

**2020 ANNUAL GROUNDWATER MONITORING  
AND CORRECTIVE ACTION REPORT**

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

**MUSCATINE POWER & WATER  
MUSCATINE, IOWA**

**January 2021**

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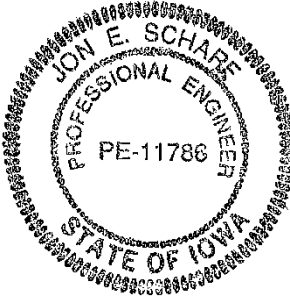

**CERTIFICATION**

**2020 ANNUAL GROUNDWATER MONITORING  
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**CCR LANDFILL  
Permit No. #70-SDP-06-82P**

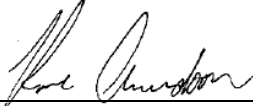
**MUSCATINE POWER & WATER  
MUSCATINE, IOWA**

**January 2021**

	<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> Date: 1/29/2021</p> <p>_____ Jon E. Scharf, P.E. License No. 11786 My renewal date is <b>December 31, 2021</b></p> <p>Pages or sheets covered by this seal: <b>ENTIRE DOCUMENT</b></p> <p>_____</p>

**Prepared By:**

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Signature: 

Date: 1/29/2021

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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 2020.

### 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 2020: 5.2 acres (Phase I & II)
- Current Temporary Covered Area 2020: 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).

Changes in the monitoring system program that occurred during this 2020 reporting period are summarized as follows:

- Monitoring well MW-23 was added as a background well and incorporated into the statistical analysis and interpretations herein.
- Prior to fall sampling MW-4A was damaged, abandoned, and replaced with MW-4B.

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 are part of the State of Iowa CCR rule [567] IAC Chapter 103 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). 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 2020, including 15 events used to establish background quality, the first detection (compliance) event, a resampling event, and the assessment monitoring events in 2020.

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 13, 2020 incorporates data collected through 2020 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.

Year 2018

Assessment monitoring commenced in 2018 with the analysis of Appendix III & IV constituents. The events were conducted March 6, June 19, and August 28, 2018. 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 2019

For additional assessment monitoring, Appendix III & IV constituents were tested during 2019. The events were conducted March 18 and August 6, 2019. These events are intended to satisfy the requirements of both the initial scan and the semi-annual and assessment monitoring requirements.

Year 2020

Additional assessment monitoring and background collection was completed in 2020 for Appendix III & IV constituents. The events were conducted April 7 and September 18, 2020. These events are intended to satisfy the requirements of both the initial scan and the semi-annual and assessment monitoring requirements.<sup>1</sup>

Assessment monitoring continued during the 2020 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					
Barium	X	X	X	X	X	X	X	X	X	X
Chromium								X		
Cobalt				X	X					
Fluoride			X	X						
Lithium								X		
Molybdenum					X				X	
Selenium								X		
Combined Radium 226+226	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,

<sup>1</sup> 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.



- (5) Statistically significant level (SSL) over a groundwater protection standard (GWPS), and
- (6) Upcoming sampling dates and constituents (as best as can be determined at this point in time).

The information shown in Table 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 2020, the facility is required to continue in assessment monitoring in 2021, 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)<sup>2</sup>. 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, these 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, 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-21). These are areas where CCR has been historically deposited and/or accumulated. All impacted wells are within 50 feet of a waste fill perimeter or accumulation/deposition area.

Statistical analysis indicates that the concentrations of multiple constituents remain above background limits (see SSI on Table 3), however, during 2020 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 must continue in assessment monitoring.

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<sup>2</sup> 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  $1 \times 10^{-7}$  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  $1.7 \times 10^{-4}$  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 discharge (upward) in the lowland area along the drainage way in the northeast corner of the site (MW-10/11) (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 January 31).

