	U	0.0654	0.0656	1.00	0.102	pCi/L	09/26/22 10:08	10/20/22 07:19	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.2		40 - 110					09/26/22 10:08	10/20/22 07:19	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-228	-0.0943	U	0.335	0.335	1.00	0.666	pCi/L	09/26/22 10:10	10/13/22 18:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.2		40 - 110					09/26/22 10:10	10/13/22 18:35	1
Y Carrier	78.5		40 - 110					09/26/22 10:10	10/13/22 18:35	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Combined Radium 226 + 228	-0.0309	U	0.341	0.341	5.00	0.666	pCi/L		10/26/22 09:28	1

Client Sample Results

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

Job ID: 310-240284-2

Client Sample ID: MW-10

Lab Sample ID: 310-240284-5

Date Collected: 09/14/22 14:50

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9315 - Radium-22 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.362		0.124	0.129	1.00	0.119	pCi/L	09/26/22 10:08	10/20/22 07:19	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.0		40 - 110					09/26/22 10:08	10/20/22 07:19	1

Method: SW846 9320 - Radium-22 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.759		0.503	0.508	1.00	0.756	pCi/L	09/26/22 10:10	10/13/22 18:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.0		40 - 110					09/26/22 10:10	10/13/22 18:35	1
Y Carrier	81.1		40 - 110					09/26/22 10:10	10/13/22 18:35	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	1.12		0.518	0.524	5.00	0.756	pCi/L		10/26/22 09:28	1

Client Sample Results

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

Job ID: 310-240284-2

Client Sample ID: MW-14A

Lab Sample ID: 310-240284-6

Date Collected: 09/13/22 10:25

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-226	0.0533	U	0.0689	0.0691	1.00	0.114	pCi/L	09/26/22 10:08	10/20/22 07:20	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	76.7		40 - 110					09/26/22 10:08	10/20/22 07:20	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-228	0.0310	U	0.529	0.529	1.00	0.956	pCi/L	09/26/22 10:10	10/13/22 18:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	76.7		40 - 110					09/26/22 10:10	10/13/22 18:35	1
Y Carrier	85.6		40 - 110					09/26/22 10:10	10/13/22 18:35	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Combined Radium 226 + 228	0.0843	U	0.533	0.533	5.00	0.956	pCi/L		10/26/22 09:28	1

Client Sample Results

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

Job ID: 310-240284-2

Client Sample ID: MW-15A

Lab Sample ID: 310-240284-7

Date Collected: 09/13/22 11:30

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-226	-0.0189	U	0.0448	0.0449	1.00	0.111	pCi/L	09/26/22 10:08	10/20/22 07:20	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.7		40 - 110					09/26/22 10:08	10/20/22 07:20	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-228	-0.140	U	0.397	0.397	1.00	0.770	pCi/L	09/26/22 10:10	10/13/22 18:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.7		40 - 110					09/26/22 10:10	10/13/22 18:35	1
Y Carrier	84.5		40 - 110					09/26/22 10:10	10/13/22 18:35	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Combined Radium 226 + 228	-0.159	U	0.400	0.400	5.00	0.770	pCi/L		10/26/22 09:28	1

Client Sample Results

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

Job ID: 310-240284-2

Client Sample ID: MW-21

Lab Sample ID: 310-240284-8

Date Collected: 09/12/22 13:45

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.117		0.0794	0.0801	1.00	0.104	pCi/L	09/26/22 10:08	10/20/22 07:20	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.2		40 - 110					09/26/22 10:08	10/20/22 07:20	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.195	U	0.374	0.374	1.00	0.747	pCi/L	09/26/22 10:10	10/13/22 18:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	86.2		40 - 110					09/26/22 10:10	10/13/22 18:35	1
Y Carrier	83.0		40 - 110					09/26/22 10:10	10/13/22 18:35	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	-0.0783	U	0.382	0.382	5.00	0.747	pCi/L		10/26/22 09:28	1

Client Sample Results

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

Job ID: 310-240284-2

Client Sample ID: MW-22

Lab Sample ID: 310-240284-9

Date Collected: 09/12/22 11:30

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.170		0.0958	0.0971	1.00	0.123	pCi/L	09/26/22 10:08	10/20/22 07:21	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.4		40 - 110					09/26/22 10:08	10/20/22 07:21	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	0.112	U	0.395	0.395	1.00	0.710	pCi/L	09/26/22 10:10	10/13/22 18:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	93.4		40 - 110					09/26/22 10:10	10/13/22 18:36	1
Y Carrier	73.6		40 - 110					09/26/22 10:10	10/13/22 18:36	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	0.283	U	0.406	0.407	5.00	0.710	pCi/L		10/26/22 09:28	1

Client Sample Results

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

Job ID: 310-240284-2

Client Sample ID: MW-23

Lab Sample ID: 310-240284-10

Date Collected: 09/13/22 09:10

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0309	U	0.0652	0.0653	1.00	0.119	pCi/L	09/26/22 10:08	10/20/22 07:21	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	81.3		40 - 110					09/26/22 10:08	10/20/22 07:21	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	-0.225	U	0.315	0.316	1.00	0.674	pCi/L	09/26/22 10:10	10/13/22 18:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	81.3		40 - 110					09/26/22 10:10	10/13/22 18:36	1
Y Carrier	83.7		40 - 110					09/26/22 10:10	10/13/22 18:36	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	-0.195	U	0.322	0.323	5.00	0.674	pCi/L		10/26/22 09:28	1

Client Sample Results

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

Job ID: 310-240284-2

Client Sample ID: QA-A

Lab Sample ID: 310-240284-14

Date Collected: 09/12/22 12:00

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.179		0.0931	0.0945	1.00	0.108	pCi/L	09/26/22 10:08	10/20/22 07:21	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.0		40 - 110					09/26/22 10:08	10/20/22 07:21	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	0.196	U	0.344	0.344	1.00	0.594	pCi/L	09/26/22 10:10	10/13/22 18:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.0		40 - 110					09/26/22 10:10	10/13/22 18:36	1
Y Carrier	82.6		40 - 110					09/26/22 10:10	10/13/22 18:36	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	0.375	U	0.356	0.357	5.00	0.594	pCi/L		10/26/22 09:28	1

Client Sample Results

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

Job ID: 310-240284-2

Client Sample ID: QA-B DUP

Lab Sample ID: 310-240284-15

Date Collected: 09/13/22 12:00

Matrix: Ground Water

Date Received: 09/16/22 08:50

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-226	0.0974	U	0.0854	0.0859	1.00	0.128	pCi/L	09/26/22 10:08	10/20/22 07:22	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	80.3		40 - 110					09/26/22 10:08	10/20/22 07:22	1

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Radium-228	0.143	U	0.385	0.385	1.00	0.684	pCi/L	09/26/22 10:10	10/13/22 18:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	80.3		40 - 110					09/26/22 10:10	10/13/22 18:36	1
Y Carrier	84.5		40 - 110					09/26/22 10:10	10/13/22 18:36	1

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

Analyte	Result	Qualifier	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2σ+/-)	(2σ+/-)						
Combined Radium 226 + 228	0.240	U	0.394	0.394	5.00	0.684	pCi/L		10/26/22 09:28	1

Definitions/Glossary

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

Job ID: 310-240284-2

Qualifiers

Rad

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

Glossary

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

QC Sample Results

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

Job ID: 310-240284-2

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-583477/1-A
Matrix: Water
Analysis Batch: 586614

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 583477

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.02623	U	0.0592	0.0592	1.00	0.110	pCi/L	09/26/22 10:08	10/20/22 07:17	1
Carrier	ME %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	80.8		40 - 110		09/26/22 10:08	10/20/22 07:17	1			

Lab Sample ID: LCS 160-583477/2-A
Matrix: Water
Analysis Batch: 586614

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 583477

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	10.84		1.15	1.00	0.107	pCi/L	96	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	85.7		40 - 110						

Lab Sample ID: 310-240284-1 DU
Matrix: Ground Water
Analysis Batch: 586614

Client Sample ID: MW-4B
Prep Type: Total/NA
Prep Batch: 583477

Analyte	Sample Sample		DU DU		Total	RL	MDC	Unit	RER	RER Limit
	Result	Qual	Result	Qual	Uncert. (2σ+/-)					
Radium-226	0.0958	U	0.03979	U	0.0845	1.00	0.150	pCi/L	0.33	1
Carrier	DU %Yield	DU Qualifier	Limits							
Ba Carrier	92.9		40 - 110							

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-583478/1-A
Matrix: Water
Analysis Batch: 585868

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 583478

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.5548	U	0.487	0.490	1.00	0.765	pCi/L	09/26/22 10:10	10/13/22 18:34	1
Carrier	ME %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	80.8		40 - 110		09/26/22 10:10	10/13/22 18:34	1			
Y Carrier	75.9		40 - 110		09/26/22 10:10	10/13/22 18:34	1			

QC Sample Results

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

Job ID: 310-240284-2

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

Lab Sample ID: LCS 160-583478/2-A

Matrix: Water

Analysis Batch: 585868

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 583478

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium-228	8.20	9.869		1.47	1.00	0.666	pCi/L	120	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	85.7		40 - 110						
Y Carrier	77.4		40 - 110						

Lab Sample ID: 310-240284-1 DU

Matrix: Ground Water

Analysis Batch: 585868

Client Sample ID: MW-4B

Prep Type: Total/NA

Prep Batch: 583478

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-228	0.740	U	0.9334		0.487	1.00	0.674	pCi/L	0.19	1
Carrier	DU %Yield	DU Qualifier	Limits							
Ba Carrier	92.9		40 - 110							
Y Carrier	83.4		40 - 110							

QC Association Summary

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

Job ID: 310-240284-2

Rad

Prep Batch: 583477

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-240284-1	MW-4B	Total/NA	Ground Water	PrecSep-21	
310-240284-2	MW-5B	Total/NA	Ground Water	PrecSep-21	
310-240284-3	MW-6A	Total/NA	Ground Water	PrecSep-21	
310-240284-4	MW-8	Total/NA	Ground Water	PrecSep-21	
310-240284-5	MW-10	Total/NA	Ground Water	PrecSep-21	
310-240284-6	MW-14A	Total/NA	Ground Water	PrecSep-21	
310-240284-7	MW-15A	Total/NA	Ground Water	PrecSep-21	
310-240284-8	MW-21	Total/NA	Ground Water	PrecSep-21	
310-240284-9	MW-22	Total/NA	Ground Water	PrecSep-21	
310-240284-10	MW-23	Total/NA	Ground Water	PrecSep-21	
310-240284-14	QA-A	Total/NA	Ground Water	PrecSep-21	
310-240284-15	QA-B DUP	Total/NA	Ground Water	PrecSep-21	
MB 160-583477/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-583477/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
310-240284-1 DU	MW-4B	Total/NA	Ground Water	PrecSep-21	

Prep Batch: 583478

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-240284-1	MW-4B	Total/NA	Ground Water	PrecSep_0	
310-240284-2	MW-5B	Total/NA	Ground Water	PrecSep_0	
310-240284-3	MW-6A	Total/NA	Ground Water	PrecSep_0	
310-240284-4	MW-8	Total/NA	Ground Water	PrecSep_0	
310-240284-5	MW-10	Total/NA	Ground Water	PrecSep_0	
310-240284-6	MW-14A	Total/NA	Ground Water	PrecSep_0	
310-240284-7	MW-15A	Total/NA	Ground Water	PrecSep_0	
310-240284-8	MW-21	Total/NA	Ground Water	PrecSep_0	
310-240284-9	MW-22	Total/NA	Ground Water	PrecSep_0	
310-240284-10	MW-23	Total/NA	Ground Water	PrecSep_0	
310-240284-14	QA-A	Total/NA	Ground Water	PrecSep_0	
310-240284-15	QA-B DUP	Total/NA	Ground Water	PrecSep_0	
MB 160-583478/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-583478/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
310-240284-1 DU	MW-4B	Total/NA	Ground Water	PrecSep_0	

Lab Chronicle

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

Job ID: 310-240284-2

Client Sample ID: MW-4B

Lab Sample ID: 310-240284-1

Date Collected: 09/14/22 11:45

Matrix: Ground Water

Date Received: 09/16/22 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			583477	ASG	EET SL	09/26/22 10:08
Total/NA	Analysis	9315		1	586614	CLP	EET SL	10/20/22 07:18
Total/NA	Prep	PrecSep_0			583478	ASG	EET SL	09/26/22 10:10
Total/NA	Analysis	9320		1	585868	FLC	EET SL	10/13/22 18:35
Total/NA	Analysis	Ra226_Ra228		1	587414	FLC	EET SL	10/26/22 09:28

Client Sample ID: MW-5B

Lab Sample ID: 310-240284-2

Date Collected: 09/14/22 13:45

Matrix: Ground Water

Date Received: 09/16/22 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			583477	ASG	EET SL	09/26/22 10:08
Total/NA	Analysis	9315		1	586614	CLP	EET SL	10/20/22 07:18
Total/NA	Prep	PrecSep_0			583478	ASG	EET SL	09/26/22 10:10
Total/NA	Analysis	9320		1	585868	FLC	EET SL	10/13/22 18:35
Total/NA	Analysis	Ra226_Ra228		1	587414	FLC	EET SL	10/26/22 09:28

Client Sample ID: MW-6A

Lab Sample ID: 310-240284-3

Date Collected: 09/14/22 12:45

Matrix: Ground Water

Date Received: 09/16/22 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			583477	ASG	EET SL	09/26/22 10:08
Total/NA	Analysis	9315		1	586614	CLP	EET SL	10/20/22 07:19
Total/NA	Prep	PrecSep_0			583478	ASG	EET SL	09/26/22 10:10
Total/NA	Analysis	9320		1	585868	FLC	EET SL	10/13/22 18:35
Total/NA	Analysis	Ra226_Ra228		1	587414	FLC	EET SL	10/26/22 09:28

Client Sample ID: MW-8

Lab Sample ID: 310-240284-4

Date Collected: 09/13/22 13:30

Matrix: Ground Water

Date Received: 09/16/22 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			583477	ASG	EET SL	09/26/22 10:08
Total/NA	Analysis	9315		1	586614	CLP	EET SL	10/20/22 07:19
Total/NA	Prep	PrecSep_0			583478	ASG	EET SL	09/26/22 10:10
Total/NA	Analysis	9320		1	585868	FLC	EET SL	10/13/22 18:35
Total/NA	Analysis	Ra226_Ra228		1	587414	FLC	EET SL	10/26/22 09:28

Lab Chronicle

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

Job ID: 310-240284-2

Client Sample ID: MW-10

Lab Sample ID: 310-240284-5

Date Collected: 09/14/22 14:50

Matrix: Ground Water

Date Received: 09/16/22 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			583477	ASG	EET SL	09/26/22 10:08
Total/NA	Analysis	9315		1	586614	CLP	EET SL	10/20/22 07:19
Total/NA	Prep	PrecSep_0			583478	ASG	EET SL	09/26/22 10:10
Total/NA	Analysis	9320		1	585868	FLC	EET SL	10/13/22 18:35
Total/NA	Analysis	Ra226_Ra228		1	587414	FLC	EET SL	10/26/22 09:28

Client Sample ID: MW-14A

Lab Sample ID: 310-240284-6

Date Collected: 09/13/22 10:25

Matrix: Ground Water

Date Received: 09/16/22 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			583477	ASG	EET SL	09/26/22 10:08
Total/NA	Analysis	9315		1	586614	CLP	EET SL	10/20/22 07:20
Total/NA	Prep	PrecSep_0			583478	ASG	EET SL	09/26/22 10:10
Total/NA	Analysis	9320		1	585868	FLC	EET SL	10/13/22 18:35
Total/NA	Analysis	Ra226_Ra228		1	587414	FLC	EET SL	10/26/22 09:28

Client Sample ID: MW-15A

Lab Sample ID: 310-240284-7

Date Collected: 09/13/22 11:30

Matrix: Ground Water

Date Received: 09/16/22 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			583477	ASG	EET SL	09/26/22 10:08
Total/NA	Analysis	9315		1	586614	CLP	EET SL	10/20/22 07:20
Total/NA	Prep	PrecSep_0			583478	ASG	EET SL	09/26/22 10:10
Total/NA	Analysis	9320		1	585868	FLC	EET SL	10/13/22 18:35
Total/NA	Analysis	Ra226_Ra228		1	587414	FLC	EET SL	10/26/22 09:28

Client Sample ID: MW-21

Lab Sample ID: 310-240284-8

Date Collected: 09/12/22 13:45

Matrix: Ground Water

Date Received: 09/16/22 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			583477	ASG	EET SL	09/26/22 10:08
Total/NA	Analysis	9315		1	586614	CLP	EET SL	10/20/22 07:20
Total/NA	Prep	PrecSep_0			583478	ASG	EET SL	09/26/22 10:10
Total/NA	Analysis	9320		1	585868	FLC	EET SL	10/13/22 18:35
Total/NA	Analysis	Ra226_Ra228		1	587414	FLC	EET SL	10/26/22 09:28

Lab Chronicle

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

Job ID: 310-240284-2

Client Sample ID: MW-22

Lab Sample ID: 310-240284-9

Date Collected: 09/12/22 11:30

Matrix: Ground Water

Date Received: 09/16/22 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			583477	ASG	EET SL	09/26/22 10:08
Total/NA	Analysis	9315		1	586614	CLP	EET SL	10/20/22 07:21
Total/NA	Prep	PrecSep_0			583478	ASG	EET SL	09/26/22 10:10
Total/NA	Analysis	9320		1	585868	FLC	EET SL	10/13/22 18:36
Total/NA	Analysis	Ra226_Ra228		1	587414	FLC	EET SL	10/26/22 09:28

Client Sample ID: MW-23

Lab Sample ID: 310-240284-10

Date Collected: 09/13/22 09:10

Matrix: Ground Water

Date Received: 09/16/22 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			583477	ASG	EET SL	09/26/22 10:08
Total/NA	Analysis	9315		1	586614	CLP	EET SL	10/20/22 07:21
Total/NA	Prep	PrecSep_0			583478	ASG	EET SL	09/26/22 10:10
Total/NA	Analysis	9320		1	585868	FLC	EET SL	10/13/22 18:36
Total/NA	Analysis	Ra226_Ra228		1	587414	FLC	EET SL	10/26/22 09:28

Client Sample ID: QA-A

Lab Sample ID: 310-240284-14

Date Collected: 09/12/22 12:00

Matrix: Ground Water

Date Received: 09/16/22 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			583477	ASG	EET SL	09/26/22 10:08
Total/NA	Analysis	9315		1	586614	CLP	EET SL	10/20/22 07:21
Total/NA	Prep	PrecSep_0			583478	ASG	EET SL	09/26/22 10:10
Total/NA	Analysis	9320		1	585868	FLC	EET SL	10/13/22 18:36
Total/NA	Analysis	Ra226_Ra228		1	587414	FLC	EET SL	10/26/22 09:28

Client Sample ID: QA-B DUP

Lab Sample ID: 310-240284-15

Date Collected: 09/13/22 12:00

Matrix: Ground Water

Date Received: 09/16/22 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			583477	ASG	EET SL	09/26/22 10:08
Total/NA	Analysis	9315		1	586651	CLP	EET SL	10/20/22 07:22
Total/NA	Prep	PrecSep_0			583478	ASG	EET SL	09/26/22 10:10
Total/NA	Analysis	9320		1	585868	FLC	EET SL	10/13/22 18:36
Total/NA	Analysis	Ra226_Ra228		1	587414	FLC	EET SL	10/26/22 09:28

Laboratory References:

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

Accreditation/Certification Summary

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

Job ID: 310-240284-2

Laboratory: Eurofins St. Louis

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	20-001	05-06-25
ANAB	Dept. of Defense ELAP	L2305	04-06-25
ANAB	Dept. of Energy	L2305.01	04-06-25
ANAB	ISO/IEC 17025	L2305	04-06-25
Arizona	State	AZ0813	12-08-22
California	Los Angeles County Sanitation Districts	10259	06-30-22 *
California	State	2886	07-01-22 *
Connecticut	State	PH-0241	03-31-23
Florida	NELAP	E87689	06-30-23
HI - RadChem Recognition	State	n/a	06-30-23
Illinois	NELAP	200023	11-30-23
Iowa	State	373	12-01-22
Kansas	NELAP	E-10236	10-31-22
Kentucky (DW)	State	KY90125	12-31-22
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-22
Louisiana (All)	NELAP	04080	06-30-23
Louisiana (DW)	State	LA011	12-31-22
Maryland	State	310	09-30-23
MI - RadChem Recognition	State	9005	06-30-23
Missouri	State	780	06-30-25
Nevada	State	MO000542020-1	07-31-23
New Jersey	NELAP	MO002	06-30-23
New York	NELAP	11616	04-01-23
North Dakota	State	R-207	06-30-23
NRC	NRC	24-24817-01	12-31-22
Oklahoma	NELAP	9997	08-31-23
Oregon	NELAP	4157	09-01-23
Pennsylvania	NELAP	68-00540	02-28-23
South Carolina	State	85002001	06-30-22 *
Texas	NELAP	T104704193	07-31-23
US Fish & Wildlife	US Federal Programs	058448	07-31-23
USDA	US Federal Programs	P330-17-00028	03-11-23
Utah	NELAP	MO000542021-14	07-31-23
Virginia	NELAP	10310	06-14-23
Washington	State	C592	08-30-23
West Virginia DEP	State	381	10-31-22

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



Method Summary

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

Job ID: 310-240284-2

Method	Method Description	Protocol	Laboratory
9315	Radium-226 (GFPC)	SW846	EET SL
9320	Radium-228 (GFPC)	SW846	EET SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	EET SL
PrecSep_0	Preparation, Precipitate Separation	None	EET SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	EET SL

Protocol References:

None = None

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

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

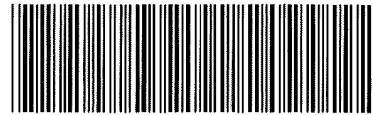
Laboratory References:

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





Environment Testing
America



310-240284 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscataine Power + Water</u>			
City/State:	CITY	STATE	Project:
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>9-16-22</u>	<u>850</u>	<u>ML</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>3</u>	
Cooler Custody Seals Present? No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present? No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID:	<u>T</u>	Correction Factor (°C):	<u>0</u>
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>0.7</u>	Corrected Temp (°C):	<u>0.7</u>
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE. If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			





Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscantine Power + Water</u>			
City/State	CITY	STATE	Project.
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>9-16-22</u>	<u>850</u>	<u>ML</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee			
<input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>2</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>T</u>	Correction Factor (°C):	<u>0</u>
* Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>1.1</u>	Corrected Temp (°C):	<u>1.1</u>
* Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			





Environment Testing
America

Place COC scanning label
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>Muscantine Power + Water</u>			
City/State:	CITY	STATE	Project
		<u>IA</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>9-16-22</u>	<u>850</u>	<u>ML</u>
Delivery Type: <input checked="" type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee			
<input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>3</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID:	<u>T</u>	Correction Factor (°C):	<u>0</u>
• Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>1.4</u>	Corrected Temp (°C):	<u>1.4</u>
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

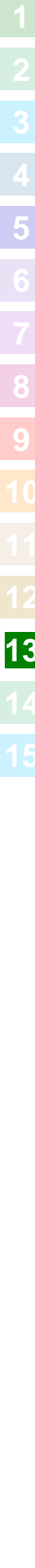


Eurofins Cedar Falls

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

Chain of Custody Record

Client Information Client Contact: Sam Bennett Phone: 563-262-3583 E-Mail: shawn_hayes@testamericainc.com Carrier Tracking No(s):		Lab PM: Hayes, Shawn M E-Mail: shawn_hayes@testamericainc.com	
Company: Muscatine Power & Water Address: 1700 Dick Drake Way City: Muscatine State: IA, Zip: 52761 Phone: 224383 Email: sbernnett@mpw.org and ramundson@hrgreen.com Project Name: Muscatine Power & Water State Landfill Site: Iowa		Due Date Requested: TAT Requested (days): PO #: WO #: TestAmerica Project #: Event:	
Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:		Preservation Codes: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
Special Instructions/Note: Total Number of containers:		Analysis Requested	
Perform MS/MSD (Yes or No)		Field Filtered Sample (Yes or No)	
602A State Metals List		9056A Chloride, Fluoride, Sulfate	
Sample Identification		Preservation Code:	
MW-4B	9/14/22	1145	G
MW-5B	9/14/22	1345	G
MW-6A	9/14/22	1245	G
MW-8	9/13/22	1330	G
MW-10	9/14/22	1450	G
MW-14A	9/13/22	1025	G
MW-15A	9/13/22	1130	G
MW-21	9/12/22	1345	G
MW-22	9/12/22	1130	G
MW-23	9/13/22	0910	G
MW-24	9/13/22	1450	G
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological			
Deliverable Requested I, II, III, IV, Other (specify)			
Empty Kit Relinquished by:			
Relinquished by: Sam Bennett		Date: 9/15/22 0900	
Relinquished by:		Date/Time:	
Relinquished by:		Date/Time:	
Relinquished by:		Date/Time:	
Custody Seals Intact:		Custody Seal No:	
Δ Yes A No		Cooler Temperature(s) °C and Other Remarks:	
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		Special Instructions/QC Requirements:	
Method of Shipment:		Received by: MC	
Date/Time: 9-16-22 800		Received by:	
Date/Time:		Received by:	
Date/Time:		Received by:	



Eurofins Cedar Falls

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

Chain of Custody Record

Client Information		Lab PM:		Carrier Tracking No(s):							
Client Contact: Sam Bennett MP&W and Rose Amundson (HR Green)		Hayes, Shawn M									
Company: Muscatine Power & Water		E-Mail: shawn.hayes@testamericainc.com									
Address: 1700 Dick Drake Way		COC No:									
City: Muscatine		Page:									
State Zip: IA, 52761		Job #:									
Phone: 224-3883		Preservation Codes:		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - ph 4-5 X - EDTA Y - EDA Z - other (specify)							
Email: sbennett@mpw.org and ramundson@hrgreen.com		Analysis Requested		Special Instructions/Note:							
Project Name: Muscatine Power & Water CCR Landfill		Due Date Requested		Total Number of Containers							
Site: Iowa		TAT Requested (days):									
Event: Fall 2022 Sample		PO #: 224-3883									
		WO #:									
		TestAmerica Project #:									
Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=oil, A=air)	Field Filtered Sample (Yes or No)	Form MS/MSD (Yes or No)	6024 CCR Lit, 7470A Mercury	2540C TD, SM4500 H+PH	9056A Chloride, Fluoride, Sulfate	Radium-226	Radium-228
GW-4B	9/14/22	1145	G	GW	X	X	X	X	X	X	X
GW-5B	9/14/22	1345	G	GW	X	X	X	X	X	X	X
GW-6A	9/14/22	1245	G	GW	X	X	X	X	X	X	X
GW-8	9/13/22	1330	G	GW	X	X	X	X	X	X	X
GW-10	9/14/22	1450	G	GW	X	X	X	X	X	X	X
GW-14A	9/13/22	1025	G	GW	X	X	X	X	X	X	X
GW-15A	9/13/22	1130	G	GW	X	X	X	X	X	X	X
GW-21	9/12/22	1345	G	GW	X	X	X	X	X	X	X
GW-22	9/12/22	1130	G	GW	X	X	X	X	X	X	X
GW-23	9/13/22	0910	G	GW	X	X	X	X	X	X	X
Duplicate-1	9/12/22	1200	G	GW	X	X	X	X	X	X	X

Non-Hazard Flammable Skin Irritant Poison B Unknown Radiological
 Deliverable Requested: I, II, III, IV, Other (specify)

Empty Kit Relinquished by: _____ Date: _____
 Relinquished by: *Sam Bennett* Date: *9/15/22* 0900 Company: *mpw*
 Relinquished by: _____ Date: _____ Company: _____
 Relinquished by: _____ Date: _____ Company: _____

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

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months
 Special Instructions/QC Requirements:

Method of Shipment: _____
 Received by: _____ Date/Time: *9/16-22 850* Company: _____
 Received by: _____ Date/Time: _____ Company: _____
 Received by: _____ Date/Time: _____ Company: _____
 Cooler Temperature(s) °C and Other Remarks:



Eurofins Cedar Falls

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

Chain of Custody Record

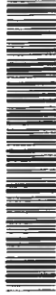
Client Information Client Contact: Sam Bennett Phone: 563-262-3583 E-Mail: shawn.hayes@testamericainc.com Company: Muscatine Power & Water		Lab PM: Hayes, Shawn M E-Mail: shawn.hayes@testamericainc.com		Carrier Tracking No(s): COC No:	
Address: 1700 Dick Drake Way City: Muscatine State, Zip: IA, 52761 Phone: 224383 PO #: 224383 WO #:		Due Date Requested: TAT Requested (days): Project Name: Muscatine Power & Water CCR Landfill Site: Iowa		Analysis Requested 602A CCR List, 747A Mercury 2540C TDS, SM4500 H+ pH 9056A Chloride, Fluoride, Sulfate Radium-226 Radium-228	
Email: sbennett@mpw.org and ramundson@hrgreen.com Project Name: Muscatine Power & Water CCR Landfill Site: Iowa		Event: Federal List Sample Date: 9/13/22 Sample Time: 1200 Sample Type (C=comp, G=grab): G Matrix (Water, Solid, Other): GW		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Sample Identification Duplicate-2		Sample Date: 9/13/22 Sample Time: 1200 Sample Type (C=comp, G=grab): G Matrix (Water, Solid, Other): GW		Special Instructions/Note: Total Number of Containers:	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Deliverable Requested I II III, IV Other (specify)		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Empty Kit Relinquished by Relinquished by: Sam Bennett Date/Time: 9/15/22 0900 Company: MPAW		Relinquished by: MPAW Date/Time: 9/16/22 850 Company:		Method of Shipment:	
Relinquished by:		Relinquished by:		Relinquished by:	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> 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



eurofins

Lead Analyst: Shawn M. Hayes
Reviewer:

Client Information (Sub Contract Lab)		Sampler: Lab PM Hayes, Shawn M	Carrier Tracking No(s): COC No: 310-53928.1	
Client Contact: Shipping/Receiving		Phone: E-Mail: Shawn.Hayes@et.eurofins.com	Page: Page 1 of 2	
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note):	Job #: 310-240284-2	
Address: 13715 Rider Trail North,		Due Date Requested: 10/27/2022	Analysis Requested A - HCL B - NaOH O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4.5 Y - Trizma L - EDTA Z - other (specify) Other:	
City: Earth City		TAT Requested (days):		
State, Zip: MO, 63045		PO #:		
Phone: 314-298-8566(Tel) 314-298-8757(Fax)		WO #:		
Email:		Project #: 31007856		
Project Name: Muscatine Power & Water CCR		SSOW#:	Total Number of Containers X 2 2 2 2 2 2 2 2 2 2 2	
Site:		Special Instructions/Note:		
Sample Identification - Client ID (Lab ID)		Field Filled Sample (Yes or No)		
MW-4B (310-240284-1)	Sample Date: 9/14/22	Sample Time: 11:45 Central		Matrix: Water
MW-5B (310-240284-2)	Sample Date: 9/14/22	Sample Time: 13:45 Central		Matrix: Water
MW-6A (310-240284-3)	Sample Date: 9/14/22	Sample Time: 12:45 Central		Matrix: Water
MW-8 (310-240284-4)	Sample Date: 9/13/22	Sample Time: 13:30 Central		Matrix: Water
MW-10 (310-240284-5)	Sample Date: 9/14/22	Sample Time: 14:50 Central		Matrix: Water
MW-14A (310-240284-6)	Sample Date: 9/13/22	Sample Time: 10:25 Central		Matrix: Water
MW-15A (310-240284-7)	Sample Date: 9/13/22	Sample Time: 11:30 Central		Matrix: Water
MW-21 (310-240284-8)	Sample Date: 9/12/22	Sample Time: 13:45 Central		Matrix: Water
MW-22 (310-240284-9)	Sample Date: 9/12/22	Sample Time: 11:30 Central		Matrix: Water
Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon 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/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.			Perform MS/MSD (Yes or No) X 9315_Ra226/PreSep_Z1 Radium-226 X 9320_Ra228/PreSep_0 Standard Target List X Ra226Ra228_GFP/ (MOD) Local Method X	
Possible Hazard Identification Unconfirmed Deliverable Requested I, II, III, IV, Other (specify)			Special Instructions/QC Requirements: <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Empty Kit Relinquished by: _____ Date: _____ Relinquished by: _____ Date/Time: 9/19/22 Relinquished by: _____ Date/Time: _____ Relinquished by: _____ Date/Time: _____			Method of Shipment: _____ Date/Time: _____ Received by: _____ Date/Time: _____ Received by: <i>Jana Worthington</i> Date/Time: SEP 20 2022 0840 Received by: _____ Date/Time: _____	
Custody Seals Intact: _____ A Yes A No			Cooler Temperature(s): °C and Other Remarks: _____	

Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-240284-2

Login Number: 240284

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Costello, Mackenzie K

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

Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-240284-2

Login Number: 240284

List Number: 2

Creator: Worthington, Sierra M

List Source: Eurofins St. Louis

List Creation: 09/20/22 10:40 AM

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	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 $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Tracer/Carrier Summary

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

Job ID: 310-240284-2

Method: 9315 - Radium-226 (GFPC)

Matrix: Ground Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	
310-240284-1	MW-4B	81.1	
310-240284-1 DU	MW-4B	92.9	
310-240284-2	MW-5B	93.1	
310-240284-3	MW-6A	91.2	
310-240284-4	MW-8	88.2	
310-240284-5	MW-10	87.0	
310-240284-6	MW-14A	76.7	
310-240284-7	MW-15A	85.7	
310-240284-8	MW-21	86.2	
310-240284-9	MW-22	93.4	
310-240284-10	MW-23	81.3	
310-240284-14	QA-A	87.0	
310-240284-15	QA-B DUP	80.3	

Tracer/Carrier Legend
 Ba = Ba Carrier

Method: 9315 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	
LCS 160-583477/2-A	Lab Control Sample	85.7	
MB 160-583477/1-A	Method Blank	80.8	

Tracer/Carrier Legend
 Ba = Ba Carrier

Method: 9320 - Radium-228 (GFPC)

Matrix: Ground Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
310-240284-1	MW-4B	81.1	78.5
310-240284-1 DU	MW-4B	92.9	83.4
310-240284-2	MW-5B	93.1	82.6
310-240284-3	MW-6A	91.2	81.9
310-240284-4	MW-8	88.2	78.5
310-240284-5	MW-10	87.0	81.1
310-240284-6	MW-14A	76.7	85.6
310-240284-7	MW-15A	85.7	84.5
310-240284-8	MW-21	86.2	83.0
310-240284-9	MW-22	93.4	73.6
310-240284-10	MW-23	81.3	83.7
310-240284-14	QA-A	87.0	82.6
310-240284-15	QA-B DUP	80.3	84.5

Tracer/Carrier Legend
 Ba = Ba Carrier
 Y = Y Carrier

Eurofins Cedar Falls

Tracer/Carrier Summary

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

Job ID: 310-240284-2

Method: 9320 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba	Y
		(40-110)	(40-110)
LCS 160-583478/2-A	Lab Control Sample	85.7	77.4
MB 160-583478/1-A	Method Blank	80.8	75.9

Tracer/Carrier Legend

Ba = Ba Carrier

Y = Y Carrier

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

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 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 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	9/14/2022 1100	8.39	707.48
*After Purging	9/14/2022 1145	10.08	705.79
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 1.19

No. of Well Volumes (based on current water level) 0.45

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 Clear, 75dF, Calm

Field Measurements (after stabilization):

Temperature 19.27 **Units** C

Equipment Used Horiba U-50

pH 7.52

Equipment Used Horiba U-50

Specific Conductance 0.692 **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** 10/11/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

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

Questions? Call or Email: Nina 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-SB
 Upgradient _____ Downgradient X
 Name of person sampling Neil Hoskins

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES D NO
 If no, explain _____
 Standing Water or Litter? (please check) D 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 (±0.01foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/14/2022 1320	1.53	707.57
*After Purging	9/14/2022 1345	2.70	706.40
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.66
 No. of Well Volumes (based on current water level) 0.17
 Was well pumped/bailed dry? No
 Equipment used:
 Bailer type _____ Dedicated Bailer? _____
 Pump type Peristaltic Dedicated Pump? Yes
 If not dedicated, method of cleaning _____

***D. FIELD MEASUREMENT**

Weather Conditions Clear, 78dF, Calm

Field Measurements (after stabilization):

Temperature 26.30 **Units** C

Equipment Used Horiba U-50

pH 7.37

Equipment Used Horiba U-50

Specific Conductance 0.723 **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** 10/11/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water Permit No. 70-SDP-6-82P
 Monitoring Well/Piezometer No. MW-6A
 Upgradient _____ Downgradient X
 Name of person sampling Neil Hoskins

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES **D** NO
 If no, explain _____
 Standing Water or Litter? (please check) **D** 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 (±0.01foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/14/2022 1220	2.69	706.23
*After Purging	9/14/2022 1245	3.13	705.79
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.66
 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 _____

***D. FIELD MEASUREMENT**

Weather Conditions Clear, 75dF, Calm

Field Measurements (after stabilization):

Temperature 26.14 **Units** C

Equipment Used Horiba U-50

pH 7.38

Equipment Used Horiba U-50

Specific Conductance 0.582 **Units** mS/m

Equipment Used Horiba U-50

Comments

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Signature Neil Hoskins **Date** 10/11/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@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-08
 Upgradient Downgradient _____
 Name of person sampling Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO
 If no, explain _____
 Standing Water or Litter? (please check) YES NO
 If yes, explain _____

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

Elevation:
 Top of inner well casing 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 (±0.01foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/13/2022 1255	17.68	729.68
*After Purging	9/13/2022 1330	22.10	725.26
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.92
 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 _____

***D. FIELD MEASUREMENT**

Weather Conditions Clear, 75dF, Calm

Field Measurements (after stabilization):

Temperature 21.00 **Units** C

Equipment Used Horiba U-50

pH 7.43

Equipment Used Horiba U-50

Specific Conductance 0.588 **Units** mS/m

Equipment Used Horiba U-50

Comments

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Signature Neil Hoskins **Date** 10/11/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@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-10
 Upgradient Downgradient _____
 Name of person sampling Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES NO
 If no, explain _____
 Standing Water or Litter? (please check) YES NO
 If yes, explain _____

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

Elevation:
 Top of inner well casing 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 (±0.01foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/14/2022 1425	4.97	713.54
*After Purging	9/14/2022 1450	5.12	713.39
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.66
 No. of Well Volumes (based on current water level) 0.26
 Was well pumped/bailed dry? No
 Equipment used:
 Bailer type _____ Dedicated Bailer? _____
 Pump type Peristaltic Dedicated Pump? Yes
 If not dedicated, method of cleaning _____

***D. FIELD MEASUREMENT**

Weather Conditions Clear, 80dF, Calm

Field Measurements (after stabilization):

Temperature 21.16 **Units** C

Equipment Used Horiba U-50

pH 7.48

Equipment Used Horiba U-50

Specific Conductance 0.611 **Units** mS/m

Equipment Used Horiba U-50

Comments

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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 Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES D NO
 If no, explain _____
 Standing Water or Litter? (please check) D 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 (±0.01foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/13/2022 0955	13.08	715.92
*After Purging	9/13/2022 1025	14.85	714.15
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.79
 No. of Well Volumes (based on current water level) 0.65
 Was well pumped/bailed dry? No
 Equipment used:
 Bailer type _____ Dedicated Bailer? _____
 Pump type Peristaltic Dedicated Pump? Yes
 If not dedicated, method of cleaning _____

***D. FIELD MEASUREMENT**

Weather Conditions Clear, 68dF, Calm

Field Measurements (after stabilization):

Temperature 18.95 **Units** C

Equipment Used Horiba U-50

pH 7.21

Equipment Used Horiba U-50

Specific Conductance 1.96 **Units** mS/m

Equipment Used Horiba U-50

Comments

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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 Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES D NO
 If no, explain _____
 Standing Water or Litter? (please check) D 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 (±0.01foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/13/2022 1115	12.57	717.42
*After Purging	9/13/2022 1130	13.69	716.30
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.53
 No. of Well Volumes (based on current water level) 0.4l
 Was well pumped/bailed dry? No
 Equipment used:
 Bailer type _____ Dedicated Bailer? _____
 Pump type Peristaltic Dedicated Pump? Yes
 If not dedicated, method of cleaning _____

***D. FIELD MEASUREMENT**

Weather Conditions Clear, 70dF, Calm

Field Measurements (after stabilization):

Temperature 20.01 **Units** C

Equipment Used Horiba U-50

pH 7.40

Equipment Used Horiba U-50

Specific Conductance 1.07 **Units** mS/m

Equipment Used Horiba U-50

Comments

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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 D NO
 If no, explain _____
 Standing Water or Litter? (please check) D 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 (±0.01foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/12/2022 1320	11.32	714.43
*After Purging	9/12/2022 1345	11.83	713.92
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.66
 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 _____

***D. FIELD MEASUREMENT**

Weather Conditions Cloudy, 65dF, NW wind 10-15 mph

Field Measurements (after stabilization):

Temperature 17.59 **Units** C

Equipment Used Horiba U-50

pH 7.09

Equipment Used Horiba U-50

Specific Conductance 0.875 **Units** mS/m

Equipment Used Horiba U-50

Comments

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/12/2022 1110	17.37	726.9
*After Purging	9/12/2022 1130	21.04	723.23
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.53
 No. of Well Volumes (based on current water level) 0.12
 Was well pumped/bailed dry? No
 Equipment used:
 Bailer type _____ Dedicated Bailer? _____
 Pump type Peristaltic Dedicated Pump? Yes
 If not dedicated, method of cleaning _____

***D. FIELD MEASUREMENT**

Weather Conditions Clear, 50dF, NW wind 5-10mph

Field Measurements (after stabilization):

Temperature 16.87 **Units** C

Equipment Used Horiba U-50

pH 7.58

Equipment Used Horiba U-50

Specific Conductance 0.713 **Units** mS/m

Equipment Used Horiba U-50

Comments

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Signature Neil Hoskins **Date** 10/11/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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

*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water Permit No. 70-SDP-6-82P
 Monitoring Well/Piezometer No. MW-23
 Upgradient X Downgradient _____
 Name of person sampling Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES **D** NO
 If no, explain _____
 Standing Water or Litter? (please check) **D** 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 (±0.01foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/13/2022 0855	7.23	719.67
*After Purging	9/13/2022 0910	10.02	716.88
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.53
 No. of Well Volumes (based on current water level) 0.16
 Was well pumped/bailed dry? No
 Equipment used:
 Bailer type _____ Dedicated Bailer? _____
 Pump type Peristaltic Dedicated Pump? Yes
 If not dedicated, method of cleaning _____

***D. FIELD MEASUREMENT**

Weather Conditions Clear, 65dF, Calm

Field Measurements (after stabilization):

Temperature 16.70 **Units** C

Equipment Used Horiba U-50

pH 7.30

Equipment Used Horiba U-50

Specific Conductance 0.576 **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** 10/11/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@mpw.org

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*Omit if only measuring groundwater elevations.

GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water Permit No. 70-SDP-6-82P
 Monitoring Well/Piezometer No. MW-24
 Upgradient _____ Downgradient Assessment
 Name of person sampling Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES **D** NO
 If no, explain _____
 Standing Water or Litter? (please check) **D** 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 (±0.01foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/13/2022 1425	17.78	717.54
*After Purging	9/13/2022 1450	18.46	716.86
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.66
 No. of Well Volumes (based on current water level) 0.91
 Was well pumped/bailed dry? No
 Equipment used:
 Bailer type _____ Dedicated Bailer? _____
 Pump type Peristaltic Dedicated Pump? Yes
 If not dedicated, method of cleaning _____

***D. FIELD MEASUREMENT**

Weather Conditions Clear, 78dF, Calm

Field Measurements (after stabilization):

Temperature 20.03 **Units** C

Equipment Used Horiba U-50

pH 7.53

Equipment Used Horiba U-50

Specific Conductance 0.576 **Units** mS/m

Equipment Used Horiba U-50

Comments

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Signature Neil Hoskins **Date** 10/11/2022

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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 _____ Downgradient Assessment
 Name of person sampling Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES **D** NO
 If no, explain _____
 Standing Water or Litter? (please check) **D** 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 38.2? Inside Casing Diameter (in inches) 2"
 Equipment Used Slope Indicator Co. Water level indicator Model 51453

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/14/2022 0833	20.73	710.35
*After Purging	9/14/2022 0910	23.65	707.43
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.92
 No. of Well Volumes (based on current water level) 0.35
 Was well pumped/bailed dry? No
 Equipment used:
 Bailer type _____ Dedicated Bailer? _____
 Pump type Peristaltic Dedicated Pump? Yes
 If not dedicated, method of cleaning _____

***D. FIELD MEASUREMENT**

Weather Conditions Clear, 65dF, Calm

Field Measurements (after stabilization):

Temperature 19.33 **Units** C

Equipment Used Horiba U-50

pH 7.71

Equipment Used Horiba U-50

Specific Conductance 0.937 **Units** mS/m

Equipment Used Horiba U-50

Comments

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Signature Neil Hoskins **Date** 10/11/2022

Telephone 563-262-3582 **Fax** _____ **Email** neil.hoskins@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-27
 Upgradient _____ Downgradient Assessment
 Name of person sampling Sam Bennett

A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Properly Capped? (please check) YES **D** NO
 If no, explain _____
 Standing Water or Litter? (please check) **D** 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 (±0.01foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/14/2022 0930	15.79	714.47
*After Purging	9/14/2022 0955	18.78	711.48
*Before Purging			

*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.92
 No. of Well Volumes (based on current water level) 0.35
 Was well pumped/bailed dry? No
 Equipment used:
 Bailer type _____ Dedicated Bailer? _____
 Pump type Peristaltic Dedicated Pump? Yes
 If not dedicated, method of cleaning _____

***D. FIELD MEASUREMENT**

Weather Conditions Clear, 65dF, Calm

Field Measurements (after stabilization):

Temperature 19.33 **Units** C

Equipment Used Horiba U-50

pH 7.71

Equipment Used Horiba U-50

Specific Conductance 0.937 **Units** mS/m

Equipment Used Horiba U-50

Comments

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LOW FLOW SAMPLING FORM

DATE 9/14/2022 WELL ID MW-5B SAMPLE DATE / TIME 9/14/2022 1345
 SITE Muscatine Power & Water DTW 1.53 NOTE _____
 PROJECT # Fall 2022 WELL DEPTH 25.30 _____
 WEATHER Clear, 78dF, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 25'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
13:20			1.53									
13:25	100	500	2.47	28.94	7.44	-85	0.716	0.0	0.04			
13:30	100	1000	2.81	27.98	7.39	-95	0.720	1.0	0.00			
13:35	100	1500	2.68	27.10	7.39	-99	0.712	1.7	0.00			
13:40	100	2000	2.74	26.59	7.39	-100	0.718	1.9	0.00			
13:45	100	2500	2.70	26.30	7.37	-101	0.723	1.9	0.00	Sample Start		
14:05			2.73							Sample End		
										Preservative	# of Containers	
										HCl		
										HNO ₃	3	
										NaOH		
										None	1	

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

LOW FLOW SAMPLING FORM

DATE 9/14/2022 WELL ID MW-6A SAMPLE DATE / TIME 9/14/2022 1245
 SITE Muscatine Power & Water DTW 2.69 NOTE _____
 PROJECT # Fall 2022 WELL DEPTH 25.35 _____
 WEATHER Clear, 75dF, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 20'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES	
12:20			2.69								
12:25	100	500	3.03	25.39	7.45	-127	0.628	0.0	0.00		
12:30	100	1000	3.08	24.83	7.40	-132	0.613	1.0	0.00		
12:35	100	1500	3.10	26.01	7.38	-132	0.589	1.5	0.00		
12:40	100	2000	3.12	26.13	7.38	-132	0.584	1.5	0.00		
12:45	100	2500	3.13	26.14	7.38	-132	0.582	1.5	0.00	Sample Start	
13:05			3.07							Sample End	
										Preservative	# of Containers
										HCl	
										HNO ₃	3
										NaOH	
										None	1

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

LOW FLOW SAMPLING FORM

DATE 9/13/2022 WELL ID MW-08 SAMPLE DATE / TIME 9/13/2022 1330
 SITE Muscatine Power & Water DTW 17.68 NOTE _____
 PROJECT # Fall 2022 WELL DEPTH 42.95 _____
 WEATHER Clear, 75dF, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 38'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES	
12:55			17.68								
13:00	100	500	18.55	26.55	7.56	-65	0.578	0	0.16		
13:05	100	1000	19.42	22.22	7.47	-62	0.596	0	0.21		
13:10	100	1500	20.20	20.06	7.43	-74	0.607	1.5	0.00		
13:15	100	2000	20.83	20.45	7.43	-86	0.604	2.3	0.00		
13:20	100	2500	21.33	20.8	7.44	-95	0.594	2.4	0.00		
13:25	100	3000	21.82	20.89	7.43	-101	0.59	2.3	0.00		
13:30	100	3500	22.10	21	7.43	-103	0.588	2.1	0.00	Sample Start	
14:00			23.60							Sample End	
									Preservative	# of Containers	
									HCl		
									HNO ₃	3	
									NaOH		
									None	1	

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

LOW FLOW SAMPLING FORM

DATE 9/14/2022 WELL ID MW-10 SAMPLE DATE / TIME 9/14/2022 1450
 SITE Muscatine Power & Water DTW 4.97 NOTE _____
 PROJECT # Fall 2022 WELL DEPTH 20.32
 WEATHER Clear, 80dF, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 15.5'

TIME	PURGE RATE(ml)	VOL REMOVED(m)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES	
14:25			4.97								
14:30	100	500	5.11	26.86	7.49	-108	0.585	0.0	0.00		
14:35	100	1000	5.11	23.56	7.49	-116	0.606	1.4	0.00		
14:40	100	1500	5.12	22.10	7.49	-117	0.607	2.5	0.00		
14:45	100	2000	5.12	21.76	7.49	-115	0.611	2.4	0.00		
14:50	100	2500	5.12	21.16	7.48	-116	0.611	2.2	0.00	Sample Start	
15:15			5.13							Sample End	
										Preservative	# of Containers
										HCl	
										HNO ₃	3
										NaOH	
										None	1

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

LOW FLOW SAMPLING FORM

DATE 9/13/2022 WELL ID MW-14A SAMPLE DATE / TIME 9/13/2022 1025
 SITE Muscatine Power & Water DTW 13.08 NOTE _____
 PROJECT # Fall 2022 WELL DEPTH 20.50
 WEATHER Clear, 68dF, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 15.5'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
9:55			13.08									
10:00	100	500	13.39	19.87	7.19	181	1.90	2.4	5.08			
10:05	100	1000	13.66	18.49	7.19	186	1.94	1.8	4.77			
10:10	100	1500	13.94	18.56	7.18	188	1.94	1.7	4.43			
10:15	100	2000	14.22	18.82	7.19	189	1.94	1.4	4.84			
10:20	100	2500	14.50	18.71	7.19	191	1.97	1.3	4.67			
10:25	100	3000	14.85	18.95	7.21	192	1.96	1.3	4.78	Sample Start		
10:51			16.22							Sample End		
										Preservative	# of Containers	DUP-1
										HCl		
										HNO ₃	3	3
										NaOH		
										None	1	1

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

LOW FLOW SAMPLING FORM

DATE 9/14/2022 WELL ID MW-26 SAMPLE DATE / TIME 9/14/22 910
 SITE Muscatine Power & Water DTW 20.18 NOTE _____
 PROJECT # Fall 2022 WELL DEPTH 38.27 _____
 WEATHER Clear, 65dF, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 35'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES	
8:33			20.73								
8:40	100	500	21.50	20.44	6.17	242	1.060	0.0	1.73		
8:45	100	1000	21.97	19.57	7.03	205	1.020	0.0	0.39		
8:50	100	1500	22.41	19.05	7.32	196	1.010	0.1	0.37		
8:55	100	2000	22.79	18.79	7.52	191	0.996	0.3	0.20		
9:00	100	2500	23.06	18.22	7.60	186	0.989	0.2	0.16		
9:05	100	3000	23.33	19.18	7.66	183	0.973	0.0	0.12		
9:10	100	3500	23.65	19.33	7.71	179	0.967	0.0	0.10	Sample Start	
9:20			23.93							Sample End	
										Preservative	# of Containers
										HCl	
										HNO ₃	1
										NaOH	
										None	1

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

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	
MW-08 Upgradient																							
Appendix III Parameters:																							
Boron	mg/L	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	0.205	< .2	< .1	< .1	< .1	<0.100	<0.100	
Calcium	mg/L	152	117	118	109	89.9	96.5	113	91.3	77	92.4	74.7	115	83.6	97.6	132	92.4	77.7	81.2	78.3	69.6	76.8	
Chloride	mg/L	19.8	17.8	16.2	17.2	15.4	17.1	14.1	14	14.4	14.5	14.9	15.6	16.1	17.1	17.2	14.7	22.3	16.3	15.8	16.7	16.7	
Fluoride	mg/L	<5	< 5	< 5	0.72	< 5	1.69	< 5	< 5	< 5	0.826	< 5	0.826	< 5	< 5	0.643	0.864	< 5	<0.5	< 5	<0.500	<0.500	
pH	SU	8.26	6.82	7.03		7.03	7.05	7.59	6.77	7.24	7.3	7.56	7.2	7.08	6.64	7.21	7.4	7.63	7.45	7.35	7.43	7.43	
Sulfate	mg/L	366	187	187	149	145	145	190	119	106	87.3	136	94.7	223	276	123	100	99.7	82.7	72.8	67.1	67.1	
Total Dissolved Solids	mg/L	636	664	708	634	578	624	656	488	470	376	502	414	612	702	418	350	382	342	322	350	350	
Appendix IV Parameters:																							
Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	0.001	< .001	< .001	< .001	< .001	< .001	< .002	<0.00200	<0.00200	<0.00200	
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	0.002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200	
Barium	mg/L	0.0861	0.0671	0.0706	0.0645	0.0594	0.0636	0.076	0.0596	0.0617	0.0761	0.0649	0.0751	0.0733	0.0613	0.0549	0.0596	0.0623	0.0631	0.0703	0.0703	0.0703	
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	0.001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	< .0001	<0.00100	<0.00100	
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	
Cobalt	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	0.000601	0.00051		< .0005	< .0005	< .0005	0.00177	0.00558	0.000517	0.000738	0.000839	0.00127	0.00143	0.00164	0.00164	
Fluoride	mg/L	< .5	< .5	< .5	0.72	< .5	1.69	< .5	< .5	< .5	0.826	< .5	< .5	0.643	0.864	< .5	< .5	< .5	< .5	< .5	<0.500	<0.500	
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500	
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	<0.100	<0.100	
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	<0.000200	<0.000200	
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	0.0022	< .002	0.00224	< .002	< .002	< .002	< .002	< .002	< .002	0.00218	<0.00200	<0.00200	
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500	
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100	
Radium-226	mg/L	0.152	0.4086	0.0139	0.234	0.0604	0.0229	0.0596	0.087		0.022				<0.0229	0.0645		0.111 U	0.0456 U	0.194	0.0635 U	0.0635 U	
Radium-228	mg/L	0.224	0.0663	0.336	0.102	0.161	0.104	0.144	0.249		0.646				<0.194	0.398		0.0974 U	0.25 U	0.123 U	-0.0943 U	-0.0943 U	
Combined Radium 226 + 228	mg/L	0.375	0.115	0.35	0.336	0.221	0.126	0.204	0.336		0.668				<0.217	0.462		0.208 U	0.296 U	0.316 U	-0.0309 U	-0.0309 U	

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	
MW-10 Upgradient																							
Appendix III Parameters:																							
Boron	mg/L	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .1	< .1	< .1	< .1	< .1	
Calcium	mg/L	89.3	80.7	83.3	86.5	81.2	79.2	83.6	85.5	83.3	77.3	88.5	85.4	76.3	78.9	75.4	74.2	78.8	80	80	90.4	82	
Chloride	mg/L	6.22	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5.00	< 5.00	
Fluoride	mg/L	0.731	< .5	< .5	< .5	< .5	0.774	< .5	< .5	< .5	< .5	< .5	< .5	< .5	0.596	< .5	< .5	< .5	< .5	< .5	< 0.500	< 0.500	
pH	SU	8.68	7.12	7.27		7.51	7.18	7.45	6.34	7.18		7.04	7.72	7.23	7.1	7.07	7.26	7.33	7.57	7.59	7.35	7.48	
Sulfate	mg/L	42.1	7.3	36.4	38.4	47.3	38.3	35.4	39	46.9		51.4	37.3	34.3	42.8	28.8	18.8	36.5	27.6	32.3	48.3	31.2	
Total Dissolved Solids	mg/L	468	412	444	428	498	538	524	458	414		314	396	392	326	320	316	344	322	314	344	340	
Appendix IV Parameters:																							
Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .002	< .002	< .002	< .00200	< .00200	
Arsenic	mg/L	0.00298	0.00369	0.00328	0.00312	0.00298	< .002	0.00262	0.00317		< .002	0.00211	0.0036	0.0056	0.00784	0.00697	0.00748	0.00393	0.00781	0.00371	0.00497		
Barium	mg/L	0.168	0.161	0.163	0.15	0.151	0.138	0.154	0.157		0.129	0.162	0.216	0.185	0.215	0.199	0.227	0.196	0.233	0.208	0.223		
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001		< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .00100	< .00100		
Cadmium	mg/L	89.3	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	< .0001	< .000100	< .000100	
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .00500	< .00500	
Cobalt	mg/L	0.000555	< .0005	0.000523	0.000638	0.000663	0.000779	0.000621	0.000695		0.000627	0.00107	0.00088	0.000783	0.000572	0.000581	0.000751	0.000752	0.000576	0.00104	0.00109		
Fluoride	mg/L	0.731	< .5	< .5	< .5	< .5	0.774	< .5	< .5		< .5	< .5	< .5	< .5	0.596	< .5	< .5	< .5	< .5	< .5	< .500	< .500	
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .000500	< .000500	
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05		< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .0100	< .0100	
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .000200	< .000200		
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002		< .002	< .002	0.0022	0.00341	0.00219	0.00215	< .002	< .002	0.00217	< .00200	< .00200		
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .00500	< .00500	
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001		< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .00100	< .00100	
Radium-226	mg/L	0.19	0.413	0.119	0.422	0.199	0.139	0.206	0.273		0.188			0.153		0.284		0.207	0.41	0.25	0.362		
Radium-228	mg/L	0.0326	0.255	0.575	0.377	0.314	0.332	-0.00196	0.558		0.0884			< .178		0.723		0.281 U	0.912	0.443 U	0.759		
Combined Radium 226 + 228	mg/L	0.223	0.668	0.694	0.799	0.513	0.47	0.204	0.831		0.276			< .331		1.01		0.488	1.32	0.693	1.12		

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095													
	March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22		
MW-22 Downgradient													

Appendix III Parameters:

Boron	mg/L	< .2	< .2	< .2	0.299	<.2	<.2	0.263	< .1	< .1	<0.100	0.322
Calcium	mg/L	69.8	91.5	80.7	91.6	83.8	80.9	75.5	78.4	79.4	80.2	79.6
Chloride	mg/L	30	27.2	29.8	27.6	26.9	24.8	23.2	28.1	20	20.2	7.04
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.507	< .5	< .5	< .5	< .5	<0.500	<0.500
pH	SU	7.36	7.9	7.42	7.21	7.12	7.32	7.53	7.7	7.97	7.23	7.58
Sulfate	mg/L	123	134	125	134	139	143	151	154	154	158	220
Total Dissolved Solids	mg/L	424	434	420	456	428	422	398	412	420	388	390

Appendix IV Parameters:

Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .002	< .002	<0.00200	<0.00200
Arsenic	mg/L	< .002	0.00245	0.00261	< .002	< .002	< .002	< .002	0.00289	0.00267	0.0034	0.00285
Barium	mg/L	0.15	0.184	0.181	0.209	0.215	0.222	0.222	0.242	0.247	0.239	0.243
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	< .0001	<0.000100	<0.000100
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500
Cobalt	mg/L	0.00142	0.00129	0.00149	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<0.000500	<0.000500
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.507	< .5	< .5	< .5	< .5	<0.500	<0.500
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500
Lithium	mg/L	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	<0.0100	<0.0100
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	<0.000200	<0.000200
Molybdenum	mg/L	0.00568	0.00423	0.00424	0.00263	0.00574	0.00297	0.00529	< .002	0.00558	0.0042	0.00446
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100
Radium-226	mg/L	0.122	0.284		0.116		0.137		0.168	0.235	0.222	0.17
Radium-228	mg/L	0.135	0.128		<.226		0.303		0.379 U	0.287 U	0.272 U	0.112 U
Combined Radium 226 + 228	mg/L	0.257	0.412		<.343		0.44		0.547	0.522	0.494	0.283 U

Muscatine Power & Water CCR Landfill												
Federal Parameters												
Job # 10100095												
MW-23		June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	
Downgradient												

Appendix III Parameters:

Boron	mg/L	< .2	< .2	< .2	< .2	< .2	0.15	< .1	< .1	<0.100	0.204
Calcium	mg/L	70.5	63.9	59.7	59.5	61	52.1	56.3	56.1	54	54.5
Chloride	mg/L	15.9	14.2	10.5	13.8	15.7	14.4	21.4	15.2	16.9	16.2
Fluoride	mg/L	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	<0.500	<0.500
pH	SU	7.69	7.55	7.24	6.75	7.33	7.53	7.61	7.89	7.39	7.3
Sulfate	mg/L	38.4	31.7	26.2	29.7	25.5	25.8	35.5	25.8	25.4	23
Total Dissolved Solids	mg/L	384	340	296	336	298	250	274	256	218	278

Appendix IV Parameters:

Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .002	< .002	<0.00200	<0.00200
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200
Barium	mg/L	0.106	0.0779	0.0922	0.0635	0.0654	0.0491	0.0608	0.0497	0.0572	0.0507
Beryllium	mg/L	< .001	< .001	<0.001	<0.001	<0.001	<0.001	< .001	< .001	<0.00100	<0.00100
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	< .0001	<0.000100	<0.000100
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500
Cobalt	mg/L	0.00161	0.00066	0.00176	< .0005	0.000817	< .0005	0.000517	<.0005	0.000561	<0.000500
Fluoride	mg/L	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	<0.500	<0.500
Lead	mg/L	0.00151	0.000626	0.00204	0.000663	0.00116	< .0005	0.000624	< .0005	0.000596	<0.000500
Lithium	mg/L	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	<0.0100	<0.0100
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	<0.000200	<0.000200
Molybdenum	mg/L	0.00822	0.00617	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100
Radium-226	mg/L	0.161		0.215		0.0587		0.0292 U	0.0236 U	0.0699 U	0.0309 U
Radium-228	mg/L	-0.419		0.785		0.517		0.266 U	0.771	1.20 U	-0.225 U
Combined Radium 226 + 228	mg/L	0.0129		1.00		0.576		0.296 U	0.794	1.27	-0.195 U

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22
MW-4A/MW-4B Downgradient																						
Appendix III Parameters:																						
Boron	mg/L	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2		0.66	< .2	< .2	< .2	< .2	< .2	< .1	< .1	< .1	<0.100	<0.100
Calcium	mg/L	98.1	88.8	89.3	94.5	86.8	85.9	88.7	89.7	85.3		95.8	91.4	91.3	99.7	93.8	89.6	89	94.1	95.1	106	92.3
Chloride	mg/L	12.6	13.2	13.6	13.5	15.1	12.5	13.2	13.2	14.7		8.81	15.3	19.4	16	15.6	14.8	15.1	22.9	16.7	20.8	16.8
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.664	0.801	< .5	< .5	< .5		< .5	< .5	< .5	0.771	0.525	< .5	< .5	< .5	< .5	<0.500	<0.500
pH	SU	8.9	7.3	7.38		7.42	7.33	8.16	6.53	7.49		7.36	7.53	7.44	7.26	7.22	7.46	7.93	7.49	7.75	7.04	7.52
Sulfate	mg/L	32.2	28.4	27.2	32.7	36	39.5	33	35.3	45.4		162	51.3	52.2	48	47	41.5	46.9	60.1	50.2	58.4	49.5
Total Dissolved Solids	mg/L	507	426	450	450	460	442	452	420	466		596	440	420	398	422	366	360	380	370	370	358
Appendix IV Parameters:																						
Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001		< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .002	< .002	<0.00200	<0.00200
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002		< .002	< .0002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200
Barium	mg/L	0.15	0.128	0.131	0.139	0.143	0.111	0.133	0.133		0.117	0.144	0.149	0.161	0.147	0.156	0.147	0.169	0.186	0.191	0.188	0.188
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001		< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005		< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	< .0001	<0.00100	<0.00100
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005		< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500
Cobalt	mg/L	< .000681	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005		< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	0.00147	0.00132	0.00335	0.00135	0.00459
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.664	0.801	< .5	< .5	< .5		< .5	< .5	< .5	0.771	0.525	< .5	< .5	< .5	< .5	<0.500	<0.500
Lead	mg/L	< .00147	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005		< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	0.000532	< .0005	< .0005	<0.000500	<0.000500
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05		< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	<0.100	<0.100
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002		< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	<0.000200	<0.000200
Molybdenum	mg/L	< .002	< .002	M .002	< .002	< .002	< .002	< .002	< .002	< .002		< .002	< .002	< .002	< .002	< .002	< .002	0.00296	< .002	< .002	<0.00200	<0.00200
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005		< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001		< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100
Radium-226	mg/L	0.54	0.326	0.285	0.585	0.215	0.0818	0.177	0.255		0.111				0.218		0.13		0.101 U	0.19 U	0.0562 U	0.0958 U
Radium-228	mg/L	0.171	0.612	0.388	0.0872	0.313	0.227	0.192	0.188		0.339				<.218		0.224		-0.049 U	0.895	0.494 U	0.740 U
Combined Radium 226 + 228	mg/L	0.711	0.938	0.674	0.672	0.528	0.309	0.368	0.443		0.45				0.436		0.354		0.0519 U	1.08	0.550 U	0.836

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095	June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	
MW-5B Downgradient																						

Appendix III Parameters:

Boron	mg/L	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .1	< .1	< .1	<0.100	<0.100
Calcium	mg/L	147	< .0005	140	147	126	130	140	139	136	134	147	146	134	139	117	108	104	108	104	108	117
Chloride	mg/L	67	65.9	66	67	70.4	62.1	63.4	64	73	67.8	68.2	65	70.8	55	64.1	44	41	42.7	37.6	38.1	39
Fluoride	mg/L	< .5	< .5	< .5	1.88	2.14	0.627	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	<0.500
pH	SU	8.49	7.08	7.1		6.05	7	7.89	6.95	7.08	7	7.23	7.3	7.14	7.05	7.02	7.24	7.33	7.31	7.22	7.37	7.37
Sulfate	mg/L	109	109	105	109	111	108	108	114	135	122	119	120	85	112	58.9	61.9	57.4	53.7	44.7	44.7	49.9
Total Dissolved Solids	mg/L	920	672	646	636	684	680	656	734	688		620	828	622	562	596	494	436	434	448	428	484

Appendix IV Parameters:

Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .002	< .002	<0.00200	<0.00200
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200
Barium	mg/L	0.331	0.295	0.304	0.315	0.316	0.296	0.31	0.300		0.341	0.336	0.357	0.326	0.301	0.25	0.239	0.252	0.241	0.258	0.253	
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.00100	<0.00100
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500
Cobalt	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500
Fluoride	mg/L	< .5	< .5	< .5	1.88	2.14	0.627	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	<0.500
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	<0.100	<0.100
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	<0.000200	0.000813
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	0.00212	< .002	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100
Radium-226	mg/L	0.365	0.449	0.598	0.509	0.464	0.357	0.433	0.213		0.349			0.196		0.293		0.231	0.257 U	0.195		0.274
Radium-228	mg/L	0.3	0.405	-0.169	0.541	0.386	0.664	0.54	0.294		0.61			0.372		0.908		0.751	1.03	0.718		0.0895 U
Combined Radium 226 + 228	mg/L	0.665	0.854	0.428	1.05	0.85	1.02	0.973	0.507		0.959			0.568		1.2		0.982	1.29	0.913		0.363 U

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095	June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	
MW-6A Downgradient																						

Appendix III Parameters:

Boron	mg/L	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .1	< .1	< .1	<.100	<.100
Calcium	mg/L	81.4	75.4	75.7	85.6	68.8	56.3	72.9	71.2	71.9	74.1	80.1	73.3	73.2	80.9	85.1	87.9	87.6	90.6	96.5	89
Chloride	mg/L	5.97	< 5	< 5	9.08	9.93	< 5	< 5	< 5	< 5	5.33	< 5	< 5	< 5	< 5	12.2	15.6	19.3	17.4	14.2	13.3
Fluoride	mg/L	< .5	< .5	< .5	2.02	1.89	0.814	< .5	< .5	< .5	< .5	< .5	< .5	< .5	0.535	0.652	< .5	< .5	< .5	< .5	<.500
pH	SU	8.71	6.79	7.21		7.2	7.14	7.7	6.73	7.58	7.4	7.58	7.18	7.15	7.12	7.3	7.24	7.59	7.61	7.35	7.38
Sulfate	mg/L	< 5	< 5	< 5	< 5	5.94	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	13.6	19.1	27.3	22.7	18.9	16.4
Total Dissolved Solids	mg/L	440	340	370	368	336	402	486	364	424		292	368	298	320	308	336	374	330	350	336

Appendix IV Parameters:

Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<.00200	<.00200
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	<.00200	<.00200
Barium	mg/L	0.209	0.199	0.196	0.216	0.197	0.152	0.197	0.19		0.206	0.222	0.206	0.2	0.211	0.216	0.231	0.245	0.248	0.249	0.229
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<.00100	<.00100
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	< .0001	<.000100	<.000100
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<.00500	<.00500
Cobalt	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<.000500	<.000500
Fluoride	mg/L	< .5	< .5	< .5	2.02	1.89	0.814	< .5	< .5	< .5	< .5	< .5	< .5	< .5	0.535	0.652	< .5	< .5	< .5	<.500	<.500
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	<.000500	<.000500
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	<.0100	<.0100
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	<.000200	<.000200
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	<.00200	<.00200
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	<.00500	<.00500
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	<.00100	<.00100
Radium-226	mg/L	0.226	0.278	0.202	0.462	0.166	0.116	0.21	0.136		0.179			0.22		0.154		0.179	0.336	0.521	0.244
Radium-228	mg/L	0.178	0.599	0.311	0.432	0.148	0.182	0.23	0.197		0.439			<.26		0.633		0.488	0.784	0.380 U	0.355 U
Combined Radium 226 + 228	mg/L	0.405	0.876	0.512	0.894	0.314	0.298	0.44	0.333		0.618			0.481		0.787		0.667	1.12	0.901	0.599

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	
MW-14A Downgradient																							
Appendix III Parameters:																							
Boron	mg/L	15.8	17.9	19.3	14.7	13.1	11.3	16.3	13	16	13.7	11	15	14	15.5	17.6	17.4	19.5	17.2	17.1	15.2	15.1	
Calcium	mg/L	281	311	308	333	268	310	307	296	310	301	278	297	309	290	255	245	244	259	270	289	301	
Chloride	mg/L	28.7	28.7	37	31.9	33.5	39.4	29.7	32.9	35.4	33.2	37.4	29	33.1	25.8	22.1	22.5	22.8	27.1	23.2	25.5	22.4	
Fluoride	mg/L	< .5	< .5	0.867	< .5	< .5	1.93	< .5	< .5	< .5		< .5	0.684	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	
pH	SU	7.88	7.1	7.15		7.52	7.25	7.57	6.85	6.68	7	7.35	7.26	7.09	6.97	7.09	7.32	7.21	7.64	7.48	7.13	7.21	
Sulfate	mg/L	1050	1040	1010	1140	1190	1200	1020	1110	1210	1140	1110	1090	1070	1050	837	888	924	952	1010	1030	978	
Total Dissolved Solids	mg/L	2000	1980	2500	2080	1010	2260	2250	2170	2080	2650	1820	1800	1900	1690	1510	1510	1620	1290	1560	1530	1710	
Appendix IV Parameters:																							
Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .004	< .001	< .001	< .002	< .002	<0.00200	<0.00200	
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002	< .002	< .008	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200
Barium	mg/L	0.0443	0.0402	0.0391	0.0383	0.0306	0.0341	0.0338	0.031			0.0285	0.0314	0.0344	0.0328	0.0398	0.0268	0.0328	0.0355	0.0345	0.0327	0.034	
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .004	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .002	< .0001	< .0001	< .0001	< .0001	< .0001	<0.000100	<0.000100
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .02	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500
Cobalt	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .002	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500
Fluoride	mg/L	< .5	< .5	0.867	< .5	< .5	1.93	< .5	< .5			< .5	0.684	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .05	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .002	< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05			< .01	< .01	< .01	< .01	< .04	< .01	< .01	< .01	< .01	< .01	<0.0100	<0.0100
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	<0.000200	<0.000200
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002	< .002	< .008	< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200
Selenium	mg/L	0.0071	0.00811	0.00821	0.00834	0.00752	0.00823	0.00829	0.00759			< .005	0.00739	0.00827	0.00569	< .02	< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .004	< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100
Radium-226	mg/L	0.0496	0.095	0.0604	0.137	0.0624	0.0561	0.0545	0.0506			0.0335			<0.0588		0.0647		0.0454 U	0.16 U	0.101 U	0.0533 U	
Radium-228	mg/L	0.0956	0.107	0.462	0.122	0.23	0.424	-0.0414	0.406			0.224			< .0365		0.332		0.568	0.524	-0.0522 U	0.0310 U	
Combined Radium 226 + 228	mg/L	0.145	0.202	0.523	0.26	0.293	0.48	0.0131	0.456			0.258			<0.0223		0.397		0.614	0.684	0.0486 U	0.0843 U	

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095	June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	March-19	April-20	September-20	April-21	September-21	April-22	September-22	
MW-15A Downgradient																						

Appendix III Parameters:

Boron	mg/L	16.8	20.6	17.9	18.4	14.9	14.7	16.4	14.7	19.2	12.9	11	10.5	14.6	8.35	7.56	10.6	14.5	10.3	11.1	6.98	10.4
Calcium	mg/L	206	199	203	244	233	226	186	206	218	217	278	102	155	118	111	163	134	128	125	127	132
Chloride	mg/L	17.1	17.2	17.6	19	21.5	47.4	12.8	15.4	20.5	20.7	37.4	< 5	10.1	8.54	9.91	13	8.63	15	8.86	7.71	8.29
Fluoride	mg/L	< .5	0.549	< .5	< .5	< .5	6.7	< .5	< .5	< .5	< .5	< .5	< .5	0.523	0.625	< .5	< .5	0.516	< .5	< 0.500	< 0.500	< 0.500
pH	SU	7.97	7.18	7.27		7.2	7.31	7.84	6.96	6.94	7	7.35	7.5	7.25	7.76	7.11	7.54	7.28	7.92	7.46	6.83	7.4
Sulfate	mg/L	827	605	607	732	849	853	537	664	835	779	1110	210	400	351	327	496	403	338	333	297	319
Total Dissolved Solids	mg/L	1620	1270	1500	1600	1470	1780	1280	1390	1520	1670	1820	676	948	724	786	942	920	738	736	682	796

Appendix IV Parameters:

Antimony	mg/L	< .05	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .002	< .002	< 0.00200	< 0.00200
Arsenic	mg/L	< .1	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< 0.00200	< 0.00200
Barium	mg/L	2.13	0.044	0.0426	0.0406	0.0402	0.0364	0.0327	0.0338		0.0285	>0338	0.0335	0.037	0.047	0.0389	0.0416	0.0365	0.0355	0.0443	0.0327		
Beryllium	mg/L	< .05	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< 0.00100	< 0.00100
Cadmium	mg/L	< .025	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< 0.000100	< 0.000100
Chromium	mg/L	< .250	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< 0.00500	< 0.00500
Cobalt	mg/L	< .025	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< 0.000500	< 0.000500
Fluoride	mg/L	< .5	0.549	< .5	< .5	< .5	6.7	< .5	< .5	< .5	< .5	< .5	< .5	< .5	0.625	< .5	< .5	0.516	< .5	< .5	< 0.500	< 0.500	
Lead	mg/L	< .025	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< 0.000500	< 0.000500
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .0005	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< 0.0100	< 0.0100
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< 0.000200	< 0.000200
Molybdenum	mg/L	< .1	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< 0.00200	< 0.00200
Selenium	mg/L	< .25	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< 0.00500	< 0.00500
Thallium	mg/L	< .05	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< 0.00100	< 0.00100
Radium-226	mg/L	0.0942	0.0703	0.164	0.106	0.0814	0.0124	0.100	0.047		0.0518				< 0.0609				0.0226 U	0.126 U	0.0866 U	-0.0189 U	
Radium-228	mg/L	0.216	0.18	0.123	0.145	0.0218	0.0842	0.121	0.197		0.0715				< 0.33				0.197 U	0.236 U	-0.0577 U	-0.140 U	
Combined Radium 226 + 228	mg/L	0.31	0.251	0.286	0.251	0.103	0.0966	0.221	0.244		0.123				< .391				0.219 U	0.362 U	0.0289 U	-0.159 U	

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22	
MW-21 Downgradient																							
Appendix III Parameters:																							
Boron	mg/L	< 2	7.23	8.45	6.93	4.87	4.49	7.36	7.05	3.33	2.24	8.81	6.84	1.36	6.95	8.46	6.76	6.82	5.24	5.88	3.57	3.69	
Calcium	mg/L	37.2	146	186	178	118	110	149	163	62.3		191	159	78.7	142	145	104	101	79.5	93.5	97.5	88.2	
Chloride	mg/L	27.7	16.6	24.4	19.2	14.2	15.6	15.1	16.1	5.09		27.1	10.9	< 5	8.3	14	8.05	7.21	5.14	6.58	7.19	18	
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.993	0.768	< .5	< .5	< .5		< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	
pH	SU	7.56	6.56	6.66		5.9	6.6	7.34	6.77	6.76	6.87	7.28	7.25	7.07	6.41	6.33	6.55	6.8	6.92	7.06	6.69	7.09	
Sulfate	mg/L	713	520	603	645	415	461	541	590	206		624	489	96.6	442	529	373	356	237	303	293	151	
Total Dissolved Solids	mg/L	1440	1110	1420	1240	1010	1060	1140	1220	514		1150	952	416	872	960	696	738	540	636	558	524	
Appendix IV Parameters:																							
Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			0.00195	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .002	< .002	< .00200	< .00200
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			0.00265	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .00200	< .00200
Barium	mg/L	0.0573	0.0482	0.0606	0.056	0.0735	0.0356	0.0461	0.0499			0.0281	0.0515	0.0622	0.0511	0.0624	0.0352	0.0407	0.0309	0.0434	0.036	0.0447	
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .00100	< .00100
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001	< .0001	< .0001	< .0001	< .000100	< .000100
Chromium	mg/L	0.00694	0.00539	0.00582	0.00561	< .005	< .005	0.00586	0.00572			< .005	0.00726	< .005	0.00647	0.00637	0.00644	0.00589	0.00708	0.00659	0.00636	0.00505	
Cobalt	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .000500	< .000500
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.993	0.768	< .5	< .5			< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .500	< .500
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	0.000633	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .000500	< .000500
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05			< .01	0.0189	< .01	0.0277	0.0279	0.0213	0.0225	0.0198	0.0233	0.0162	0.018	
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .000200	< .000200
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	0.00383	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .00200	< .00200
Selenium	mg/L	0.0165	0.0103	0.0137	0.0119	0.0074	0.00674	0.0106	0.0109			< .005	0.00939	< .005	0.102	0.0108	0.00632	0.00762	< .005	0.00617	0.00634	< .00500	< .00500
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .00100	< .00100
Radium-226	mg/L	0.299	0.148	0.427	0.128	0.0502	-0.00511	0.0379	0.299			0.0141			0.117		0.0383		0.0282 U	0.0566 U	0.0448 U	0.117	
Radium-228	mg/L	-0.0462	0.0116	0.391	0.178	-0.0507	0.1	0.507	0.605			0.344			< .17		0.267		0.154 U	0.443	0.126 U	-0.195 U	
Combined Radium 226 + 228	mg/L	0.253	0.159	0.817	0.306	-0.000573	0.0953	0.545	0.814			0.358			< .287		0.305		0.182 U	0.499	0.171 U	-0.0783 U	

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095											
MW-24 Downgradient		June-18	August-18	March-19	August-19	April-20	September-20	April-21	September-21	April-22	September-22

Appendix III Parameters:

Boron	mg/L	< .2	< .2		< .2	< .2	0.109	< .1	<.1	<0.100	0.134
Calcium	mg/L	88	72.8		103	94.3	69.9	74.6	69	62.8	66.8
Chloride	mg/L	19.9	18.1		22.4	24.8	19.5	28.9	21.9	19.9	19.9
Fluoride	mg/L	0.653	< .5		< .5	< .5	< .5	< .5	< .5		<0.500
pH	SU	7.47	7.39		6.87	7.29	7.47	7.64	7.44	7.49	7.53
Sulfate	mg/L	101	70		169	164	81	91.2	59.3	48.5	44.5
Total Dissolved Solids	mg/L	474	368		542						

Appendix IV Parameters:

Antimony	mg/L	< .001	< .001		< .001						
Arsenic	mg/L	< .002	< .002		< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200
Barium	mg/L	0.0695	0.0776		0.128	0.084	0.0969	0.0936	0.0922	0.0826	0.0887
Beryllium	mg/L	< .001	< .001		< .001	< .001	< .001	< .001	< .001	<0.00100	<0.00100
Cadmium	mg/L	< .0005	< .0005		< .0005						
Chromium	mg/L	< .005	< .005		< .005						
Cobalt	mg/L	< .0005	< .0005		< .0005	< .0005	< .0005	< .0005	<.0005	<0.000500	<0.000500
Fluoride	mg/L	0.653	< .5		< .5	< .5	< .5	< .5	< .5	<0.500	<0.500
Lead	mg/L	< .0005	< .0005		< .0005	< .0005	< .0005	< .0005	< .0005	<0.000500	<0.000500
Lithium	mg/L	< .01	< .01		< .01						
Mercury	mg/L	< .0002	< .0002		< .0002						
Molybdenum	mg/L	0.00447	< .002		< .002	< .002	< .002	< .002	< .002	<0.00200	<0.00200
Selenium	mg/L	< .005	< .005		< .005	< .005	< .005	< .005	< .005	<0.00500	<0.00500
Thallium	mg/L	< .001	< .001		< .001						
Radium-226	mg/L	-0.0261							0.00873 U		
Radium-228	mg/L	0.19							0.266 U		
Combined Radium 226 + 228	mg/L	0.164							0.275 U		

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095 MW-26 Downgradient	April-20	September-20	April-21	September-21	April-22	September-22

Appendix III Parameters:

Boron	mg/L		2.5	2.33	2.49	0.058	1.97
Calcium	mg/L		134	130	134	0.19	133
Chloride	mg/L		19.7	21.1	19.3	2.25	18.4
Fluoride	mg/L		< .5	< .5	< .5	0.22	<0.500
pH	SU		7.88	8.12	7.98	7.69	7.71
Sulfate	mg/L		376	341	358	2	313
Total Dissolved Solids	mg/L						

Appendix IV Parameters:

Antimony	mg/L						
Arsenic	mg/L		< .002	< .002	< .002	0.00075	<0.00200
Barium	mg/L		0.114	0.0989	0.0889	0.00088	0.0876
Beryllium	mg/L		< .001	< .001	< .001	0.00027	<0.00100
Cadmium	mg/L						
Chromium	mg/L						
Cobalt	mg/L		< .005	< .005	<.0005	0.00019	<0.000500
Fluoride	mg/L		< .5	< .5	< .5	0.22	<0.500
Lead	mg/L		< .0005	< .0005	< .0005	0.00024	<0.000500
Lithium	mg/L						
Mercury	mg/L						
Molybdenum	mg/L		< .002	0.00239	< .002	0.0012	<0.00200
Selenium	mg/L		< .005	< .005	< .005	0.00096	<0.00500
Thallium	mg/L						
Radium-226	mg/L						
Radium-228	mg/L						
Combined Radium 226 + 228	mg/L						

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095 MW-27 Downgradient	April-20	September-20	April-21	September-21	April-22	September-22

Appendix III Parameters:

Boron	mg/L		3.25	0.17	3.82	0.058	1.41
Calcium	mg/L		61	57.6	68.4	0.19	38.7
Chloride	mg/L		13.6	10.4	15	2.25	19
Fluoride	mg/L		< .5	< .5	< .5	0.22	<0.500
pH	SU		6.69	7.56	7.03	6.76	7.71
Sulfate	mg/L		119	7.63	111	2	38.2
Total Dissolved Solids	mg/L						

Appendix IV Parameters:

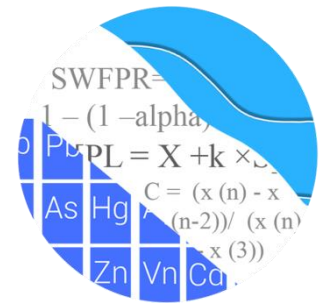
Antimony	mg/L						
Arsenic	mg/L		< .002	< .002	< .002	0.00075	<0.00200
Barium	mg/L		0.0738	0.0534	0.0862	0.00088	0.0594
Beryllium	mg/L		< .001	< .001	< .001	0.00027	<0.00100
Cadmium	mg/L						
Chromium	mg/L						
Cobalt	mg/L		< .005	< .0005	<.0005	0.00019	<0.000500
Fluoride	mg/L		< .5	< .5	< .5	0.22	<0.500
Lead	mg/L		< .0005	< .0005	< .0005	0.00024	0.000536
Lithium	mg/L						
Mercury	mg/L						
Molybdenum	mg/L		< .002	< .002	< .002	0.0012	<0.00200
Selenium	mg/L		< .005	< .005	< .005	0.00096	<0.00500
Thallium	mg/L						
Radium-226	mg/L						
Radium-228	mg/L						
Combined Radium 226 + 228	mg/L						

APPENDIX D

STATISTICAL RESULTS AND METHODOLOGIES

- Annual Statistical Results Report, November 17, 2022
- Flow Charts showing statistical procedure methodologies

GROUNDWATER STATS CONSULTING



November 17, 2022

HR Green, Inc.
Attn: Ms. Rose Amundson
8710 Earhart Ln, SW
Cedar Rapids, Iowa 52404

Re: Muscatine Power & Water – September 2022 Detection & Assessment Monitoring Report

Dear Ms. Amundson,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the statistical analysis of groundwater data for the September 2022 sample event at the Muscatine Power & Water for the Coal Combustion Residuals (CCR) program. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals from Electric Utilities (CCR Rule, 2015) as well as with the United States Environmental Protection Agency (USEPA) Unified Guidance (2009).

Sampling began for the CCR program in June 2016 for all wells except newly installed well MW-22 which has been sampled since 2018. The monitoring well network at Muscatine Power & Water consists of the following:

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

The CCR program consists of the following constituents:

- **Appendix III** (Detection Monitoring) - boron, calcium, chloride, fluoride, pH, sulfate, and TDS
- **Appendix IV** (Assessment Monitoring) - antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, combined radium 226 + 228, fluoride, lead, lithium, mercury, molybdenum, selenium, and thallium

Data were sent electronically to Groundwater Stats Consulting, and the statistical analysis was reviewed by Kristina Rayner, Senior Statistician and Founder of Groundwater Stats Consulting.

When there are no detections present in downgradient wells for a given constituent, statistical analyses are not required. A summary of downgradient well/constituent pairs with 100% non-detects follows this letter.

Time series plots for Appendix III and IV parameters at all wells are provided for the purpose of screening data at these wells (Figure A). Additionally, a separate section of box plots is included for all constituents at upgradient and downgradient wells (Figure B). The time series plots are used to initially screen for suspected outliers and trends, while the box plots provide visual representation of variation within individual wells and between all wells. Values in background which have been flagged as outliers may be seen in a lighter font and as a disconnected symbol on the graphs.

In earlier analyses, data at all wells were evaluated for the following: 1) outliers; 2) trends; 3) most appropriate statistical method for Appendix III parameters based on site characteristics of groundwater data upgradient of the facility; and 4) eligibility of downgradient wells when intrawell statistical methods are recommended. Power curves were provided and demonstrated that the selected statistical methods for Appendix III parameters comply with the USEPA Unified Guidance. The EPA suggests the selected statistical method should provide at least 55% power at 3 standard deviations or at least 80% power at 4 standard deviations.

Prior to constructing statistical limits in this analysis, background data were screened for outliers and extreme trending patterns, particularly in upgradient wells, that would lead to artificially elevated statistical limits. No new outliers were flagged during this analysis and a list of previously flagged outliers follows this letter (Figure C).

Summary of Statistical Methods – Appendix III Parameters:

Based on the earlier evaluation described above, the following methods were selected:

- Interwell prediction limits, combined with a 1-of-2 resample plan for boron, calcium, chloride, fluoride, pH, sulfate, and TDS

Parametric prediction limits are utilized when the screened historical data follow a normal or transformed-normal distribution. When data cannot be normalized or the majority of data are non-detects, a nonparametric test is utilized. While the false positive rate associated with the parametric limits is based on an annual 10% (5% per semi-annual event) as recommended by the EPA Unified Guidance (2009), the false positive rate associated with the nonparametric limits is dependent upon the available background sample size, number of future comparisons, and verification resample plan. The distribution of data is tested using the Shapiro-Wilk/Shapiro-Francia test for normality. After testing for normality and performing any adjustments as discussed below (US EPA, 2009), data are analyzed using either parametric or non-parametric prediction limits.

- No statistical analyses are required on wells and analytes containing 100% non-detects (USEPA Unified Guidance, 2009, Chapter 6).
- When data contain <15% non-detects in background, simple substitution of one-half the reporting limit is utilized in the statistical analysis. The reporting limit utilized for non-detects is the most recent practical quantification limit (PQL) as reported by the laboratory.
- When data contain between 15-50% non-detects, the Kaplan-Meier non-detect adjustment is applied to the background data. This technique adjusts the mean and standard deviation of the historical concentrations to account for concentrations below the reporting limit.
- Nonparametric prediction limits are used on data containing greater than 50% non-detects.

Natural systems continuously evolve due to physical changes made to the environment. Examples include capping a landfill, paving areas near a well, or lining a drainage channel to prevent erosion. Periodic updating of background statistical limits is necessary to accommodate these types of changes. In the interwell case, prediction limits are updated with upgradient well data during each event after careful screening for any new outliers. In some cases, the earlier portion of data are deselected prior to construction of limits to provide sensitive limits that will rapidly detect changes in groundwater quality. Even though the data are excluded from the calculation, the values will continue to be reported and shown in tables and graphs.

Original Background Screening Summary – Conducted in October 2017

Background data were originally screened in October 2017 for all parameters at each well for the constituents listed above, and the results of the screening were submitted during that time. A summary of the October 2017 screening is discussed below.

Outlier Screening

Time series plots were used to initially screen for suspected outliers, trends, and seasonal patterns. Outliers and trends in background data result in increased variation and statistical limits that are not conservative from a regulatory perspective, if not addressed.

Box plots provide visual representation of variation within individual wells and between all wells. Data were further evaluated through the Analysis of Variance test to determine whether observed variation is statistically significant, and guide the decision logic for determining an appropriate statistical limit as discussed below.

A handful of possible outliers were identified and formally tested using Tukey's box plot method. When outliers were confirmed, these values were flagged in the computer database with "o" in order to deselect prior to construction of statistical limits. Flagged values appear as a disconnected, lighter symbol on the time series graphs. A summary of Tukey's test results was included with the screening.

Seasonality

No seasonal patterns were visually apparent in any of the detected data; therefore, no deseasonalizing adjustments were made to the data. When seasonal patterns are observed, data may be optionally deseasonalized so that the resulting limits will correctly account for the seasonality as a predictable pattern rather than random variation or a release.

Trend Testing

The Sen's Slope/Mann Kendall trend test was used to evaluate all proposed background data through August 2017 to identify statistically significant increasing or decreasing trends. In the absence of suspected contamination, significant trending data are typically not included as part of the background data used for construction of prediction limits. This step serves to eliminate the trend and, thus, reduce variation in background. When statistically significant decreasing trends are present, earlier data are evaluated to determine whether earlier concentration levels are significantly different than current reported concentrations and will be deselected as necessary. When the historical records of data are truncated for the reasons above, a summary report will be provided to show the date ranges used in construction of the statistical limits.

The results of the trend analyses showed a statistically significant decreasing trend for chloride in upgradient well MW-08. This trend was relatively low in magnitude when

compared to average concentrations; therefore, no adjustments were made to the data sets. No other statistically significant trends were identified for any of the Appendix III parameters. The results of the trend tests were included with the screening.

Determination of Statistical Methods

The Analysis of Variance (ANOVA), tolerance limits, and confidence intervals were used to identify the most appropriate statistical approach for Muscatine Power & Water. Based on the results from the 2017 background screening, interwell methods were recommended initially in lieu of intrawell methods. Interwell tests compare downgradient well data to statistical limits constructed from pooled upgradient well data. This method is appropriate when average concentrations are similar across upgradient wells. Intrawell tests compare compliance data from a single well to screened historical data within the same well, and are appropriate when upgradient wells exhibit spatial variation; when statistical limits constructed from upgradient wells would not be conservative from a regulatory perspective; and when downgradient water quality is unimpacted compared to upgradient water quality for the same parameters.

If further research identifies whether the elevated downgradient concentrations are likely the result of natural geological conditions or an off-site source, data would be re-evaluated to determine the most appropriate statistical Detection Monitoring method.

Prediction Limits – Appendix III Parameters September 2022

Interwell prediction limits were constructed as recommended in the CCR Rule (2015) and in the EPA Unified Guidance (2009), based on a 1-of-2 resample plan using pooled upgradient well data for all Appendix III parameters through September 2022 (Figure D). Interwell prediction limits pool upgradient well data to establish a background limit for an individual constituent. The September 2022 sample from each downgradient well is compared to the background limit to determine whether initial exceedances are present.

In the event of an initial exceedance of compliance well data, the 1-of-2 resample plan allows for collection of one additional sample to determine whether the initial exceedance is confirmed. When an independent resample confirms the initial exceedance, a statistically significant increase is identified and further research would be required to identify the cause of the exceedance (i.e., impact from the site, natural variation, or an off-site source). If the resample falls within the statistical limit, the initial exceedance is considered to be a false positive result and, therefore, no exceedance is noted and no further action is necessary. If no resample is collected, the original result is considered a confirmed exceedance.

Parametric prediction limits were constructed when background data followed a normal or transformed-normal distribution. Non-parametric prediction limits are provided for data sets with greater than 50% non-detects, and for data sets which do not follow a normal or transformed-normal distribution. A summary table of well/constituent pairs found to exceed their respective limits follows this letter and prediction limit exceedances were noted for the following well/constituent pairs:

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

When prediction limit exceedances are identified in downgradient wells, data are further evaluated using the Sen's Slope/Mann Kendall trend test at the 99% confidence level to determine whether concentrations are statistically increasing, decreasing, or stable (Figure E). Upgradient wells are included in the trend analyses for all parameters found to exceed their prediction limit in downgradient wells to identify whether similar patterns exist upgradient of the site which is an indication of natural variability in groundwater unrelated to practices at the site. A summary of the trend test results follows this letter. Statistically significant trends were identified for the following well/constituent pairs:

Increasing:

- Sulfate: MW-22 (upgradient)

Decreasing:

- Boron: MW-15A
- Calcium: MW-08 and MW-23 (both upgradient)
- Chloride: MW-22 (upgradient) and MW-5B
- Sulfate: MW-08 (upgradient)
- TDS: MW-08 (upgradient), MW-10 (upgradient), MW-14A, and MW-15A

Appendix IV Analysis - September 2022

For Appendix IV parameters, confidence intervals for each downgradient well/constituent were compared against corresponding Groundwater Protection Standards (GWPS). GWPS were developed as described below. Well/constituent pairs that have 100% non-detects or only trace values below the reporting limits do not require analysis. Data from upgradient wells for Appendix IV parameters are reassessed for outliers during each

analysis. No new outliers were identified and a summary of flagged outliers follows this report (Figure C).

Interwell Upper Tolerance Limits

Parametric tolerance limits were used to calculate background limits from pooled upgradient well data through September 2022 for Appendix IV parameters, with a target of 95% confidence and 95% coverage, to determine background limits (Figure F). The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples.

Groundwater Protection Standards

The background limits were compared to the Maximum Contaminant Levels (MCLs), CCR Rule-Specified levels, and background limits in the Groundwater Protection Standard (GWPS) table following this letter to determine the highest limit for use as the GWPS in the Confidence Interval comparisons (Figure G).

Confidence Intervals

Confidence intervals were then constructed on downgradient wells with data through September 2022 for each of the Appendix IV parameters using the highest limit of the MCL, CCR Rule-Specified level, or background limit as discussed above (Figure H). Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. No statistical exceedances were identified and a summary of the confidence interval results follows this letter.

Thank you for the opportunity to assist you in the statistical analysis of groundwater quality for Muscatine Power & Water. If you have any questions or comments, please feel free to contact us.