### 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. In addition, MP&W received authorization from the IDNR Water Quality Section to allow leachate from the leachate collection system to flow to the sediment runoff pond from which the water is intermittently siphoned/pumped to the Farm Pond. 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 4, 2019. Summary of statistical analysis used to establish baseline water quality, SSI and SSL. Includes the analysis of 46 sample events conducted from June 2016 through August 2019.

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, 2020. Annual Inspection Report, Muscatine Power & Water, CCR Landfill.

HR Green, December 19, 2020. 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, 2016. 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



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

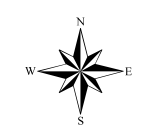
Figure 2  
SITE MAP

CCR Landfill  
Muscatine Power and Water

**Legend**

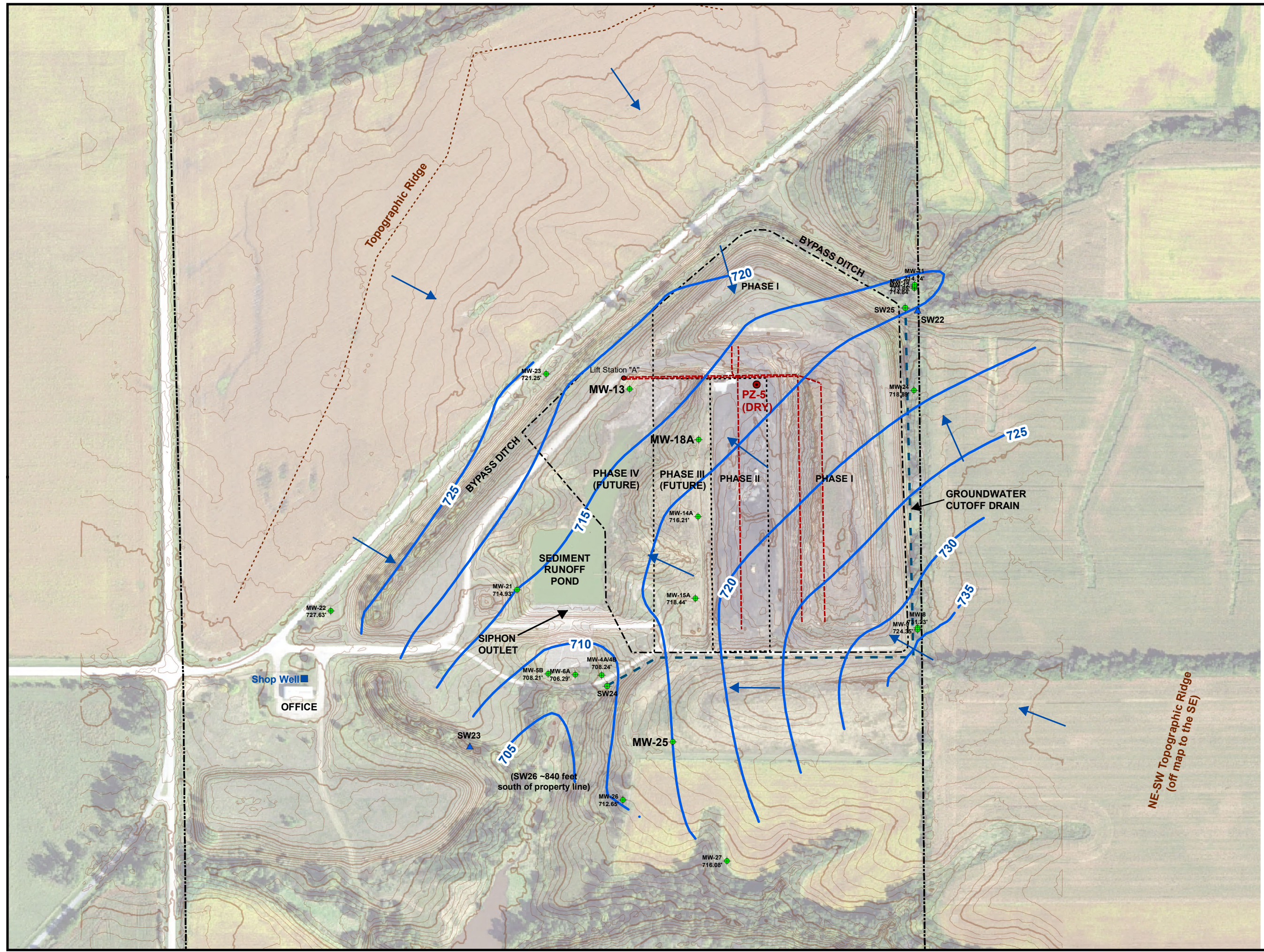
- ▲ Surface Water Points
- ◆ Groundwater Points
- Piezometers (Head, in feet)
- Shop Well
- Water Table (09/24/20)
- - - Leachate Collection System
- - - Groundwater Cut-Off Drain
- ▭ Permitted Fill Area
- ⋯ Phase Boundaries
- ▭ Property Line (Approx.)
- ← Groundwater Flow Direction

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



0 320 Feet

Projected Coordinate System:  
NAD 1983 StatePlane Iowa\_South





## **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)

**Table 1**

**Summary of Monitoring Wells and Piezometers  
2020 Groundwater Monitoring and Corrective Action Report  
Muscatine Power & Water CCR Landfill  
Permit No. #70-SDP-06-82P**

Well ID	State Plane <sup>(1)</sup>		WELL CONSTRUCTION <sup>(2)</sup>					Function	Hydrogeologic Unit	WATER LEVELS (Feet, amsl) <sup>(3)</sup>				
			Elevation		Well Depth	Screen Length	Screened Lithology			Low	High	Vertical Gradient 9/2020 <sup>(4)</sup>	4/7/2020	9/24/2020
			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-4A <sup>(5)</sup>	510,481	2,268,964	713.45	711.18	24.55	10	Clay, Silt	Monitoring	Uppermost Aquifer	705.73	710.01	N/A	708.89	N/A
MW-4B <sup>(5)</sup>	510,484	2,268,975	715.87	712.04	24.70	10	Clay, Silt	Monitoring	Uppermost Aquifer	705.73	710.01	N/A	N/A	708.24
MW-5B	510,485	2,268,777	709.10	706.73	25.30	10	Silt, Clay	Monitoring	Uppermost Aquifer	704.07	708.21	N/A	707.80	708.21
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	706.52	706.29
MW-8	510,639	2,270,068	747.36	744.37	42.95	10	Till	Monitoring	Uppermost Aquifer	728.06	737.74	0.000	735.20	731.23
MW-9	510,646	2,270,068	747.12	744.40	58.74	10	Till	Piezometer	Uppermost Aquifer	721.96	729.75	N/A	727.64	724.35
MW-10	511,846	2,270,058	718.51	716.32	20.32	10	Silt, Till	Monitoring	Uppermost Aquifer	710.89	715.10	0.000	714.93	713.85
MW-11	511,840	2,270,058	718.34	716.00	55.97	10	Till, Sand	Piezometer	Uppermost Aquifer	713.44	718.34	0.000	717.24	714.71
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	716.97	714.84
MW-14A	511,035	2,269,301	729.00	726.19	20.50	10	Silt, Till, Clay	Monitoring	Uppermost Aquifer	712.59	718.91	N/A	718.58	716.21
MW-15A	510,748	2,269,291	729.99	727.12	20.50	10	Silt, Clay	Monitoring	Uppermost Aquifer	713.83	721.17	N/A	721.17	718.44
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	715.87	714.93
MW-22	510,704	2,268,017	744.27	741.13	41	10	Clay Till	Monitoring	Uppermost Aquifer	727.43	731.18	N/A	731.18	727.63
MW-23	511,532	2,268,770	726.90	723.73	25	10	Clay Till	Assessment	Uppermost Aquifer	719.37	723.02	N/A	723.02	721.25
MW-24	511,476	2,270,056	735.32	732.10	20	10	Clay Till	Assessment	Uppermost Aquifer	718.47	725.83	N/A	722.88	718.89
MW-26	510,044	2,269,037	731.08	727.35	38.27	10	Clay Till	Assessment	Uppermost Aquifer	712.65	712.65	N/A	N/A	712.65
MW-27	509,830	2,269,401	730.26	726.26	19.44	10	Sand Clay	Assessment	Uppermost Aquifer	716.08	716.08	N/A	N/A	716.08

(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: 2002-2020 (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.