For Groundwater Stats Consulting,



Andrew T. Collins
Project Manager



Kristina L. Rayner
Senior Statistician

100% Non-Detects: Appendix IV Downgradient

Analysis Run 11/16/2022 1:36 PM View: Federal Confidence Intervals
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Antimony (mg/L)

MW-14A, MW-15A, MW-21, MW-4B, MW-5B, MW-6A

Arsenic (mg/L)

MW-14A, MW-15A, MW-21, MW-4B, MW-5B, MW-6A

Beryllium (mg/L)

MW-14A, MW-15A, MW-21, MW-4B, MW-5B, MW-6A

Cadmium (mg/L)

MW-14A, MW-15A, MW-21, MW-4B, MW-5B, MW-6A

Chromium (mg/L)

MW-14A, MW-15A, MW-4B, MW-5B, MW-6A

Cobalt (mg/L)

MW-14A, MW-15A, MW-21, MW-5B, MW-6A

Lead (mg/L)

MW-14A, MW-15A, MW-5B, MW-6A

Lithium (mg/L)

MW-14A, MW-15A, MW-4B, MW-5B, MW-6A

Mercury (mg/L)

MW-14A, MW-15A, MW-21, MW-4B, MW-6A

Molybdenum (mg/L)

MW-14A, MW-15A, MW-6A

Selenium (mg/L)

MW-4B, MW-5B, MW-6A

Thallium (mg/L)

MW-14A, MW-15A, MW-21, MW-4B, MW-5B, MW-6A

Interwell Prediction Limits - Significant Results

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/16/2022, 1:19 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bq	N Bq	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-14A	0.322	n/a	9/14/2022	15.1	Yes	61	n/a	n/a	n/a	90.16	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-15A	0.322	n/a	9/14/2022	10.4	Yes	61	n/a	n/a	n/a	90.16	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-21	0.322	n/a	9/14/2022	3.69	Yes	61	n/a	n/a	n/a	90.16	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Calcium (mg/L)	MW-14A	152	n/a	9/14/2022	301	Yes	61	n/a	n/a	n/a	0	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-5B	30	n/a	9/14/2022	39	Yes	61	n/a	n/a	n/a	31.15	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-14A	366	n/a	9/14/2022	978	Yes	61	n/a	n/a	n/a	0	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-14A	668.8	n/a	9/14/2022	1710	Yes	61	20.39	2.912	0	None	sqrt(x)	0.001254	Param Inter 1 of 2	
Total Dissolved Solids (mg/L)	MW-15A	668.8	n/a	9/14/2022	796	Yes	61	20.39	2.912	0	None	sqrt(x)	0.001254	Param Inter 1 of 2	

Interwell Prediction Limits - All Results

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/16/2022, 1:19 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bq	N	Bq	Mean	Std. Dev.	%NDs	ND	Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-14A	0.322	n/a	9/14/2022	15.1	Yes	61	n/a	n/a	n/a	n/a	90.16	n/a	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-15A	0.322	n/a	9/14/2022	10.4	Yes	61	n/a	n/a	n/a	n/a	90.16	n/a	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-21	0.322	n/a	9/14/2022	3.69	Yes	61	n/a	n/a	n/a	n/a	90.16	n/a	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-4B	0.322	n/a	9/14/2022	0.1ND	No	61	n/a	n/a	n/a	n/a	90.16	n/a	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-5B	0.322	n/a	9/14/2022	0.1ND	No	61	n/a	n/a	n/a	n/a	90.16	n/a	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-6A	0.322	n/a	9/14/2022	0.1ND	No	61	n/a	n/a	n/a	n/a	90.16	n/a	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Calcium (mg/L)	MW-14A	152	n/a	9/14/2022	301	Yes	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-15A	152	n/a	9/14/2022	132	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-21	152	n/a	9/14/2022	88.2	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-4B	152	n/a	9/14/2022	92.3	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-5B	152	n/a	9/14/2022	117	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-6A	152	n/a	9/14/2022	89	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-14A	30	n/a	9/14/2022	22.4	No	61	n/a	n/a	n/a	n/a	31.15	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-15A	30	n/a	9/14/2022	8.29	No	61	n/a	n/a	n/a	n/a	31.15	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-21	30	n/a	9/14/2022	18	No	61	n/a	n/a	n/a	n/a	31.15	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-4B	30	n/a	9/14/2022	16.8	No	61	n/a	n/a	n/a	n/a	31.15	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-5B	30	n/a	9/14/2022	39	Yes	61	n/a	n/a	n/a	n/a	31.15	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-6A	30	n/a	9/14/2022	13.3	No	61	n/a	n/a	n/a	n/a	31.15	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Fluoride (mg/L)	MW-14A	0.864	n/a	9/14/2022	0.5ND	No	60	n/a	n/a	n/a	n/a	86.67	n/a	n/a	n/a	0.0005218	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-15A	0.864	n/a	9/14/2022	0.5ND	No	60	n/a	n/a	n/a	n/a	86.67	n/a	n/a	n/a	0.0005218	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-21	0.864	n/a	9/14/2022	0.5ND	No	60	n/a	n/a	n/a	n/a	86.67	n/a	n/a	n/a	0.0005218	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-4B	0.864	n/a	9/14/2022	0.5ND	No	60	n/a	n/a	n/a	n/a	86.67	n/a	n/a	n/a	0.0005218	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-5B	0.864	n/a	9/14/2022	0.5ND	No	60	n/a	n/a	n/a	n/a	86.67	n/a	n/a	n/a	0.0005218	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-6A	0.864	n/a	9/14/2022	0.5ND	No	60	n/a	n/a	n/a	n/a	86.67	n/a	n/a	n/a	0.0005218	NP Inter (NDs) 1 of 2
pH (SU)	MW-14A	7.83	6.885	9/14/2022	7.21	No	61	7.358	0.2515	0	None	No	0.0006268	Param	Inter	1 of 2	
pH (SU)	MW-15A	7.83	6.885	9/14/2022	7.4	No	61	7.358	0.2515	0	None	No	0.0006268	Param	Inter	1 of 2	
pH (SU)	MW-21	7.83	6.885	9/14/2022	7.09	No	61	7.358	0.2515	0	None	No	0.0006268	Param	Inter	1 of 2	
pH (SU)	MW-4B	7.83	6.885	9/14/2022	7.52	No	61	7.358	0.2515	0	None	No	0.0006268	Param	Inter	1 of 2	
pH (SU)	MW-5B	7.83	6.885	9/14/2022	7.37	No	61	7.358	0.2515	0	None	No	0.0006268	Param	Inter	1 of 2	
pH (SU)	MW-6A	7.83	6.885	9/14/2022	7.38	No	61	7.358	0.2515	0	None	No	0.0006268	Param	Inter	1 of 2	
Sulfate (mg/L)	MW-14A	366	n/a	9/14/2022	978	Yes	61	n/a	n/a	n/a	0	n/a	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-15A	366	n/a	9/14/2022	319	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-21	366	n/a	9/14/2022	151	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-4B	366	n/a	9/14/2022	49.5	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-5B	366	n/a	9/14/2022	49.9	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-6A	366	n/a	9/14/2022	16.4	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-14A	668.8	n/a	9/14/2022	1710	Yes	61	20.39	2.912	0	None	sqrt(x)	0.001254	Param	Inter	1 of 2	
Total Dissolved Solids (mg/L)	MW-15A	668.8	n/a	9/14/2022	796	Yes	61	20.39	2.912	0	None	sqrt(x)	0.001254	Param	Inter	1 of 2	
Total Dissolved Solids (mg/L)	MW-21	668.8	n/a	9/14/2022	524	No	61	20.39	2.912	0	None	sqrt(x)	0.001254	Param	Inter	1 of 2	
Total Dissolved Solids (mg/L)	MW-4B	668.8	n/a	9/14/2022	358	No	61	20.39	2.912	0	None	sqrt(x)	0.001254	Param	Inter	1 of 2	
Total Dissolved Solids (mg/L)	MW-5B	668.8	n/a	9/14/2022	484	No	61	20.39	2.912	0	None	sqrt(x)	0.001254	Param	Inter	1 of 2	
Total Dissolved Solids (mg/L)	MW-6A	668.8	n/a	9/14/2022	334	No	61	20.39	2.912	0	None	sqrt(x)	0.001254	Param	Inter	1 of 2	

Trend Tests - Prediction Limit Exceedances - Significant Results

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/16/2022, 1:28 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron (mg/L)	MW-15A	-1.647	-127	-87	Yes	21	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-08 (bg)	-7.173	-94	-81	Yes	20	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-23 (bg)	-2.586	-31	-30	Yes	10	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-22 (bg)	-2.677	-39	-34	Yes	11	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-5B	-4.91	-99	-87	Yes	21	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-08 (bg)	-18.23	-108	-81	Yes	20	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-22 (bg)	9.567	51	34	Yes	11	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-08 (bg)	-61.43	-125	-81	Yes	20	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-10 (bg)	-26.48	-100	-81	Yes	20	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-14A	-126.7	-96	-87	Yes	21	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-15A	-160.3	-117	-87	Yes	21	0	n/a	n/a	0.01	NP

Trend Tests - Prediction Limit Exceedances - All Results

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/16/2022, 1:28 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron (mg/L)	MW-08 (bg)	0	7	81	No	20	95	n/a	n/a	0.01	NP
Boron (mg/L)	MW-10 (bg)	0	0	81	No	20	100	n/a	n/a	0.01	NP
Boron (mg/L)	MW-14A	0.2601	20	87	No	21	0	n/a	n/a	0.01	NP
Boron (mg/L)	MW-15A	-1.647	-127	-87	Yes	21	0	n/a	n/a	0.01	NP
Boron (mg/L)	MW-21	-0.1976	-34	-87	No	21	4.762	n/a	n/a	0.01	NP
Boron (mg/L)	MW-22 (bg)	0	9	34	No	11	72.73	n/a	n/a	0.01	NP
Boron (mg/L)	MW-23 (bg)	0	11	30	No	10	80	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-08 (bg)	-7.173	-94	-81	Yes	20	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-10 (bg)	-0.8819	-43	-81	No	20	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-14A	-7.357	-80	-87	No	21	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-22 (bg)	-0.5331	-9	-34	No	11	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-23 (bg)	-2.586	-31	-30	Yes	10	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-08 (bg)	0.01021	2	81	No	20	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-10 (bg)	0	-19	-81	No	20	95	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-22 (bg)	-2.677	-39	-34	Yes	11	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-23 (bg)	0.675	17	30	No	10	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-5B	-4.91	-99	-87	Yes	21	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-08 (bg)	-18.23	-108	-81	Yes	20	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-10 (bg)	-1.184	-42	-81	No	20	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-14A	-28.49	-74	-87	No	21	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-22 (bg)	9.567	51	34	Yes	11	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-23 (bg)	-1.88	-28	-30	No	10	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-08 (bg)	-61.43	-125	-81	Yes	20	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-10 (bg)	-26.48	-100	-81	Yes	20	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-14A	-126.7	-96	-87	Yes	21	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-15A	-160.3	-117	-87	Yes	21	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-22 (bg)	-8.725	-32	-34	No	11	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-23 (bg)	-29.94	-29	-30	No	10	0	n/a	n/a	0.01	NP

Upper Tolerance Limit Summary Table

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/16/2022, 1:30 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.Bq</u>	<u>N</u>	<u>Bq Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Antimony (mg/L)	n/a	0.002	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)
Arsenic (mg/L)	n/a	0.00784	n/a	n/a	n/a	n/a	59	n/a	n/a	61.02	n/a	n/a	0.04849	NP Inter(NDs)
Barium (mg/L)	n/a	0.247	n/a	n/a	n/a	n/a	59	n/a	n/a	0	n/a	n/a	0.04849	NP Inter(normality)
Beryllium (mg/L)	n/a	0.001	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)
Cadmium (mg/L)	n/a	0.0001	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)
Chromium (mg/L)	n/a	0.005	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)
Cobalt (mg/L)	n/a	0.00558	n/a	n/a	n/a	n/a	60	n/a	n/a	36.67	n/a	n/a	0.04607	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	n/a	1.151	n/a	n/a	n/a	n/a	45	0.4642	0.3284	0	None	No	0.05	Inter
Fluoride (mg/L)	n/a	0.864	n/a	n/a	n/a	n/a	60	n/a	n/a	86.67	n/a	n/a	0.04607	NP Inter(NDs)
Lead (mg/L)	n/a	0.00204	n/a	n/a	n/a	n/a	59	n/a	n/a	88.14	n/a	n/a	0.04849	NP Inter(NDs)
Lithium (mg/L)	n/a	0.01	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)
Mercury (mg/L)	n/a	0.0002	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)
Molybdenum (mg/L)	n/a	0.00822	n/a	n/a	n/a	n/a	61	n/a	n/a	65.57	n/a	n/a	0.04377	NP Inter(NDs)
Selenium (mg/L)	n/a	0.005	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)
Thallium (mg/L)	n/a	0.001	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)

MUSCATINE POWER & WATER GWPS				
Constituent Name	MCL	CCR Rule-Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.002	0.006
Arsenic, Total (mg/L)	0.01		0.0078	0.01
Barium, Total (mg/L)	2		0.25	2
Beryllium, Total (mg/L)	0.004		0.001	0.004
Cadmium, Total (mg/L)	0.005		0.0001	0.005
Chromium, Total (mg/L)	0.1		0.005	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.0056	0.006
Combined Radium, Total (pCi/L)	5		1.15	5
Fluoride, Total (mg/L)	4		0.86	4
Lead, Total (mg/L)	0.015		0.002	0.015
Lithium, Total (mg/L)	n/a	0.04	0.01	0.04
Mercury, Total (mg/L)	0.002		0.0002	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.0082	0.1
Selenium, Total (mg/L)	0.05		0.005	0.05
Thallium, Total (mg/L)	0.002		0.001	0.002

*MCL = Maximum Contaminant Level

*CCR = Coal Combustion Residual

*GWPS = Groundwater Protection Standard

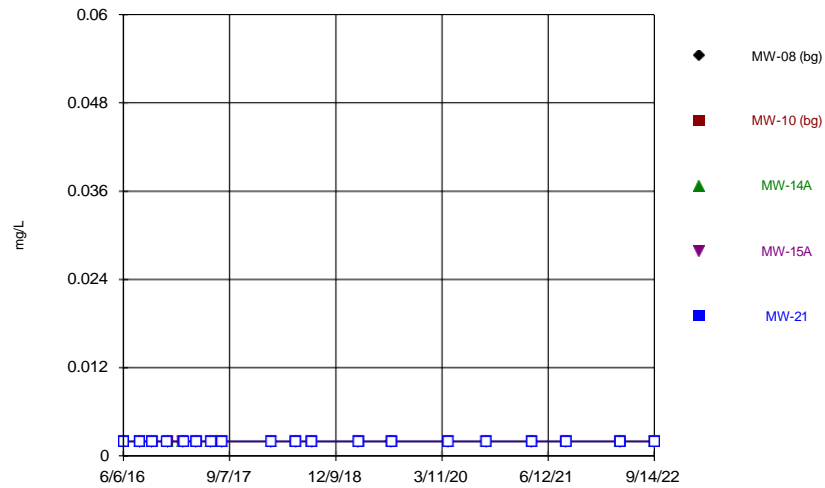
Confidence Intervals - All Results (No Significant)

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/16/2022, 1:39 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Barium (mg/L)	MW-14A	0.03698	0.0319	2	No	19	0.03444	0.004337	0	None	No	0.01	Param.
Barium (mg/L)	MW-15A	0.04081	0.03544	2	No	18	0.03813	0.004436	0	None	No	0.01	Param.
Barium (mg/L)	MW-21	0.05534	0.03941	2	No	19	0.04737	0.01361	0	None	No	0.01	Param.
Barium (mg/L)	MW-4B	0.1618	0.1354	2	No	19	0.1486	0.02256	0	None	No	0.01	Param.
Barium (mg/L)	MW-5B	0.3173	0.2744	2	No	19	0.2958	0.03663	0	None	No	0.01	Param.
Barium (mg/L)	MW-6A	0.2251	0.1979	2	No	19	0.2115	0.02323	0	None	No	0.01	Param.
Chromium (mg/L)	MW-21	0.006368	0.00551	0.1	No	19	0.005939	0.0007519	21.05	Kaplan-Meier	No	0.01	Param.
Cobalt (mg/L)	MW-4B	0.00135	0.0005	0.006	No	19	0.001014	0.001111	68.42	None	No	0.01	NP (NDs)
Combined Radium 226 + 228 (pCi/L)	MW-14A	0.4467	0.1507	5	No	15	0.2987	0.2185	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-15A	0.3481	0.1016	5	No	15	0.2248	0.1819	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-21	0.4916	0.1367	5	No	15	0.3142	0.2618	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-4B	0.7394	0.3807	5	No	15	0.5601	0.2647	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-5B	1.03	0.6533	5	No	15	0.8415	0.2776	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-6A	0.7871	0.4456	5	No	15	0.6163	0.252	0	None	No	0.01	Param.
Fluoride (mg/L)	MW-14A	0.684	0.5	4	No	19	0.529	0.09206	89.47	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-15A	0.516	0.5	4	No	19	0.5112	0.03021	78.95	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-21	0.768	0.5	4	No	20	0.5381	0.1227	90	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-4B	0.525	0.5	4	No	20	0.5381	0.09251	80	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-5B	0.627	0.5	4	No	20	0.6574	0.4654	85	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-6A	0.535	0.5	4	No	20	0.6706	0.4463	75	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-21	0.000633	0.0005	0.015	No	19	0.000507	0.00003051	94.74	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-4B	0.000532	0.0005	0.015	No	18	0.0005018	0.000007542	94.44	None	No	0.01	NP (NDs)
Lithium (mg/L)	MW-21	0.0225	0.01	0.04	No	19	0.01556	0.006605	52.63	None	No	0.01	NP (NDs)
Mercury (mg/L)	MW-5B	0.000813	0.0002	0.002	No	19	0.0002323	0.0001406	94.74	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-21	0.00383	0.002	0.1	No	19	0.002096	0.0004198	94.74	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-4B	0.00296	0.002	0.1	No	19	0.002051	0.0002202	94.74	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-5B	0.00212	0.002	0.1	No	19	0.002006	0.00002753	94.74	None	No	0.01	NP (NDs)
Selenium (mg/L)	MW-14A	0.00823	0.005	0.05	No	19	0.006565	0.001494	42.11	None	No	0.01	NP (normality)
Selenium (mg/L)	MW-15A	0.00502	0.005	0.05	No	19	0.005001	0.000004588	94.74	None	No	0.01	NP (NDs)
Selenium (mg/L)	MW-21	0.01055	0.00681	0.05	No	19	0.008678	0.003277	21.05	Kaplan-Meier	No	0.01	Param.

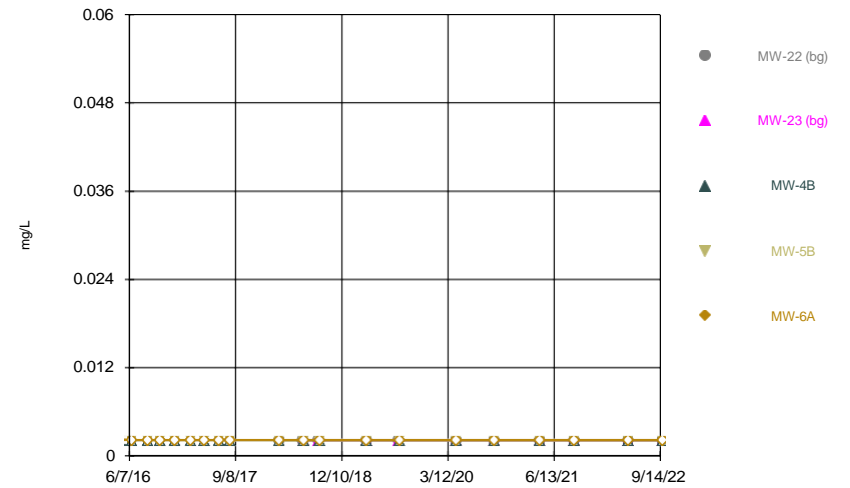
FIGURE A.

Time Series



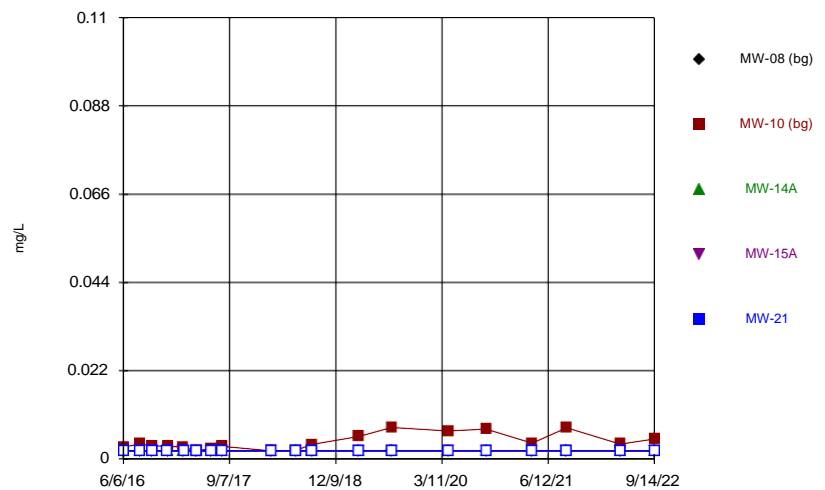
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



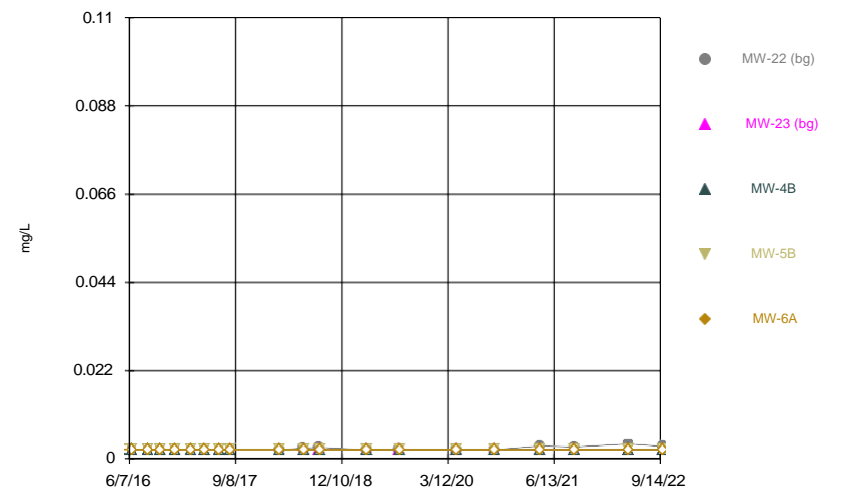
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



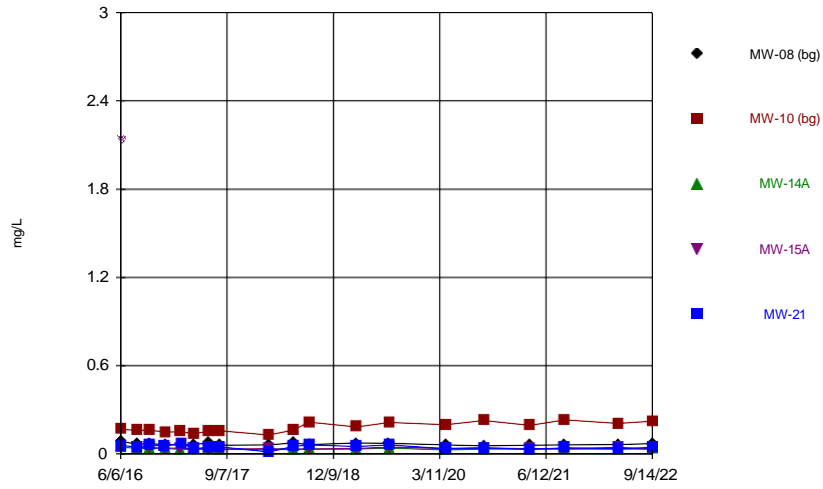
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



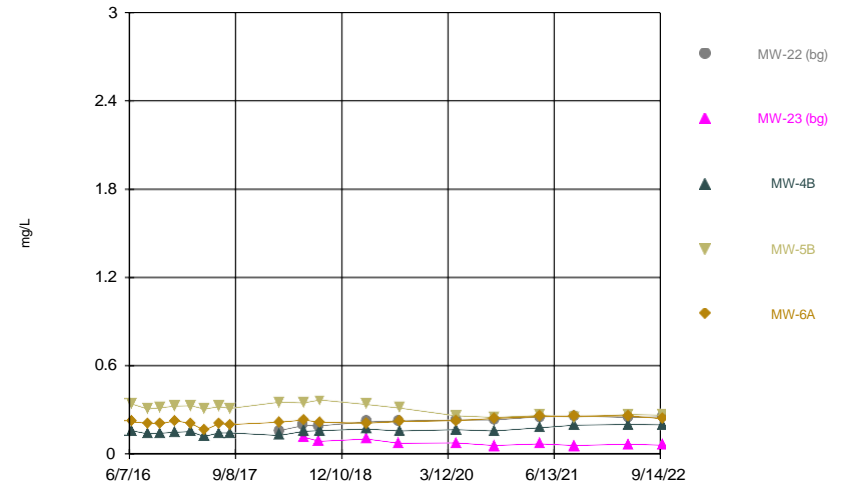
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Time Series



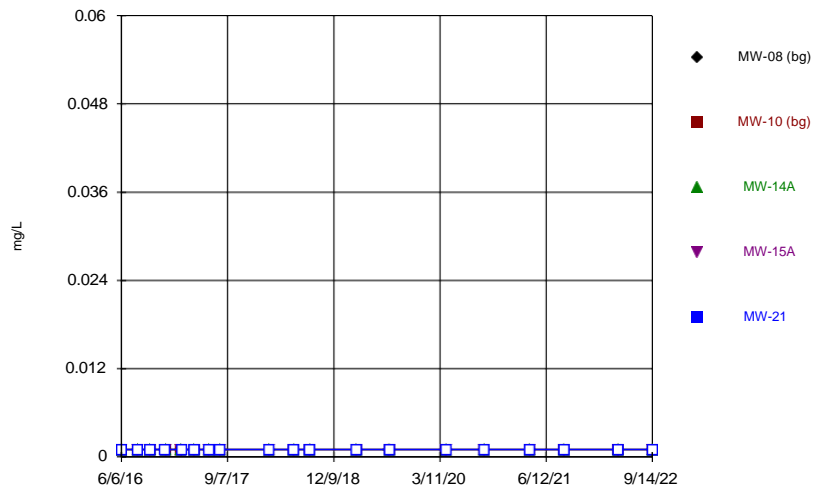
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Time Series



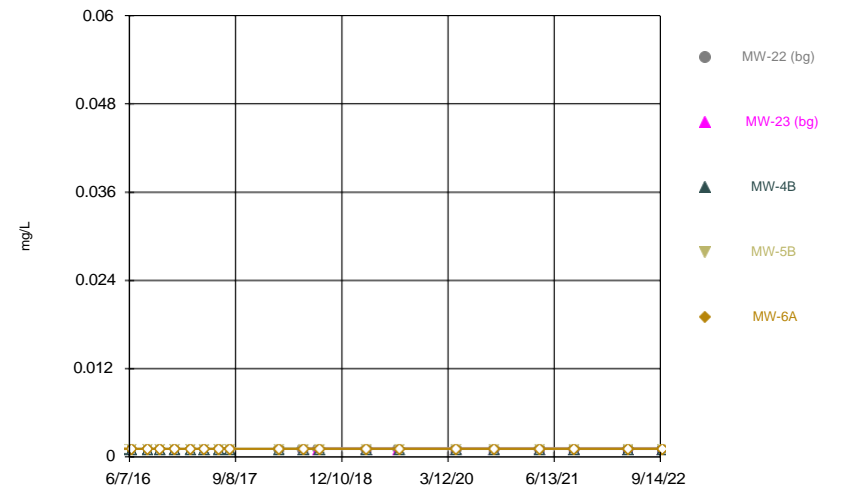
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Time Series



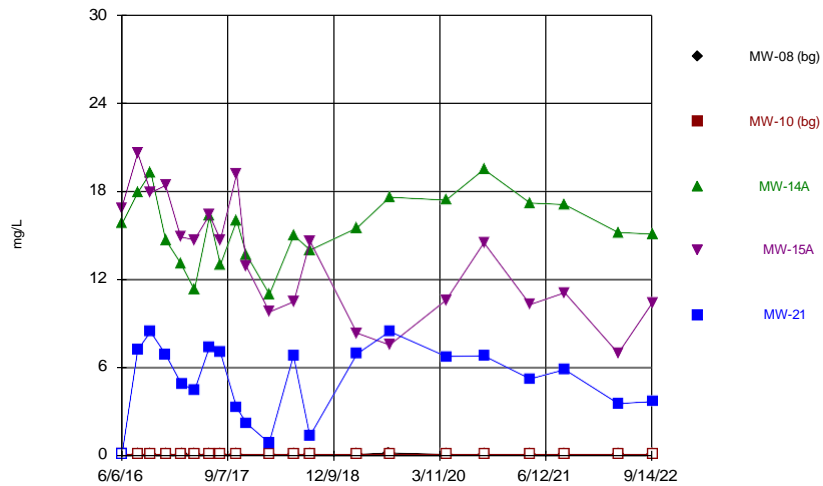
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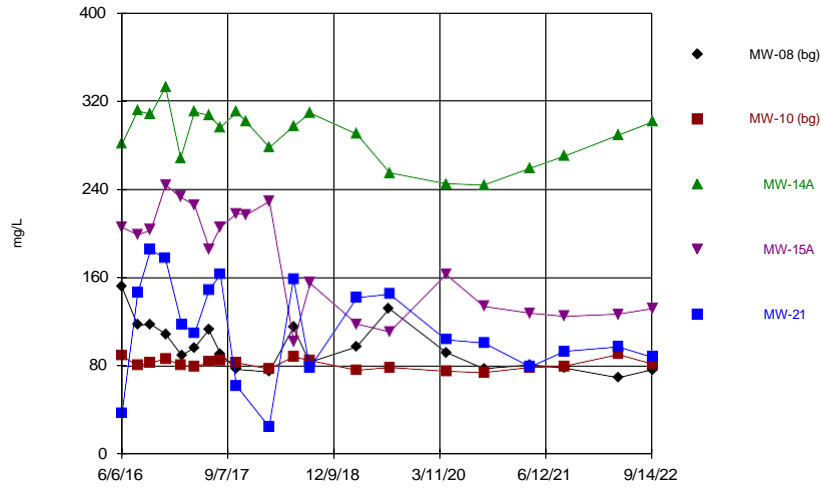


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Time Series

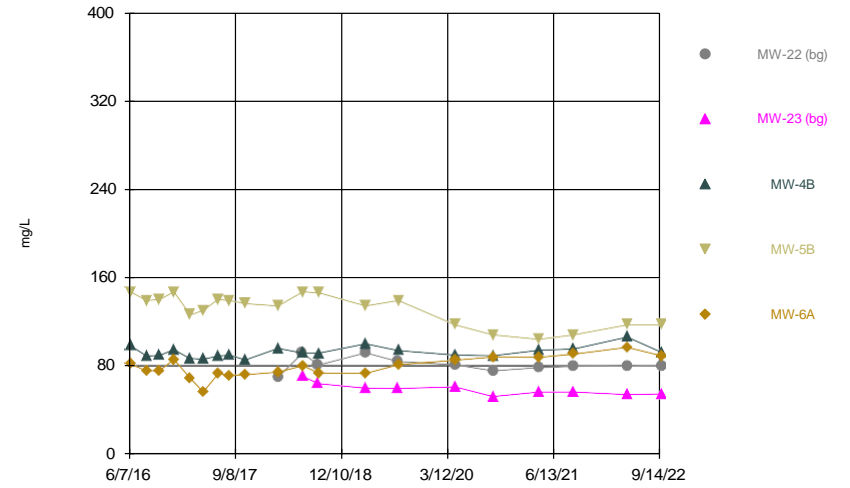


Time Series



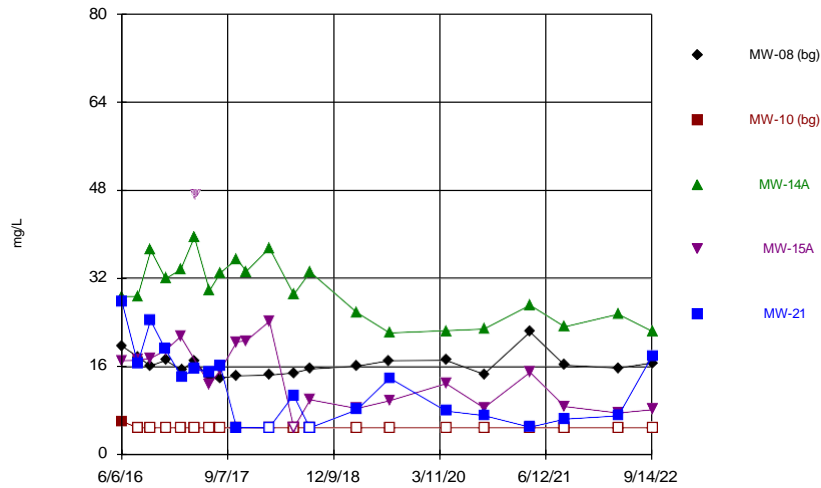
Constituent: Calcium Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



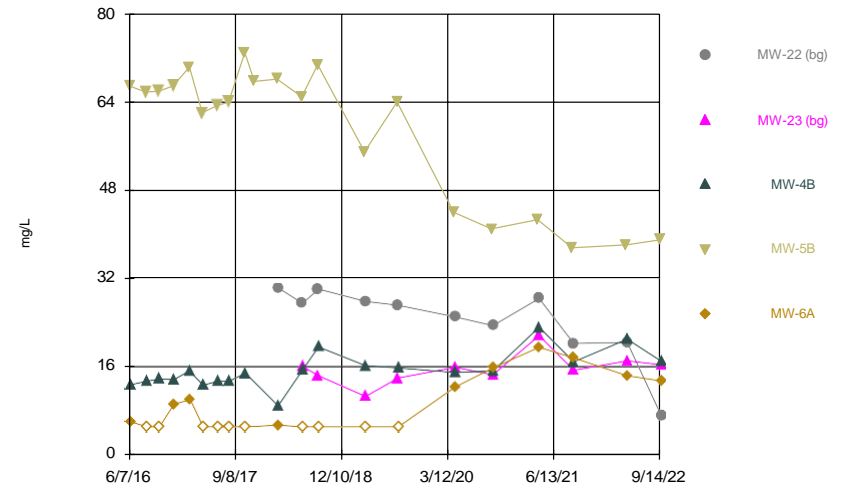
Constituent: Calcium Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



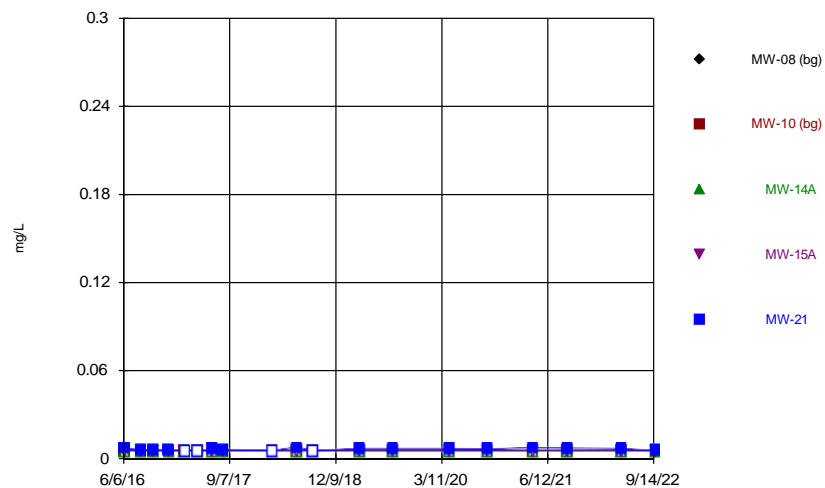
Constituent: Chloride Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



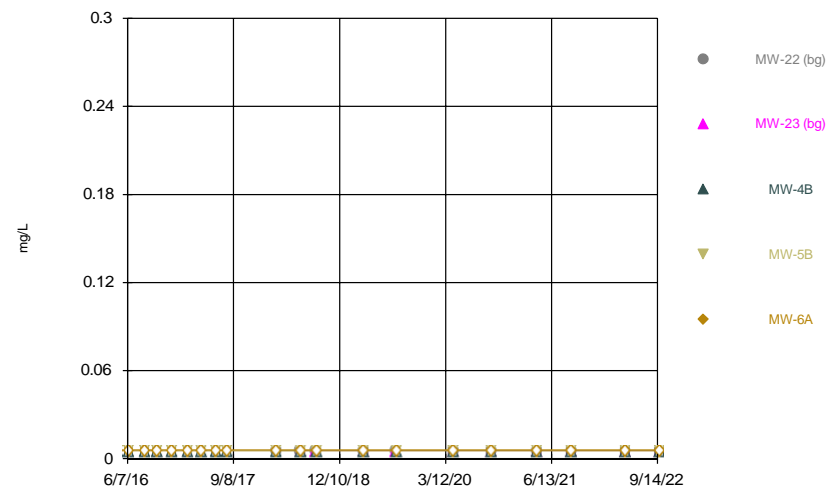
Constituent: Chloride Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



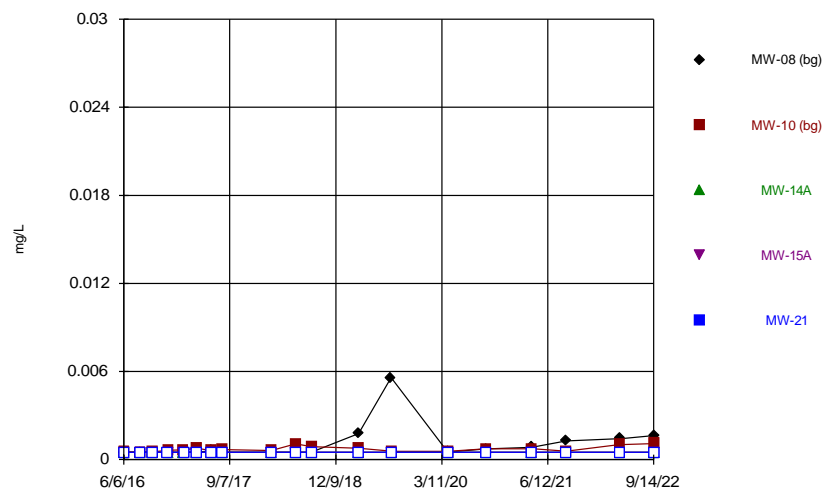
Constituent: Chromium Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



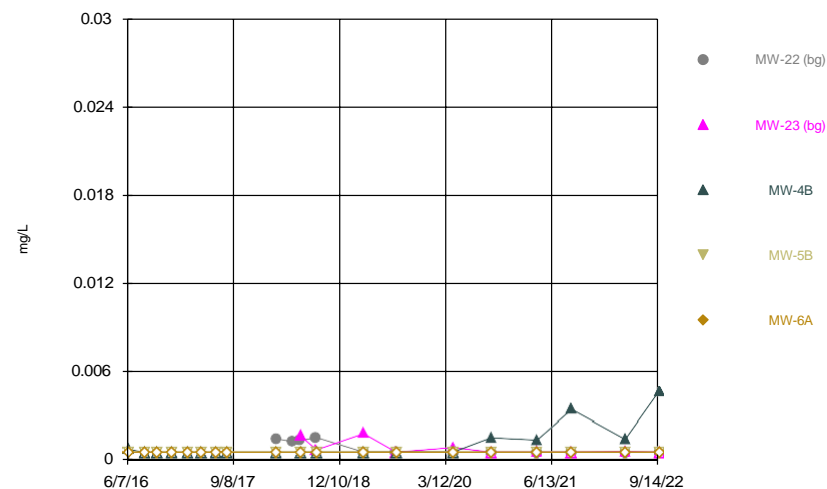
Constituent: Chromium Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



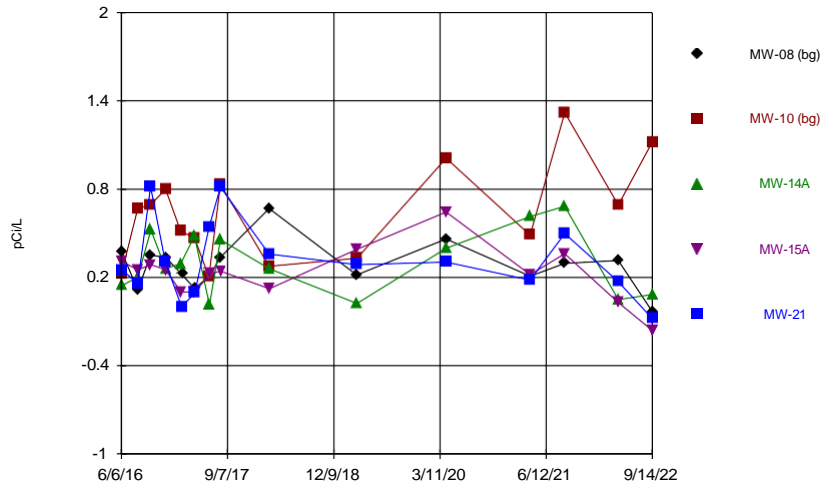
Constituent: Cobalt Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



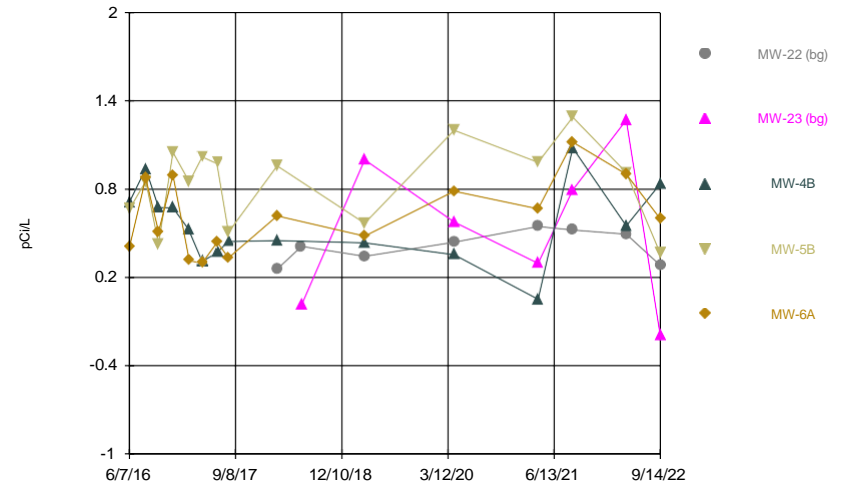
Constituent: Cobalt Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



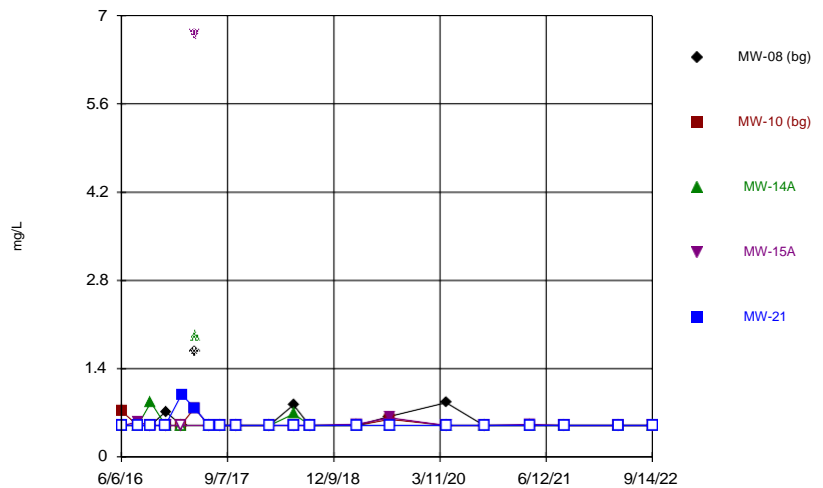
Constituent: Combined Radium 226 + 228 Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



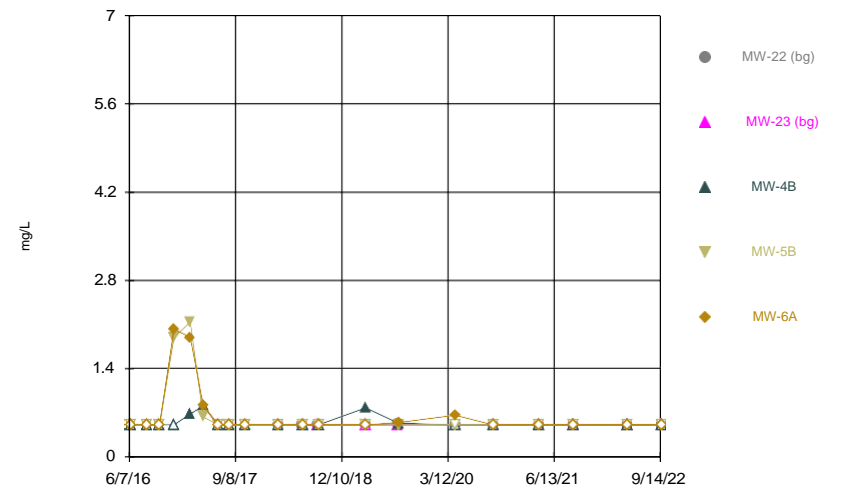
Constituent: Combined Radium 226 + 228 Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



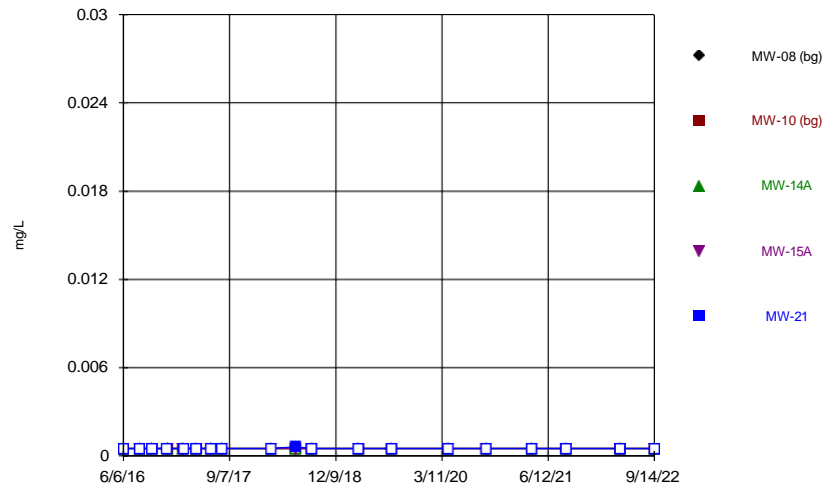
Constituent: Fluoride Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



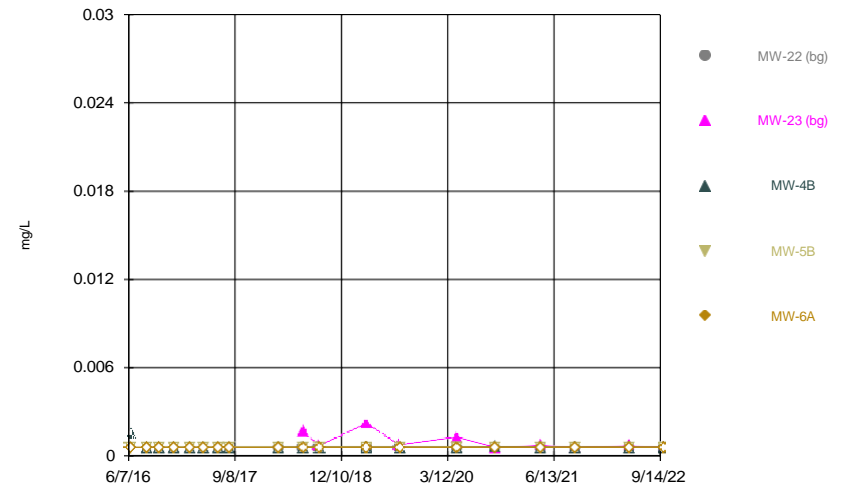
Constituent: Fluoride Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



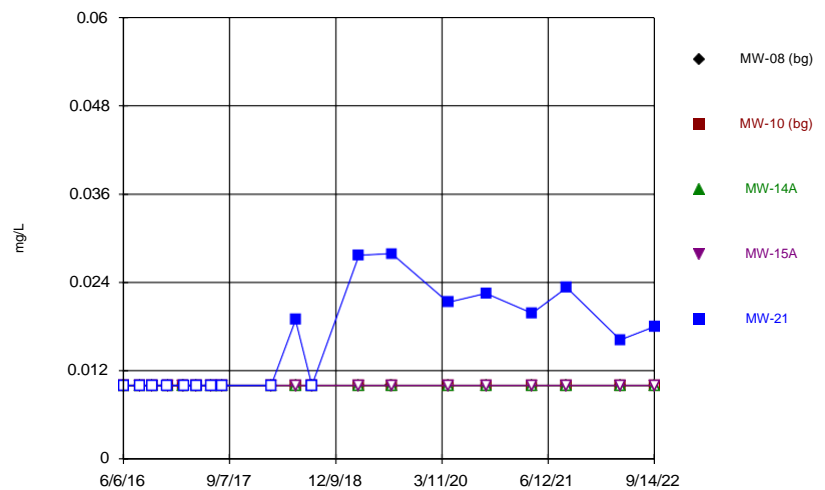
Constituent: Lead Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



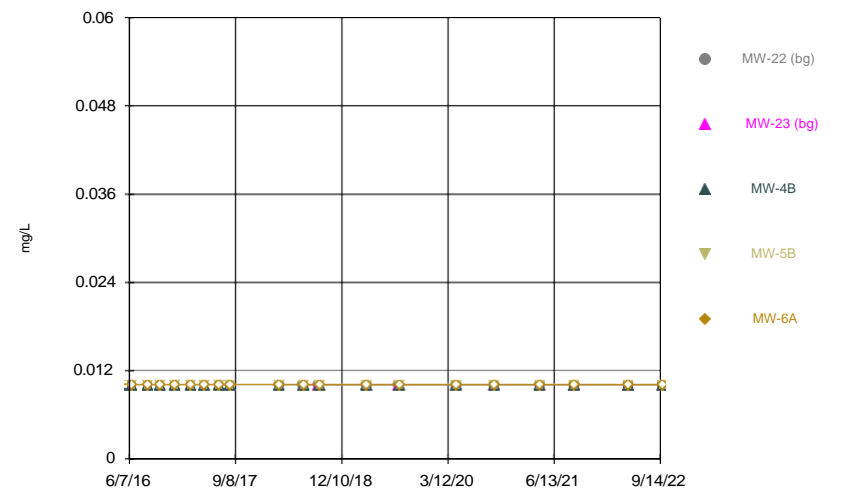
Constituent: Lead Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



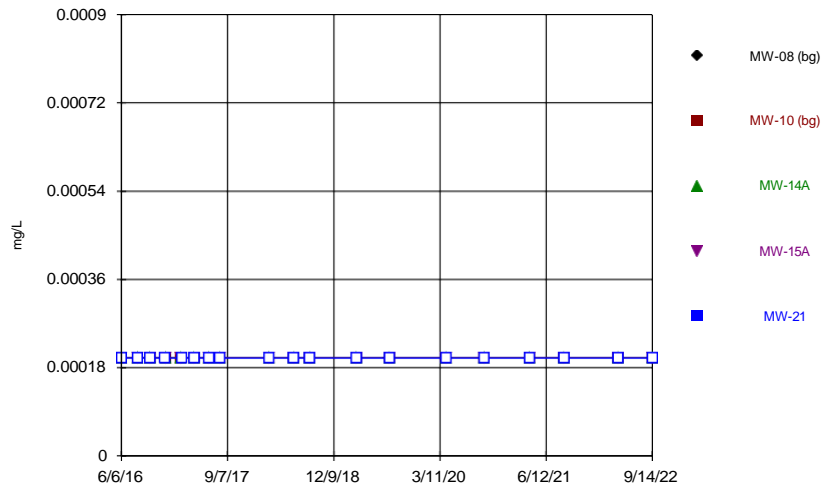
Constituent: Lithium Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