Table 2

Implementation Schedule  
2020 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 Constituents Tested						
						Establish Background Levels (Initial 8 Events)		Detection Monitoring	Resampling Events To Verify Initial SSI Over Background	Assessment Monitoring <sup>(1)</sup>	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	3/6/2018 / 6/19/2018 / 8/29/2018 / 3/18/2019 / 8/6/2019 / 4/7/2020 / 9/24/2020	None in 2020	
MW-4A/MW-4B	Downgradient	15	1	7	N/A	Appendix III & IV	Appendix III & IV	Appendix III		Appendix III & IV	N/A	
MW-5B	Downgradient	15	1	7	N/A	Appendix III & IV	Appendix III & IV	Appendix III	Chloride	Appendix III & IV	N/A	
MW-6A	Downgradient	15	1	7	N/A	Appendix III & IV	Appendix III & IV	Appendix III		Appendix III & IV	N/A	
MW-8	Upgradient	15	1	7	N/A	Appendix III & IV	Appendix III & IV	Appendix III		Appendix III & IV	N/A	
MW-10	Upgradient	15	1	7	N/A	Appendix III & IV	Appendix III & IV	Appendix III		Appendix III & IV	N/A	
MW-13 <sup>(3)</sup>	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	15	1	7	N/A	Appendix III & IV	Appendix III & IV	Appendix III	Boron, calcium, chloride, sulfate, TDS	Appendix III & IV	N/A	
MW-15A	Downgradient	15	1	7	N/A	Appendix III & IV	Appendix III & IV	Appendix III	Boron, calcium, chloride, sulfate, TDS	Appendix III & IV	N/A	
MW-18A <sup>(3)</sup>	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	15	1	7	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					
MW-22 <sup>(2)</sup>	Upgradient	7	1	7	N/A	Appendix III & IV	Appendix III & IV	N/A	N/A	N/A	N/A	
						2018: Jun 30, Aug 30 2019: Mar 18, Aug 6	2020: Apr 7, Sept 18					
MW-23 <sup>(2)</sup>	Upgradient	6	1	6	N/A	Appendix III & IV	Appendix III & IV	N/A	N/A	N/A	N/A	

(1) Assessment monitoring: the full Appendix III & IV constituent lists are tested, except for radium through 2020.

(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**  
**2020 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 (SSL) Over GWPS	Upcoming Sampling Dates And Constituents			
						Resample	Semi-Annual Assessment Monitoring: March 2021	Semi-Annual Assessment Monitoring: September 2021	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: TDS	None	N/A	Appendix III & IV	Appendix III & IV	
MW-10	Background	None	None	None	None	N/A	Appendix III & IV	Appendix III & IV	
MW-13	Abandoned <sup>(1)</sup>	None	N/A	N/A	N/A	N/A	N/A	N/A	
MW-14A	Assessment	None	Boron, calcium, sulfate, TDS	None	None	N/A	Appendix III & IV	Appendix III & IV	
MW-15A	Assessment	None	Boron, calcium, sulfate, TDS	Downward: Boron, TDS	None	N/A	Appendix III & IV	Appendix III & IV	
MW-18A	Abandoned <sup>(1)</sup>	None	N/A	N/A	N/A	N/A	N/A	N/A	
MW-21	Assessment	None	Boron, pH, Sulfate, TDS	Downward: TDS	None	N/A	Appendix III & IV	Appendix III & IV	
MW-22	Background	None	None	None	None	N/A	Appendix III & IV	Appendix III & IV	
MW-23	Background	None	None	None	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  
 2019 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		0.001	0.006
Arsenic	(mg/L)	0.01		0.0078	0.01
Barium	(mg/L)	2		0.22	2
Beryllium	(mg/L)	0.004		0.001	0.004
Cadmium	(mg/L)	0.005		0.0005	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		0.88	5
Fluoride	(mg/L)	4		0.83	4
Lead	(mg/L)	0.015		0.0005	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	0.0057	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, 11/13/2020