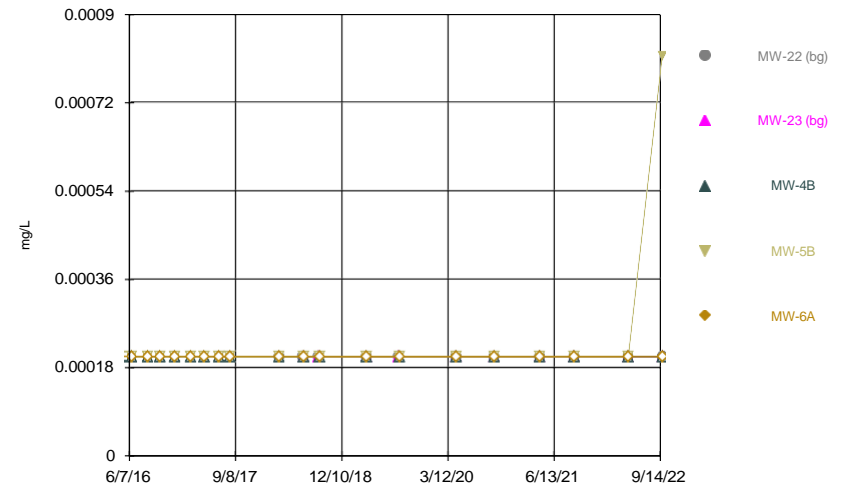
Constituent: Lithium Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



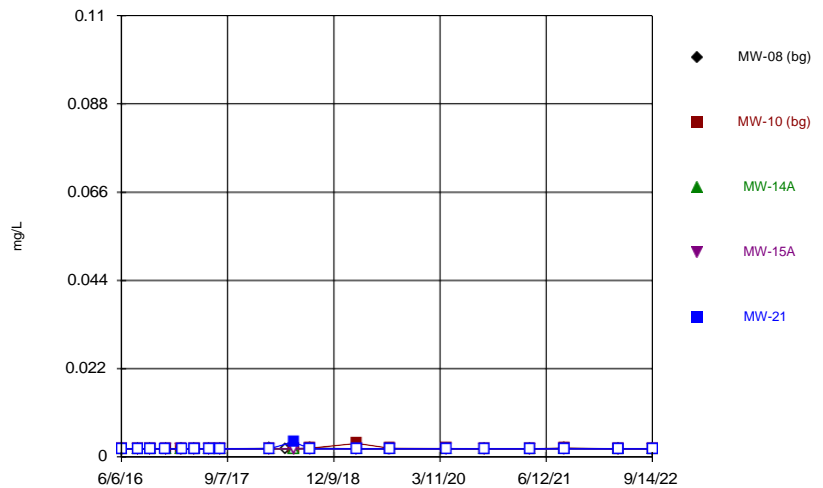
Constituent: Mercury Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



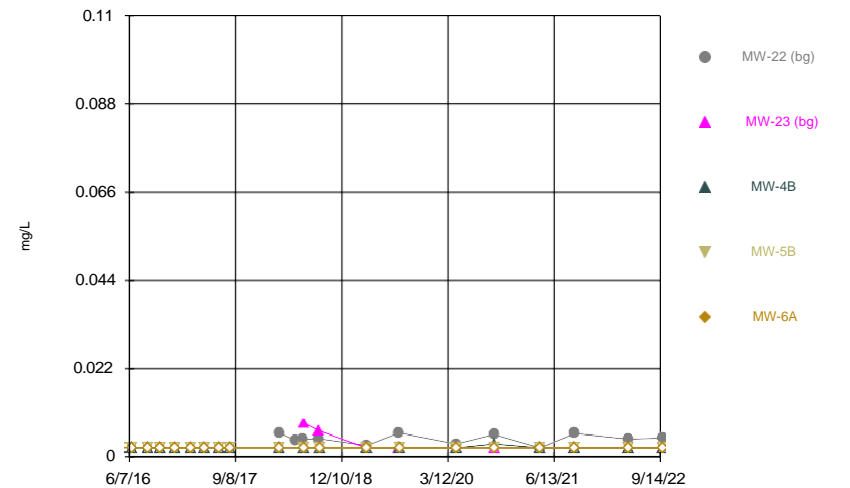
Constituent: Mercury Analysis Run 11/16/2022 1:01 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



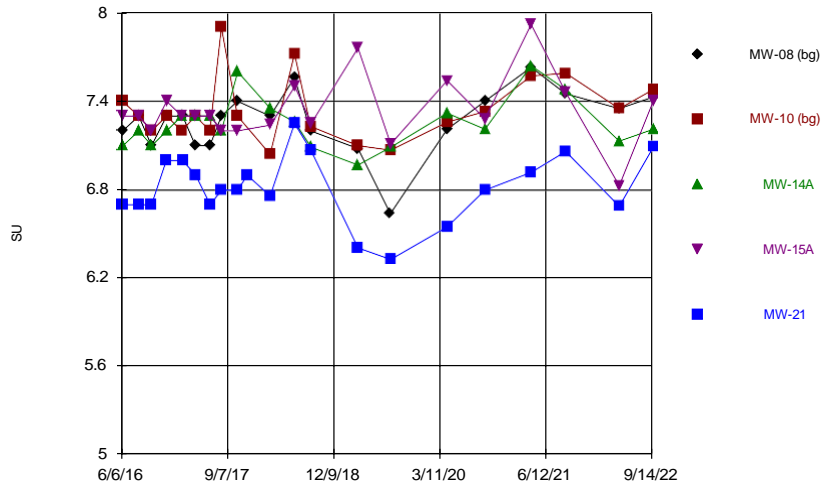
Constituent: Molybdenum Analysis Run 11/16/2022 1:02 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



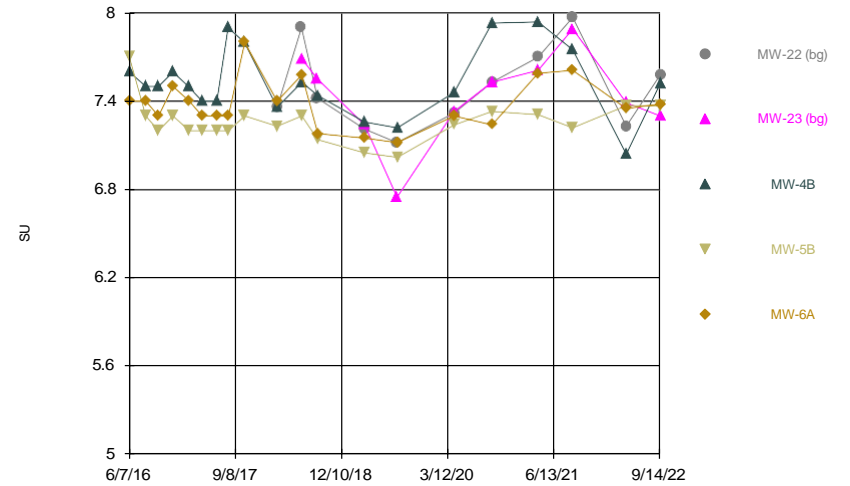
Constituent: Molybdenum Analysis Run 11/16/2022 1:02 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



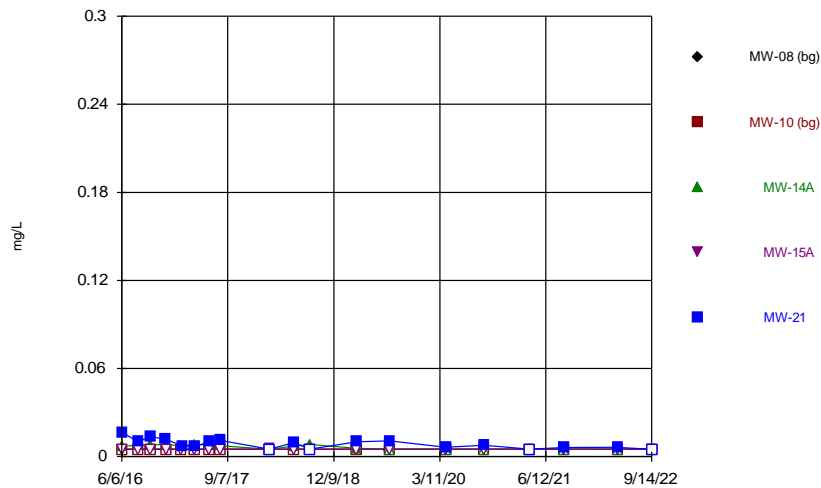
Constituent: pH Analysis Run 11/16/2022 1:02 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



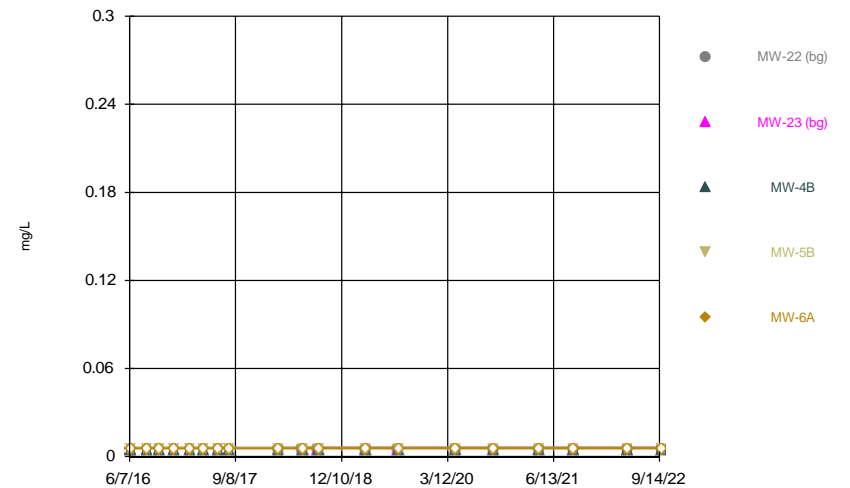
Constituent: pH Analysis Run 11/16/2022 1:02 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



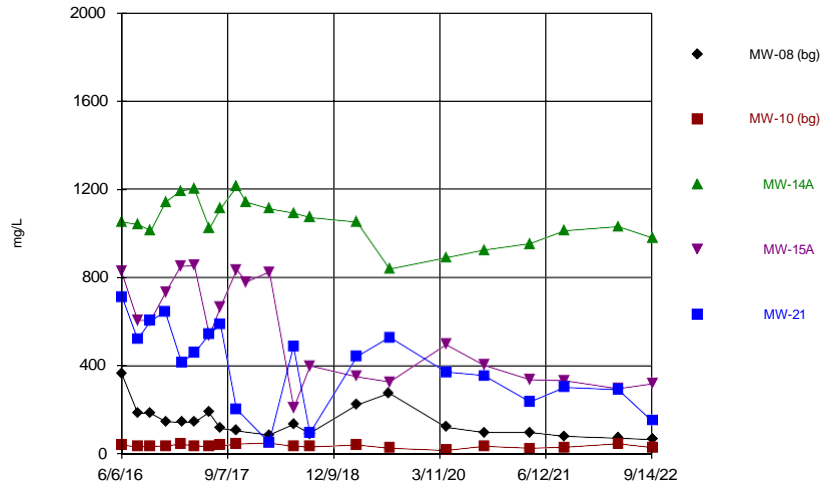
Constituent: Selenium Analysis Run 11/16/2022 1:02 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



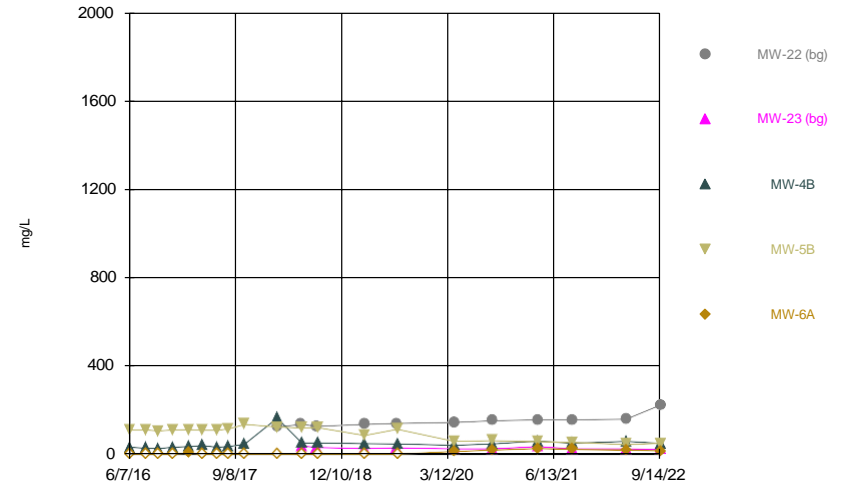
Constituent: Selenium Analysis Run 11/16/2022 1:02 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



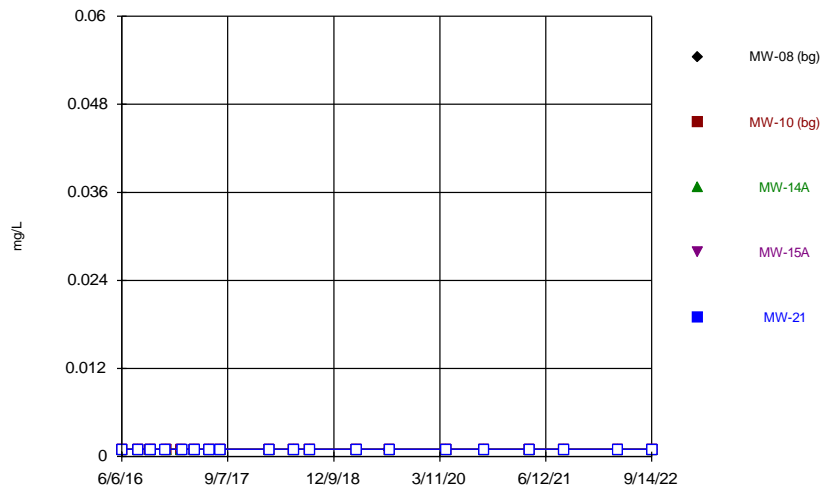
Constituent: Sulfate Analysis Run 11/16/2022 1:02 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



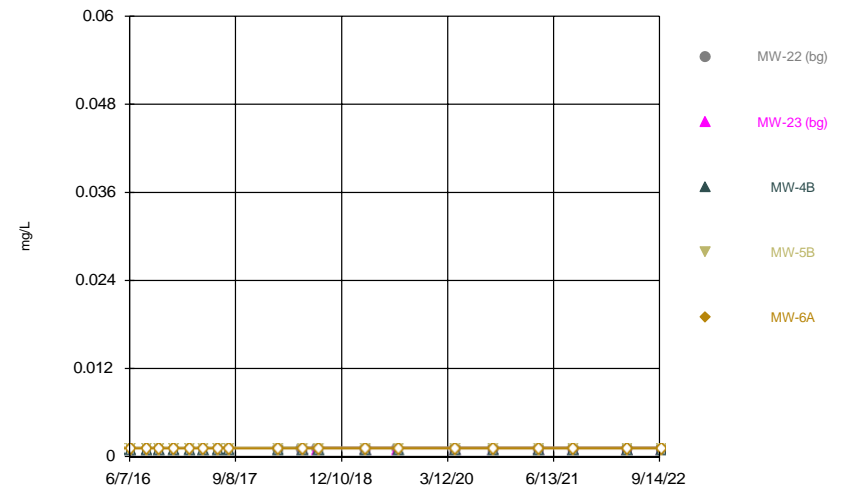
Constituent: Sulfate Analysis Run 11/16/2022 1:02 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



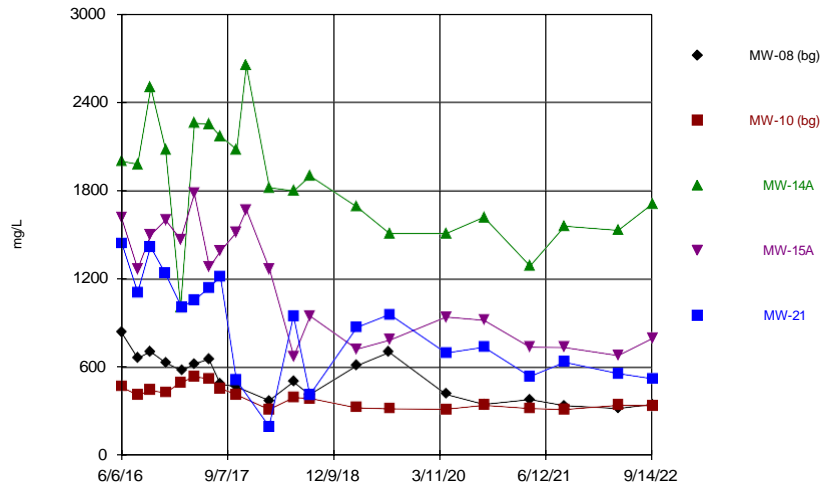
Constituent: Thallium Analysis Run 11/16/2022 1:02 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



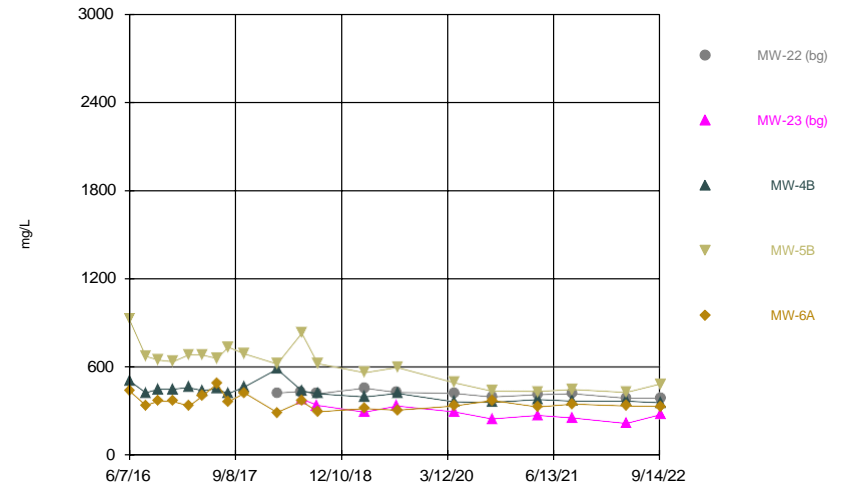
Constituent: Thallium Analysis Run 11/16/2022 1:02 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



Constituent: Total Dissolved Solids Analysis Run 11/16/2022 1:02 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



Constituent: Total Dissolved Solids Analysis Run 11/16/2022 1:02 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series

Constituent: Antimony (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.002		<0.002	
6/7/2016	<0.002				
6/8/2016			<0.002		<0.002
8/15/2016		<0.002	<0.002	<0.002	<0.002
8/16/2016	<0.002				
10/10/2016	<0.002	<0.002			<0.002
10/11/2016			<0.002	<0.002	
12/12/2016					<0.002
12/14/2016	<0.002	<0.002	<0.002	<0.002	
2/17/2017		<0.002	<0.002	<0.002	
2/21/2017	<0.002				<0.002
4/17/2017	<0.002	<0.002	<0.002	<0.002	
4/18/2017					<0.002
6/19/2017	<0.002	<0.002			
6/20/2017					<0.002
6/21/2017			<0.002	<0.002	
8/7/2017	<0.002	<0.002			
8/8/2017			<0.002	<0.002	<0.002
3/5/2018		<0.002			
3/6/2018	<0.002				<0.002
3/7/2018			<0.002	<0.002	
6/19/2018	<0.002	<0.002			<0.002
6/20/2018			<0.002	<0.002	
8/27/2018	<0.002	<0.002			
8/28/2018					<0.002
8/29/2018			<0.002	<0.002	
3/18/2019	<0.002				
3/19/2019		<0.002			
3/20/2019			<0.002	<0.002	<0.002
8/6/2019	<0.002				
8/7/2019		<0.002	<0.002	<0.002	<0.002
4/7/2020	<0.002	<0.002	<0.002	<0.002	<0.002
9/18/2020	<0.002	<0.002	<0.002	<0.002	<0.002
4/5/2021	<0.002	<0.002	<0.002	<0.002	<0.002
9/1/2021	<0.002	<0.002	<0.002	<0.002	<0.002
4/20/2022	<0.002	<0.002	<0.002	<0.002	<0.002
9/14/2022	<0.002	<0.002	<0.002	<0.002	<0.002

Time Series

Constituent: Antimony (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.002	<0.002	<0.002
8/16/2016			<0.002	<0.002	<0.002
10/11/2016			<0.002	<0.002	<0.002
12/12/2016			<0.002	<0.002	<0.002
2/17/2017			<0.002		
2/21/2017				<0.002	<0.002
4/17/2017			<0.002	<0.002	<0.002
6/20/2017			<0.002	<0.002	
6/21/2017					<0.002
8/7/2017			<0.002		
8/8/2017				<0.002	<0.002
3/6/2018	<0.002		<0.002	<0.002	<0.002
6/19/2018	<0.002				
6/20/2018		<0.002			
6/21/2018			<0.002	<0.002	<0.002
8/27/2018	<0.002	<0.002			
8/28/2018			<0.002		
8/29/2018				<0.002	<0.002
3/19/2019	<0.002	<0.002	<0.002	<0.002	<0.002
8/6/2019	<0.002	<0.002			
8/7/2019			<0.002	<0.002	<0.002
4/7/2020	<0.002	<0.002	<0.002	<0.002	<0.002
9/18/2020	<0.002	<0.002	<0.002	<0.002	<0.002
4/5/2021	<0.002	<0.002	<0.002	<0.002	<0.002
9/1/2021	<0.002	<0.002	<0.002	<0.002	<0.002
4/20/2022	<0.002	<0.002	<0.002	<0.002	<0.002
9/14/2022	<0.002	<0.002	<0.002	<0.002	<0.002

Time Series

Constituent: Arsenic (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		0.00298		<0.002	
6/7/2016	<0.002				
6/8/2016			<0.002		<0.002
8/15/2016		0.00369	<0.002	<0.002	<0.002
8/16/2016	<0.002				
10/10/2016	<0.002	0.00328			<0.002
10/11/2016			<0.002	<0.002	
12/12/2016					<0.002
12/14/2016	<0.002	0.00312	<0.002	<0.002	
2/17/2017		0.00298	<0.002	<0.002	
2/21/2017	<0.002				<0.002
4/17/2017	<0.002	<0.002	<0.002	<0.002	
4/18/2017					<0.002
6/19/2017	<0.002	0.00262			
6/20/2017					<0.002
6/21/2017			<0.002	<0.002	
8/7/2017	<0.002	0.00317			
8/8/2017			<0.002	<0.002	<0.002
3/5/2018		<0.002			
3/6/2018	<0.002				<0.002
3/7/2018			<0.002	<0.002	
6/19/2018	<0.002	0.00211			<0.002
6/20/2018			<0.002	<0.002	
8/27/2018	<0.002	0.0036			
8/28/2018					<0.002
8/29/2018			<0.002	<0.002	
3/18/2019	<0.002				
3/19/2019		0.0056			
3/20/2019			<0.002	<0.002	<0.002
8/6/2019	<0.002				
8/7/2019		0.00784	<0.002	<0.002	<0.002
4/7/2020	<0.002	0.00697	<0.002	<0.002	<0.002
9/18/2020	<0.002	0.00748	<0.002	<0.002	<0.002
4/5/2021	<0.002	0.00393	<0.002	<0.002	<0.002
9/1/2021	<0.002	0.00781	<0.002	<0.002	<0.002
4/20/2022	<0.002	0.00371	<0.002	<0.002	<0.002
9/14/2022	<0.002	0.00497	<0.002	<0.002	<0.002

Time Series

Constituent: Arsenic (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.002	<0.002	<0.002
8/16/2016			<0.002	<0.002	<0.002
10/11/2016			<0.002	<0.002	<0.002
12/12/2016			<0.002	<0.002	<0.002
2/17/2017			<0.002		
2/21/2017				<0.002	<0.002
4/17/2017			<0.002	<0.002	<0.002
6/20/2017			<0.002	<0.002	
6/21/2017					<0.002
8/7/2017			<0.002		
8/8/2017				<0.002	<0.002
3/6/2018	<0.002		<0.002	<0.002	<0.002
6/19/2018	0.00245				
6/20/2018		<0.002			
6/21/2018			<0.002	<0.002	<0.002
8/27/2018	0.00261	<0.002			
8/28/2018			<0.002		
8/29/2018				<0.002	<0.002
3/19/2019	<0.002	<0.002	<0.002	<0.002	<0.002
8/6/2019	<0.002	<0.002			
8/7/2019			<0.002	<0.002	<0.002
4/7/2020	<0.002	<0.002	<0.002	<0.002	<0.002
9/18/2020	<0.002	<0.002	<0.002	<0.002	<0.002
4/5/2021	0.00289	<0.002	<0.002	<0.002	<0.002
9/1/2021	0.00267	<0.002	<0.002	<0.002	<0.002
4/20/2022	0.0034	<0.002	<0.002	<0.002	<0.002
9/14/2022	0.00285	<0.002	<0.002	<0.002	<0.002

Time Series

Constituent: Barium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		0.168		2.13 (o)	
6/7/2016	0.0861				
6/8/2016			0.0443		0.0573
8/15/2016		0.161	0.0402	0.044	0.0482
8/16/2016	0.0671				
10/10/2016	0.0706	0.163			0.0606
10/11/2016			0.0391	0.0426	
12/12/2016					0.056
12/14/2016	0.0645	0.15	0.0383	0.0406	
2/17/2017		0.151	0.0306	0.0402	
2/21/2017	0.0594 (F1)				0.0735
4/17/2017	0.0636	0.138	0.0341	0.0364	
4/18/2017					0.0356
6/19/2017	0.076	0.154			
6/20/2017					0.0461
6/21/2017			0.0338	0.0327	
8/7/2017	0.0596	0.157			
8/8/2017			0.031	0.0338	0.0499
3/5/2018		0.129			
3/6/2018	0.0617				0.0148
3/7/2018			0.0285	0.0352	
6/19/2018	0.0761	0.162			0.0515
6/20/2018			0.0314	0.0338	
8/27/2018	0.0649	0.216			
8/28/2018					0.0622
8/29/2018			0.0344	0.0335	
3/18/2019	0.0751				
3/19/2019		0.185			
3/20/2019			0.0328	0.037	0.0511
8/6/2019	0.0733				
8/7/2019		0.215	0.0398	0.047	0.0624
4/7/2020	0.0613	0.199	0.0266	0.0389	0.0352
9/18/2020	0.0549	0.227	0.0328	0.0416	0.0407
4/5/2021	0.0596	0.196	0.0355	0.0365	0.0309
9/1/2021	0.0623	0.233	0.0345	0.0355	0.0434
4/20/2022	0.0631	0.208	0.0327	0.0443	0.036
9/14/2022	0.0703	0.223	0.034	0.0327	0.0447

Time Series

Constituent: Barium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			0.15	0.331	0.209
8/16/2016			0.128	0.295	0.199
10/11/2016			0.131	0.304	0.196
12/12/2016			0.139	0.315	0.216
2/17/2017			0.143		
2/21/2017				0.316	0.197
4/17/2017			0.111	0.296	0.152
6/20/2017			0.133	0.31	
6/21/2017					0.197
8/7/2017			0.133		
8/8/2017				0.3	0.19
3/6/2018	0.15		0.117	0.341	0.206
6/19/2018	0.184				
6/20/2018		0.106			
6/21/2018			0.144	0.336	0.222
8/27/2018	0.181	0.0779			
8/28/2018			0.149		
8/29/2018				0.357	0.206
3/19/2019	0.209	0.0922	0.161	0.326	0.2
8/6/2019	0.215	0.0635			
8/7/2019			0.147	0.301	0.211
4/7/2020	0.222	0.0654	0.156	0.25	0.216
9/18/2020	0.222	0.0491	0.147	0.239	0.231
4/5/2021	0.242	0.0608	0.169	0.252	0.245
9/1/2021	0.247	0.0497	0.186	0.241	0.248
4/20/2022	0.239	0.0572	0.191	0.258	0.249
9/14/2022	0.243	0.0507	0.188	0.253	0.229

Time Series

Constituent: Beryllium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.001		<0.001	
6/7/2016	<0.001				
6/8/2016			<0.001		<0.001
8/15/2016		<0.001	<0.001	<0.001	<0.001
8/16/2016	<0.001				
10/10/2016	<0.001	<0.001			<0.001
10/11/2016			<0.001	<0.001	
12/12/2016					<0.001
12/14/2016	<0.001	<0.001	<0.001	<0.001	
2/17/2017		<0.001	<0.001	<0.001	
2/21/2017	<0.001				<0.001
4/17/2017	<0.001	<0.001	<0.001	<0.001	
4/18/2017					<0.001
6/19/2017	<0.001	<0.001			
6/20/2017					<0.001
6/21/2017			<0.001	<0.001	
8/7/2017	<0.001	<0.001			
8/8/2017			<0.001	<0.001	<0.001
3/5/2018		<0.001			
3/6/2018	<0.001				<0.001
3/7/2018			<0.001	<0.001	
6/19/2018	<0.001	<0.001			<0.001
6/20/2018			<0.001	<0.001	
8/27/2018	<0.001	<0.001			
8/28/2018					<0.001
8/29/2018			<0.001	<0.001	
3/18/2019	<0.001				
3/19/2019		<0.001			
3/20/2019			<0.001	<0.001	<0.001
8/6/2019	<0.001				
8/7/2019		<0.001	<0.001	<0.001	<0.001
4/7/2020	<0.001	<0.001	<0.001	<0.001	<0.001
9/18/2020	<0.001	<0.001	<0.001	<0.001	<0.001
4/5/2021	<0.001	<0.001	<0.001	<0.001	<0.001
9/1/2021	<0.001	<0.001	<0.001	<0.001	<0.001
4/20/2022	<0.001	<0.001	<0.001	<0.001	<0.001
9/14/2022	<0.001	<0.001	<0.001	<0.001	<0.001

Time Series

Constituent: Beryllium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.001	<0.001	<0.001
8/16/2016			<0.001	<0.001	<0.001
10/11/2016			<0.001	<0.001	<0.001
12/12/2016			<0.001	<0.001	<0.001
2/17/2017			<0.001		
2/21/2017				<0.001	<0.001
4/17/2017			<0.001	<0.001	<0.001
6/20/2017			<0.001	<0.001	
6/21/2017					<0.001
8/7/2017			<0.001		
8/8/2017				<0.001	<0.001
3/6/2018	<0.001		<0.001	<0.001	<0.001
6/19/2018	<0.001				
6/20/2018		<0.001			
6/21/2018			<0.001	<0.001	<0.001
8/27/2018	<0.001	<0.001			
8/28/2018			<0.001		
8/29/2018				<0.001	<0.001
3/19/2019	<0.001	<0.001	<0.001	<0.001	<0.001
8/6/2019	<0.001	<0.001			
8/7/2019			<0.001	<0.001	<0.001
4/7/2020	<0.001	<0.001	<0.001	<0.001	<0.001
9/18/2020	<0.001	<0.001	<0.001	<0.001	<0.001
4/5/2021	<0.001	<0.001	<0.001	<0.001	<0.001
9/1/2021	<0.001	<0.001	<0.001	<0.001	<0.001
4/20/2022	<0.001	<0.001	<0.001	<0.001	<0.001
9/14/2022	<0.001	<0.001	<0.001	<0.001	<0.001

Time Series

Constituent: Boron (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.1		16.8	
6/7/2016	<0.1				
6/8/2016			15.8		<0.1
8/15/2016		<0.1	17.9	20.6	7.23
8/16/2016	<0.1				
10/10/2016	<0.1	<0.1			8.45
10/11/2016			19.3	17.9	
12/12/2016					6.93
12/14/2016	<0.1	<0.1	14.7	18.4	
2/17/2017		<0.1	13.1	14.9	
2/21/2017	<0.1				4.87
4/17/2017	<0.1	<0.1	11.3	14.7	
4/18/2017					4.49
6/19/2017	<0.1	<0.1			
6/20/2017					7.36
6/21/2017			16.3	16.4	
8/7/2017	<0.1	<0.1			
8/8/2017			13	14.7	7.05
10/16/2017	<0.1	<0.1			3.33
10/17/2017			16	19.2	
11/28/2017			13.7 (R)	12.9 (R)	2.24 (R)
3/5/2018		<0.1			
3/6/2018	<0.1				0.885
3/7/2018			11	9.8	
6/19/2018	<0.1	<0.1			6.84
6/20/2018			15	10.5	
8/27/2018	<0.1	<0.1			
8/28/2018					1.36
8/29/2018			14	14.6	
3/18/2019	<0.1				
3/19/2019		<0.1			
3/20/2019			15.5	8.35	6.95
8/6/2019	0.205				
8/7/2019		<0.1	17.6	7.56	8.46
4/7/2020	<0.1	<0.1	17.4	10.6	6.76
9/18/2020	<0.1	<0.1	19.5	14.5	6.82
4/5/2021	<0.1	<0.1	17.2	10.3	5.24
9/1/2021	<0.1	<0.1	17.1	11.1	5.88
4/20/2022	<0.1	<0.1	15.2	6.98	3.57
9/14/2022	<0.1	<0.1	15.1	10.4	3.69

Time Series

Constituent: Boron (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.1	<0.1	<0.1
8/16/2016			<0.1	<0.1	<0.1
10/11/2016			<0.1	<0.1	<0.1
12/12/2016			<0.1	<0.1	<0.1
2/17/2017			<0.1		
2/21/2017				<0.1	<0.1
4/17/2017			<0.1	<0.1	<0.1
6/20/2017			<0.1	<0.1	
6/21/2017					<0.1
8/7/2017			<0.1		
8/8/2017				<0.1	<0.1
10/16/2017			<0.1		
10/17/2017				<0.1	<0.1
3/6/2018	<0.1		0.66	<0.1	<0.1
6/19/2018	<0.1				
6/20/2018		<0.1			
6/21/2018			<0.1	<0.1	<0.1
8/27/2018	<0.1	<0.1			
8/28/2018			<0.1		
8/29/2018				<0.1	<0.1
3/19/2019	0.299	<0.1	<0.1	<0.1	<0.1
8/6/2019	<0.1	<0.1			
8/7/2019			<0.1	<0.1	<0.1
4/7/2020	<0.1	<0.1	<0.1	<0.1	<0.1
9/18/2020	0.263	0.15	<0.1	<0.1	<0.1
4/5/2021	<0.1	<0.1	<0.1	<0.1	<0.1
9/1/2021	<0.1	<0.1	<0.1	<0.1	<0.1
4/20/2022	<0.1	<0.1	<0.1	<0.1	<0.1
9/14/2022	0.322	0.204	<0.1	<0.1	<0.1

Time Series

Constituent: Cadmium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.0001		<0.0001	
6/7/2016	<0.0001				
6/8/2016			<0.0001		<0.0001
8/15/2016		<0.0001	<0.0001	<0.0001	<0.0001
8/16/2016	<0.0001				
10/10/2016	<0.0001	<0.0001			<0.0001
10/11/2016			<0.0001	<0.0001	
12/12/2016					<0.0001
12/14/2016	<0.0001	<0.0001	<0.0001	<0.0001	
2/17/2017		<0.0001	<0.0001	<0.0001	
2/21/2017	<0.0001				<0.0001
4/17/2017	<0.0001	<0.0001	<0.0001	<0.0001	
4/18/2017					<0.0001
6/19/2017	<0.0001	<0.0001			
6/20/2017					<0.0001
6/21/2017			<0.0001	<0.0001	
8/7/2017	<0.0001	<0.0001			
8/8/2017			<0.0001	<0.0001	<0.0001
3/5/2018		<0.0001			
3/6/2018	<0.0001				<0.0001
3/7/2018			<0.0001	<0.0001	
6/19/2018	<0.0001	<0.0001			<0.0001
6/20/2018			<0.0001	<0.0001	
8/27/2018	<0.0001	<0.0001			
8/28/2018					<0.0001
8/29/2018			<0.0001	<0.0001	
3/18/2019	<0.0001				
3/19/2019		<0.0001			
3/20/2019			<0.0001	<0.0001	<0.0001
8/6/2019	<0.0001				
8/7/2019		<0.0001	<0.0001	<0.0001	<0.0001
4/7/2020	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
9/18/2020	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
4/5/2021	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
9/1/2021	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
4/20/2022	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
9/14/2022	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Time Series

Constituent: Cadmium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.0001	<0.0001	<0.0001
8/16/2016			<0.0001	<0.0001	<0.0001
10/11/2016			<0.0001	<0.0001	<0.0001
12/12/2016			<0.0001	<0.0001	<0.0001
2/17/2017			<0.0001		
2/21/2017				<0.0001	<0.0001
4/17/2017			<0.0001	<0.0001	<0.0001
6/20/2017			<0.0001	<0.0001	
6/21/2017					<0.0001
8/7/2017			<0.0001		
8/8/2017				<0.0001	<0.0001
3/6/2018	<0.0001		<0.0001	<0.0001	<0.0001
6/19/2018	<0.0001				
6/20/2018		<0.0001			
6/21/2018			<0.0001	<0.0001	<0.0001
8/27/2018	<0.0001	<0.0001			
8/28/2018			<0.0001		
8/29/2018				<0.0001	<0.0001
3/19/2019	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
8/6/2019	<0.0001	<0.0001			
8/7/2019			<0.0001	<0.0001	<0.0001
4/7/2020	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
9/18/2020	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
4/5/2021	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
9/1/2021	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
4/20/2022	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
9/14/2022	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Time Series

Constituent: Calcium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		89.3		206	
6/7/2016	152				
6/8/2016			281		37.2
8/15/2016		80.7	311	199	146
8/16/2016	117				
10/10/2016	118	83.3			185
10/11/2016			308	203	
12/12/2016					178
12/14/2016	109	86.5	333	244	
2/17/2017		81.2	268	233	
2/21/2017	89.9				118
4/17/2017	96.5	79.2	310	226	
4/18/2017					110
6/19/2017	113	83.6			
6/20/2017					149
6/21/2017			307	186	
8/7/2017	91.3	85.5			
8/8/2017			296	206	163
10/16/2017	77	83.3			62.3
10/17/2017			310	218	
11/28/2017			301 (R)	217 (R)	
3/5/2018		77.3			
3/6/2018	74.7				25.1
3/7/2018			278	229	
6/19/2018	115	88.5			159
6/20/2018			297	102	
8/27/2018	83.6	85.4			
8/28/2018					78.7
8/29/2018			309	155	
3/18/2019	97.6				
3/19/2019		76.3			
3/20/2019			290	118	142
8/6/2019	132				
8/7/2019		78.9	255	111	145
4/7/2020	92.4	75.4	245	163	104
9/18/2020	77.7	74.2	244	134	101
4/5/2021	81.2	78.8	259	128	79.5
9/1/2021	78.3	80	270	125	93.5
4/20/2022	69.6	90.4	289	127	97.5
9/14/2022	76.8	82	301	132	88.2

Time Series

Constituent: Calcium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			98.2	147	81.4
8/16/2016			88.8	139	75.4
10/11/2016			89.3	140	75.7
12/12/2016			94.5	147	85.6
2/17/2017			86.8		
2/21/2017				126	68.8
4/17/2017			85.9	130	56.3
6/20/2017			88.7	140	
6/21/2017					72.9
8/7/2017			89.7		
8/8/2017				139	71.2
10/16/2017			85.3		
10/17/2017				136	71.9
3/6/2018	69.8		95.8	134	74.1
6/19/2018	91.5				
6/20/2018		70.5			
6/21/2018			91.4	147	80.1
8/27/2018	80.7	63.9			
8/28/2018			91.3		
8/29/2018				146	73.3
3/19/2019	91.6	59.7	99.7	134	73.2
8/6/2019	83.8	59.5			
8/7/2019			93.8	139	80.9
4/7/2020	80.9	61	89.6	117	85.1
9/18/2020	75.5	52.1	89	108	87.9
4/5/2021	78.4	56.3	94.1	104	87.6
9/1/2021	79.4	56.1	95.1	108	90.6
4/20/2022	80.2	54	106	117	96.5
9/14/2022	79.6	54.5	92.3	117	89

Time Series

Constituent: Chloride (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		6.22		17.1	
6/7/2016	19.8				
6/8/2016			28.7		27.7
8/15/2016		<5	28.7	17.2	16.6
8/16/2016	17.8				
10/10/2016	16.2	<5			24.4
10/11/2016			37	17.6	
12/12/2016					19.2
12/14/2016	17.2	<5	31.9	19	
2/17/2017		<5	33.5	21.5	
2/21/2017	15.4				14.2
4/17/2017	17.1	<5	39.4	47.4 (o)	
4/18/2017					15.6
6/19/2017	14.1	<5			
6/20/2017					15.1
6/21/2017			29.7	12.8	
8/7/2017	14	<5			
8/8/2017			32.9	15.4	16.1
10/16/2017	14.4	<5			5.09
10/17/2017			35.4	20.5	
11/28/2017			33.2 (R)	20.7 (R)	
3/5/2018		<5			
3/6/2018	14.5				<5
3/7/2018			37.4	24.2	
6/19/2018	14.9	<5			10.9
6/20/2018			29	<5	
8/27/2018	15.6	<5			
8/28/2018					<5
8/29/2018			33.1	10.1	
3/18/2019	16.1				
3/19/2019		<5			
3/20/2019			25.8	8.54	8.3
8/6/2019	17.1				
8/7/2019		<5	22.1	9.91	14
4/7/2020	17.2	<5	22.5	13	8.05
9/18/2020	14.7	<5	22.8	8.63	7.21
4/5/2021	22.3	<5	27.1	15	5.14
9/1/2021	16.3	<5	23.2	8.86	6.58
4/20/2022	15.8	<5	25.5	7.71	7.19
9/14/2022	16.7	<5	22.4	8.29	18

Time Series

Constituent: Chloride (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			12.6	67	5.97
8/16/2016			13.2	65.9	<5
10/11/2016			13.6	66	<5
12/12/2016			13.5	67	9.08
2/17/2017			15.1		
2/21/2017				70.4	9.93
4/17/2017			12.5	62.1	<5
6/20/2017			13.2	63.4	
6/21/2017					<5
8/7/2017			13.2		
8/8/2017				64	<5
10/16/2017			14.7		
10/17/2017				73	<5
11/28/2017				67.8 (R)	
3/6/2018	30		8.81	68.2	5.33
6/19/2018	27.2				
6/20/2018		15.9			
6/21/2018			15.3	65	<5
8/27/2018	29.8	14.2			
8/28/2018			19.4		
8/29/2018				70.8	<5
3/19/2019	27.6	10.5	16	55	<5
8/6/2019	26.9	13.8			
8/7/2019			15.6	64.1	<5
4/7/2020	24.8	15.7	14.8	44	12.2
9/18/2020	23.2	14.4	15.1	41	15.6
4/5/2021	28.1	21.4	22.9	42.7	19.3
9/1/2021	20	15.2	16.7	37.6	17.4
4/20/2022	20.2	16.9	20.8	38.1	14.2
9/14/2022	7.04	16.2	16.8	39	13.3

Time Series

Constituent: Chromium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.005		<0.005	
6/7/2016	<0.005				
6/8/2016			<0.005		0.00694
8/15/2016		<0.005	<0.005	<0.005	0.00538
8/16/2016	<0.005				
10/10/2016	<0.005	<0.005			0.00582
10/11/2016			<0.005	<0.005	
12/12/2016					0.00561
12/14/2016	<0.005	<0.005	<0.005	<0.005	
2/17/2017		<0.005	<0.005 (F2)	<0.005	
2/21/2017	<0.005				<0.005
4/17/2017	<0.005	<0.005	<0.005	<0.005	
4/18/2017					<0.005
6/19/2017	<0.005	<0.005			
6/20/2017					0.00586
6/21/2017			<0.005	<0.005	
8/7/2017	<0.005	<0.005			
8/8/2017			<0.005	<0.005	0.00572
3/5/2018		<0.005			
3/6/2018	<0.005				<0.005
3/7/2018			<0.005	<0.005	
6/19/2018	<0.005	<0.005			0.00726
6/20/2018			<0.005	<0.005	
8/27/2018	<0.005	<0.005			
8/28/2018					<0.005
8/29/2018			<0.005	<0.005	
3/18/2019	<0.005				
3/19/2019		<0.005			
3/20/2019			<0.005	<0.005	0.00647
8/6/2019	<0.005				
8/7/2019		<0.005	<0.005	<0.005	0.00637
4/7/2020	<0.005	<0.005	<0.005	<0.005	0.00644
9/18/2020	<0.005	<0.005	<0.005	<0.005	0.00589
4/5/2021	<0.005	<0.005	<0.005	<0.005	0.00708
9/1/2021	<0.005	<0.005	<0.005	<0.005	0.00659
4/20/2022	<0.005	<0.005	<0.005	<0.005	0.00636
9/14/2022	<0.005	<0.005	<0.005	<0.005	0.00505

Time Series

Constituent: Chromium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.005	<0.005	<0.005
8/16/2016			<0.005	<0.005	<0.005
10/11/2016			<0.005	<0.005	<0.005
12/12/2016			<0.005	<0.005	<0.005
2/17/2017			<0.005		
2/21/2017				<0.005	<0.005
4/17/2017			<0.005	<0.005	<0.005
6/20/2017			<0.005	<0.005	
6/21/2017					<0.005
8/7/2017			<0.005		
8/8/2017				<0.005	<0.005
3/6/2018	<0.005		<0.005	<0.005	<0.005
6/19/2018	<0.005				
6/20/2018		<0.005			
6/21/2018			<0.005	<0.005	<0.005
8/27/2018	<0.005	<0.005			
8/28/2018			<0.005		
8/29/2018				<0.005	<0.005
3/19/2019	<0.005	<0.005	<0.005	<0.005	<0.005
8/6/2019	<0.005	<0.005			
8/7/2019			<0.005	<0.005	<0.005
4/7/2020	<0.005	<0.005	<0.005	<0.005	<0.005
9/18/2020	<0.005	<0.005	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	<0.005	<0.005

Time Series

Constituent: Cobalt (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		0.000555		<0.0005	
6/7/2016	<0.0005				
6/8/2016			<0.0005		<0.0005
8/15/2016		<0.0005	<0.0005	<0.0005	<0.0005
8/16/2016	<0.0005				
10/10/2016	<0.0005	0.000523			<0.0005
10/11/2016			<0.0005	<0.0005	
12/12/2016					<0.0005
12/14/2016	<0.0005	0.000638	<0.0005	<0.0005	
2/17/2017		0.000663	<0.0005	<0.0005	
2/21/2017	<0.0005				<0.0005
4/17/2017	<0.0005	0.000779	<0.0005	<0.0005	
4/18/2017					<0.0005
6/19/2017	0.000601	0.000621			
6/20/2017					<0.0005
6/21/2017			<0.0005	<0.0005	
8/7/2017	0.00051	0.000695			
8/8/2017			<0.0005	<0.0005	<0.0005
3/5/2018		0.000627			
3/6/2018	<0.0005				<0.0005
3/7/2018			<0.0005	<0.0005	
6/19/2018	<0.0005	0.00107			<0.0005
6/20/2018			<0.0005	<0.0005	
8/27/2018	<0.0005	0.00088			
8/28/2018					<0.0005
8/29/2018			<0.0005	<0.0005	
3/18/2019	0.00177				
3/19/2019		0.000783			
3/20/2019			<0.0005	<0.0005	<0.0005
8/6/2019	0.00558				
8/7/2019		0.000572	<0.0005	<0.0005	<0.0005
4/7/2020	0.000517	0.000581	<0.0005	<0.0005	<0.0005
9/18/2020	0.000738	0.000751	<0.0005	<0.0005	<0.0005
4/5/2021	0.000839	0.000752	<0.0005	<0.0005	<0.0005
9/1/2021	0.00127	0.000576	<0.0005	<0.0005	<0.0005
4/20/2022	0.00143	0.00104	<0.0005	<0.0005	<0.0005
9/14/2022	0.00164	0.00109	<0.0005	<0.0005	<0.0005

Time Series

Constituent: Cobalt (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			0.000681	<0.0005	<0.0005
8/16/2016			<0.0005	<0.0005	<0.0005
10/11/2016			<0.0005	<0.0005	<0.0005
12/12/2016			<0.0005	<0.0005	<0.0005
2/17/2017			<0.0005		
2/21/2017				<0.0005	<0.0005
4/17/2017			<0.0005	<0.0005	<0.0005
6/20/2017			<0.0005	<0.0005	
6/21/2017					<0.0005
8/7/2017			<0.0005		
8/8/2017				<0.0005	<0.0005
3/6/2018	0.00142		<0.0005	<0.0005	<0.0005
5/14/2018	0.0012				
6/19/2018	0.00129				
6/20/2018		0.00161			
6/21/2018			<0.0005	<0.0005	<0.0005
8/27/2018	0.00149	0.00066			
8/28/2018			<0.0005		
8/29/2018				<0.0005	<0.0005
3/19/2019	<0.0005	0.00176	<0.0005	<0.0005	<0.0005
8/6/2019	<0.0005	<0.0005			
8/7/2019			<0.0005	<0.0005	<0.0005
4/7/2020	<0.0005	0.000817	<0.0005	<0.0005	<0.0005
9/18/2020	<0.0005	<0.0005	0.00147	<0.0005	<0.0005
4/5/2021	<0.0005	0.000517	0.00132	<0.0005	<0.0005
9/1/2021	<0.0005	<0.0005	0.00335	<0.0005	<0.0005
4/20/2022	<0.0005	0.000561	0.00135	<0.0005	<0.0005
9/14/2022	<0.0005	<0.0005	0.00459	<0.0005	<0.0005

Time Series

Constituent: Combined Radium 226 + 228 (pCi/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		0.223 (U)		0.31 (U)	
6/7/2016	0.375 (U)				
6/8/2016			0.145 (U)		0.253 (U)
8/15/2016		0.668	0.202 (U)	0.251 (U)	0.159 (U)
8/16/2016	0.115 (U)				
10/10/2016	0.35 (U)	0.694			0.817
10/11/2016			0.523	0.286 (U)	
12/12/2016					0.306 (U)
12/14/2016	0.336 (U)	0.799	0.26 (U)	0.251 (U)	
2/17/2017		0.513	0.293 (U)	0.103 (U)	
2/21/2017	0.221 (U)				-0.000573 (U)
4/17/2017	0.126 (U)	0.47	0.48	0.0966 (U)	
4/18/2017					0.0953 (U)
6/19/2017	0.204 (U)	0.204 (U)			
6/20/2017					0.545
6/21/2017			0.0131 (U)	0.221 (U)	
8/7/2017	0.336 (U)	0.831			
8/8/2017			0.456	0.244 (U)	0.814
3/5/2018		0.276 (U)			
3/6/2018	0.668				0.358
3/7/2018			0.258 (U)	0.123 (U)	
3/18/2019	0.217 (U)				
3/19/2019		0.331 (U)			
3/20/2019			0.0223 (U)	0.391 (U)	0.287 (U)
4/7/2020	0.462	1.01	0.397 (U)	0.645	0.305 (U)
4/5/2021	0.208 (U)	0.488	0.614	0.219 (U)	0.182 (U)
9/1/2021	0.296 (U)	1.32	0.684	0.362 (U)	0.499
4/20/2022	0.316 (U)	0.693	0.0486 (U)	0.0289 (U)	0.171 (U)
9/14/2022	-0.0309 (U)	1.12	0.0843 (U)	-0.159 (U)	-0.0783 (U)

Time Series

Constituent: Combined Radium 226 + 228 (pCi/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			0.711 (U)	0.665	0.405
8/16/2016			0.938 (U)	0.854	0.876
10/11/2016			0.674	0.428 (U)	0.512
12/12/2016			0.672	1.05	0.894
2/17/2017			0.528		
2/21/2017				0.85	0.314 (U)
4/17/2017			0.309 (U)	1.02	0.298 (U)
6/20/2017			0.368	0.973	
6/21/2017					0.44
8/7/2017			0.443		
8/8/2017				0.507	0.333 (U)
3/6/2018	0.257 (U)		0.45	0.959	0.618
6/19/2018	0.412 (U)				
6/20/2018		0.0129 (U)			
3/19/2019	0.343 (U)	1	0.436	0.568	0.481
4/7/2020	0.44	0.576	0.354 (U)	1.2	0.787
4/5/2021	0.547	0.296 (U)	0.0519 (U)	0.982	0.667
9/1/2021	0.522	0.794	1.08	1.29	1.12
4/20/2022	0.494	1.27	0.55 (U)	0.913	0.901
9/14/2022	0.283 (U)	-0.195 (U)	0.836	0.363 (U)	0.599

Time Series

Constituent: Fluoride (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		0.731		<0.5	
6/7/2016	<0.5				
6/8/2016			<0.5		<0.5
8/15/2016		<0.5	<0.5	0.549	<0.5
8/16/2016	<0.5				
10/10/2016	<0.5	<0.5			<0.5
10/11/2016			0.867	<0.5	
12/12/2016					<0.5
12/14/2016	0.72	<0.5	<0.5	<0.5	
2/17/2017		<0.5	<0.5	<0.5	
2/21/2017	<0.5				0.993
4/17/2017	1.69 (o)	0.774	1.93 (o)	6.7 (o)	
4/18/2017					0.768
6/19/2017	<0.5	<0.5			
6/20/2017					<0.5
6/21/2017			<0.5	<0.5	
8/7/2017	<0.5	<0.5			
8/8/2017			<0.5	<0.5	<0.5
10/16/2017	<0.5	<0.5			<0.5
10/17/2017			<0.5	<0.5	
3/5/2018		<0.5			
3/6/2018	<0.5				<0.5
3/7/2018			<0.5	<0.5	
6/19/2018	0.826	<0.5			<0.5
6/20/2018			0.684	<0.5	
8/27/2018	<0.5	<0.5			
8/28/2018					<0.5
8/29/2018			<0.5	<0.5	
3/18/2019	<0.5				
3/19/2019		<0.5			
3/20/2019			<0.5	0.523	<0.5
8/6/2019	0.643				
8/7/2019		0.596	<0.5	0.625	<0.5
4/7/2020	0.864	<0.5	<0.5	<0.5	<0.5
9/18/2020	<0.5	<0.5	<0.5	<0.5	<0.5
4/5/2021	<0.5	<0.5	<0.5	0.516	<0.5
9/1/2021	<0.5	<0.5	<0.5	<0.5	<0.5
4/20/2022	<0.5	<0.5	<0.5	<0.5	<0.5
9/14/2022	<0.5	<0.5	<0.5	<0.5	<0.5

Time Series

Constituent: Fluoride (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.5	<0.5	<0.5
8/16/2016			<0.5	<0.5	<0.5
10/11/2016			<0.5	<0.5	<0.5
12/12/2016			<0.5	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			<0.5	<0.5	
6/21/2017					<0.5
8/7/2017			<0.5		
8/8/2017				<0.5	<0.5
10/16/2017			<0.5		
10/17/2017				<0.5	<0.5
3/6/2018	<0.5		<0.5	<0.5	<0.5
6/19/2018	<0.5				
6/20/2018		<0.5			
6/21/2018			<0.5	<0.5	<0.5
8/27/2018	<0.5	<0.5			
8/28/2018			<0.5		
8/29/2018				<0.5	<0.5
3/19/2019	<0.5	<0.5	0.771	<0.5	<0.5
8/6/2019	0.507	<0.5			
8/7/2019			0.525	<0.5	0.535
4/7/2020	<0.5	<0.5	<0.5	<0.5	0.652
9/18/2020	<0.5	<0.5	<0.5	<0.5	<0.5
4/5/2021	<0.5	<0.5	<0.5	<0.5	<0.5
9/1/2021	<0.5	<0.5	<0.5	<0.5	<0.5
4/20/2022	<0.5	<0.5	<0.5	<0.5	<0.5
9/14/2022	<0.5	<0.5	<0.5	<0.5	<0.5

Time Series

Constituent: Lead (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.0005		<0.0005	
6/7/2016	<0.0005				
6/8/2016			<0.0005		<0.0005
8/15/2016		<0.0005	<0.0005	<0.0005	<0.0005
8/16/2016	<0.0005				
10/10/2016	<0.0005	<0.0005			<0.0005
10/11/2016			<0.0005	<0.0005	
12/12/2016					<0.0005
12/14/2016	<0.0005	<0.0005	<0.0005	<0.0005	
2/17/2017		<0.0005	<0.0005	<0.0005	
2/21/2017	<0.0005				<0.0005
4/17/2017	<0.0005	<0.0005	<0.0005	<0.0005	
4/18/2017					<0.0005
6/19/2017	<0.0005	<0.0005			
6/20/2017					<0.0005
6/21/2017			<0.0005	<0.0005	
8/7/2017	<0.0005	<0.0005			
8/8/2017			<0.0005	<0.0005	<0.0005
3/5/2018		<0.0005			
3/6/2018	<0.0005				<0.0005
3/7/2018			<0.0005	<0.0005	
6/19/2018	<0.0005	<0.0005			0.000633
6/20/2018			<0.0005	<0.0005	
8/27/2018	<0.0005	<0.0005			
8/28/2018					<0.0005
8/29/2018			<0.0005	<0.0005	
3/18/2019	<0.0005				
3/19/2019		<0.0005			
3/20/2019			<0.0005	<0.0005	<0.0005
8/6/2019	<0.0005				
8/7/2019		<0.0005	<0.0005	<0.0005	<0.0005
4/7/2020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
9/18/2020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/5/2021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
9/1/2021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/20/2022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
9/14/2022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Time Series

Constituent: Lead (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			0.00147 (o)	<0.0005	<0.0005
8/16/2016			<0.0005	<0.0005	<0.0005
10/11/2016			<0.0005	<0.0005	<0.0005
12/12/2016			<0.0005	<0.0005	<0.0005
2/17/2017			<0.0005		
2/21/2017				<0.0005	<0.0005
4/17/2017			<0.0005	<0.0005	<0.0005
6/20/2017			<0.0005	<0.0005	
6/21/2017					<0.0005
8/7/2017			<0.0005		
8/8/2017				<0.0005	<0.0005
3/6/2018	<0.0005		<0.0005	<0.0005	<0.0005
6/19/2018	<0.0005				
6/20/2018		0.00151			
6/21/2018			<0.0005	<0.0005	<0.0005
8/27/2018	<0.0005	0.000626			
8/28/2018			<0.0005		
8/29/2018				<0.0005	<0.0005
3/19/2019	<0.0005	0.00204	<0.0005	<0.0005	<0.0005
8/6/2019	<0.0005	0.000663			
8/7/2019			<0.0005	<0.0005	<0.0005
4/7/2020	<0.0005	0.00116	<0.0005	<0.0005	<0.0005
9/18/2020	<0.0005	<0.0005	0.000532	<0.0005	<0.0005
4/5/2021	<0.0005	0.000624	<0.0005	<0.0005	<0.0005
9/1/2021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/20/2022	<0.0005	0.000596	<0.0005	<0.0005	<0.0005
9/14/2022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

Time Series

Constituent: Lithium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.01		<0.01	
6/7/2016	<0.01				
6/8/2016			<0.01		<0.01
8/15/2016		<0.01	<0.01	<0.01	<0.01
8/16/2016	<0.01				
10/10/2016	<0.01	<0.01			<0.01
10/11/2016			<0.01	<0.01	
12/12/2016					<0.01
12/14/2016	<0.01	<0.01	<0.01	<0.01	
2/17/2017		<0.01	<0.01	<0.01	
2/21/2017	<0.01				<0.01
4/17/2017	<0.01	<0.01	<0.01	<0.01	
4/18/2017					<0.01
6/19/2017	<0.01	<0.01			
6/20/2017					<0.01
6/21/2017			<0.01	<0.01	
8/7/2017	<0.01	<0.01			
8/8/2017			<0.01	<0.01	<0.01
3/5/2018		<0.01			
3/6/2018	<0.01				<0.01
3/7/2018			<0.01	<0.01	
6/19/2018	<0.01	<0.01			0.0189
6/20/2018			<0.01	<0.01	
8/27/2018	<0.01	<0.01			
8/28/2018					<0.01
8/29/2018			<0.01	<0.01	
3/18/2019	<0.01				
3/19/2019		<0.01			
3/20/2019			<0.01	<0.01	0.0277
8/6/2019	<0.01				
8/7/2019		<0.01	<0.01	<0.01	0.0279
4/7/2020	<0.01	<0.01	<0.01	<0.01	0.0213
9/18/2020	<0.01	<0.01	<0.01	<0.01	0.0225
4/5/2021	<0.01	<0.01	<0.01	<0.01	0.0198
9/1/2021	<0.01	<0.01	<0.01	<0.01	0.0233
4/20/2022	<0.01	<0.01	<0.01	<0.01	0.0162
9/14/2022	<0.01	<0.01	<0.01	<0.01	0.018

Time Series

Constituent: Lithium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.01	<0.01	<0.01
8/16/2016			<0.01	<0.01	<0.01
10/11/2016			<0.01	<0.01	<0.01
12/12/2016			<0.01	<0.01	<0.01
2/17/2017			<0.01		
2/21/2017				<0.01	<0.01
4/17/2017			<0.01	<0.01	<0.01
6/20/2017			<0.01	<0.01	
6/21/2017					<0.01
8/7/2017			<0.01		
8/8/2017				<0.01	<0.01
3/6/2018	<0.01		<0.01	<0.01	<0.01
6/19/2018	<0.01				
6/20/2018		<0.01			
6/21/2018			<0.01	<0.01	<0.01
8/27/2018	<0.01	<0.01			
8/28/2018			<0.01		
8/29/2018				<0.01	<0.01
3/19/2019	<0.01	<0.01	<0.01	<0.01	<0.01
8/6/2019	<0.01	<0.01			
8/7/2019			<0.01	<0.01	<0.01
4/7/2020	<0.01	<0.01	<0.01	<0.01	<0.01
9/18/2020	<0.01	<0.01	<0.01	<0.01	<0.01
4/5/2021	<0.01	<0.01	<0.01	<0.01	<0.01
9/1/2021	<0.01	<0.01	<0.01	<0.01	<0.01
4/20/2022	<0.01	<0.01	<0.01	<0.01	<0.01
9/14/2022	<0.01	<0.01	<0.01	<0.01	<0.01

Time Series

Constituent: Mercury (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.0002		<0.0002	
6/7/2016	<0.0002				
6/8/2016			<0.0002		<0.0002
8/15/2016		<0.0002	<0.0002	<0.0002	<0.0002
8/16/2016	<0.0002				
10/10/2016	<0.0002	<0.0002			<0.0002
10/11/2016			<0.0002	<0.0002	
12/12/2016					<0.0002
12/14/2016	<0.0002	<0.0002	<0.0002	<0.0002	
2/17/2017		<0.0002	<0.0002	<0.0002	
2/21/2017	<0.0002				<0.0002
4/17/2017	<0.0002	<0.0002 (F1)	<0.0002	<0.0002	
4/18/2017					<0.0002
6/19/2017	<0.0002	<0.0002			
6/20/2017					<0.0002
6/21/2017			<0.0002	<0.0002	
8/7/2017	<0.0002	<0.0002			
8/8/2017			<0.0002	<0.0002	<0.0002
3/5/2018		<0.0002			
3/6/2018	<0.0002				<0.0002
3/7/2018			<0.0002	<0.0002	
6/19/2018	<0.0002	<0.0002			<0.0002
6/20/2018			<0.0002	<0.0002	
8/27/2018	<0.0002	<0.0002			
8/28/2018					<0.0002
8/29/2018			<0.0002	<0.0002	
3/18/2019	<0.0002				
3/19/2019		<0.0002			
3/20/2019			<0.0002	<0.0002	<0.0002
8/6/2019	<0.0002				
8/7/2019		<0.0002	<0.0002	<0.0002	<0.0002
4/7/2020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/18/2020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4/5/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/1/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4/20/2022	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/14/2022	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Time Series

Constituent: Mercury (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.0002	<0.0002	<0.0002
8/16/2016			<0.0002	<0.0002	<0.0002
10/11/2016			<0.0002	<0.0002	<0.0002
12/12/2016			<0.0002	<0.0002	<0.0002
2/17/2017			<0.0002		
2/21/2017				<0.0002	<0.0002
4/17/2017			<0.0002	<0.0002	<0.0002
6/20/2017			<0.0002	<0.0002	
6/21/2017					<0.0002
8/7/2017			<0.0002		
8/8/2017				<0.0002	<0.0002
3/6/2018	<0.0002		<0.0002	<0.0002	<0.0002
6/19/2018	<0.0002				
6/20/2018		<0.0002			
6/21/2018			<0.0002	<0.0002	<0.0002
8/27/2018	<0.0002	<0.0002			
8/28/2018			<0.0002		
8/29/2018				<0.0002	<0.0002
3/19/2019	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
8/6/2019	<0.0002	<0.0002			
8/7/2019			<0.0002	<0.0002	<0.0002
4/7/2020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/18/2020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4/5/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/1/2021	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
4/20/2022	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
9/14/2022	<0.0002	<0.0002	<0.0002	0.000813	<0.0002

Time Series

Constituent: Molybdenum (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.002		<0.002	
6/7/2016	<0.002				
6/8/2016			<0.002		<0.002
8/15/2016		<0.002	<0.002	<0.002	<0.002
8/16/2016	<0.002				
10/10/2016	<0.002	<0.002			<0.002
10/11/2016			<0.002	<0.002	
12/12/2016					<0.002
12/14/2016	<0.002	<0.002	<0.002	<0.002	
2/17/2017		<0.002	<0.002	<0.002	
2/21/2017	<0.002				<0.002
4/17/2017	<0.002	<0.002	<0.002	<0.002	
4/18/2017					<0.002
6/19/2017	<0.002	<0.002			
6/20/2017					<0.002
6/21/2017			<0.002	<0.002	
8/7/2017	<0.002	<0.002			
8/8/2017			<0.002	<0.002	<0.002
3/5/2018		<0.002			
3/6/2018	0.0022				<0.002
3/7/2018			<0.002	<0.002	
5/14/2018	<0.002				
6/19/2018	<0.002	<0.002			0.00383
6/20/2018			<0.002	<0.002	
8/27/2018	0.00224	0.0022			
8/28/2018					<0.002
8/29/2018			<0.002	<0.002	
3/18/2019	<0.002				
3/19/2019		0.00341			
3/20/2019			<0.002	<0.002	<0.002
8/6/2019	<0.002				
8/7/2019		0.00219	<0.002	<0.002	<0.002
4/7/2020	<0.002	0.00215	<0.002	<0.002	<0.002
9/18/2020	<0.002	<0.002	<0.002	<0.002	<0.002
4/5/2021	<0.002	<0.002	<0.002	<0.002	<0.002
9/1/2021	0.00218	0.00217	<0.002	<0.002	<0.002
4/20/2022	<0.002	<0.002	<0.002	<0.002	<0.002
9/14/2022	<0.002	<0.002	<0.002	<0.002	<0.002

Time Series

Constituent: Molybdenum (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.002	<0.002	<0.002
8/16/2016			<0.002	<0.002	<0.002
10/11/2016			<0.002	<0.002	<0.002
12/12/2016			<0.002	<0.002	<0.002
2/17/2017			<0.002		
2/21/2017				<0.002	<0.002
4/17/2017			<0.002	<0.002	<0.002
6/20/2017			<0.002	<0.002	
6/21/2017					<0.002
8/7/2017			<0.002		
8/8/2017				<0.002	<0.002
3/6/2018	0.00568		<0.002	<0.002	<0.002
5/14/2018	0.00385				
6/19/2018	0.00423				
6/20/2018		0.00822			
6/21/2018			<0.002	<0.002	<0.002
8/27/2018	0.00424	0.00617			
8/28/2018			<0.002		
8/29/2018				<0.002	<0.002
3/19/2019	0.00263	<0.002	<0.002	0.00212	<0.002
8/6/2019	0.00574	<0.002			
8/7/2019			<0.002	<0.002	<0.002
4/7/2020	0.00297	<0.002	<0.002	<0.002	<0.002
9/18/2020	0.00529	<0.002	0.00296	<0.002	<0.002
4/5/2021	<0.002	<0.002	<0.002	<0.002	<0.002
9/1/2021	0.00558	<0.002	<0.002	<0.002	<0.002
4/20/2022	0.0042	<0.002	<0.002	<0.002	<0.002
9/14/2022	0.00446	<0.002	<0.002	<0.002	<0.002

Time Series

Constituent: pH (SU) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		7.4		7.3	
6/7/2016	7.2				
6/8/2016			7.1		6.7
8/15/2016		7.3	7.2	7.3	6.7
8/16/2016	7.3				
10/10/2016	7.1	7.2			6.7
10/11/2016			7.1	7.2	
12/12/2016					7
12/14/2016	7.3	7.3	7.2	7.4	
2/17/2017		7.2	7.3	7.3	
2/21/2017	7.3				7
4/17/2017	7.1	7.3	7.3	7.3	
4/18/2017					6.9
6/19/2017	7.1	7.2			
6/20/2017					6.7
6/21/2017			7.3	7.3	
8/7/2017	7.3	7.9			
8/8/2017			7.2	7.2	6.8
10/16/2017	7.4	7.3			6.8
10/17/2017			7.6	7.2	
11/28/2017					6.9 (R)
3/5/2018		7.04			
3/6/2018	7.3				6.76
3/7/2018			7.35	7.24	
6/19/2018	7.56	7.72			7.25
6/20/2018			7.26	7.5	
8/27/2018	7.2	7.23			
8/28/2018					7.07
8/29/2018			7.09	7.25	
3/19/2019	7.08	7.1			
3/20/2019			6.97	7.76	6.41
8/6/2019	6.64				
8/7/2019		7.07	7.09	7.11	6.33
4/7/2020	7.21	7.26	7.32	7.54	6.55
9/18/2020	7.4	7.33	7.21	7.28	6.8
4/5/2021	7.63	7.57	7.64	7.92	6.92
9/1/2021	7.45	7.59	7.48	7.46	7.06
4/20/2022	7.35	7.35	7.13	6.83	6.69
9/14/2022	7.43	7.48	7.21	7.4	7.09

Time Series

Constituent: pH (SU) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			7.6	7.7	7.4
8/16/2016			7.5	7.3	7.4
10/11/2016			7.5	7.2	7.3
12/12/2016			7.6	7.3	7.5
2/17/2017			7.5		
2/21/2017				7.2	7.4
4/17/2017			7.4	7.2	7.3
6/20/2017			7.4	7.2	
6/21/2017					7.3
8/7/2017			7.9		
8/8/2017				7.2	7.3
10/16/2017			7.8		
10/17/2017				7.3	7.8
3/6/2018	7.36		7.36	7.23	7.4
6/19/2018	7.9				
6/20/2018		7.69			
6/21/2018			7.53	7.3	7.58
8/27/2018	7.42	7.55			
8/28/2018			7.44		
8/29/2018				7.14	7.18
3/19/2019	7.21	7.24	7.26	7.05	7.15
8/6/2019	7.12	6.75			
8/7/2019			7.22	7.02	7.12
4/7/2020	7.32	7.33	7.46	7.24	7.3
9/18/2020	7.53	7.53	7.93	7.33	7.24
4/5/2021	7.7	7.61	7.94	7.31	7.59
9/1/2021	7.97	7.89	7.75	7.22	7.61
4/20/2022	7.23	7.39	7.04	7.37	7.35
9/14/2022	7.58	7.3	7.52	7.37	7.38

Time Series

Constituent: Selenium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.005		<0.005	
6/7/2016	<0.005				
6/8/2016			0.0071		0.0165
8/15/2016		<0.005	0.00811	<0.005	0.0103
8/16/2016	<0.005				
10/10/2016	<0.005	<0.005			0.0137
10/11/2016			0.00821	<0.005	
12/12/2016					0.0119
12/14/2016	<0.005	<0.005	0.00834	<0.005	
2/17/2017		<0.005	0.00752	<0.005	
2/21/2017	<0.005				0.0074
4/17/2017	<0.005	<0.005	0.00823	<0.005	
4/18/2017					0.00674
6/19/2017	<0.005	<0.005			
6/20/2017					0.0106
6/21/2017			0.00829	<0.005	
8/7/2017	<0.005	<0.005			
8/8/2017			0.00759	<0.005	0.0109
3/5/2018		<0.005			
3/6/2018	<0.005				<0.005
3/7/2018			<0.005	0.00502	
6/19/2018	<0.005	<0.005			0.00939
6/20/2018			0.00739	<0.005	
8/27/2018	<0.005	<0.005			
8/28/2018					<0.005
8/29/2018			0.00827	<0.005	
3/18/2019	<0.005				
3/19/2019		<0.005			
3/20/2019			0.00569	<0.005	0.0102
8/6/2019	<0.005				
8/7/2019		<0.005	<0.005	<0.005	0.0108
4/7/2020	<0.005	<0.005	<0.005	<0.005	0.00632
9/18/2020	<0.005	<0.005	<0.005	<0.005	0.00762
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	<0.005	0.00617
4/20/2022	<0.005	<0.005	<0.005	<0.005	0.00634
9/14/2022	<0.005	<0.005	<0.005	<0.005	<0.005

Time Series

Constituent: Selenium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.005	<0.005	<0.005
8/16/2016			<0.005	<0.005	<0.005
10/11/2016			<0.005	<0.005	<0.005
12/12/2016			<0.005	<0.005	<0.005
2/17/2017			<0.005		
2/21/2017				<0.005	<0.005
4/17/2017			<0.005	<0.005	<0.005
6/20/2017			<0.005	<0.005	
6/21/2017					<0.005
8/7/2017			<0.005		
8/8/2017				<0.005	<0.005
3/6/2018	<0.005		<0.005	<0.005	<0.005
6/19/2018	<0.005				
6/20/2018		<0.005			
6/21/2018			<0.005	<0.005	<0.005
8/27/2018	<0.005	<0.005			
8/28/2018			<0.005		
8/29/2018				<0.005	<0.005
3/19/2019	<0.005	<0.005	<0.005	<0.005	<0.005
8/6/2019	<0.005	<0.005			
8/7/2019			<0.005	<0.005	<0.005
4/7/2020	<0.005	<0.005	<0.005	<0.005	<0.005
9/18/2020	<0.005	<0.005	<0.005	<0.005	<0.005
4/5/2021	<0.005	<0.005	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	<0.005	<0.005	<0.005
4/20/2022	<0.005	<0.005	<0.005	<0.005	<0.005
9/14/2022	<0.005	<0.005	<0.005	<0.005	<0.005

Time Series

Constituent: Sulfate (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		42.1		827	
6/7/2016	366				
6/8/2016			1050		713
8/15/2016		33.8	1040	605	520
8/16/2016	187				
10/10/2016	187	36.4			603
10/11/2016			1010	607	
12/12/2016					645
12/14/2016	149	38.4	1140	732	
2/17/2017		47.3	1190	849	
2/21/2017	145				415
4/17/2017	145	38.3	1200	853	
4/18/2017					461
6/19/2017	190	35.4			
6/20/2017					541
6/21/2017			1020	537	
8/7/2017	119	39			
8/8/2017			1110	664	590
10/16/2017	106	46.9			206
10/17/2017			1210	835	
11/28/2017			1140 (R)	779 (R)	
3/5/2018		51.4			
3/6/2018	87.3				53.7
3/7/2018			1110	824	
6/19/2018	136	37.3			489
6/20/2018			1090	210	
8/27/2018	94.7	34.3			
8/28/2018					96.6
8/29/2018			1070	400	
3/18/2019	223				
3/19/2019		42.8			
3/20/2019			1050	351	442
8/6/2019	276				
8/7/2019		28.8	837	327	529
4/7/2020	123	18.6	888	496	373
9/18/2020	100	36.5	924	403	356
4/5/2021	99.7	27.6	952	338	237
9/1/2021	82.7	32.3	1010	333	303
4/20/2022	72.8	48.3	1030	297	293
9/14/2022	67.1	31.2	978	319	151

Time Series

Constituent: Sulfate (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			32.2	109	<5
8/16/2016			28.4	109	<5
10/11/2016			27.2	105	<5
12/12/2016			32.7	109	<5
2/17/2017			36		
2/21/2017				111	5.94
4/17/2017			39.5	108	<5
6/20/2017			33	108	
6/21/2017					<5
8/7/2017			35.3		
8/8/2017				114	<5
10/16/2017			45.4		
10/17/2017				135	<5
3/6/2018	123		162	122	<5
6/19/2018	134				
6/20/2018		38.4			
6/21/2018			51.3	119	<5
8/27/2018	125	31.7			
8/28/2018			52.2		
8/29/2018				120	<5
3/19/2019	134	26.2	48	85	<5
8/6/2019	139	29.7			
8/7/2019			47	112	<5
4/7/2020	143	25.5	41.5	58.9	13.6
9/18/2020	151	25.8	46.9	61.9	19.1
4/5/2021	154	35.5	60.1	57.4	27.3
9/1/2021	154	25.8	50.2	53.7	22.7
4/20/2022	158	25.4	58.4	44.7	18.9
9/14/2022	220	23	49.5	49.9	16.4

Time Series

Constituent: Thallium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		<0.001		<0.001	
6/7/2016	<0.001				
6/8/2016			<0.001		<0.001
8/15/2016		<0.001	<0.001	<0.001	<0.001
8/16/2016	<0.001				
10/10/2016	<0.001	<0.001			<0.001
10/11/2016			<0.001	<0.001	
12/12/2016					<0.001
12/14/2016	<0.001	<0.001	<0.001	<0.001	
2/17/2017		<0.001	<0.001	<0.001	
2/21/2017	<0.001				<0.001
4/17/2017	<0.001	<0.001	<0.001	<0.001	
4/18/2017					<0.001
6/19/2017	<0.001	<0.001			
6/20/2017					<0.001
6/21/2017			<0.001	<0.001	
8/7/2017	<0.001	<0.001			
8/8/2017			<0.001	<0.001	<0.001
3/5/2018		<0.001			
3/6/2018	<0.001				<0.001
3/7/2018			<0.001	<0.001	
6/19/2018	<0.001	<0.001			<0.001
6/20/2018			<0.001	<0.001	
8/27/2018	<0.001	<0.001			
8/28/2018					<0.001
8/29/2018			<0.001	<0.001	
3/18/2019	<0.001				
3/19/2019		<0.001			
3/20/2019			<0.001	<0.001	<0.001
8/6/2019	<0.001				
8/7/2019		<0.001	<0.001	<0.001	<0.001
4/7/2020	<0.001	<0.001	<0.001	<0.001	<0.001
9/18/2020	<0.001	<0.001	<0.001	<0.001	<0.001
4/5/2021	<0.001	<0.001	<0.001	<0.001	<0.001
9/1/2021	<0.001	<0.001	<0.001	<0.001	<0.001
4/20/2022	<0.001	<0.001	<0.001	<0.001	<0.001
9/14/2022	<0.001	<0.001	<0.001	<0.001	<0.001

Time Series

Constituent: Thallium (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			<0.001	<0.001	<0.001
8/16/2016			<0.001	<0.001	<0.001
10/11/2016			<0.001	<0.001	<0.001
12/12/2016			<0.001	<0.001	<0.001
2/17/2017			<0.001		
2/21/2017				<0.001	<0.001
4/17/2017			<0.001	<0.001	<0.001
6/20/2017			<0.001	<0.001	
6/21/2017					<0.001
8/7/2017			<0.001		
8/8/2017				<0.001	<0.001
3/6/2018	<0.001		<0.001	<0.001	<0.001
6/19/2018	<0.001				
6/20/2018		<0.001			
6/21/2018			<0.001	<0.001	<0.001
8/27/2018	<0.001	<0.001			
8/28/2018			<0.001		
8/29/2018				<0.001	<0.001
3/19/2019	<0.001	<0.001	<0.001	<0.001	<0.001
8/6/2019	<0.001	<0.001			
8/7/2019			<0.001	<0.001	<0.001
4/7/2020	<0.001	<0.001	<0.001	<0.001	<0.001
9/18/2020	<0.001	<0.001	<0.001	<0.001	<0.001
4/5/2021	<0.001	<0.001	<0.001	<0.001	<0.001
9/1/2021	<0.001	<0.001	<0.001	<0.001	<0.001
4/20/2022	<0.001	<0.001	<0.001	<0.001	<0.001
9/14/2022	<0.001	<0.001	<0.001	<0.001	<0.001

Time Series

Constituent: Total Dissolved Solids (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-08 (bg)	MW-10 (bg)	MW-14A	MW-15A	MW-21
6/6/2016		468		1620	
6/7/2016	836				
6/8/2016			2000		1440
8/15/2016		412	1980	1270	1110
8/16/2016	664				
10/10/2016	708	444			1420
10/11/2016			2500	1500	
12/12/2016					1240
12/14/2016	634	428	2080	1600	
2/17/2017		498	1010	1470	
2/21/2017	578				1010
4/17/2017	624	538	2260	1780	
4/18/2017					1060
6/19/2017	656	524			
6/20/2017					1140
6/21/2017			2250	1280	
8/7/2017	488	458			
8/8/2017			2170	1390	1220
10/16/2017	470	414			514
10/17/2017			2080	1520	
11/28/2017			2650 (R)	1670 (R)	
3/5/2018		314			
3/6/2018	376				200
3/7/2018			1820	1270	
6/19/2018	502	396			952
6/20/2018			1800	676	
8/27/2018	414	392			
8/28/2018					416
8/29/2018			1900	948	
3/18/2019	612				
3/19/2019		326			
3/20/2019			1690	724	872
8/6/2019	702				
8/7/2019		320	1510	786	960
4/7/2020	418	316	1510	942	698
9/18/2020	350	344	1620	920	738
4/5/2021	382	322	1290	738	540
9/1/2021	342	314	1560	736	636
4/20/2022	322	344	1530	682	558
9/14/2022	350	340	1710	796	524

Time Series

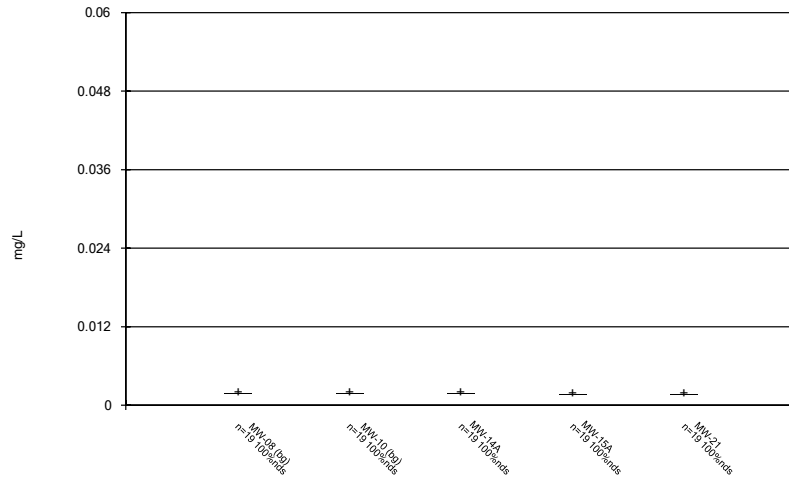
Constituent: Total Dissolved Solids (mg/L) Analysis Run 11/16/2022 1:13 PM View: Federal Descriptive

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4B	MW-5B	MW-6A
6/7/2016			507	920	440
8/16/2016			426	672	340
10/11/2016			450	646	370
12/12/2016			450	636	368
2/17/2017			460		
2/21/2017				684	336
4/17/2017			442	680	402
6/20/2017			452	656	
6/21/2017					486
8/7/2017			420		
8/8/2017				734	364
10/16/2017			466		
10/17/2017				688	424
3/6/2018	424		586	620	292
6/19/2018	434				
6/20/2018		384			
6/21/2018			440	828	368
8/27/2018	420	340			
8/28/2018			420		
8/29/2018				622	298
3/19/2019	456	296	398	562	320
8/6/2019	428	336			
8/7/2019			422	596	308
4/7/2020	422	298	366	494	336
9/18/2020	398	250	360	436	374
4/5/2021	412	274	380	434	330
9/1/2021	420	256	370	448	350
4/20/2022	388	218	370	428	336
9/14/2022	390	278	358	484	334

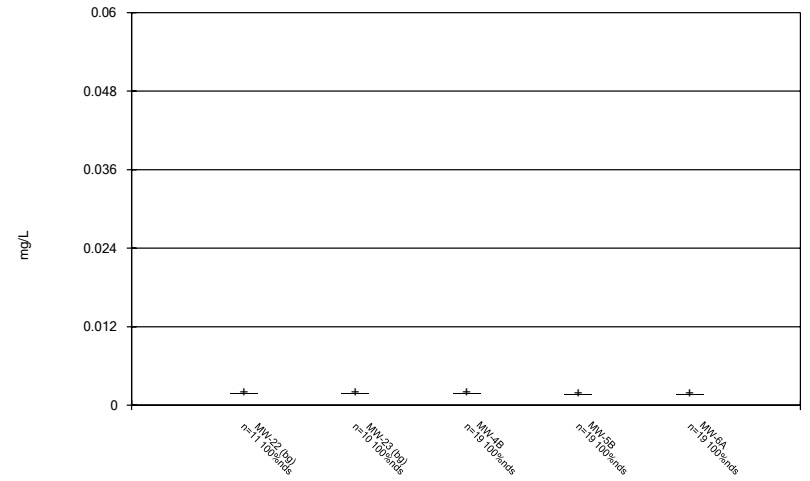
FIGURE B.

Box & Whiskers Plot



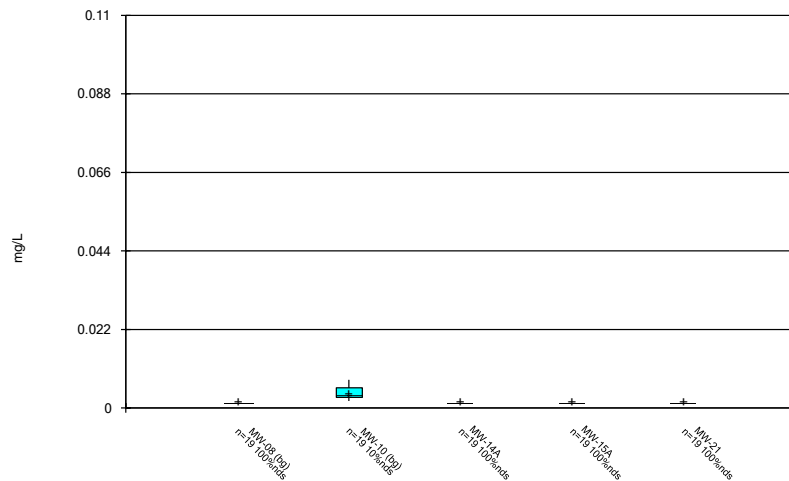
Constituent: Antimony Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



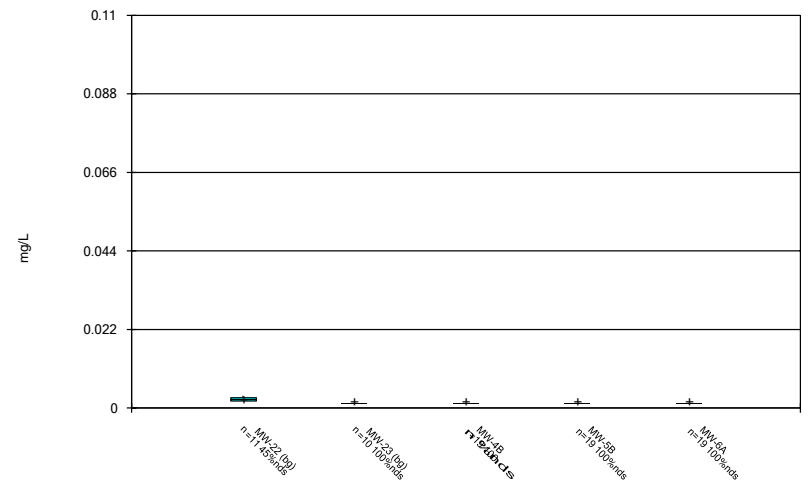
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 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



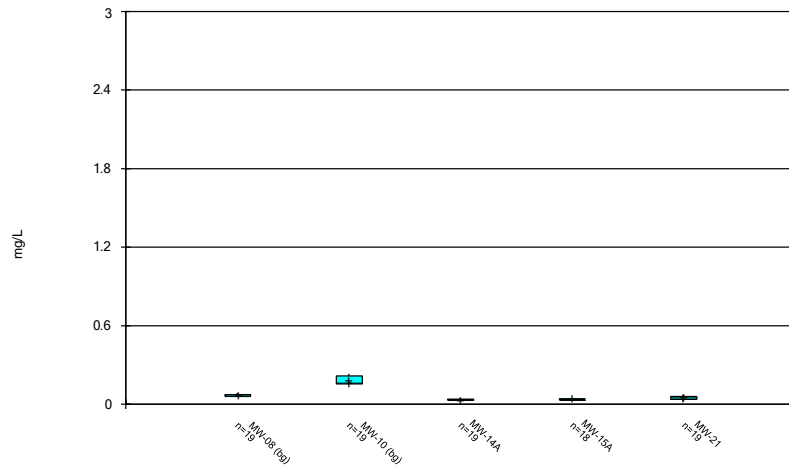
Constituent: Arsenic Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



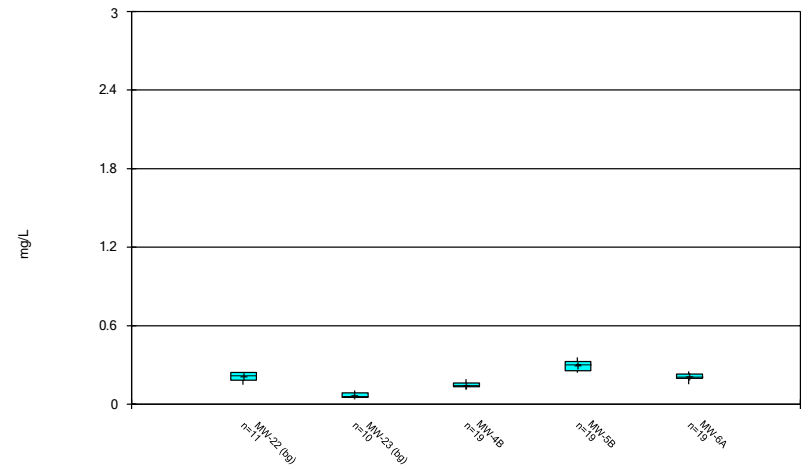
Constituent: Arsenic Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



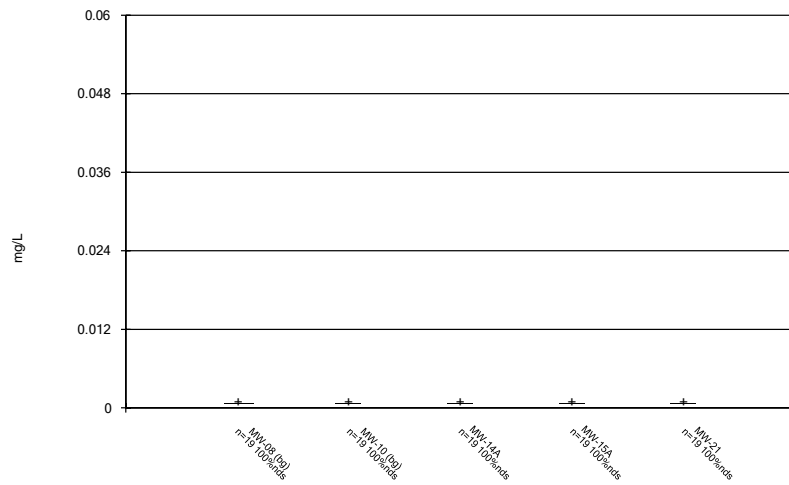
Constituent: Barium Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



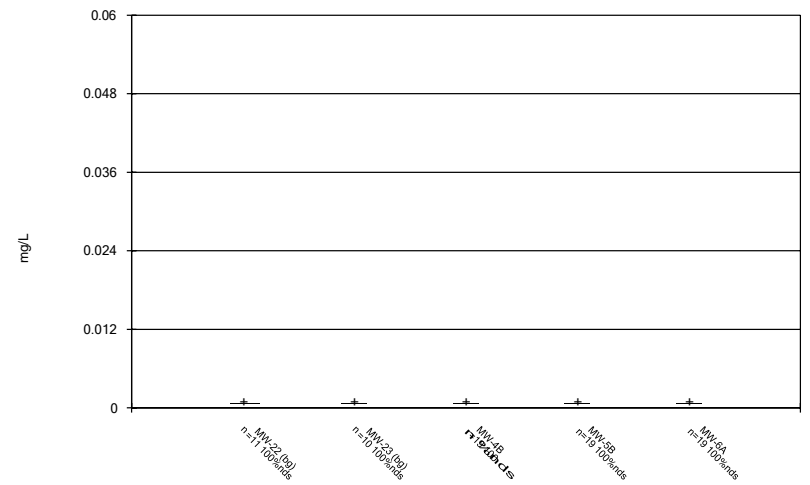
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 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



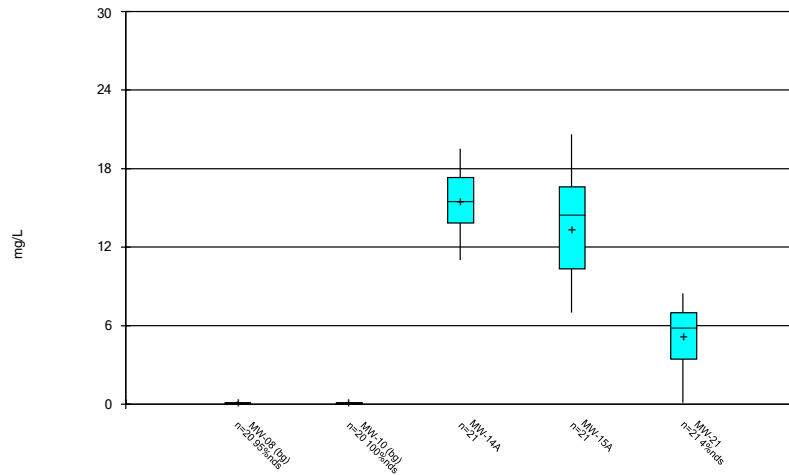
Constituent: Beryllium Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



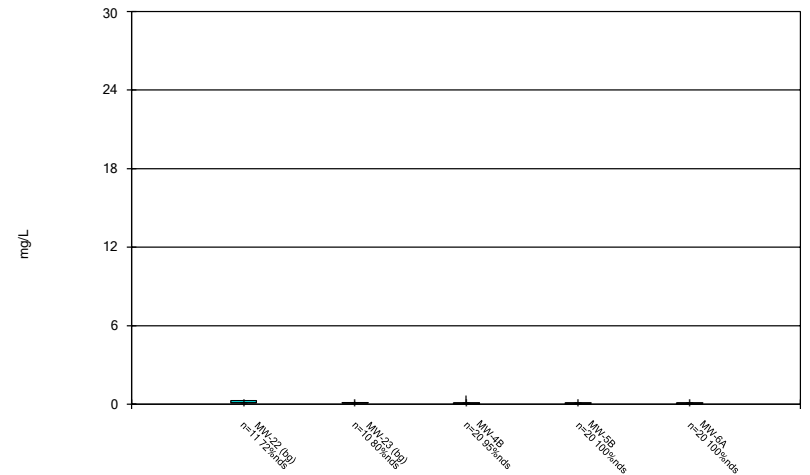
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 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



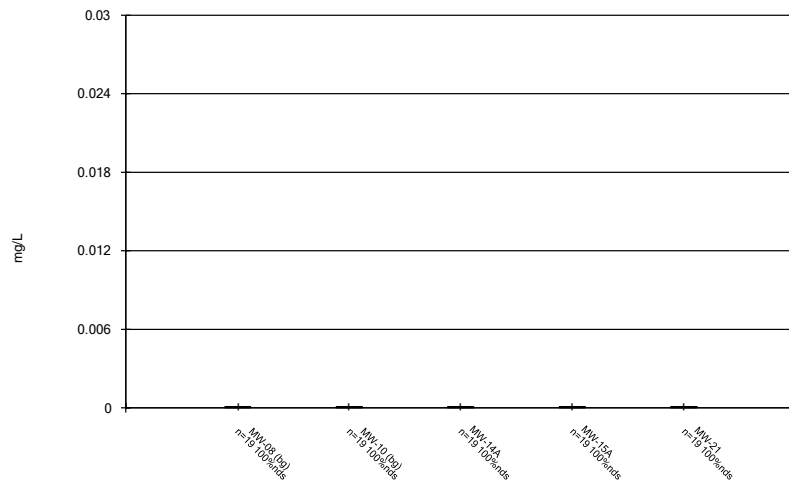
Constituent: Boron Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



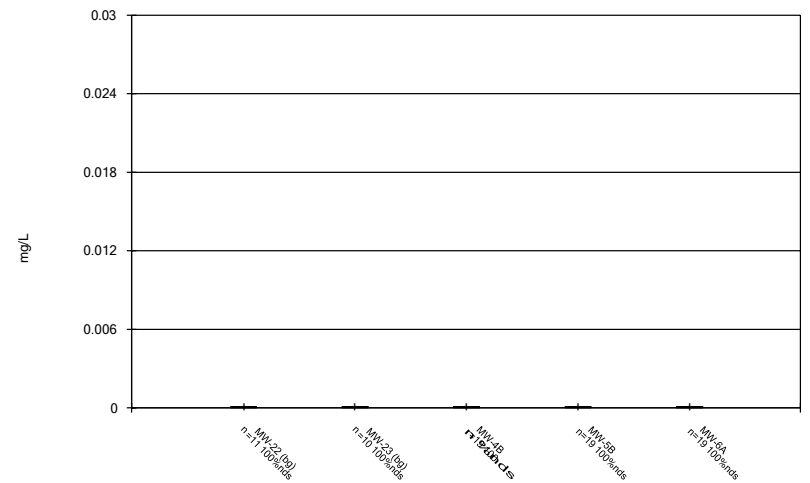
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



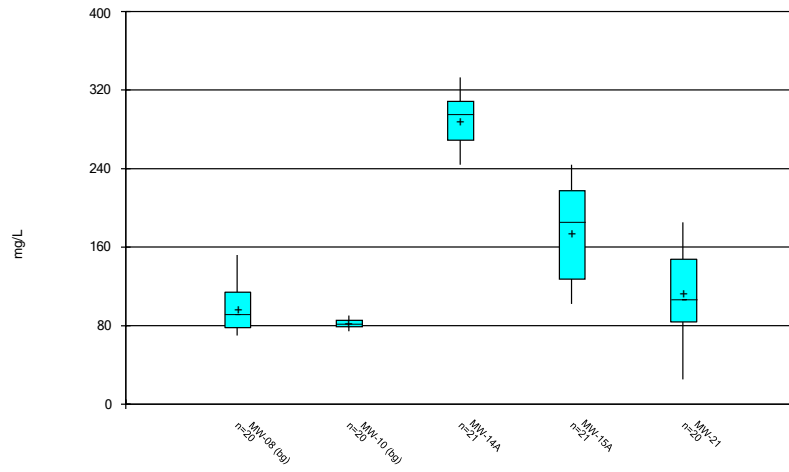
Constituent: Cadmium Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