GWPS: Ground Water Protection Standard

## **APPENDIX C**

### **SAMPLING DATA**

- April 7 and September 18, 2020 Sampling Events
  - Laboratory analytical Reports
  - Ground water sampling forms
  - Low Flow Sampling Forms
- Summary Tabulations of Analytical Results

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-179427-1

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:  
4/22/2020 4:58:40 PM

Shawn Hayes, Senior Project Manager  
(319)229-8211  
[shawn.hayes@testamericainc.com](mailto:shawn.hayes@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*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: 310-179427-1

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## Job ID: 310-179427-1

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Laboratory: Eurofins TestAmerica, Cedar Falls

### Narrative

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Job Narrative  
310-179427-1

### Comments

No additional comments.

### Receipt

The samples were received on 4/10/2020 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.4° 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: 310-179427-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-179427-1	MW8	Ground Water	04/08/20 12:45	04/10/20 09:00	
310-179427-2	MW10	Ground Water	04/07/20 18:20	04/10/20 09:00	
310-179427-3	MW22	Ground Water	04/08/20 10:00	04/10/20 09:00	
310-179427-4	MW23	Ground Water	04/08/20 11:30	04/10/20 09:00	
310-179427-5	DUPLICATE	Ground Water	04/08/20 12:00	04/10/20 09:00	

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# Detection Summary

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

Job ID: 310-179427-1

## Client Sample ID: MW8

## Lab Sample ID: 310-179427-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	17.2		5.00		mg/L	5		9056A	Total/NA
Fluoride	0.864		0.500		mg/L	5		9056A	Total/NA
Sulfate	123		5.00		mg/L	5		9056A	Total/NA
Barium	0.0613		0.00200		mg/L	1		6020A	Total/NA
Calcium	92.4		0.500		mg/L	1		6020A	Total/NA
Cobalt	0.000517		0.000500		mg/L	1		6020A	Total/NA
Magnesium	37.1		0.500		mg/L	1		6020A	Total/NA
Manganese	0.119		0.0100		mg/L	1		6020A	Total/NA
Strontium	0.233		0.00100		mg/L	1		6020A	Total/NA

## Client Sample ID: MW10

## Lab Sample ID: 310-179427-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	18.6		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00697		0.00200		mg/L	1		6020A	Total/NA
Barium	0.199		0.00200		mg/L	1		6020A	Total/NA
Calcium	75.4		0.500		mg/L	1		6020A	Total/NA
Cobalt	0.000581		0.000500		mg/L	1		6020A	Total/NA
Iron	3.36		0.100		mg/L	1		6020A	Total/NA
Magnesium	31.4		0.500		mg/L	1		6020A	Total/NA
Manganese	0.184		0.0100		mg/L	1		6020A	Total/NA
Molybdenum	0.00215		0.00200		mg/L	1		6020A	Total/NA
Strontium	0.190		0.00100		mg/L	1		6020A	Total/NA

## Client Sample ID: MW22

## Lab Sample ID: 310-179427-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	24.8		5.00		mg/L	5		9056A	Total/NA
Sulfate	143		5.00		mg/L	5		9056A	Total/NA
Barium	0.222		0.00200		mg/L	1		6020A	Total/NA
Calcium	80.9		0.500		mg/L	1		6020A	Total/NA
Magnesium	34.5		0.500		mg/L	1		6020A	Total/NA
Manganese	0.0896		0.0100		mg/L	1		6020A	Total/NA
Molybdenum	0.00297		0.00200		mg/L	1		6020A	Total/NA
Strontium	0.129		0.00100		mg/L	1		6020A	Total/NA