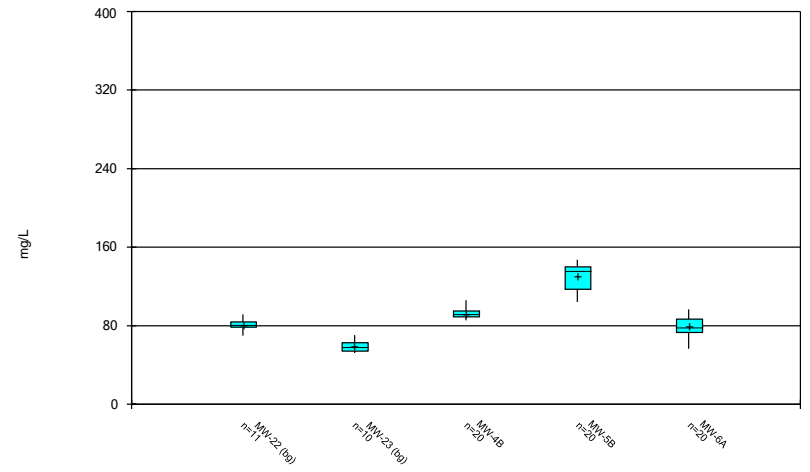
Constituent: Cadmium Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



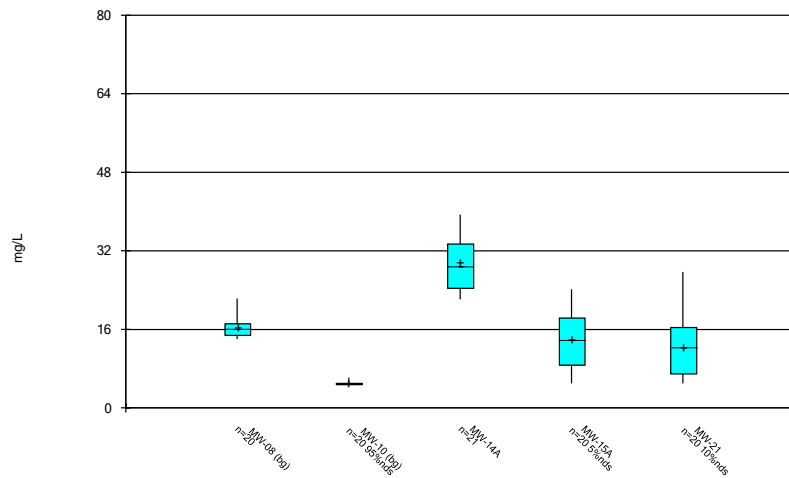
Constituent: Calcium Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



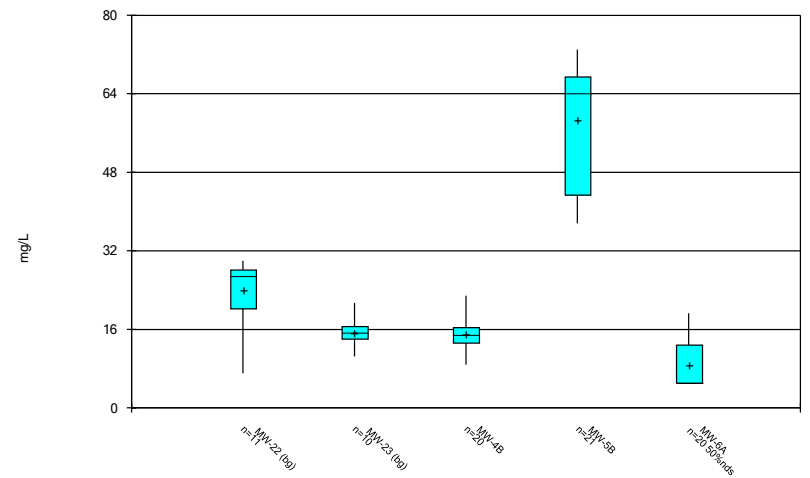
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 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



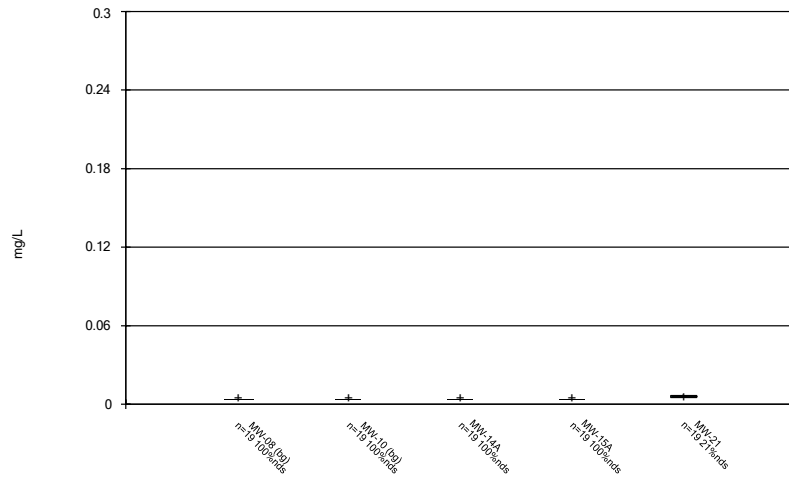
Constituent: Chloride Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



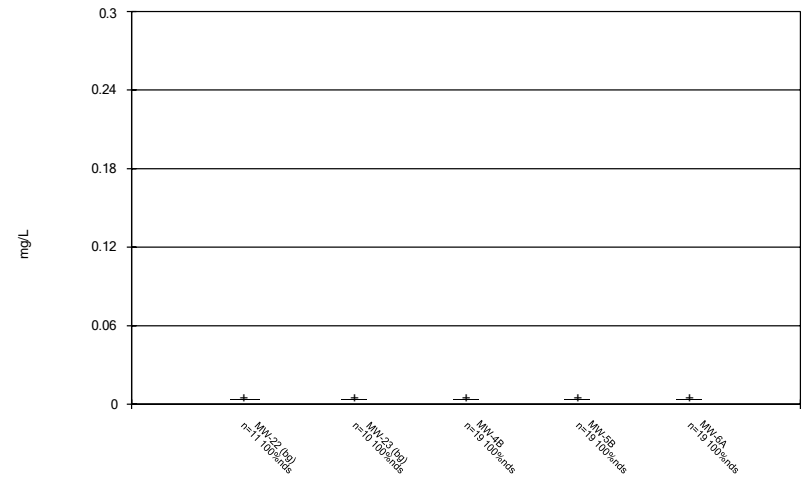
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 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



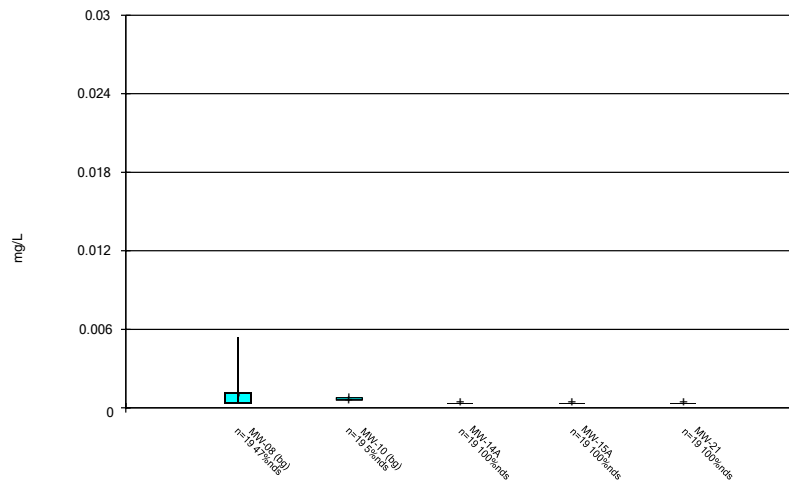
Constituent: Chromium Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



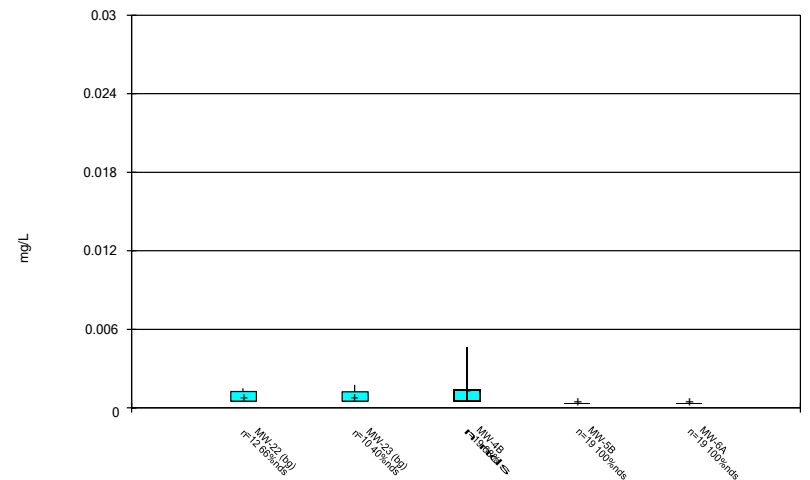
Constituent: Chromium Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



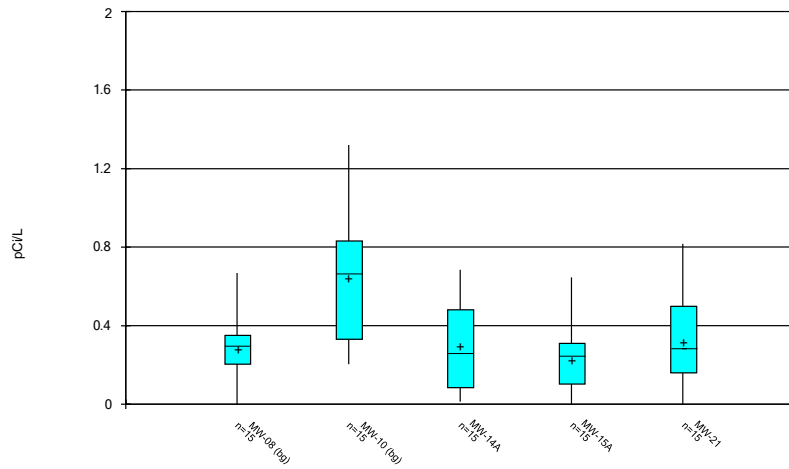
Constituent: Cobalt Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



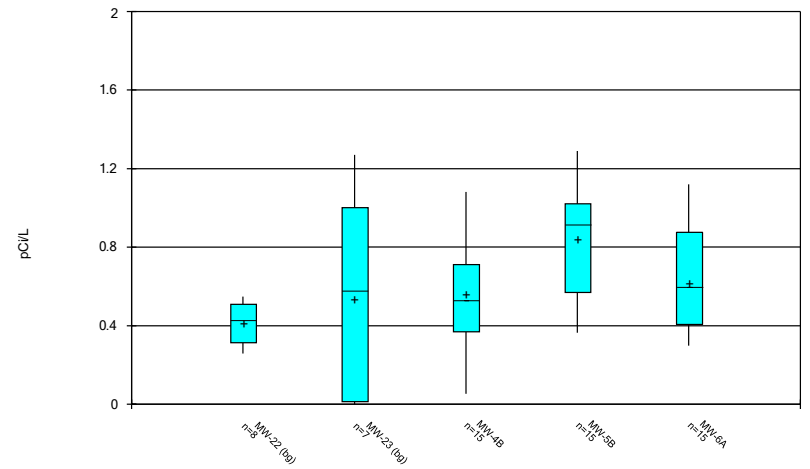
Constituent: Cobalt Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



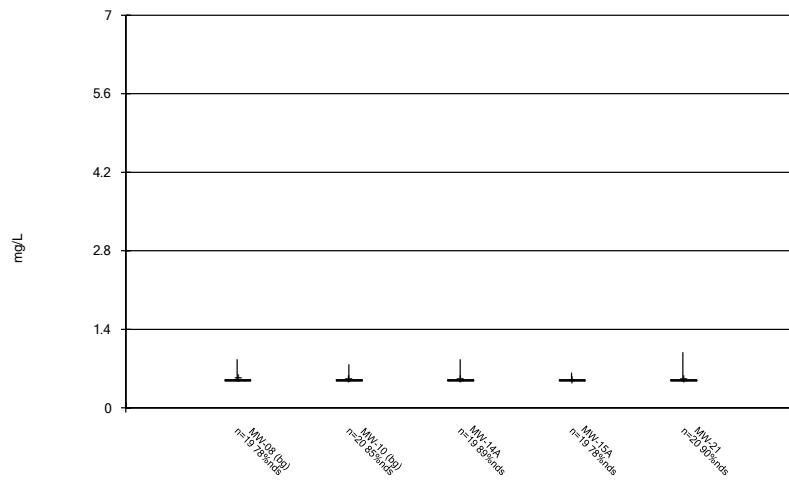
Constituent: Combined Radium 226 + 228 Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



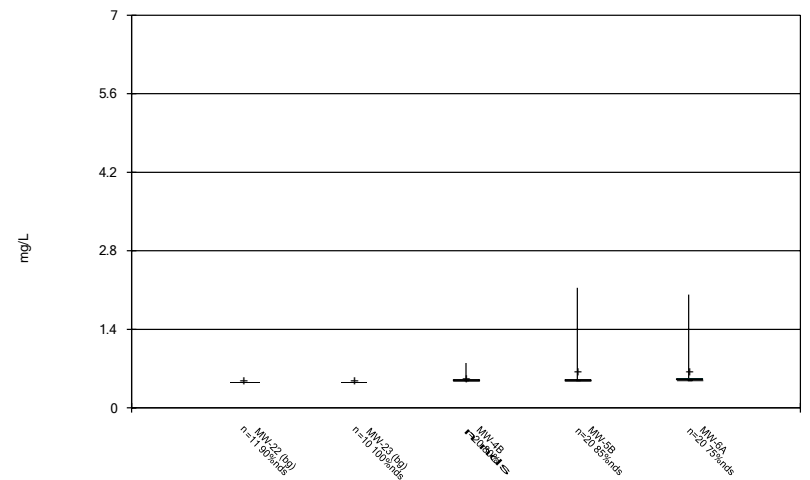
Constituent: Combined Radium 226 + 228 Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



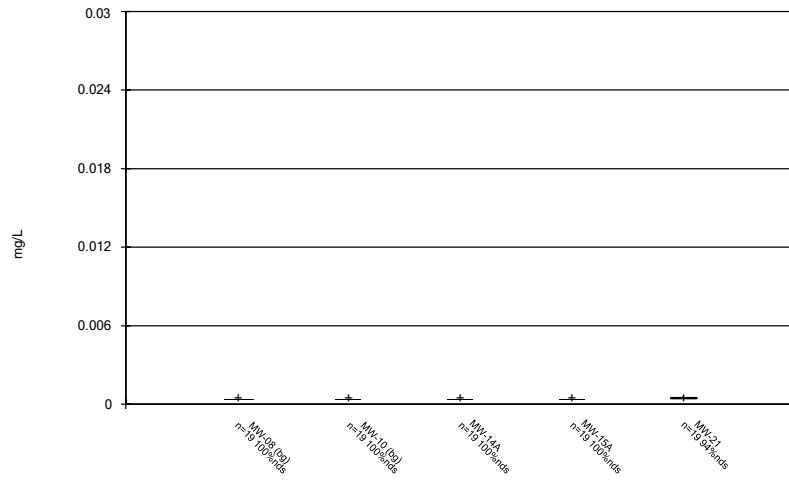
Constituent: Fluoride Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



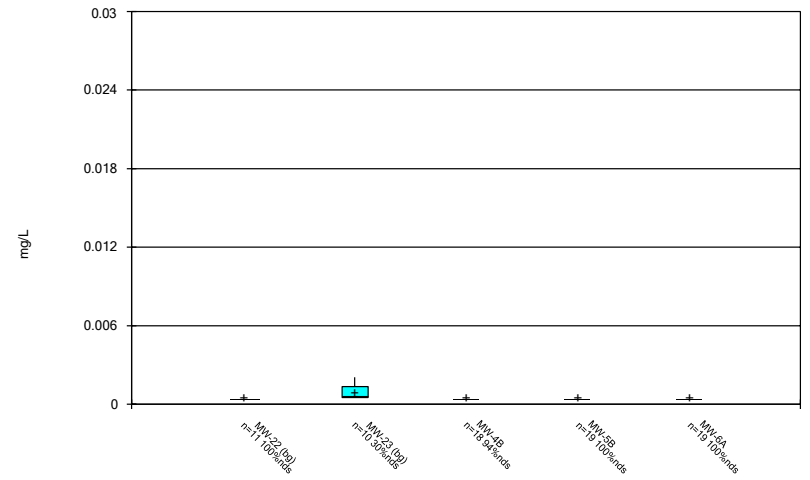
Constituent: Fluoride Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



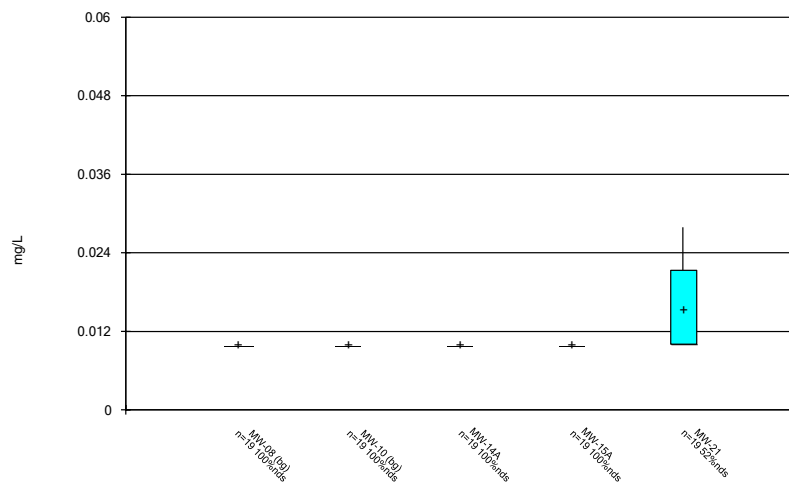
Constituent: Lead Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



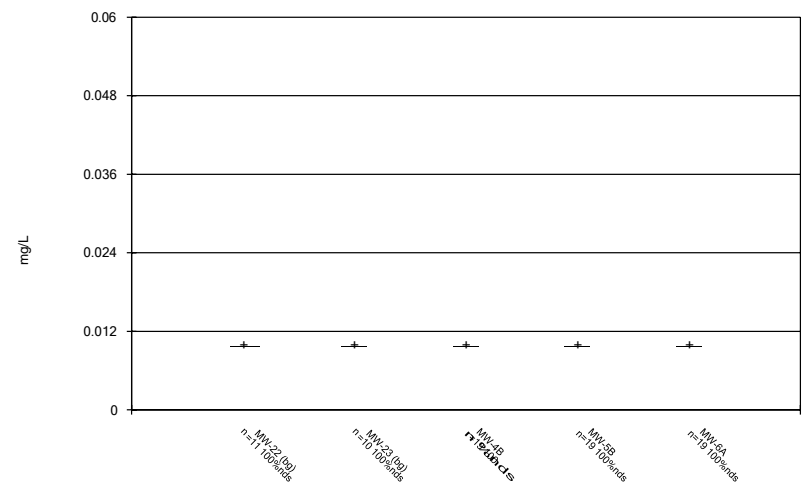
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



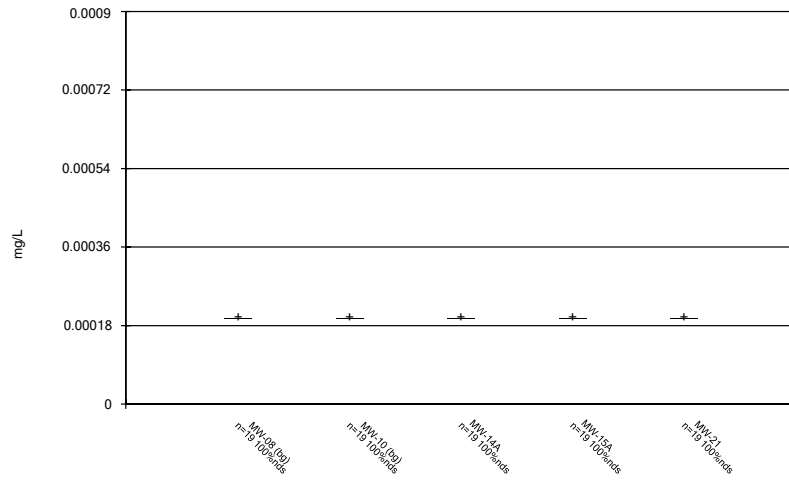
Constituent: Lithium Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



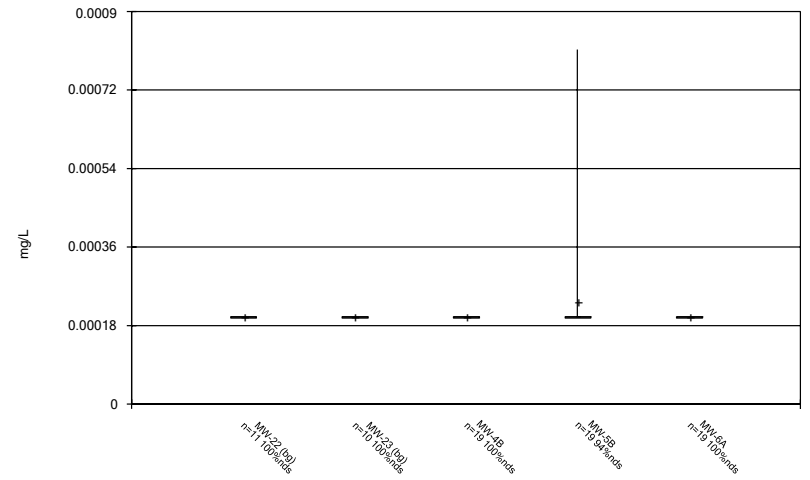
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



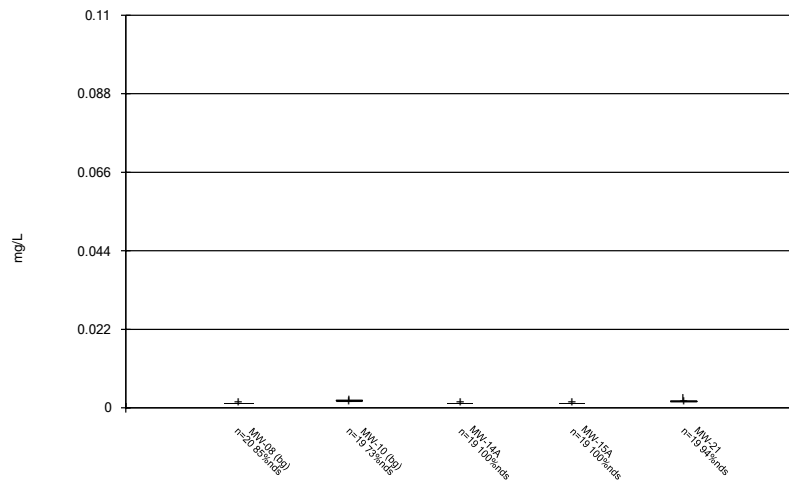
Constituent: Mercury Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



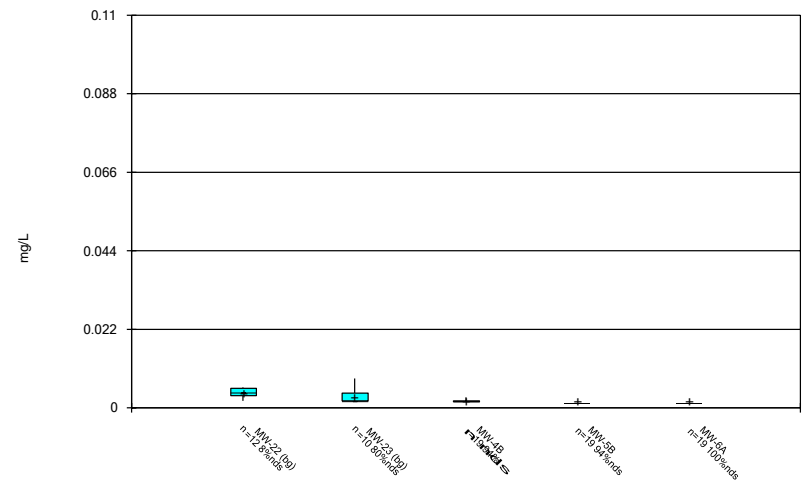
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 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



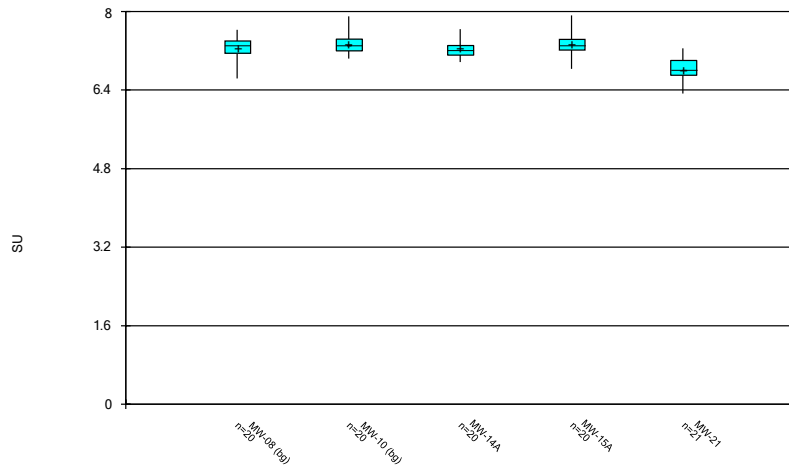
Constituent: Molybdenum Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



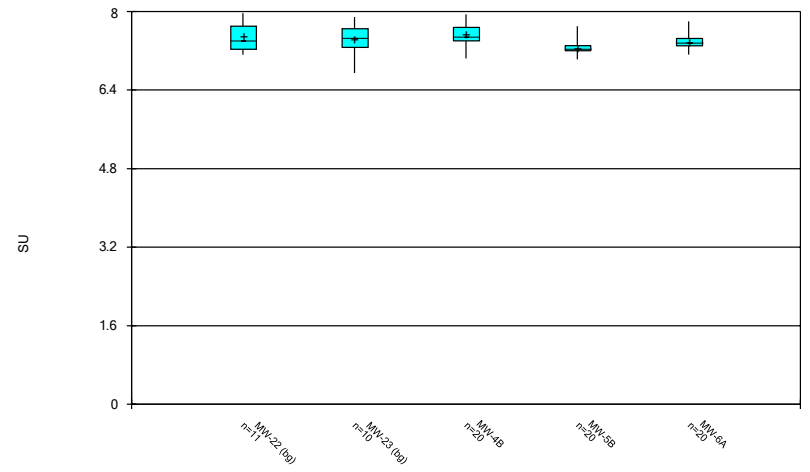
Constituent: Molybdenum Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



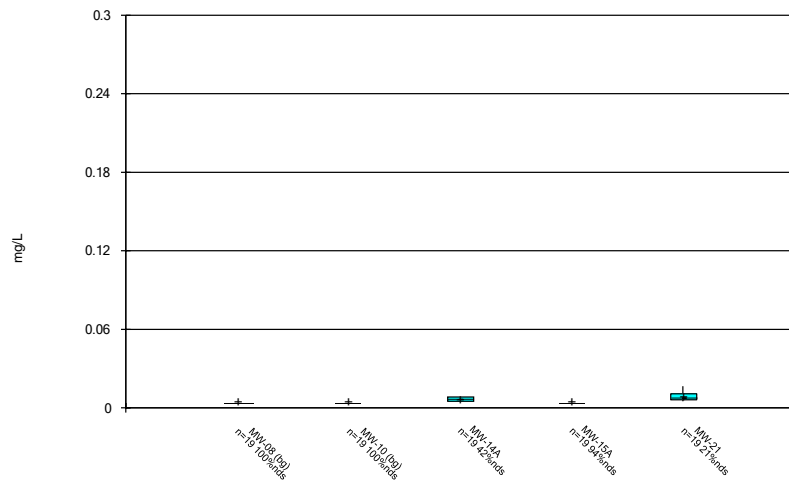
Constituent: pH Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



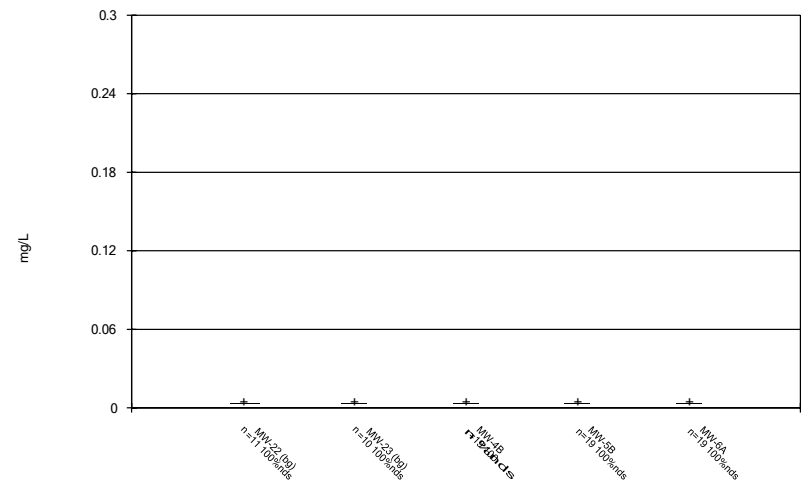
Constituent: pH Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



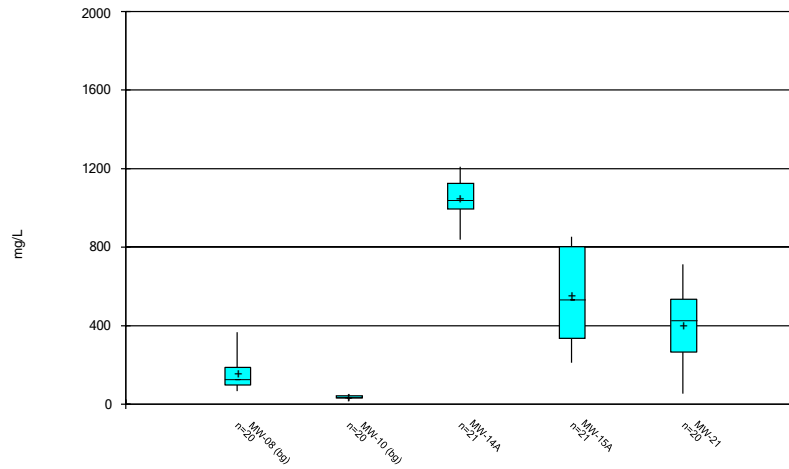
Constituent: Selenium Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



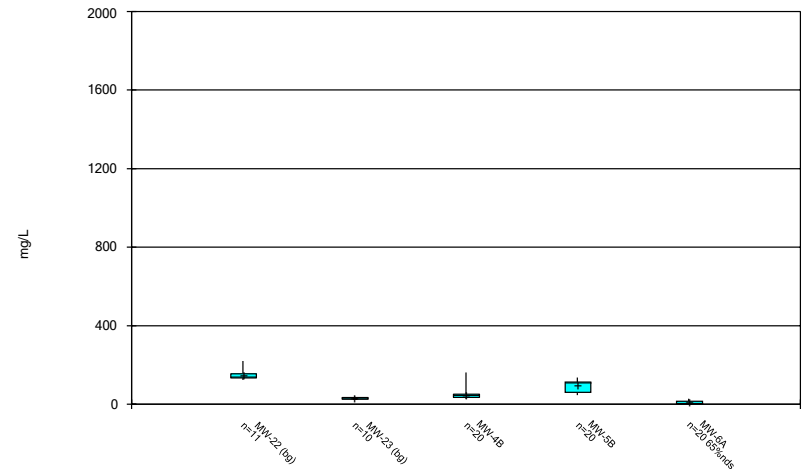
Constituent: Selenium Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



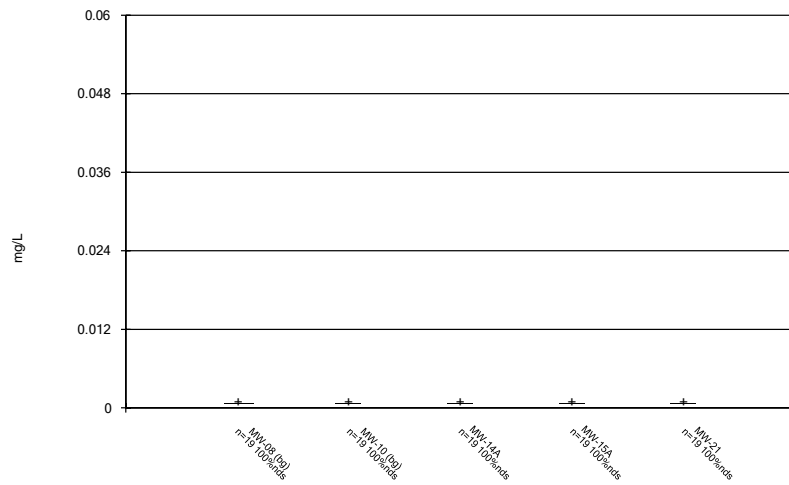
Constituent: Sulfate Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



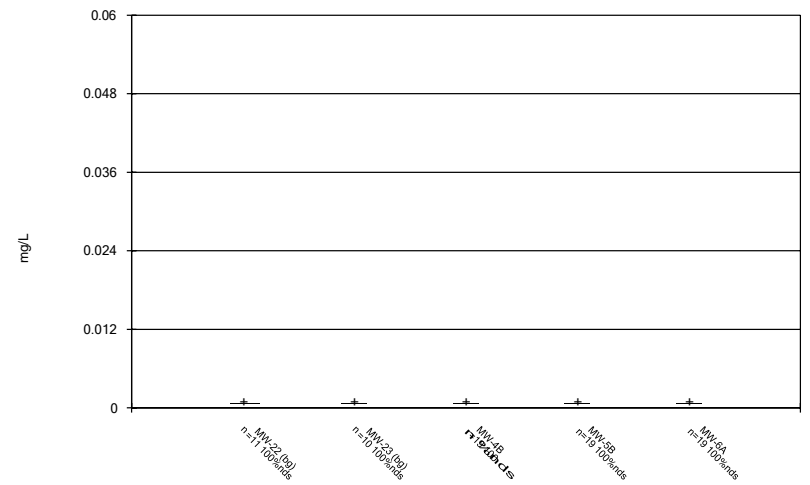
Constituent: Sulfate Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



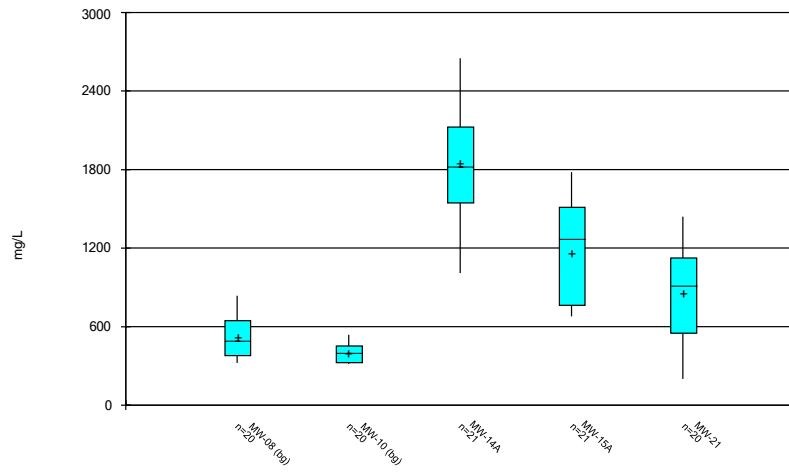
Constituent: Thallium Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



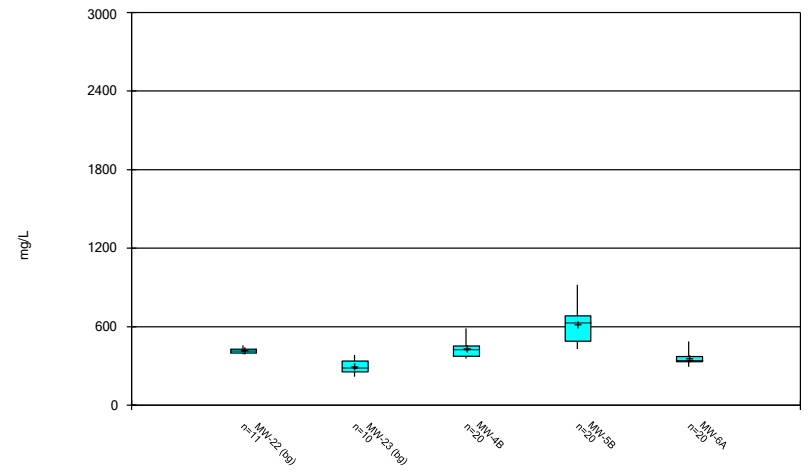
Constituent: Thallium Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



Constituent: Total Dissolved Solids Analysis Run 11/16/2022 1:14 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



Constituent: Total Dissolved Solids Analysis Run 11/16/2022 1:15 PM View: Federal Descriptive
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

FIGURE C.

Outlier Summary

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/16/2022, 1:15 PM

	MW-15A Barium (mg/L)	MW-15A Chloride (mg/L)	MW-08 Fluoride (mg/L)	MW-14A Fluoride (mg/L)	MW-15A Fluoride (mg/L)	MW-4B Lead (mg/L)
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)		

FIGURE D.

Interwell Prediction Limits - Significant Results

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/16/2022, 1:19 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bq	N Bq	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-14A	0.322	n/a	9/14/2022	15.1	Yes	61	n/a	n/a	n/a	90.16	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-15A	0.322	n/a	9/14/2022	10.4	Yes	61	n/a	n/a	n/a	90.16	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-21	0.322	n/a	9/14/2022	3.69	Yes	61	n/a	n/a	n/a	90.16	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Calcium (mg/L)	MW-14A	152	n/a	9/14/2022	301	Yes	61	n/a	n/a	n/a	0	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-5B	30	n/a	9/14/2022	39	Yes	61	n/a	n/a	n/a	31.15	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-14A	366	n/a	9/14/2022	978	Yes	61	n/a	n/a	n/a	0	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-14A	668.8	n/a	9/14/2022	1710	Yes	61	20.39	2.912	0	None		sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-15A	668.8	n/a	9/14/2022	796	Yes	61	20.39	2.912	0	None		sqrt(x)	0.001254	Param Inter 1 of 2

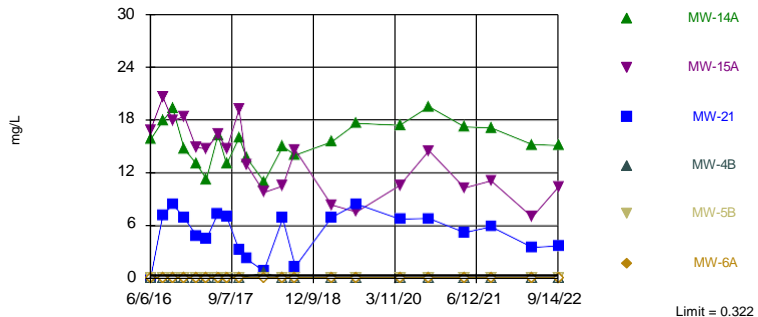
Interwell Prediction Limits - All Results

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/16/2022, 1:19 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bq	N	Bq	Mean	Std. Dev.	%NDs	ND	Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-14A	0.322	n/a	9/14/2022	15.1	Yes	61	n/a	n/a	n/a	n/a	90.16	n/a	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-15A	0.322	n/a	9/14/2022	10.4	Yes	61	n/a	n/a	n/a	n/a	90.16	n/a	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-21	0.322	n/a	9/14/2022	3.69	Yes	61	n/a	n/a	n/a	n/a	90.16	n/a	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-4B	0.322	n/a	9/14/2022	0.1ND	No	61	n/a	n/a	n/a	n/a	90.16	n/a	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-5B	0.322	n/a	9/14/2022	0.1ND	No	61	n/a	n/a	n/a	n/a	90.16	n/a	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-6A	0.322	n/a	9/14/2022	0.1ND	No	61	n/a	n/a	n/a	n/a	90.16	n/a	n/a	n/a	0.0005084	NP Inter (NDs) 1 of 2
Calcium (mg/L)	MW-14A	152	n/a	9/14/2022	301	Yes	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-15A	152	n/a	9/14/2022	132	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-21	152	n/a	9/14/2022	88.2	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-4B	152	n/a	9/14/2022	92.3	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-5B	152	n/a	9/14/2022	117	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-6A	152	n/a	9/14/2022	89	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-14A	30	n/a	9/14/2022	22.4	No	61	n/a	n/a	n/a	n/a	31.15	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-15A	30	n/a	9/14/2022	8.29	No	61	n/a	n/a	n/a	n/a	31.15	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-21	30	n/a	9/14/2022	18	No	61	n/a	n/a	n/a	n/a	31.15	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-4B	30	n/a	9/14/2022	16.8	No	61	n/a	n/a	n/a	n/a	31.15	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-5B	30	n/a	9/14/2022	39	Yes	61	n/a	n/a	n/a	n/a	31.15	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-6A	30	n/a	9/14/2022	13.3	No	61	n/a	n/a	n/a	n/a	31.15	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Fluoride (mg/L)	MW-14A	0.864	n/a	9/14/2022	0.5ND	No	60	n/a	n/a	n/a	n/a	86.67	n/a	n/a	n/a	0.0005218	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-15A	0.864	n/a	9/14/2022	0.5ND	No	60	n/a	n/a	n/a	n/a	86.67	n/a	n/a	n/a	0.0005218	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-21	0.864	n/a	9/14/2022	0.5ND	No	60	n/a	n/a	n/a	n/a	86.67	n/a	n/a	n/a	0.0005218	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-4B	0.864	n/a	9/14/2022	0.5ND	No	60	n/a	n/a	n/a	n/a	86.67	n/a	n/a	n/a	0.0005218	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-5B	0.864	n/a	9/14/2022	0.5ND	No	60	n/a	n/a	n/a	n/a	86.67	n/a	n/a	n/a	0.0005218	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-6A	0.864	n/a	9/14/2022	0.5ND	No	60	n/a	n/a	n/a	n/a	86.67	n/a	n/a	n/a	0.0005218	NP Inter (NDs) 1 of 2
pH (SU)	MW-14A	7.83	6.885	9/14/2022	7.21	No	61	7.358	0.2515	0	None	No	0.0006268	Param	Inter	1 of 2	
pH (SU)	MW-15A	7.83	6.885	9/14/2022	7.4	No	61	7.358	0.2515	0	None	No	0.0006268	Param	Inter	1 of 2	
pH (SU)	MW-21	7.83	6.885	9/14/2022	7.09	No	61	7.358	0.2515	0	None	No	0.0006268	Param	Inter	1 of 2	
pH (SU)	MW-4B	7.83	6.885	9/14/2022	7.52	No	61	7.358	0.2515	0	None	No	0.0006268	Param	Inter	1 of 2	
pH (SU)	MW-5B	7.83	6.885	9/14/2022	7.37	No	61	7.358	0.2515	0	None	No	0.0006268	Param	Inter	1 of 2	
pH (SU)	MW-6A	7.83	6.885	9/14/2022	7.38	No	61	7.358	0.2515	0	None	No	0.0006268	Param	Inter	1 of 2	
Sulfate (mg/L)	MW-14A	366	n/a	9/14/2022	978	Yes	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-15A	366	n/a	9/14/2022	319	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-21	366	n/a	9/14/2022	151	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-4B	366	n/a	9/14/2022	49.5	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-5B	366	n/a	9/14/2022	49.9	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-6A	366	n/a	9/14/2022	16.4	No	61	n/a	n/a	n/a	n/a	0	n/a	n/a	n/a	0.0005084	NP Inter (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-14A	668.8	n/a	9/14/2022	1710	Yes	61	20.39	2.912	0	None	sqrt(x)	0.001254	Param	Inter	1 of 2	
Total Dissolved Solids (mg/L)	MW-15A	668.8	n/a	9/14/2022	796	Yes	61	20.39	2.912	0	None	sqrt(x)	0.001254	Param	Inter	1 of 2	
Total Dissolved Solids (mg/L)	MW-21	668.8	n/a	9/14/2022	524	No	61	20.39	2.912	0	None	sqrt(x)	0.001254	Param	Inter	1 of 2	
Total Dissolved Solids (mg/L)	MW-4B	668.8	n/a	9/14/2022	358	No	61	20.39	2.912	0	None	sqrt(x)	0.001254	Param	Inter	1 of 2	
Total Dissolved Solids (mg/L)	MW-5B	668.8	n/a	9/14/2022	484	No	61	20.39	2.912	0	None	sqrt(x)	0.001254	Param	Inter	1 of 2	
Total Dissolved Solids (mg/L)	MW-6A	668.8	n/a	9/14/2022	334	No	61	20.39	2.912	0	None	sqrt(x)	0.001254	Param	Inter	1 of 2	

Exceeds Limit: MW-14A, MW-15A, MW-21

Prediction Limit
Interwell Non-parametric

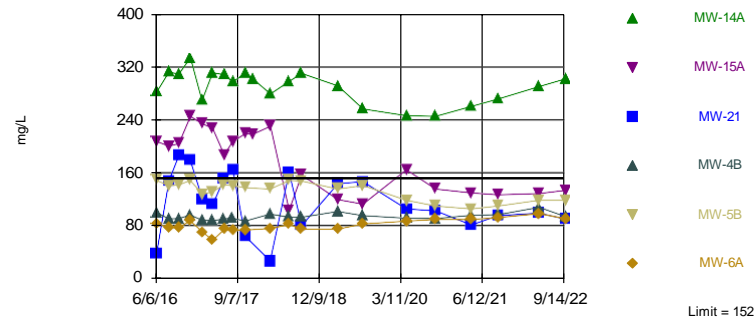


Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 61 background values. 90.16% NDs. Annual per-constituent alpha = 0.006083. Individual comparison alpha = 0.0005084 (1 of 2). Comparing 6 points to limit.

Constituent: Boron Analysis Run 11/16/2022 1:17 PM View: Federal Prediction Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Exceeds Limit: MW-14A

Prediction Limit
Interwell Non-parametric

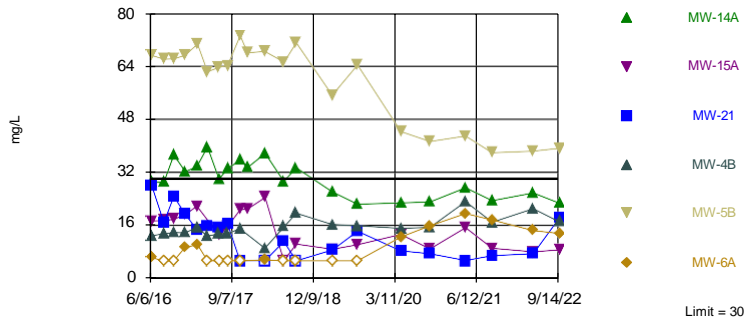


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 61 background values. Annual per-constituent alpha = 0.006083. Individual comparison alpha = 0.0005084 (1 of 2). Comparing 6 points to limit.

Constituent: Calcium Analysis Run 11/16/2022 1:17 PM View: Federal Prediction Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Exceeds Limit: MW-5B

Prediction Limit
Interwell Non-parametric

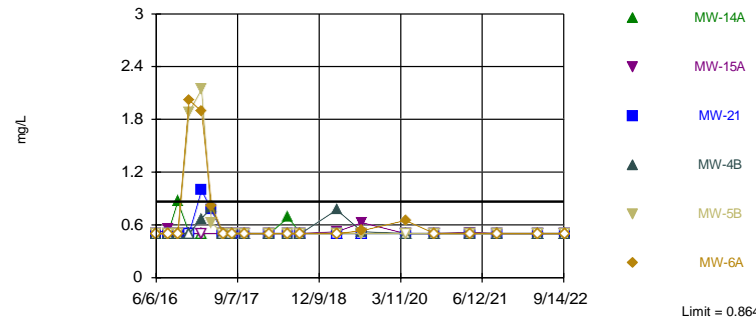


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 61 background values. 31.15% NDs. Annual per-constituent alpha = 0.006083. Individual comparison alpha = 0.0005084 (1 of 2). Comparing 6 points to limit.

Constituent: Chloride Analysis Run 11/16/2022 1:17 PM View: Federal Prediction Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Within Limit

Prediction Limit
Interwell Non-parametric

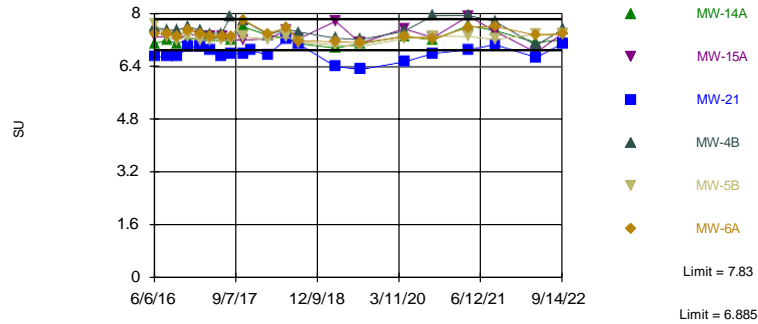


Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 60 background values. 86.67% NDs. Annual per-constituent alpha = 0.006244. Individual comparison alpha = 0.0005218 (1 of 2). Comparing 6 points to limit.

Constituent: Fluoride Analysis Run 11/16/2022 1:17 PM View: Federal Prediction Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Within Limits

Prediction Limit
Interwell Parametric

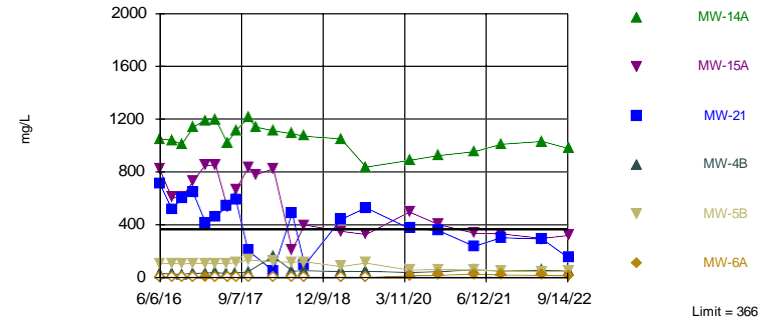


Background Data Summary: Mean=7.358, Std. Dev.=0.2515, n=61. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9497, critical = 0.946. Kappa = 1.879 (c=7, w=6, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0006268. Comparing 6 points to limit.

Constituent: pH Analysis Run 11/16/2022 1:17 PM View: Federal Prediction Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Exceeds Limit: MW-14A

Prediction Limit
Interwell Non-parametric

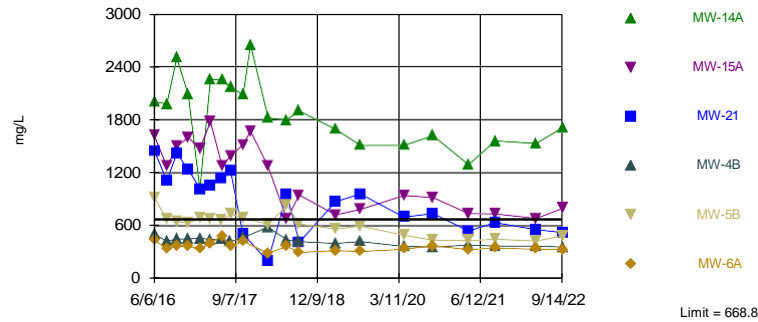


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 61 background values. Annual per-constituent alpha = 0.006083. Individual comparison alpha = 0.0005084 (1 of 2). Comparing 6 points to limit.

Constituent: Sulfate Analysis Run 11/16/2022 1:17 PM View: Federal Prediction Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Exceeds Limit: MW-14A, MW-15A

Prediction Limit
Interwell Parametric



Background Data Summary (based on square root transformation): Mean=20.39, Std. Dev.=2.912, n=61. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9512, critical = 0.946. Kappa = 1.879 (c=7, w=6, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.001254. Comparing 6 points to limit.

Constituent: Total Dissolved Solids Analysis Run 11/16/2022 1:17 PM View: Federal Prediction Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 11/16/2022 1:19 PM View: Federal Prediction Limits

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-6A	MW-5B	MW-21	MW-14A	MW-22 (bg)
6/6/2016	16.8	<0.1							
6/7/2016			<0.1	<0.1	<0.1	<0.1			
6/8/2016							<0.1	15.8	
8/15/2016	20.6	<0.1					7.23	17.9	
8/16/2016			<0.1	<0.1	<0.1	<0.1			
10/10/2016		<0.1	<0.1				8.45		
10/11/2016	17.9			<0.1	<0.1	<0.1		19.3	
12/12/2016				<0.1	<0.1	<0.1	6.93		
12/14/2016	18.4	<0.1	<0.1					14.7	
2/17/2017	14.9	<0.1		<0.1				13.1	
2/21/2017			<0.1		<0.1	<0.1	4.87		
4/17/2017	14.7	<0.1	<0.1	<0.1	<0.1	<0.1		11.3	
4/18/2017							4.49		
6/19/2017		<0.1	<0.1						
6/20/2017				<0.1		<0.1	7.36		
6/21/2017	16.4				<0.1			16.3	
8/7/2017		<0.1	<0.1	<0.1					
8/8/2017	14.7				<0.1	<0.1	7.05	13	
10/16/2017		<0.1	<0.1	<0.1			3.33		
10/17/2017	19.2				<0.1	<0.1		16	
11/28/2017	12.9 (R)						2.24 (R)	13.7 (R)	
3/5/2018		<0.1							
3/6/2018			<0.1	0.66	<0.1	<0.1	0.885		<0.1
3/7/2018	9.8							11	
6/19/2018		<0.1	<0.1				6.84		<0.1
6/20/2018	10.5							15	
6/21/2018				<0.1	<0.1	<0.1			
8/27/2018		<0.1	<0.1						<0.1
8/28/2018				<0.1			1.36		
8/29/2018	14.6				<0.1	<0.1		14	
3/18/2019			<0.1						
3/19/2019		<0.1		<0.1	<0.1	<0.1			0.299
3/20/2019	8.35						6.95	15.5	
8/6/2019			0.205						<0.1
8/7/2019	7.56	<0.1		<0.1	<0.1	<0.1	8.46	17.6	
4/7/2020	10.6	<0.1	<0.1	<0.1	<0.1	<0.1	6.76	17.4	<0.1
9/18/2020	14.5	<0.1	<0.1	<0.1	<0.1	<0.1	6.82	19.5	0.263
4/5/2021	10.3	<0.1	<0.1	<0.1	<0.1	<0.1	5.24	17.2	<0.1
9/1/2021	11.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.88	17.1	<0.1
4/20/2022	6.98	<0.1	<0.1	<0.1	<0.1	<0.1	3.57	15.2	<0.1
9/14/2022	10.4	<0.1	<0.1	<0.1	<0.1	<0.1	3.69	15.1	0.322

Prediction Limit

Constituent: Boron (mg/L) Analysis Run 11/16/2022 1:19 PM View: Federal Prediction Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	<0.1
6/21/2018	
8/27/2018	<0.1
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	<0.1
3/20/2019	
8/6/2019	<0.1
8/7/2019	
4/7/2020	<0.1
9/18/2020	0.15
4/5/2021	<0.1
9/1/2021	<0.1
4/20/2022	<0.1
9/14/2022	0.204

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 11/16/2022 1:19 PM View: Federal Prediction Limits

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-5B	MW-6A	MW-14A	MW-21	MW-22 (bg)
6/6/2016	206	89.3							
6/7/2016			152	98.2	147	81.4			
6/8/2016							281	37.2	
8/15/2016	199	80.7					311	146	
8/16/2016			117	88.8	139	75.4			
10/10/2016		83.3	118						185
10/11/2016	203			89.3	140	75.7	308		
12/12/2016				94.5	147	85.6			178
12/14/2016	244	86.5	109				333		
2/17/2017	233	81.2		86.8			268		
2/21/2017			89.9		126	68.8			118
4/17/2017	226	79.2	96.5	85.9	130	56.3	310		
4/18/2017									110
6/19/2017		83.6	113						
6/20/2017				88.7	140				149
6/21/2017	186					72.9	307		
8/7/2017		85.5	91.3	89.7					
8/8/2017	206				139	71.2	296		163
10/16/2017		83.3	77	85.3					62.3
10/17/2017	218				136	71.9	310		
11/28/2017	217 (R)						301 (R)		
3/5/2018		77.3							
3/6/2018			74.7	95.8	134	74.1		25.1	69.8
3/7/2018	229						278		
6/19/2018		88.5	115					159	91.5
6/20/2018	102						297		
6/21/2018				91.4	147	80.1			
8/27/2018		85.4	83.6						80.7
8/28/2018				91.3				78.7	
8/29/2018	155				146	73.3	309		
3/18/2019			97.6						
3/19/2019		76.3		99.7	134	73.2			91.6
3/20/2019	118						290	142	
8/6/2019			132						83.8
8/7/2019	111	78.9		93.8	139	80.9	255	145	
4/7/2020	163	75.4	92.4	89.6	117	85.1	245	104	80.9
9/18/2020	134	74.2	77.7	89	108	87.9	244	101	75.5
4/5/2021	128	78.8	81.2	94.1	104	87.6	259	79.5	78.4
9/1/2021	125	80	78.3	95.1	108	90.6	270	93.5	79.4
4/20/2022	127	90.4	69.6	106	117	96.5	289	97.5	80.2
9/14/2022	132	82	76.8	92.3	117	89	301	88.2	79.6

Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 11/16/2022 1:19 PM View: Federal Prediction Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	70.5
6/21/2018	
8/27/2018	63.9
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	59.7
3/20/2019	
8/6/2019	59.5
8/7/2019	
4/7/2020	61
9/18/2020	52.1
4/5/2021	56.3
9/1/2021	56.1
4/20/2022	54
9/14/2022	54.5

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 11/16/2022 1:19 PM View: Federal Prediction Limits

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-5B	MW-6A	MW-21	MW-14A	MW-22 (bg)
6/6/2016	17.1	6.22							
6/7/2016			19.8	12.6	67	5.97			
6/8/2016							27.7	28.7	
8/15/2016	17.2	<5					16.6	28.7	
8/16/2016			17.8	13.2	65.9	<5			
10/10/2016		<5	16.2				24.4		
10/11/2016	17.6			13.6	66	<5		37	
12/12/2016				13.5	67	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	12.5	62.1	<5		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	14	13.2					
8/8/2017	15.4				64	<5	16.1	32.9	
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	8.81	68.2	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				15.3	65	<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		16	55	<5			27.6
3/20/2019	8.54						8.3	25.8	
8/6/2019			17.1						26.9
8/7/2019	9.91	<5		15.6	64.1	<5	14	22.1	
4/7/2020	13	<5	17.2	14.8	44	12.2	8.05	22.5	24.8
9/18/2020	8.63	<5	14.7	15.1	41	15.6	7.21	22.8	23.2
4/5/2021	15	<5	22.3	22.9	42.7	19.3	5.14	27.1	28.1
9/1/2021	8.86	<5	16.3	16.7	37.6	17.4	6.58	23.2	20
4/20/2022	7.71	<5	15.8	20.8	38.1	14.2	7.19	25.5	20.2
9/14/2022	8.29	<5	16.7	16.8	39	13.3	18	22.4	7.04

Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 11/16/2022 1:19 PM View: Federal Prediction Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	15.9
6/21/2018	
8/27/2018	14.2
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	10.5
3/20/2019	
8/6/2019	13.8
8/7/2019	
4/7/2020	15.7
9/18/2020	14.4
4/5/2021	21.4
9/1/2021	15.2
4/20/2022	16.9
9/14/2022	16.2

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 11/16/2022 1:19 PM View: Federal Prediction Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	<0.5
6/21/2018	
8/27/2018	<0.5
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	<0.5
3/20/2019	
8/6/2019	<0.5
8/7/2019	
4/7/2020	<0.5
9/18/2020	<0.5
4/5/2021	<0.5
9/1/2021	<0.5
4/20/2022	<0.5
9/14/2022	<0.5

Prediction Limit

Constituent: pH (SU) Analysis Run 11/16/2022 1:19 PM View: Federal Prediction Limits

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-6A	MW-5B	MW-21	MW-14A	MW-22 (bg)
6/6/2016	7.3	7.4							
6/7/2016			7.2	7.6	7.4	7.7			
6/8/2016							6.7	7.1	
8/15/2016	7.3	7.3					6.7	7.2	
8/16/2016			7.3	7.5	7.4	7.3			
10/10/2016		7.2	7.1				6.7		
10/11/2016	7.2			7.5	7.3	7.2		7.1	
12/12/2016				7.6	7.5	7.3	7		
12/14/2016	7.4	7.3	7.3					7.2	
2/17/2017	7.3	7.2		7.5				7.3	
2/21/2017			7.3		7.4	7.2	7		
4/17/2017	7.3	7.3	7.1	7.4	7.3	7.2		7.3	
4/18/2017							6.9		
6/19/2017		7.2	7.1						
6/20/2017				7.4		7.2	6.7		
6/21/2017	7.3				7.3			7.3	
8/7/2017		7.9	7.3	7.9					
8/8/2017	7.2				7.3	7.2	6.8	7.2	
10/16/2017		7.3	7.4	7.8			6.8		
10/17/2017	7.2				7.8	7.3		7.6	
11/28/2017							6.9 (R)		
3/5/2018		7.04							
3/6/2018			7.3	7.36	7.4	7.23	6.76		7.36
3/7/2018	7.24							7.35	
6/19/2018		7.72	7.56				7.25		7.9
6/20/2018	7.5							7.26	
6/21/2018				7.53	7.58	7.3			
8/27/2018		7.23	7.2						7.42
8/28/2018				7.44			7.07		
8/29/2018	7.25				7.18	7.14		7.09	
3/19/2019		7.1	7.08	7.26	7.15	7.05			7.21
3/20/2019	7.76						6.41	6.97	
8/6/2019			6.64						7.12
8/7/2019	7.11	7.07		7.22	7.12	7.02	6.33	7.09	
4/7/2020	7.54	7.26	7.21	7.46	7.3	7.24	6.55	7.32	7.32
9/18/2020	7.28	7.33	7.4	7.93	7.24	7.33	6.8	7.21	7.53
4/5/2021	7.92	7.57	7.63	7.94	7.59	7.31	6.92	7.64	7.7
9/1/2021	7.46	7.59	7.45	7.75	7.61	7.22	7.06	7.48	7.97
4/20/2022	6.83	7.35	7.35	7.04	7.35	7.37	6.69	7.13	7.23
9/14/2022	7.4	7.48	7.43	7.52	7.38	7.37	7.09	7.21	7.58

Prediction Limit

Constituent: pH (SU) Analysis Run 11/16/2022 1:19 PM View: Federal Prediction Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	7.69
6/21/2018	
8/27/2018	7.55
8/28/2018	
8/29/2018	
3/19/2019	7.24
3/20/2019	
8/6/2019	6.75
8/7/2019	
4/7/2020	7.33
9/18/2020	7.53
4/5/2021	7.61
9/1/2021	7.89
4/20/2022	7.39
9/14/2022	7.3

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 11/16/2022 1:19 PM View: Federal Prediction Limits

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-5B	MW-6A	MW-14A	MW-21	MW-22 (bg)
6/6/2016	827	42.1							
6/7/2016			366	32.2	109	<5			
6/8/2016							1050	713	
8/15/2016	605	33.8					1040	520	
8/16/2016			187	28.4	109	<5			
10/10/2016		36.4	187					603	
10/11/2016	607			27.2	105	<5	1010		
12/12/2016				32.7	109	<5		645	
12/14/2016	732	38.4	149				1140		
2/17/2017	849	47.3		36			1190		
2/21/2017			145		111	5.94		415	
4/17/2017	853	38.3	145	39.5	108	<5	1200		
4/18/2017								461	
6/19/2017		35.4	190						
6/20/2017				33	108			541	
6/21/2017	537					<5	1020		
8/7/2017		39	119	35.3					
8/8/2017	664				114	<5	1110	590	
10/16/2017		46.9	106	45.4				206	
10/17/2017	835				135	<5	1210		
11/28/2017	779 (R)						1140 (R)		
3/5/2018		51.4							
3/6/2018			87.3	162	122	<5		53.7	123
3/7/2018	824						1110		
6/19/2018		37.3	136					489	134
6/20/2018	210						1090		
6/21/2018				51.3	119	<5			
8/27/2018		34.3	94.7						125
8/28/2018				52.2				96.6	
8/29/2018	400				120	<5	1070		
3/18/2019			223						
3/19/2019		42.8		48	85	<5			134
3/20/2019	351						1050	442	
8/6/2019			276						139
8/7/2019	327	28.8		47	112	<5	837	529	
4/7/2020	496	18.6	123	41.5	58.9	13.6	888	373	143
9/18/2020	403	36.5	100	46.9	61.9	19.1	924	356	151
4/5/2021	338	27.6	99.7	60.1	57.4	27.3	952	237	154
9/1/2021	333	32.3	82.7	50.2	53.7	22.7	1010	303	154
4/20/2022	297	48.3	72.8	58.4	44.7	18.9	1030	293	158
9/14/2022	319	31.2	67.1	49.5	49.9	16.4	978	151	220

Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 11/16/2022 1:19 PM View: Federal Prediction Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	38.4
6/21/2018	
8/27/2018	31.7
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	26.2
3/20/2019	
8/6/2019	29.7
8/7/2019	
4/7/2020	25.5
9/18/2020	25.8
4/5/2021	35.5
9/1/2021	25.8
4/20/2022	25.4
9/14/2022	23

Prediction Limit

Constituent: Total Dissolved Solids (mg/L) Analysis Run 11/16/2022 1:19 PM View: Federal Prediction Limits

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-4B	MW-5B	MW-6A	MW-14A	MW-21	MW-22 (bg)
6/6/2016	1620	468							
6/7/2016			836	507	920	440			
6/8/2016							2000	1440	
8/15/2016	1270	412					1980	1110	
8/16/2016			664	426	672	340			
10/10/2016		444	708					1420	
10/11/2016	1500			450	646	370	2500		
12/12/2016				450	636	368		1240	
12/14/2016	1600	428	634				2080		
2/17/2017	1470	498		460			1010		
2/21/2017			578		684	336		1010	
4/17/2017	1780	538	624	442	680	402	2260		
4/18/2017								1060	
6/19/2017		524	656						
6/20/2017				452	656			1140	
6/21/2017	1280					486	2250		
8/7/2017		458	488	420					
8/8/2017	1390				734	364	2170	1220	
10/16/2017		414	470	466				514	
10/17/2017	1520				688	424	2080		
11/28/2017	1670 (R)						2650 (R)		
3/5/2018		314							
3/6/2018			376	586	620	292		200	424
3/7/2018	1270						1820		
6/19/2018		396	502					952	434
6/20/2018	676						1800		
6/21/2018				440	828	368			
8/27/2018		392	414						420
8/28/2018				420				416	
8/29/2018	948				622	298	1900		
3/18/2019			612						
3/19/2019		326		398	562	320			456
3/20/2019	724						1690	872	
8/6/2019			702						428
8/7/2019	786	320		422	596	308	1510	960	
4/7/2020	942	316	418	366	494	336	1510	698	422
9/18/2020	920	344	350	360	436	374	1620	738	398
4/5/2021	738	322	382	380	434	330	1290	540	412
9/1/2021	736	314	342	370	448	350	1560	636	420
4/20/2022	682	344	322	370	428	336	1530	558	388
9/14/2022	796	340	350	358	484	334	1710	524	390

Prediction Limit

Constituent: Total Dissolved Solids (mg/L) Analysis Run 11/16/2022 1:19 PM View: Federal Prediction Limits
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

MW-23 (bg)

6/6/2016	
6/7/2016	
6/8/2016	
8/15/2016	
8/16/2016	
10/10/2016	
10/11/2016	
12/12/2016	
12/14/2016	
2/17/2017	
2/21/2017	
4/17/2017	
4/18/2017	
6/19/2017	
6/20/2017	
6/21/2017	
8/7/2017	
8/8/2017	
10/16/2017	
10/17/2017	
11/28/2017	
3/5/2018	
3/6/2018	
3/7/2018	
6/19/2018	
6/20/2018	384
6/21/2018	
8/27/2018	340
8/28/2018	
8/29/2018	
3/18/2019	
3/19/2019	296
3/20/2019	
8/6/2019	336
8/7/2019	
4/7/2020	298
9/18/2020	250
4/5/2021	274
9/1/2021	256
4/20/2022	218
9/14/2022	278

FIGURE E.

Trend Tests - Prediction Limit Exceedances - Significant Results

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/16/2022, 1:28 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron (mg/L)	MW-15A	-1.647	-127	-87	Yes	21	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-08 (bg)	-7.173	-94	-81	Yes	20	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-23 (bg)	-2.586	-31	-30	Yes	10	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-22 (bg)	-2.677	-39	-34	Yes	11	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-5B	-4.91	-99	-87	Yes	21	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-08 (bg)	-18.23	-108	-81	Yes	20	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-22 (bg)	9.567	51	34	Yes	11	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-08 (bg)	-61.43	-125	-81	Yes	20	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-10 (bg)	-26.48	-100	-81	Yes	20	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-14A	-126.7	-96	-87	Yes	21	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-15A	-160.3	-117	-87	Yes	21	0	n/a	n/a	0.01	NP

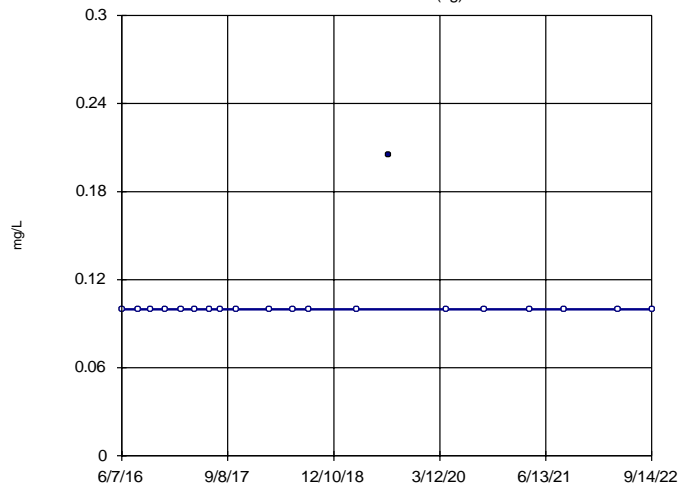
Trend Tests - Prediction Limit Exceedances - All Results

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/16/2022, 1:28 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron (mg/L)	MW-08 (bg)	0	7	81	No	20	95	n/a	n/a	0.01	NP
Boron (mg/L)	MW-10 (bg)	0	0	81	No	20	100	n/a	n/a	0.01	NP
Boron (mg/L)	MW-14A	0.2601	20	87	No	21	0	n/a	n/a	0.01	NP
Boron (mg/L)	MW-15A	-1.647	-127	-87	Yes	21	0	n/a	n/a	0.01	NP
Boron (mg/L)	MW-21	-0.1976	-34	-87	No	21	4.762	n/a	n/a	0.01	NP
Boron (mg/L)	MW-22 (bg)	0	9	34	No	11	72.73	n/a	n/a	0.01	NP
Boron (mg/L)	MW-23 (bg)	0	11	30	No	10	80	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-08 (bg)	-7.173	-94	-81	Yes	20	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-10 (bg)	-0.8819	-43	-81	No	20	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-14A	-7.357	-80	-87	No	21	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-22 (bg)	-0.5331	-9	-34	No	11	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-23 (bg)	-2.586	-31	-30	Yes	10	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-08 (bg)	0.01021	2	81	No	20	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-10 (bg)	0	-19	-81	No	20	95	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-22 (bg)	-2.677	-39	-34	Yes	11	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-23 (bg)	0.675	17	30	No	10	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-5B	-4.91	-99	-87	Yes	21	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-08 (bg)	-18.23	-108	-81	Yes	20	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-10 (bg)	-1.184	-42	-81	No	20	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-14A	-28.49	-74	-87	No	21	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-22 (bg)	9.567	51	34	Yes	11	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-23 (bg)	-1.88	-28	-30	No	10	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-08 (bg)	-61.43	-125	-81	Yes	20	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-10 (bg)	-26.48	-100	-81	Yes	20	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-14A	-126.7	-96	-87	Yes	21	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-15A	-160.3	-117	-87	Yes	21	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-22 (bg)	-8.725	-32	-34	No	11	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-23 (bg)	-29.94	-29	-30	No	10	0	n/a	n/a	0.01	NP

Sen's Slope Estimator

MW-08 (bg)

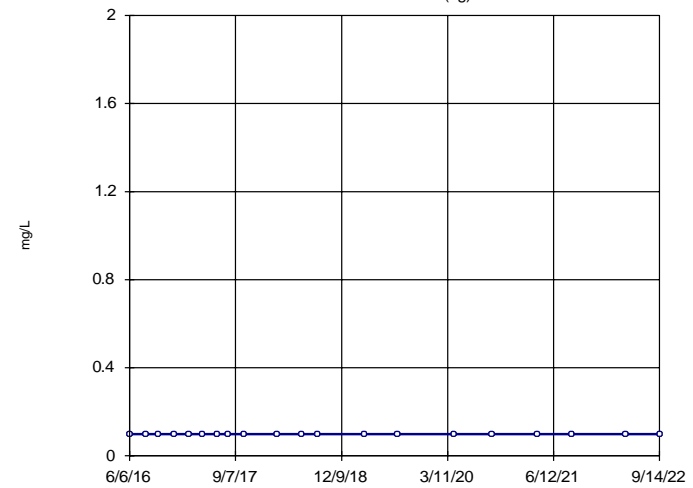


n = 20
Slope = 0
units per year.
Mann-Kendall
statistic = 7
critical = 81
Trend not sig-
nificant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: Boron Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

MW-10 (bg)

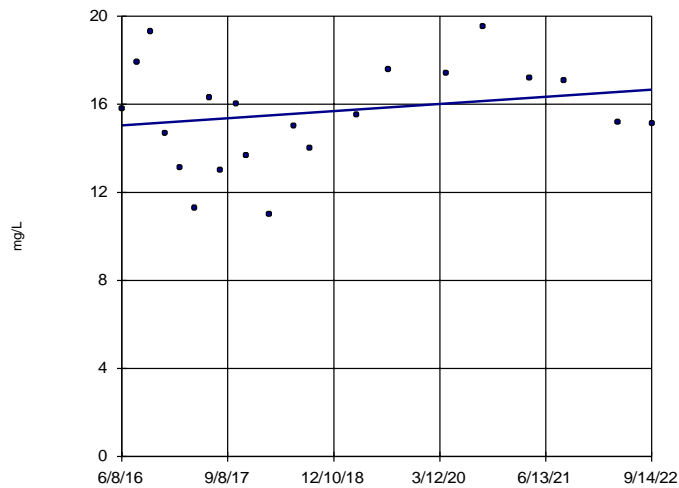


n = 20
Slope = 0
units per year.
Mann-Kendall
statistic = 0
critical = 81
Trend not sig-
nificant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: Boron Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

MW-14A

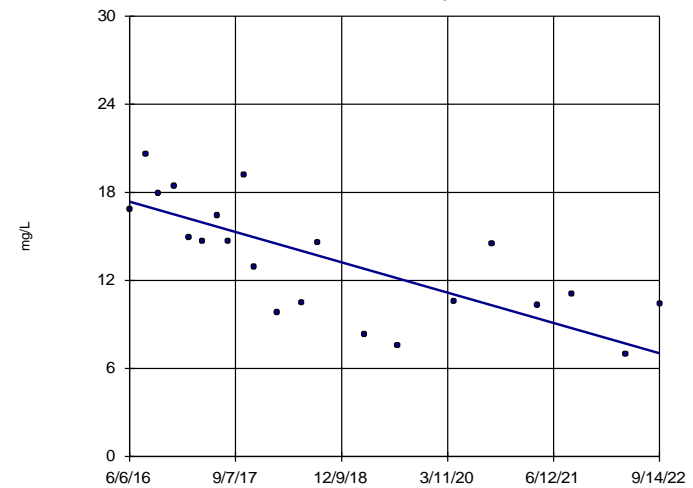


n = 21
Slope = 0.2601
units per year.
Mann-Kendall
statistic = 20
critical = 87
Trend not sig-
nificant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: Boron Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

MW-15A

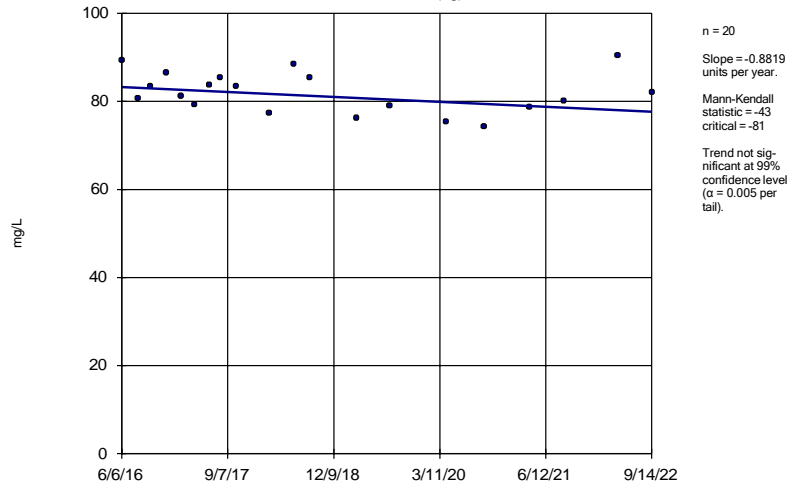


n = 21
Slope = -1.647
units per year.
Mann-Kendall
statistic = -127
critical = -87
Decreasing trend
significant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: Boron Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

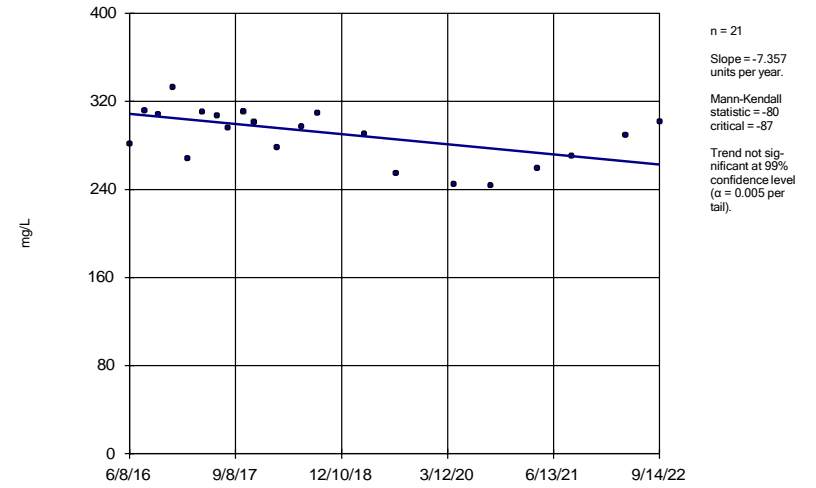
MW-10 (bg)



Constituent: Calcium Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

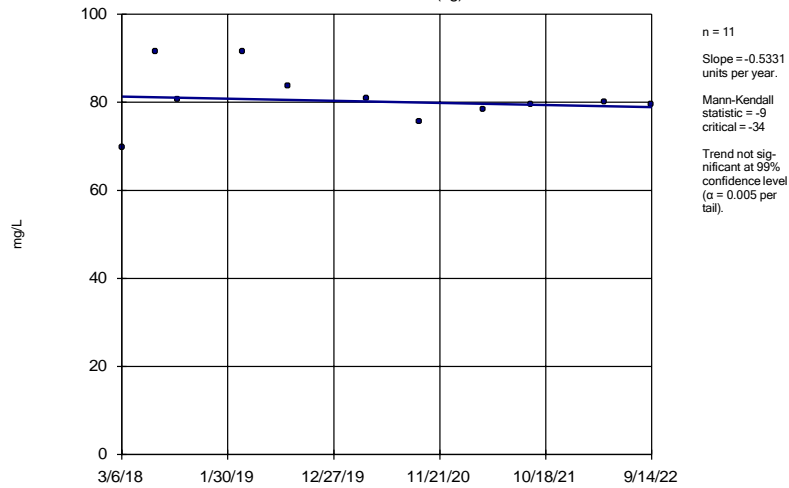
MW-14A



Constituent: Calcium Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

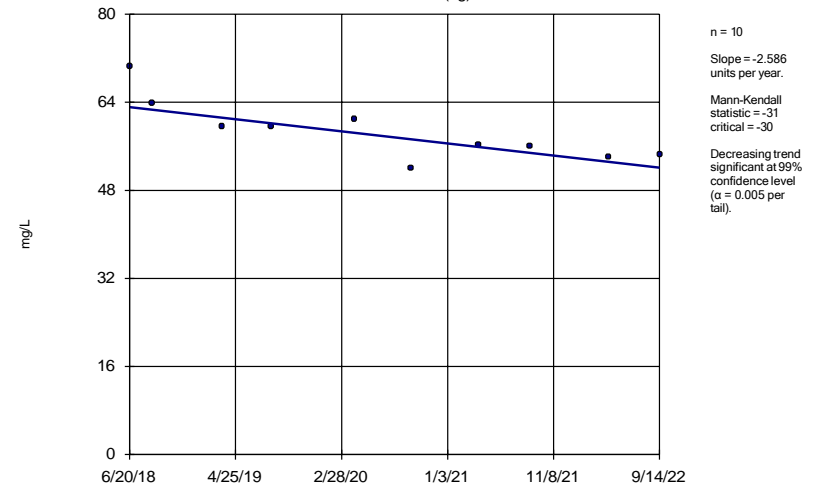
MW-22 (bg)



Constituent: Calcium Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

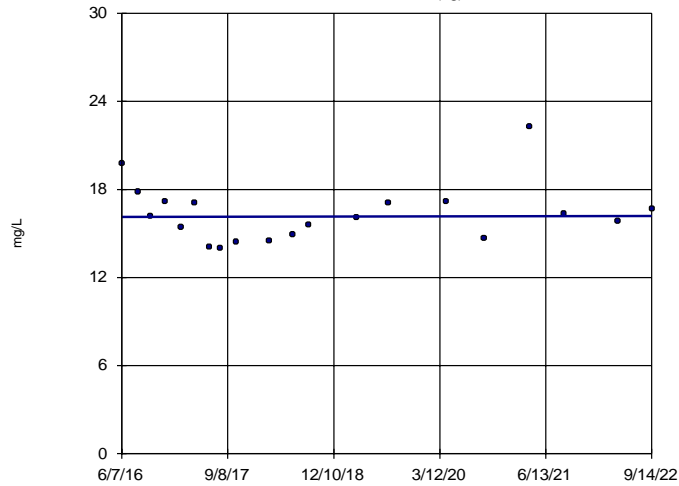
MW-23 (bg)



Constituent: Calcium Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

MW-08 (bg)

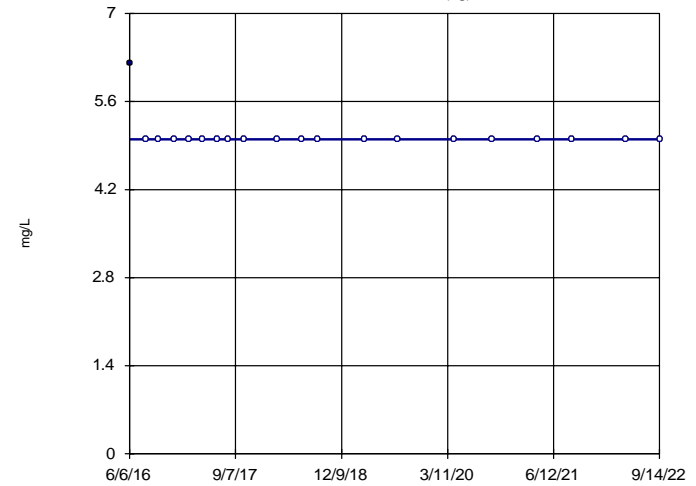


n = 20
 Slope = 0.01021
 units per year.
 Mann-Kendall
 statistic = 2
 critical = 81
 Trend not sig-
 nificant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Chloride Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

MW-10 (bg)

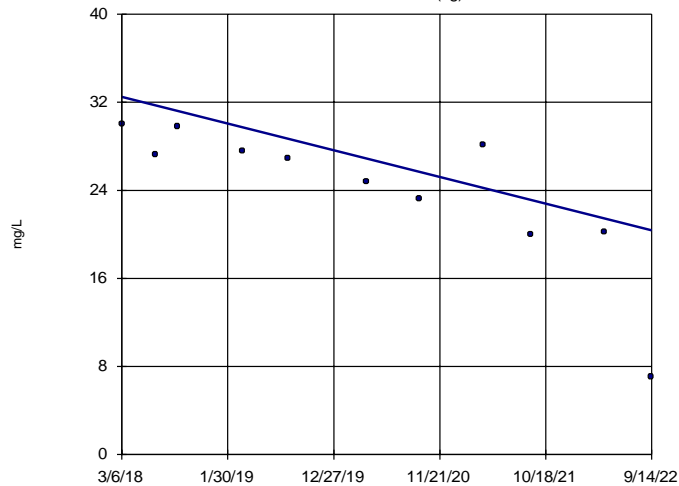


n = 20
 Slope = 0
 units per year.
 Mann-Kendall
 statistic = -19
 critical = -81
 Trend not sig-
 nificant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Chloride Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

MW-22 (bg)

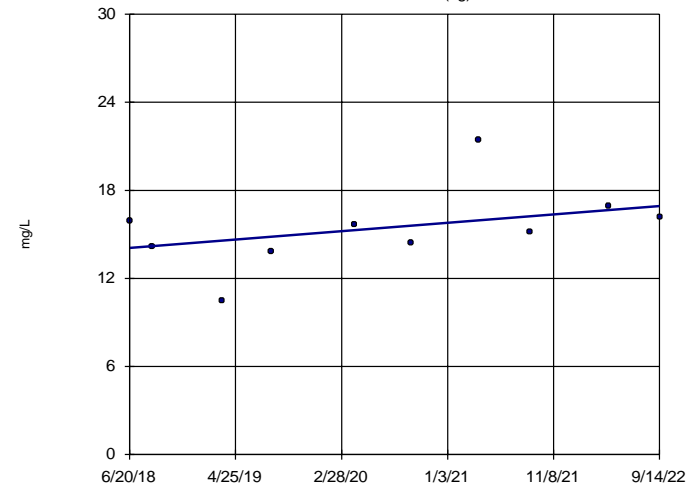


n = 11
 Slope = -2.677
 units per year.
 Mann-Kendall
 statistic = -39
 critical = -34
 Decreasing trend
 significant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Chloride Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

MW-23 (bg)

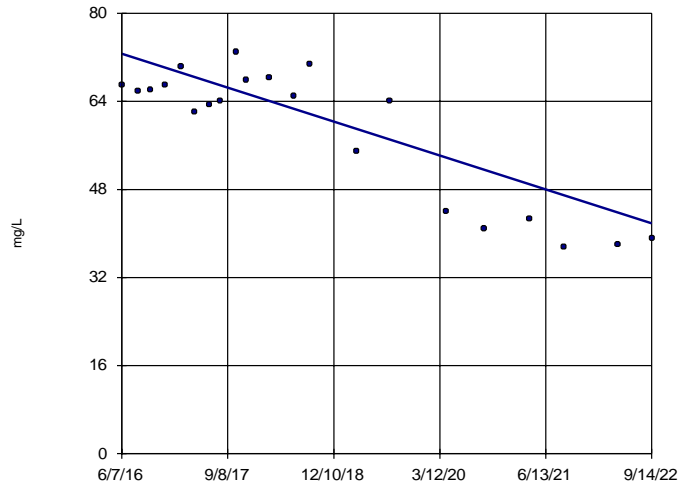


n = 10
 Slope = 0.675
 units per year.
 Mann-Kendall
 statistic = 17
 critical = 30
 Trend not sig-
 nificant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Chloride Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

MW-5B

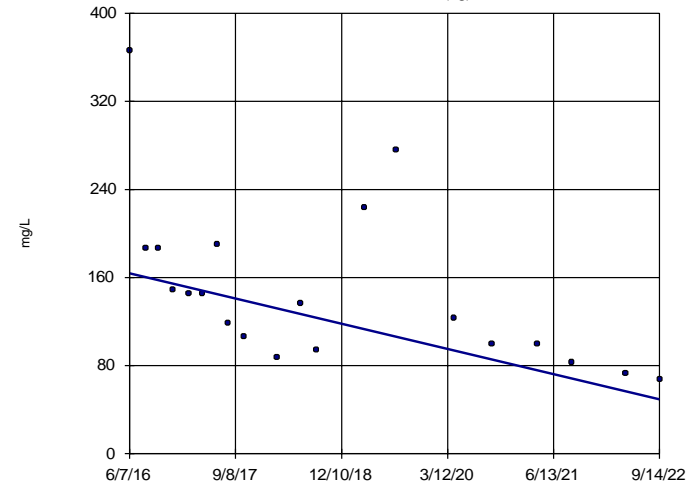


n = 21
 Slope = -4.91 units per year.
 Mann-Kendall statistic = -.99
 critical = -.87
 Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Chloride Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

MW-08 (bg)

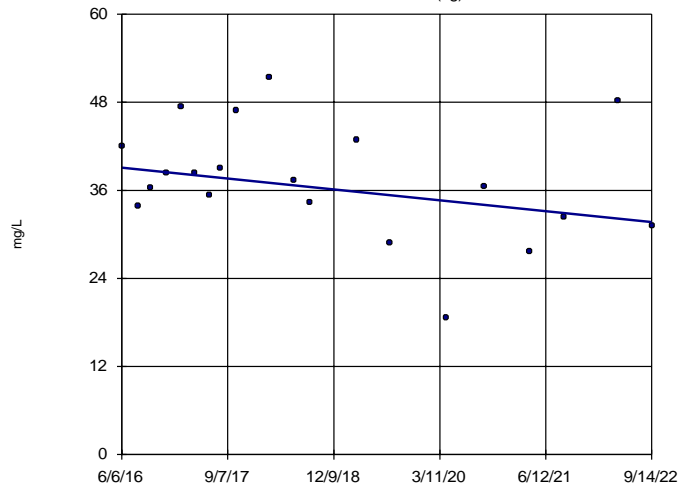


n = 20
 Slope = -18.23 units per year.
 Mann-Kendall statistic = -1.08
 critical = -.81
 Decreasing trend significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

MW-10 (bg)

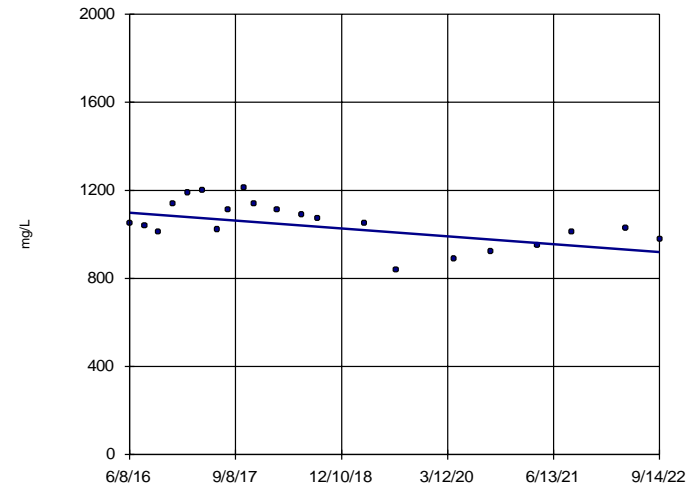


n = 20
 Slope = -1.184 units per year.
 Mann-Kendall statistic = -.42
 critical = -.81
 Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

MW-14A

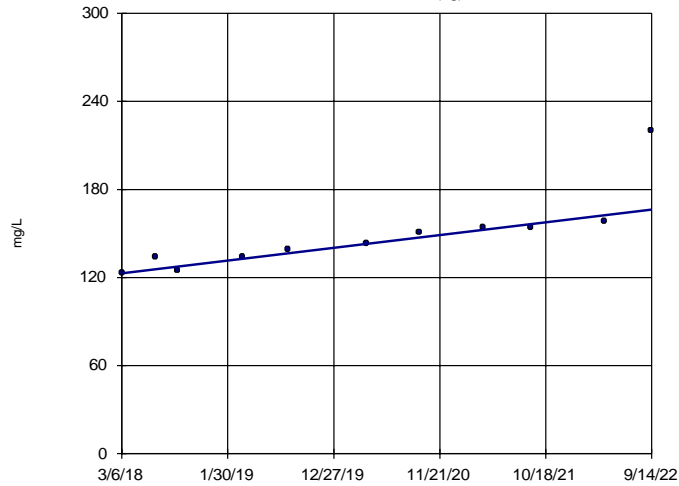


n = 21
 Slope = -28.49 units per year.
 Mann-Kendall statistic = -.74
 critical = -.87
 Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Sulfate Analysis Run 11/16/2022 1:24 PM View: Federal Trend Tests
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

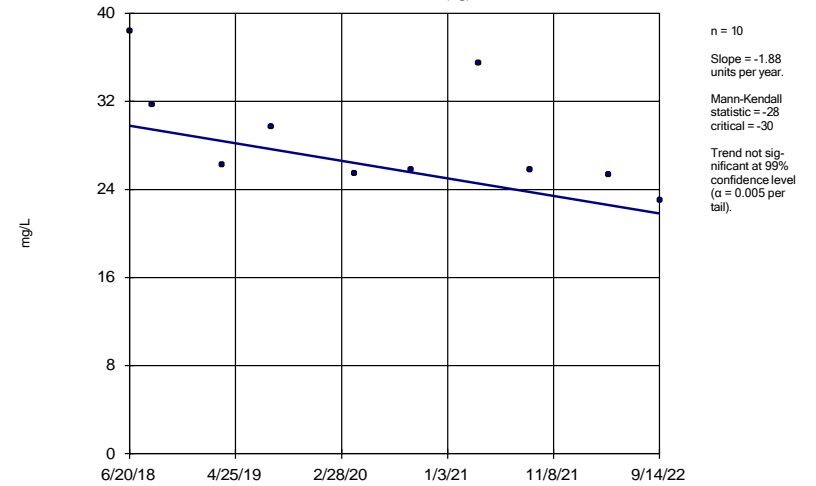
MW-22 (bg)



Constituent: Sulfate Analysis Run 11/16/2022 1:25 PM View: Federal Trend Tests
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

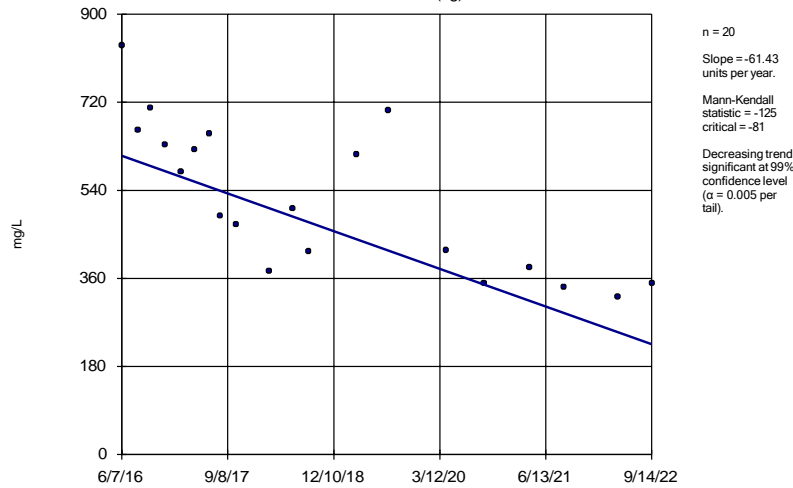
MW-23 (bg)



Constituent: Sulfate Analysis Run 11/16/2022 1:25 PM View: Federal Trend Tests
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

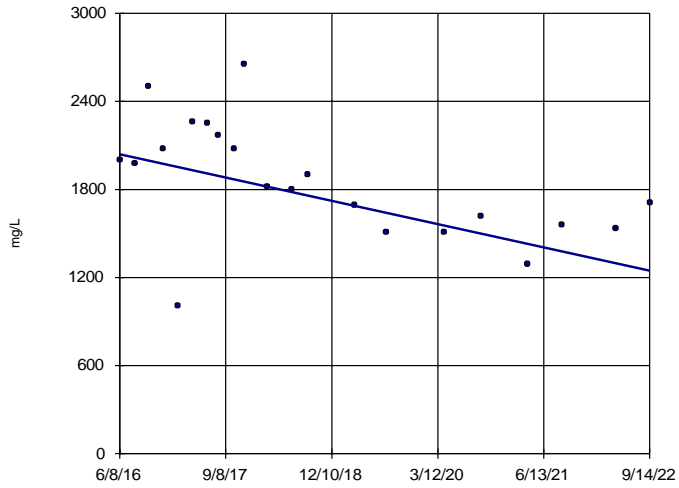
Sen's Slope Estimator

MW-08 (bg)



Sen's Slope Estimator

MW-14A

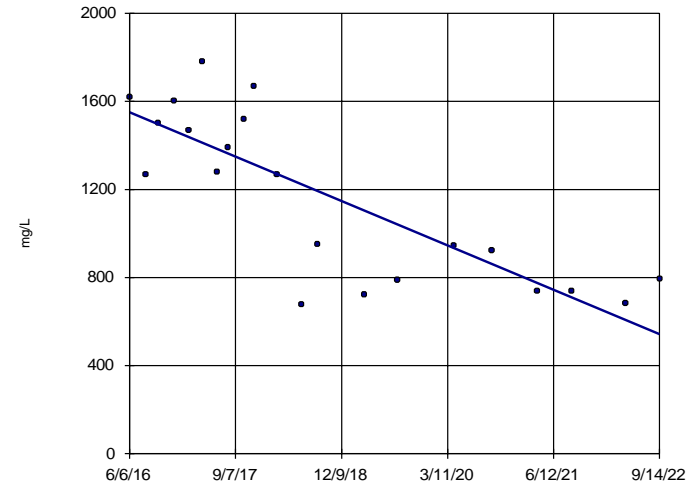


n = 21
 Slope = -126.7
 units per year.
 Mann-Kendall
 statistic = -.96
 critical = -.87
 Decreasing trend
 significant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Total Dissolved Solids Analysis Run 11/16/2022 1:25 PM View: Federal Trend Tests
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

MW-15A

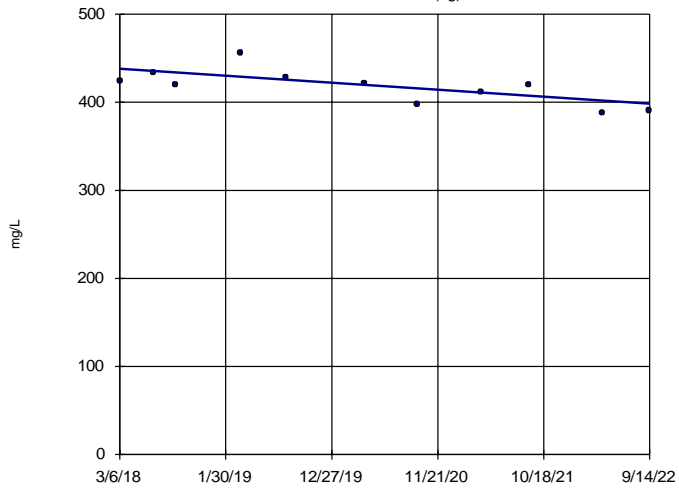


n = 21
 Slope = -160.3
 units per year.
 Mann-Kendall
 statistic = -1.17
 critical = -.87
 Decreasing trend
 significant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Total Dissolved Solids Analysis Run 11/16/2022 1:25 PM View: Federal Trend Tests
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

MW-22 (bg)

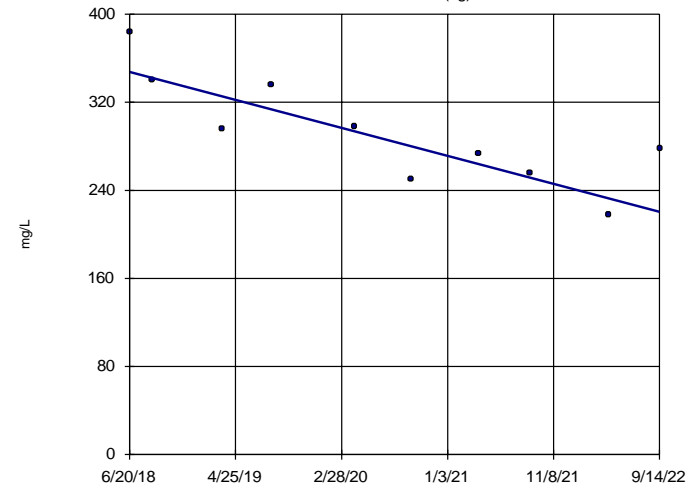


n = 11
 Slope = -8.725
 units per year.
 Mann-Kendall
 statistic = -.32
 critical = -.34
 Trend not sig-
 nificant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Total Dissolved Solids Analysis Run 11/16/2022 1:25 PM View: Federal Trend Tests
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator

MW-23 (bg)



n = 10
 Slope = -29.94
 units per year.
 Mann-Kendall
 statistic = -.29
 critical = -.30
 Trend not sig-
 nificant at 99%
 confidence level
 ($\alpha = 0.005$ per
 tail).