## Client Sample ID: MW23

## Lab Sample ID: 310-179427-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	15.7		5.00		mg/L	5		9056A	Total/NA
Sulfate	25.5		5.00		mg/L	5		9056A	Total/NA
Aluminum	0.552		0.0500		mg/L	1		6020A	Total/NA
Barium	0.0654		0.00200		mg/L	1		6020A	Total/NA
Calcium	61.0		0.500		mg/L	1		6020A	Total/NA
Cobalt	0.000817		0.000500		mg/L	1		6020A	Total/NA
Iron	0.485		0.100		mg/L	1		6020A	Total/NA
Lead	0.00116		0.000500		mg/L	1		6020A	Total/NA
Magnesium	28.5		0.500		mg/L	1		6020A	Total/NA
Manganese	0.0718		0.0100		mg/L	1		6020A	Total/NA
Strontium	0.0661		0.00100		mg/L	1		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Detection Summary

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

Job ID: 310-179427-1

**Client Sample ID: DUPLICATE**

**Lab Sample ID: 310-179427-5**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	25.9		5.00		mg/L	5		9056A	Total/NA
Sulfate	142		5.00		mg/L	5		9056A	Total/NA
Barium	0.219		0.00200		mg/L	1		6020A	Total/NA
Calcium	81.1		0.500		mg/L	1		6020A	Total/NA
Magnesium	34.0		0.500		mg/L	1		6020A	Total/NA
Manganese	0.104		0.0100		mg/L	1		6020A	Total/NA
Molybdenum	0.00362		0.00200		mg/L	1		6020A	Total/NA
Strontium	0.128		0.00100		mg/L	1		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

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

Job ID: 310-179427-1

**Client Sample ID: MW8**

**Lab Sample ID: 310-179427-1**

Date Collected: 04/08/20 12:45

Matrix: Ground Water

Date Received: 04/10/20 09:00

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	17.2		5.00		mg/L			04/14/20 02:54	5
Fluoride	0.864		0.500		mg/L			04/14/20 02:54	5
Sulfate	123		5.00		mg/L			04/14/20 02:54	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/13/20 08:26	04/21/20 18:36	1
Arsenic	<0.00200		0.00200		mg/L		04/13/20 08:26	04/21/20 18:36	1
Barium	0.0613		0.00200		mg/L		04/13/20 08:26	04/21/20 18:36	1
Beryllium	<0.00100		0.00100		mg/L		04/13/20 08:26	04/21/20 18:36	1
Boron	<0.200		0.200		mg/L		04/13/20 08:26	04/21/20 18:36	1
Calcium	92.4		0.500		mg/L		04/13/20 08:26	04/21/20 18:36	1
Cobalt	0.000517		0.000500		mg/L		04/13/20 08:26	04/21/20 18:36	1
Copper	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 18:36	1
Iron	<0.100		0.100		mg/L		04/13/20 08:26	04/21/20 18:36	1
Lead	<0.000500		0.000500		mg/L		04/13/20 08:26	04/21/20 18:36	1
Magnesium	37.1		0.500		mg/L		04/13/20 08:26	04/21/20 18:36	1
Manganese	0.119		0.0100		mg/L		04/13/20 08:26	04/21/20 18:36	1
Molybdenum	<0.00200		0.00200		mg/L		04/13/20 08:26	04/21/20 18:36	1
Nickel	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 18:36	1
Selenium	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 18:36	1
Strontium	0.233		0.00100		mg/L		04/13/20 08:26	04/21/20 18:36	1
Vanadium	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 18:36	1
Zinc	<0.0200		0.0200		mg/L		04/13/20 08:26	04/21/20 18:36	1