Constituent: Total Dissolved Solids Analysis Run 11/16/2022 1:25 PM View: Federal Trend Tests
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

FIGURE F.

Upper Tolerance Limit Summary Table

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/16/2022, 1:30 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.Bq	N	Bq Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony (mg/L)	n/a	0.002	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)
Arsenic (mg/L)	n/a	0.00784	n/a	n/a	n/a	n/a	59	n/a	n/a	61.02	n/a	n/a	0.04849	NP Inter(NDs)
Barium (mg/L)	n/a	0.247	n/a	n/a	n/a	n/a	59	n/a	n/a	0	n/a	n/a	0.04849	NP Inter(normality)
Beryllium (mg/L)	n/a	0.001	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)
Cadmium (mg/L)	n/a	0.0001	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)
Chromium (mg/L)	n/a	0.005	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)
Cobalt (mg/L)	n/a	0.00558	n/a	n/a	n/a	n/a	60	n/a	n/a	36.67	n/a	n/a	0.04607	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	n/a	1.151	n/a	n/a	n/a	n/a	45	0.4642	0.3284	0	None	No	0.05	Inter
Fluoride (mg/L)	n/a	0.864	n/a	n/a	n/a	n/a	60	n/a	n/a	86.67	n/a	n/a	0.04607	NP Inter(NDs)
Lead (mg/L)	n/a	0.00204	n/a	n/a	n/a	n/a	59	n/a	n/a	88.14	n/a	n/a	0.04849	NP Inter(NDs)
Lithium (mg/L)	n/a	0.01	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)
Mercury (mg/L)	n/a	0.0002	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)
Molybdenum (mg/L)	n/a	0.00822	n/a	n/a	n/a	n/a	61	n/a	n/a	65.57	n/a	n/a	0.04377	NP Inter(NDs)
Selenium (mg/L)	n/a	0.005	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)
Thallium (mg/L)	n/a	0.001	n/a	n/a	n/a	n/a	59	n/a	n/a	100	n/a	n/a	0.04849	NP Inter(NDs)

FIGURE G.

MUSCATINE POWER & WATER GWPS				
Constituent Name	MCL	CCR Rule-Specified	Background Limit	GWPS
Antimony, Total (mg/L)	0.006		0.002	0.006
Arsenic, Total (mg/L)	0.01		0.0078	0.01
Barium, Total (mg/L)	2		0.25	2
Beryllium, Total (mg/L)	0.004		0.001	0.004
Cadmium, Total (mg/L)	0.005		0.0001	0.005
Chromium, Total (mg/L)	0.1		0.005	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.0056	0.006
Combined Radium, Total (pCi/L)	5		1.15	5
Fluoride, Total (mg/L)	4		0.86	4
Lead, Total (mg/L)	0.015		0.002	0.015
Lithium, Total (mg/L)	n/a	0.04	0.01	0.04
Mercury, Total (mg/L)	0.002		0.0002	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.0082	0.1
Selenium, Total (mg/L)	0.05		0.005	0.05
Thallium, Total (mg/L)	0.002		0.001	0.002

**MCL = Maximum Contaminant Level*

**CCR = Coal Combustion Residual*

**GWPS = Groundwater Protection Standard*

FIGURE H.

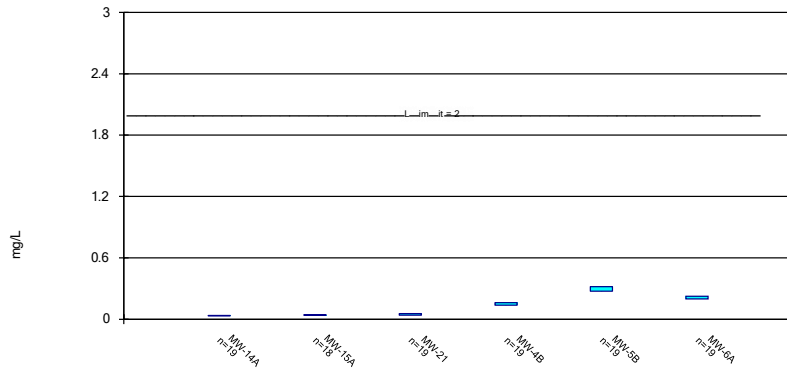
Confidence Intervals - All Results (No Significant)

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/16/2022, 1:39 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Barium (mg/L)	MW-14A	0.03698	0.0319	2	No	19	0.03444	0.004337	0	None	No	0.01	Param.
Barium (mg/L)	MW-15A	0.04081	0.03544	2	No	18	0.03813	0.004436	0	None	No	0.01	Param.
Barium (mg/L)	MW-21	0.05534	0.03941	2	No	19	0.04737	0.01361	0	None	No	0.01	Param.
Barium (mg/L)	MW-4B	0.1618	0.1354	2	No	19	0.1486	0.02256	0	None	No	0.01	Param.
Barium (mg/L)	MW-5B	0.3173	0.2744	2	No	19	0.2958	0.03663	0	None	No	0.01	Param.
Barium (mg/L)	MW-6A	0.2251	0.1979	2	No	19	0.2115	0.02323	0	None	No	0.01	Param.
Chromium (mg/L)	MW-21	0.006368	0.00551	0.1	No	19	0.005939	0.0007519	21.05	Kaplan-Meier	No	0.01	Param.
Cobalt (mg/L)	MW-4B	0.00135	0.0005	0.006	No	19	0.001014	0.001111	68.42	None	No	0.01	NP (NDs)
Combined Radium 226 + 228 (pCi/L)	MW-14A	0.4467	0.1507	5	No	15	0.2987	0.2185	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-15A	0.3481	0.1016	5	No	15	0.2248	0.1819	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-21	0.4916	0.1367	5	No	15	0.3142	0.2618	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-4B	0.7394	0.3807	5	No	15	0.5601	0.2647	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-5B	1.03	0.6533	5	No	15	0.8415	0.2776	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-6A	0.7871	0.4456	5	No	15	0.6163	0.252	0	None	No	0.01	Param.
Fluoride (mg/L)	MW-14A	0.684	0.5	4	No	19	0.529	0.09206	89.47	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-15A	0.516	0.5	4	No	19	0.5112	0.03021	78.95	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-21	0.768	0.5	4	No	20	0.5381	0.1227	90	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-4B	0.525	0.5	4	No	20	0.5381	0.09251	80	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-5B	0.627	0.5	4	No	20	0.6574	0.4654	85	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-6A	0.535	0.5	4	No	20	0.6706	0.4463	75	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-21	0.000633	0.0005	0.015	No	19	0.000507	0.00003051	94.74	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-4B	0.000532	0.0005	0.015	No	18	0.0005018	0.000007542	94.44	None	No	0.01	NP (NDs)
Lithium (mg/L)	MW-21	0.0225	0.01	0.04	No	19	0.01556	0.006605	52.63	None	No	0.01	NP (NDs)
Mercury (mg/L)	MW-5B	0.000813	0.0002	0.002	No	19	0.0002323	0.0001406	94.74	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-21	0.00383	0.002	0.1	No	19	0.002096	0.0004198	94.74	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-4B	0.00296	0.002	0.1	No	19	0.002051	0.0002202	94.74	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-5B	0.00212	0.002	0.1	No	19	0.002006	0.00002753	94.74	None	No	0.01	NP (NDs)
Selenium (mg/L)	MW-14A	0.00823	0.005	0.05	No	19	0.006565	0.001494	42.11	None	No	0.01	NP (normality)
Selenium (mg/L)	MW-15A	0.00502	0.005	0.05	No	19	0.005001	0.000004588	94.74	None	No	0.01	NP (NDs)
Selenium (mg/L)	MW-21	0.01055	0.00681	0.05	No	19	0.008678	0.003277	21.05	Kaplan-Meier	No	0.01	Param.

Parametric Confidence Interval

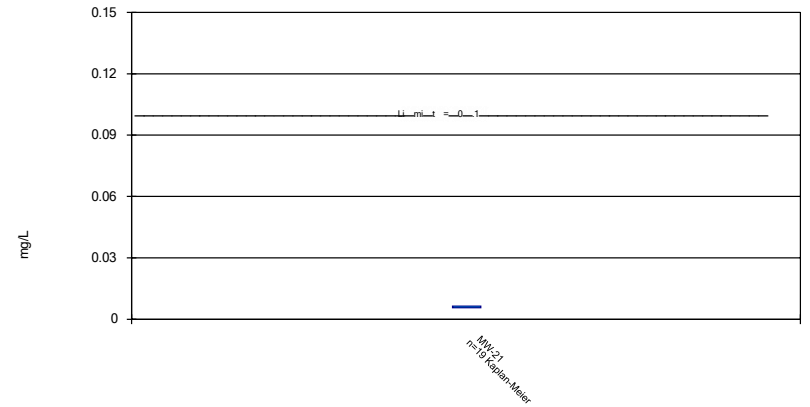
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium Analysis Run 11/16/2022 1:36 PM View: Federal Confidence Intervals
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Parametric Confidence Interval

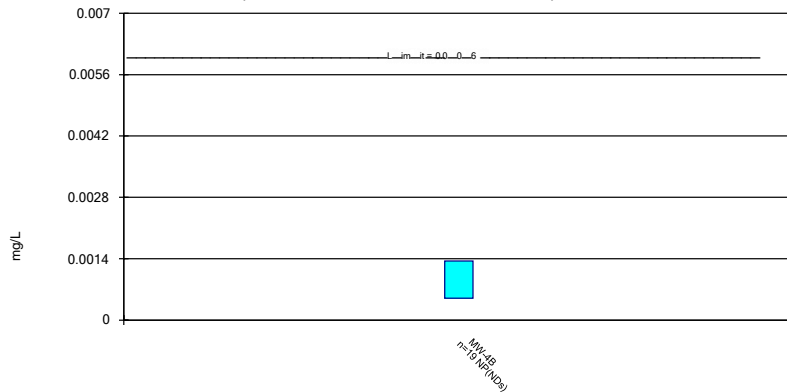
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium Analysis Run 11/16/2022 1:36 PM View: Federal Confidence Intervals
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Non-Parametric Confidence Interval

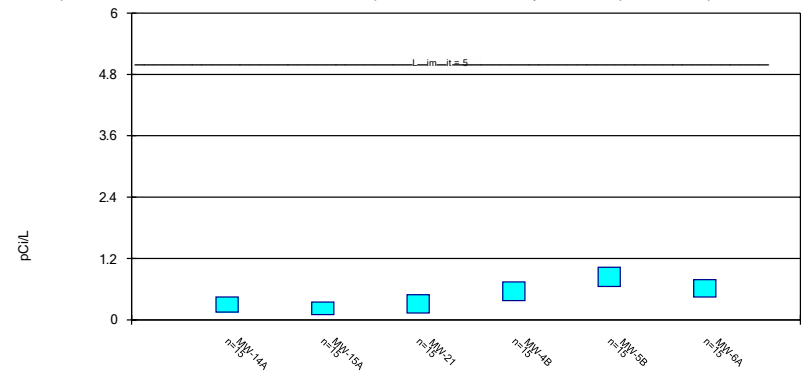
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Cobalt Analysis Run 11/16/2022 1:36 PM View: Federal Confidence Intervals
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Parametric Confidence Interval

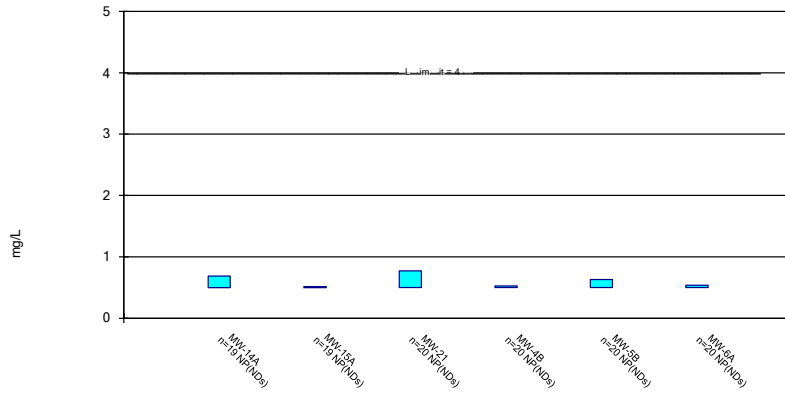
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 11/16/2022 1:36 PM View: Federal Confidence Intervals
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Non-Parametric Confidence Interval

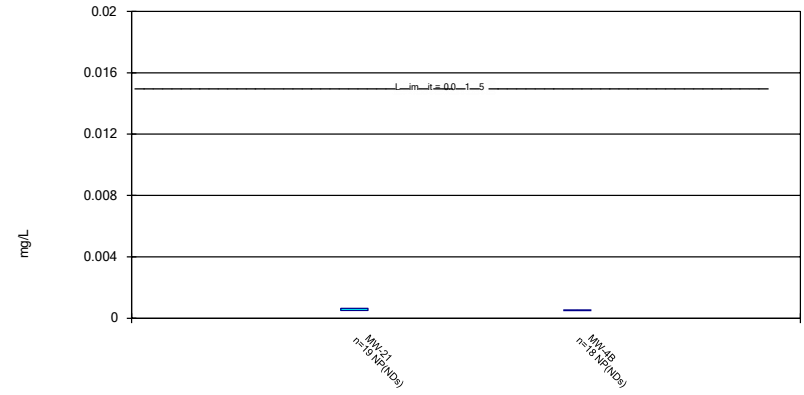
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Fluoride Analysis Run 11/16/2022 1:36 PM View: Federal Confidence Intervals
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Non-Parametric Confidence Interval

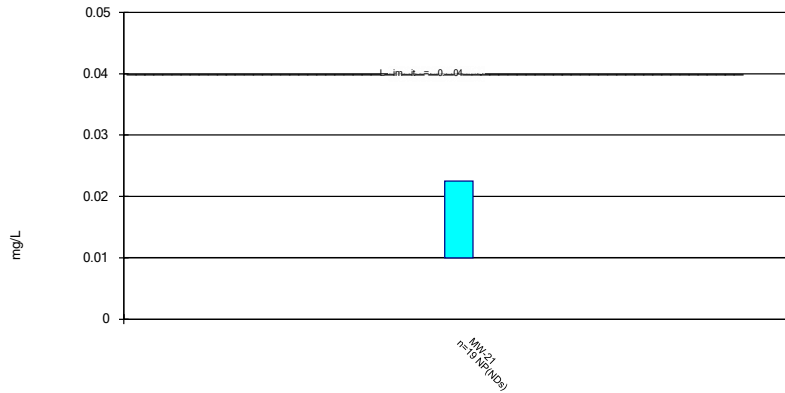
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead Analysis Run 11/16/2022 1:36 PM View: Federal Confidence Intervals
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Non-Parametric Confidence Interval

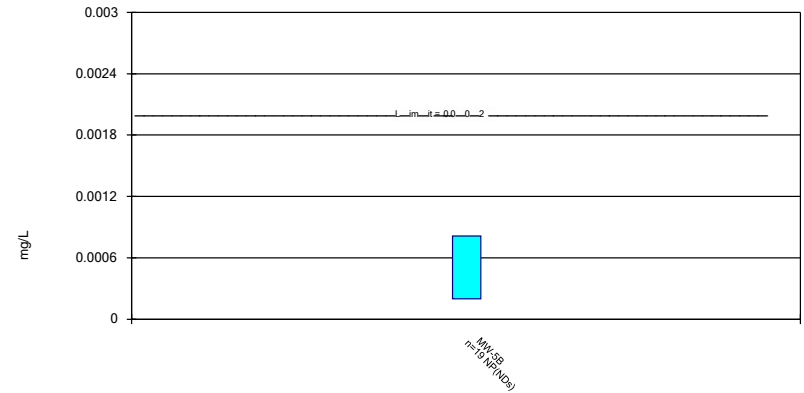
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lithium Analysis Run 11/16/2022 1:36 PM View: Federal Confidence Intervals
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Non-Parametric Confidence Interval

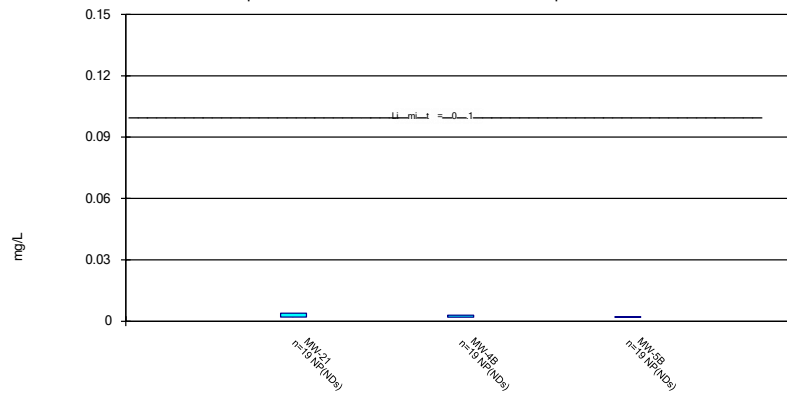
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Mercury Analysis Run 11/16/2022 1:36 PM View: Federal Confidence Intervals
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Non-Parametric Confidence Interval

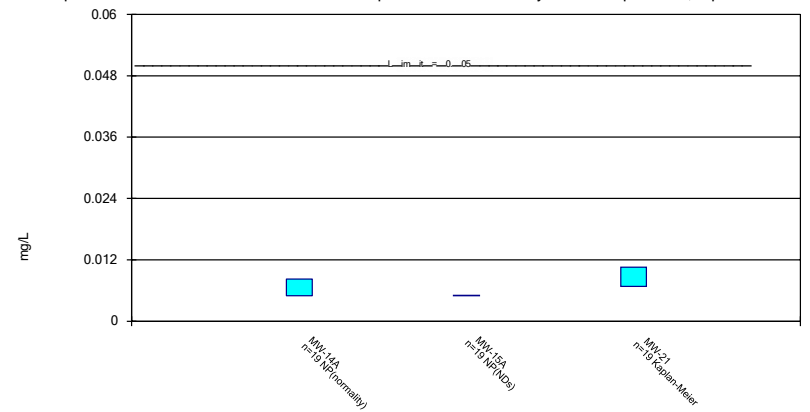
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Molybdenum Analysis Run 11/16/2022 1:36 PM View: Federal Confidence Intervals
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium Analysis Run 11/16/2022 1:36 PM View: Federal Confidence Intervals
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Confidence Interval

Constituent: Barium (mg/L) Analysis Run 11/16/2022 1:39 PM View: Federal Confidence Intervals

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-14A	MW-15A	MW-21	MW-4B	MW-5B	MW-6A
6/6/2016		2.13 (o)				
6/7/2016				0.15	0.331	0.209
6/8/2016	0.0443		0.0573			
8/15/2016	0.0402	0.044	0.0482			
8/16/2016				0.128	0.295	0.199
10/10/2016			0.0606			
10/11/2016	0.0391	0.0426		0.131	0.304	0.196
12/12/2016			0.056	0.139	0.315	0.216
12/14/2016	0.0383	0.0406				
2/17/2017	0.0306	0.0402		0.143		
2/21/2017			0.0735		0.316	0.197
4/17/2017	0.0341	0.0364		0.111	0.296	0.152
4/18/2017			0.0356			
6/20/2017			0.0461	0.133	0.31	
6/21/2017	0.0338	0.0327				0.197
8/7/2017				0.133		
8/8/2017	0.031	0.0338	0.0499		0.3	0.19
3/6/2018			0.0148	0.117	0.341	0.206
3/7/2018	0.0285	0.0352				
6/19/2018			0.0515			
6/20/2018	0.0314	0.0338				
6/21/2018				0.144	0.336	0.222
8/28/2018			0.0622	0.149		
8/29/2018	0.0344	0.0335			0.357	0.206
3/19/2019				0.161	0.326	0.2
3/20/2019	0.0328	0.037	0.0511			
8/7/2019	0.0398	0.047	0.0624	0.147	0.301	0.211
4/7/2020	0.0266	0.0389	0.0352	0.156	0.25	0.216
9/18/2020	0.0328	0.0416	0.0407	0.147	0.239	0.231
4/5/2021	0.0355	0.0365	0.0309	0.169	0.252	0.245
9/1/2021	0.0345	0.0355	0.0434	0.186	0.241	0.248
4/20/2022	0.0327	0.0443	0.036	0.191	0.258	0.249
9/14/2022	0.034	0.0327	0.0447	0.188	0.253	0.229
Mean	0.03444	0.03813	0.04737	0.1486	0.2958	0.2115
Std. Dev.	0.004337	0.004436	0.01361	0.02256	0.03663	0.02323
Upper Lim.	0.03698	0.04081	0.05534	0.1618	0.3173	0.2251
Lower Lim.	0.0319	0.03544	0.03941	0.1354	0.2744	0.1979

Confidence Interval

Constituent: Chromium (mg/L) Analysis Run 11/16/2022 1:39 PM View: Federal Confidence Intervals

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-21
6/8/2016	0.00694
8/15/2016	0.00538
10/10/2016	0.00582
12/12/2016	0.00561
2/21/2017	<0.005
4/18/2017	<0.005
6/20/2017	0.00586
8/8/2017	0.00572
3/6/2018	<0.005
6/19/2018	0.00726
8/28/2018	<0.005
3/20/2019	0.00647
8/7/2019	0.00637
4/7/2020	0.00644
9/18/2020	0.00589
4/5/2021	0.00708
9/1/2021	0.00659
4/20/2022	0.00636
9/14/2022	0.00505
Mean	0.005939
Std. Dev.	0.0007519
Upper Lim.	0.006368
Lower Lim.	0.00551

Confidence Interval

Constituent: Cobalt (mg/L) Analysis Run 11/16/2022 1:39 PM View: Federal Confidence Intervals

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-4B
6/7/2016	0.000681
8/16/2016	<0.0005
10/11/2016	<0.0005
12/12/2016	<0.0005
2/17/2017	<0.0005
4/17/2017	<0.0005
6/20/2017	<0.0005
8/7/2017	<0.0005
3/6/2018	<0.0005
6/21/2018	<0.0005
8/28/2018	<0.0005
3/19/2019	<0.0005
8/7/2019	<0.0005
4/7/2020	<0.0005
9/18/2020	0.00147
4/5/2021	0.00132
9/1/2021	0.00335
4/20/2022	0.00135
9/14/2022	0.00459
Mean	0.001014
Std. Dev.	0.001111
Upper Lim.	0.00135
Lower Lim.	0.0005

Confidence Interval

Constituent: Combined Radium 226 + 228 (pCi/L) Analysis Run 11/16/2022 1:39 PM View: Federal Confidence Intervals

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-14A	MW-15A	MW-21	MW-4B	MW-5B	MW-6A
6/6/2016		0.31 (U)				
6/7/2016				0.711 (U)	0.665	0.405
6/8/2016	0.145 (U)		0.253 (U)			
8/15/2016	0.202 (U)	0.251 (U)	0.159 (U)			
8/16/2016				0.938 (U)	0.854	0.876
10/10/2016			0.817			
10/11/2016	0.523	0.286 (U)		0.674	0.428 (U)	0.512
12/12/2016			0.306 (U)	0.672	1.05	0.894
12/14/2016	0.26 (U)	0.251 (U)				
2/17/2017	0.293 (U)	0.103 (U)		0.528		
2/21/2017			-0.000573 (U)		0.85	0.314 (U)
4/17/2017	0.48	0.0966 (U)		0.309 (U)	1.02	0.298 (U)
4/18/2017			0.0953 (U)			
6/20/2017			0.545	0.368	0.973	
6/21/2017	0.0131 (U)	0.221 (U)				0.44
8/7/2017				0.443		
8/8/2017	0.456	0.244 (U)	0.814		0.507	0.333 (U)
3/6/2018			0.358	0.45	0.959	0.618
3/7/2018	0.258 (U)	0.123 (U)				
3/19/2019				0.436	0.568	0.481
3/20/2019	0.0223 (U)	0.391 (U)	0.287 (U)			
4/7/2020	0.397 (U)	0.645	0.305 (U)	0.354 (U)	1.2	0.787
4/5/2021	0.614	0.219 (U)	0.182 (U)	0.0519 (U)	0.982	0.667
9/1/2021	0.684	0.362 (U)	0.499	1.08	1.29	1.12
4/20/2022	0.0486 (U)	0.0289 (U)	0.171 (U)	0.55 (U)	0.913	0.901
9/14/2022	0.0843 (U)	-0.159 (U)	-0.0783 (U)	0.836	0.363 (U)	0.599
Mean	0.2987	0.2248	0.3142	0.5601	0.8415	0.6163
Std. Dev.	0.2185	0.1819	0.2618	0.2647	0.2776	0.252
Upper Lim.	0.4467	0.3481	0.4916	0.7394	1.03	0.7871
Lower Lim.	0.1507	0.1016	0.1367	0.3807	0.6533	0.4456

Confidence Interval

Constituent: Fluoride (mg/L) Analysis Run 11/16/2022 1:39 PM View: Federal Confidence Intervals

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-14A	MW-15A	MW-21	MW-4B	MW-5B	MW-6A
6/6/2016		<0.5				
6/7/2016				<0.5	<0.5	<0.5
6/8/2016	<0.5		<0.5			
8/15/2016	<0.5	0.549	<0.5			
8/16/2016				<0.5	<0.5	<0.5
10/10/2016			<0.5			
10/11/2016	0.867	<0.5		<0.5	<0.5	<0.5
12/12/2016			<0.5	<0.5	1.88	2.02
12/14/2016	<0.5	<0.5				
2/17/2017	<0.5	<0.5		0.664		
2/21/2017			0.993		2.14	1.89
4/17/2017	1.93 (o)	6.7 (o)		0.801	0.627	0.814
4/18/2017			0.768			
6/20/2017			<0.5	<0.5	<0.5	
6/21/2017	<0.5	<0.5				<0.5
8/7/2017				<0.5		
8/8/2017	<0.5	<0.5	<0.5		<0.5	<0.5
10/16/2017			<0.5	<0.5		
10/17/2017	<0.5	<0.5			<0.5	<0.5
3/6/2018			<0.5	<0.5	<0.5	<0.5
3/7/2018	<0.5	<0.5				
6/19/2018			<0.5			
6/20/2018	0.684	<0.5				
6/21/2018				<0.5	<0.5	<0.5
8/28/2018			<0.5	<0.5		
8/29/2018	<0.5	<0.5			<0.5	<0.5
3/19/2019				0.771	<0.5	<0.5
3/20/2019	<0.5	0.523	<0.5			
8/7/2019	<0.5	0.625	<0.5	0.525	<0.5	0.535
4/7/2020	<0.5	<0.5	<0.5	<0.5	<0.5	0.652
9/18/2020	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4/5/2021	<0.5	0.516	<0.5	<0.5	<0.5	<0.5
9/1/2021	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4/20/2022	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
9/14/2022	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Mean	0.529	0.5112	0.5381	0.5381	0.6574	0.6706
Std. Dev.	0.09206	0.03021	0.1227	0.09251	0.4654	0.4463
Upper Lim.	0.684	0.516	0.768	0.525	0.627	0.535
Lower Lim.	0.5	0.5	0.5	0.5	0.5	0.5

Confidence Interval

Constituent: Lead (mg/L) Analysis Run 11/16/2022 1:39 PM View: Federal Confidence Intervals

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-21	MW-4B
6/7/2016		0.00147 (o)
6/8/2016	<0.0005	
8/15/2016	<0.0005	
8/16/2016		<0.0005
10/10/2016	<0.0005	
10/11/2016		<0.0005
12/12/2016	<0.0005	<0.0005
2/17/2017		<0.0005
2/21/2017	<0.0005	
4/17/2017		<0.0005
4/18/2017	<0.0005	
6/20/2017	<0.0005	<0.0005
8/7/2017		<0.0005
8/8/2017	<0.0005	
3/6/2018	<0.0005	<0.0005
6/19/2018	0.000633	
6/21/2018		<0.0005
8/28/2018	<0.0005	<0.0005
3/19/2019		<0.0005
3/20/2019	<0.0005	
8/7/2019	<0.0005	<0.0005
4/7/2020	<0.0005	<0.0005
9/18/2020	<0.0005	0.000532
4/5/2021	<0.0005	<0.0005
9/1/2021	<0.0005	<0.0005
4/20/2022	<0.0005	<0.0005
9/14/2022	<0.0005	<0.0005
Mean	0.000507	0.0005018
Std. Dev.	3.051E-05	7.542E-06
Upper Lim.	0.000633	0.000532
Lower Lim.	0.0005	0.0005

Confidence Interval

Constituent: Lithium (mg/L) Analysis Run 11/16/2022 1:39 PM View: Federal Confidence Intervals

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-21
6/8/2016	<0.01
8/15/2016	<0.01
10/10/2016	<0.01
12/12/2016	<0.01
2/21/2017	<0.01
4/18/2017	<0.01
6/20/2017	<0.01
8/8/2017	<0.01
3/6/2018	<0.01
6/19/2018	0.0189
8/28/2018	<0.01
3/20/2019	0.0277
8/7/2019	0.0279
4/7/2020	0.0213
9/18/2020	0.0225
4/5/2021	0.0198
9/1/2021	0.0233
4/20/2022	0.0162
9/14/2022	0.018
Mean	0.01556
Std. Dev.	0.006605
Upper Lim.	0.0225
Lower Lim.	0.01

Confidence Interval

Constituent: Mercury (mg/L) Analysis Run 11/16/2022 1:39 PM View: Federal Confidence Intervals

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-5B
6/7/2016	<0.0002
8/16/2016	<0.0002
10/11/2016	<0.0002
12/12/2016	<0.0002
2/21/2017	<0.0002
4/17/2017	<0.0002
6/20/2017	<0.0002
8/8/2017	<0.0002
3/6/2018	<0.0002
6/21/2018	<0.0002
8/29/2018	<0.0002
3/19/2019	<0.0002
8/7/2019	<0.0002
4/7/2020	<0.0002
9/18/2020	<0.0002
4/5/2021	<0.0002
9/1/2021	<0.0002
4/20/2022	<0.0002
9/14/2022	0.000813
Mean	0.0002323
Std. Dev.	0.0001406
Upper Lim.	0.000813
Lower Lim.	0.0002

Confidence Interval

Constituent: Molybdenum (mg/L) Analysis Run 11/16/2022 1:39 PM View: Federal Confidence Intervals

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-21	MW-4B	MW-5B
6/7/2016		<0.002	<0.002
6/8/2016	<0.002		
8/15/2016	<0.002		
8/16/2016		<0.002	<0.002
10/10/2016	<0.002		
10/11/2016		<0.002	<0.002
12/12/2016	<0.002	<0.002	<0.002
2/17/2017		<0.002	
2/21/2017	<0.002		<0.002
4/17/2017		<0.002	<0.002
4/18/2017	<0.002		
6/20/2017	<0.002	<0.002	<0.002
8/7/2017		<0.002	
8/8/2017	<0.002		<0.002
3/6/2018	<0.002	<0.002	<0.002
6/19/2018	0.00383		
6/21/2018		<0.002	<0.002
8/28/2018	<0.002	<0.002	
8/29/2018			<0.002
3/19/2019		<0.002	0.00212
3/20/2019	<0.002		
8/7/2019	<0.002	<0.002	<0.002
4/7/2020	<0.002	<0.002	<0.002
9/18/2020	<0.002	0.00296	<0.002
4/5/2021	<0.002	<0.002	<0.002
9/1/2021	<0.002	<0.002	<0.002
4/20/2022	<0.002	<0.002	<0.002
9/14/2022	<0.002	<0.002	<0.002
Mean	0.002096	0.002051	0.002006
Std. Dev.	0.0004198	0.0002202	2.753E-05
Upper Lim.	0.00383	0.00296	0.00212
Lower Lim.	0.002	0.002	0.002

Confidence Interval

Constituent: Selenium (mg/L) Analysis Run 11/16/2022 1:39 PM View: Federal Confidence Intervals

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-14A	MW-15A	MW-21
6/6/2016		<0.005	
6/8/2016	0.0071		0.0165
8/15/2016	0.00811	<0.005	0.0103
10/10/2016			0.0137
10/11/2016	0.00821	<0.005	
12/12/2016			0.0119
12/14/2016	0.00834	<0.005	
2/17/2017	0.00752	<0.005	
2/21/2017			0.0074
4/17/2017	0.00823	<0.005	
4/18/2017			0.00674
6/20/2017			0.0106
6/21/2017	0.00829	<0.005	
8/8/2017	0.00759	<0.005	0.0109
3/6/2018			<0.005
3/7/2018	<0.005	0.00502	
6/19/2018			0.00939
6/20/2018	0.00739	<0.005	
8/28/2018			<0.005
8/29/2018	0.00827	<0.005	
3/20/2019	0.00569	<0.005	0.0102
8/7/2019	<0.005	<0.005	0.0108
4/7/2020	<0.005	<0.005	0.00632
9/18/2020	<0.005	<0.005	0.00762
4/5/2021	<0.005	<0.005	<0.005
9/1/2021	<0.005	<0.005	0.00617
4/20/2022	<0.005	<0.005	0.00634
9/14/2022	<0.005	<0.005	<0.005
Mean	0.006565	0.005001	0.008678
Std. Dev.	0.001494	4.588E-06	0.003277
Upper Lim.	0.00823	0.00502	0.01055
Lower Lim.	0.005	0.005	0.00681

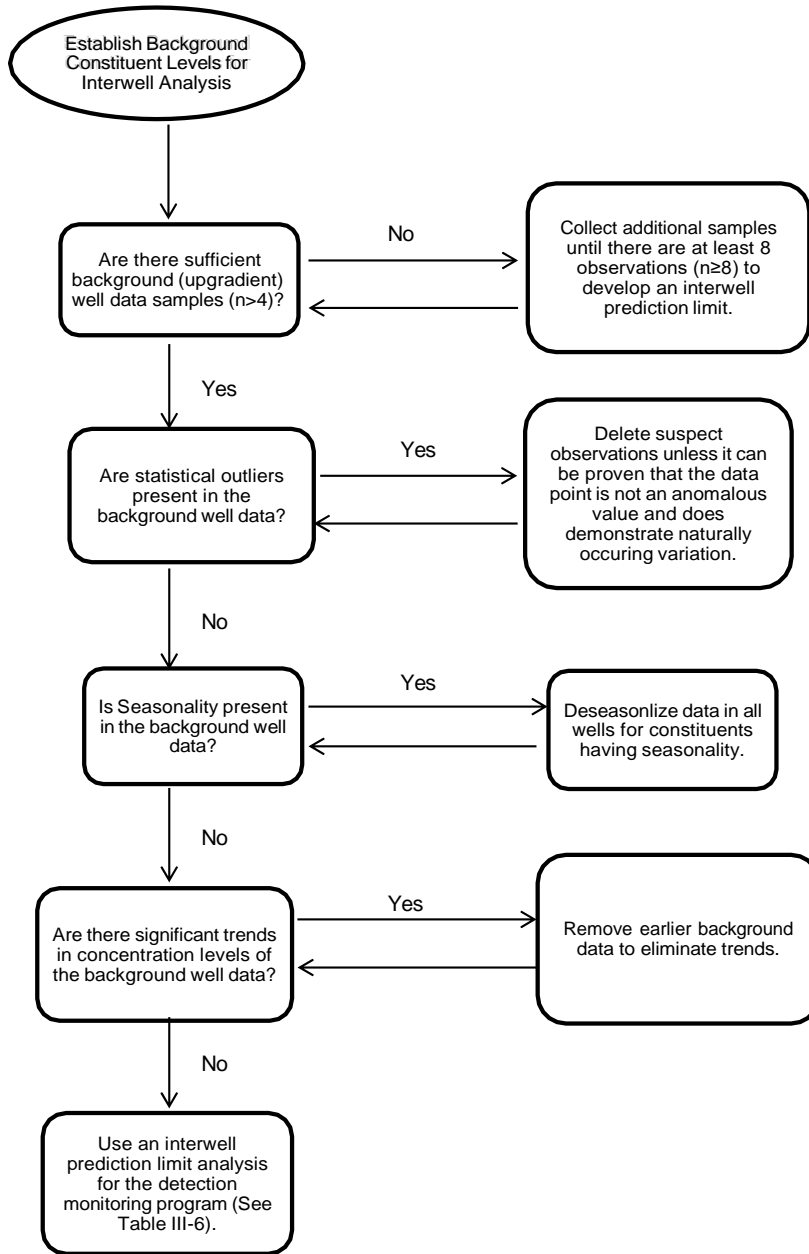


Table III-4: Methodology to Screen Background Data for Interwell Limits and Establish Background Constituent Levels

From: *Groundwater Monitoring System and Sampling and Analysis Program, CCR Landfill* (HR Green, May 2017).

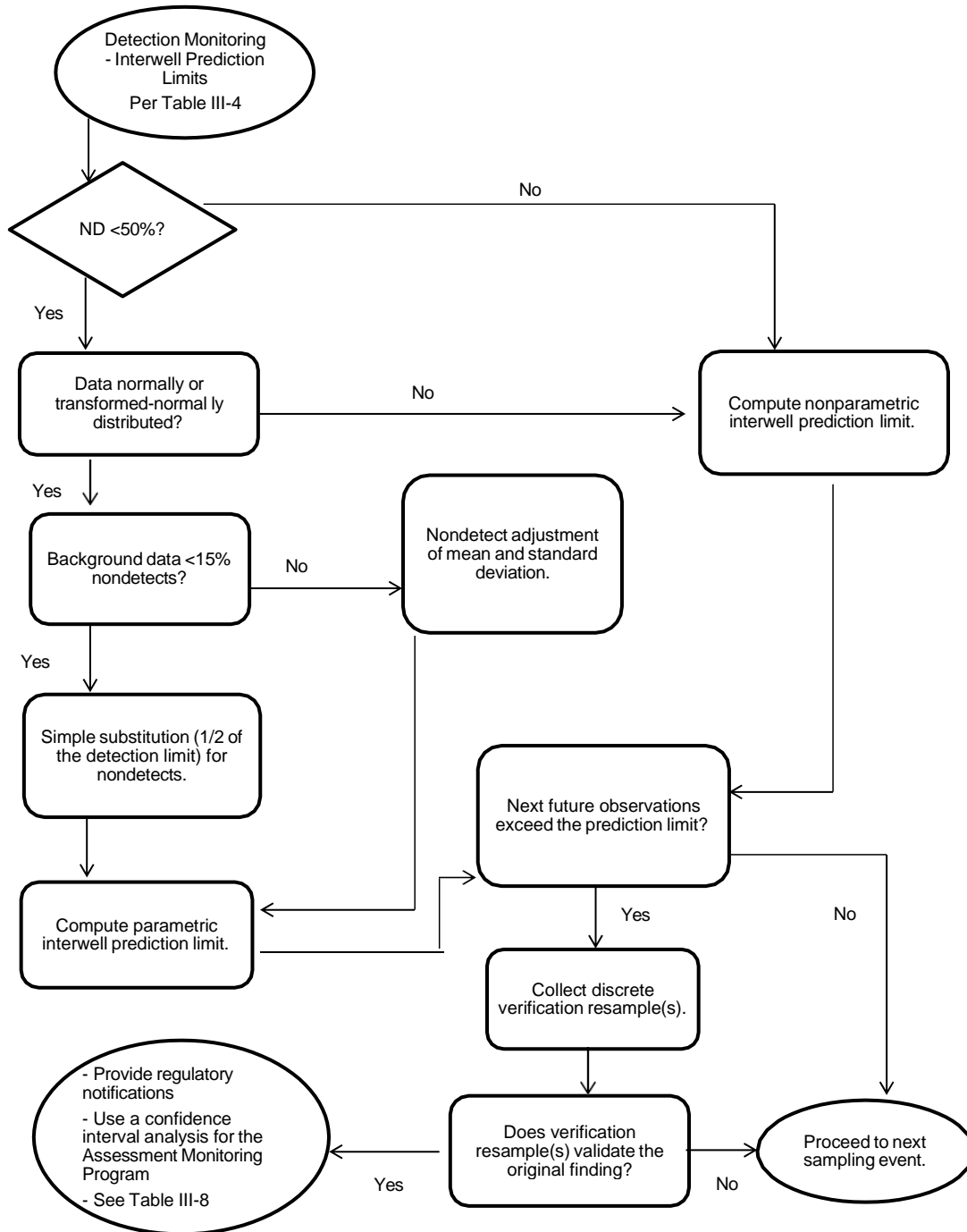


Table III-6: Methodology for Detection Monitoring - Computing Interwell Prediction Limits

From: *Groundwater Monitoring System and Sampling and Analysis Program, CCR Landfill* (HR Green, May 2017).

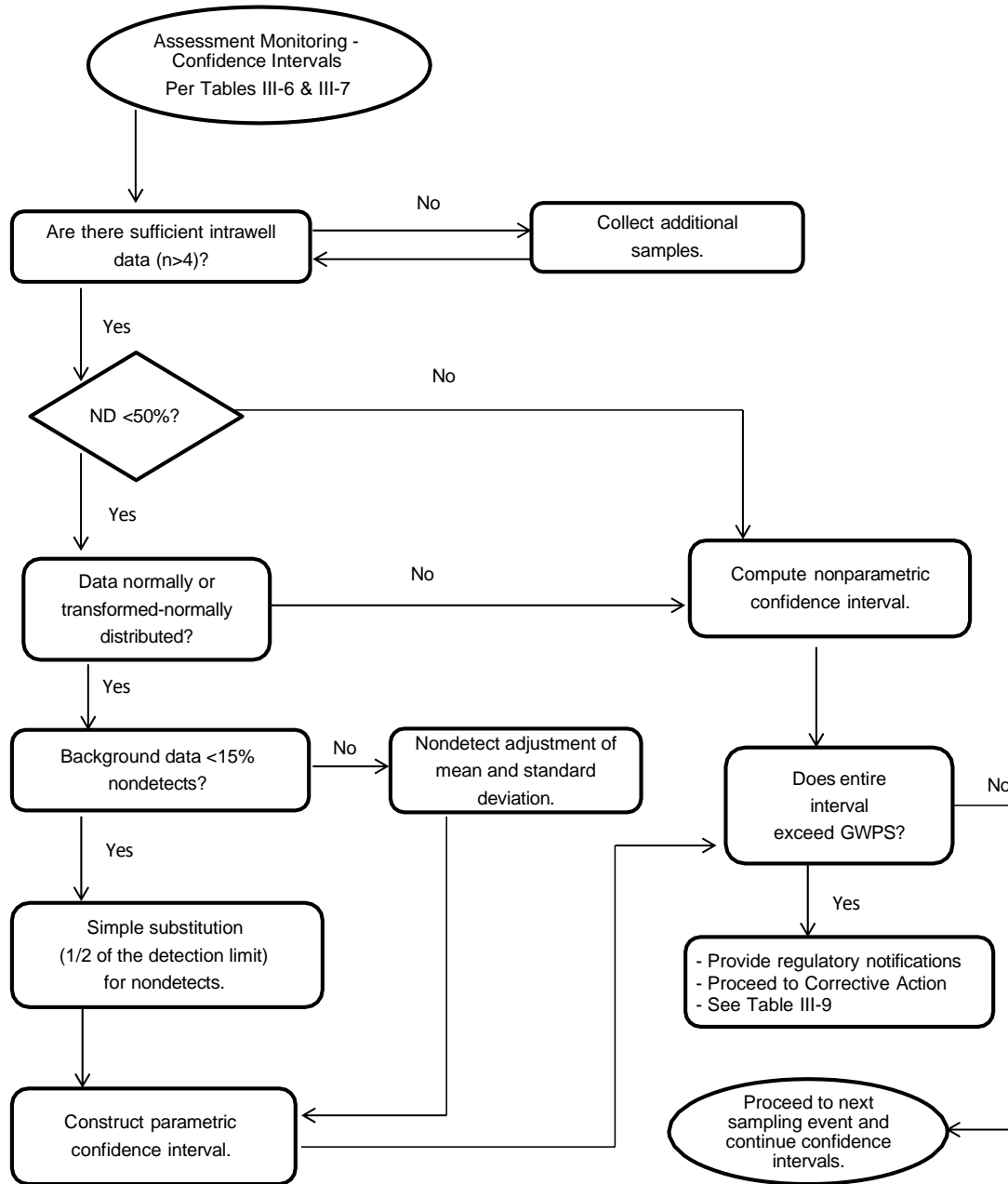


Table III-8: Methodology for Assessment Monitoring – Constructing Confidence Intervals

From: *Groundwater Monitoring System and Sampling and Analysis Program, CCR Landfill* (HR Green, May 2017).

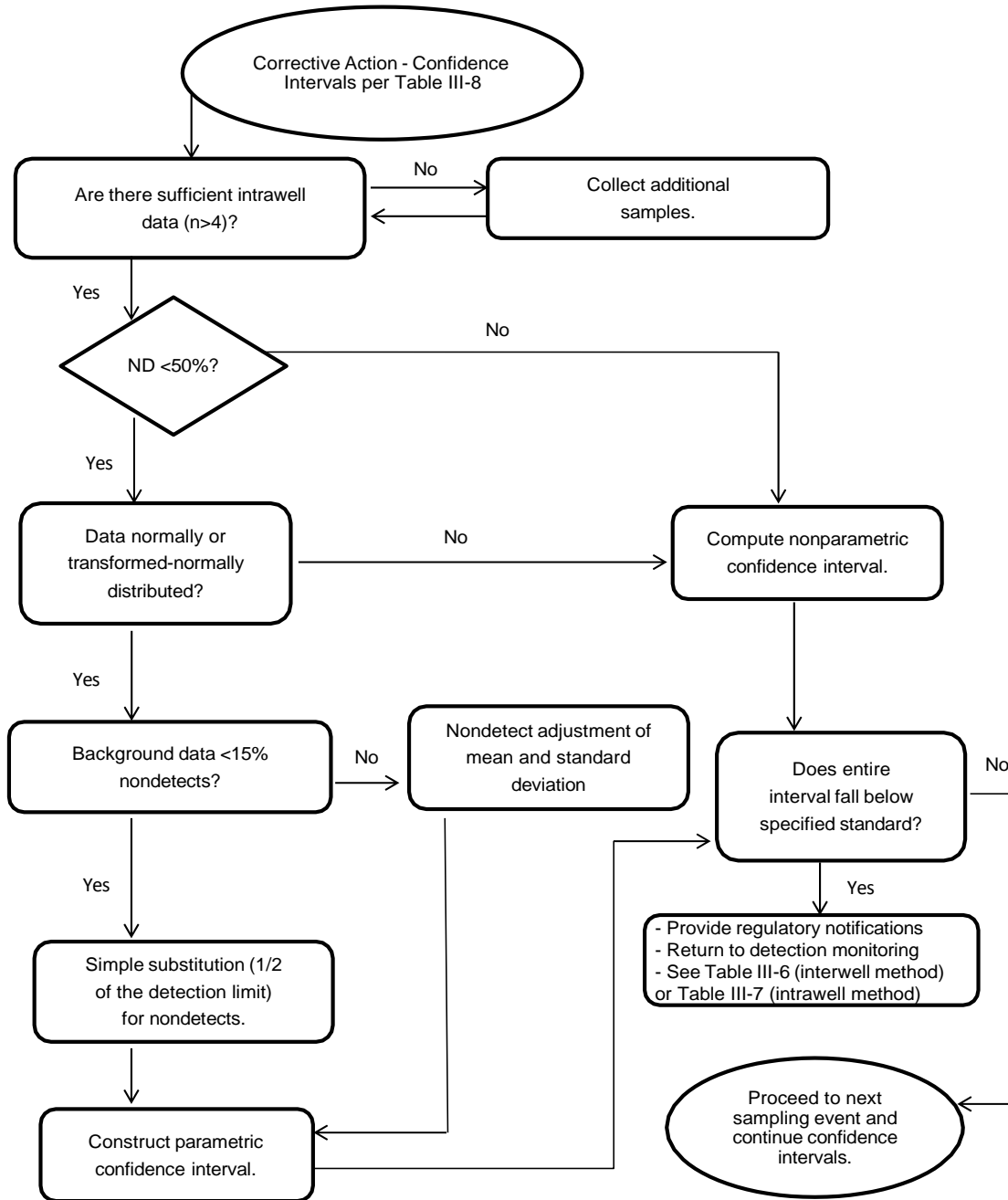


Table III-9: Methodology for Corrective Action

From: *Groundwater Monitoring System and Sampling and Analysis Program, CCR Landfill* (HR Green, May 2017).