# Client Sample Results

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

Job ID: 310-179427-1

**Client Sample ID: MW10**  
**Date Collected: 04/07/20 18:20**  
**Date Received: 04/10/20 09:00**

**Lab Sample ID: 310-179427-2**  
**Matrix: Ground Water**

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			04/14/20 03:10	5
Fluoride	<0.500		0.500		mg/L			04/14/20 03:10	5
<b>Sulfate</b>	<b>18.6</b>		5.00		mg/L			04/14/20 03:10	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/13/20 08:26	04/21/20 19:02	1
<b>Arsenic</b>	<b>0.00697</b>		0.00200		mg/L		04/13/20 08:26	04/21/20 19:02	1
<b>Barium</b>	<b>0.199</b>		0.00200		mg/L		04/13/20 08:26	04/21/20 19:02	1
Beryllium	<0.00100		0.00100		mg/L		04/13/20 08:26	04/21/20 19:02	1
Boron	<0.200		0.200		mg/L		04/13/20 08:26	04/21/20 19:02	1
<b>Calcium</b>	<b>75.4</b>		0.500		mg/L		04/13/20 08:26	04/21/20 19:02	1
<b>Cobalt</b>	<b>0.000581</b>		0.000500		mg/L		04/13/20 08:26	04/21/20 19:02	1
Copper	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:02	1
<b>Iron</b>	<b>3.36</b>		0.100		mg/L		04/13/20 08:26	04/21/20 19:02	1
Lead	<0.000500		0.000500		mg/L		04/13/20 08:26	04/21/20 19:02	1
<b>Magnesium</b>	<b>31.4</b>		0.500		mg/L		04/13/20 08:26	04/21/20 19:02	1
<b>Manganese</b>	<b>0.184</b>		0.0100		mg/L		04/13/20 08:26	04/21/20 19:02	1
<b>Molybdenum</b>	<b>0.00215</b>		0.00200		mg/L		04/13/20 08:26	04/21/20 19:02	1
Nickel	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:02	1
Selenium	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:02	1
<b>Strontium</b>	<b>0.190</b>		0.00100		mg/L		04/13/20 08:26	04/21/20 19:02	1
Vanadium	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:02	1
Zinc	<0.0200		0.0200		mg/L		04/13/20 08:26	04/21/20 19:02	1

# Client Sample Results

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

Job ID: 310-179427-1

**Client Sample ID: MW22**  
**Date Collected: 04/08/20 10:00**  
**Date Received: 04/10/20 09:00**

**Lab Sample ID: 310-179427-3**  
**Matrix: Ground Water**

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>24.8</b>		5.00		mg/L			04/14/20 03:26	5
Fluoride	<0.500		0.500		mg/L			04/14/20 03:26	5
<b>Sulfate</b>	<b>143</b>		5.00		mg/L			04/14/20 03:26	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/13/20 08:26	04/21/20 19:05	1
Arsenic	<0.00200		0.00200		mg/L		04/13/20 08:26	04/21/20 19:05	1
<b>Barium</b>	<b>0.222</b>		0.00200		mg/L		04/13/20 08:26	04/21/20 19:05	1
Beryllium	<0.00100		0.00100		mg/L		04/13/20 08:26	04/21/20 19:05	1
Boron	<0.200		0.200		mg/L		04/13/20 08:26	04/21/20 19:05	1
<b>Calcium</b>	<b>80.9</b>		0.500		mg/L		04/13/20 08:26	04/21/20 19:05	1
Cobalt	<0.000500		0.000500		mg/L		04/13/20 08:26	04/21/20 19:05	1
Copper	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:05	1
Iron	<0.100		0.100		mg/L		04/13/20 08:26	04/21/20 19:05	1
Lead	<0.000500		0.000500		mg/L		04/13/20 08:26	04/21/20 19:05	1
<b>Magnesium</b>	<b>34.5</b>		0.500		mg/L		04/13/20 08:26	04/21/20 19:05	1
<b>Manganese</b>	<b>0.0896</b>		0.0100		mg/L		04/13/20 08:26	04/21/20 19:05	1
<b>Molybdenum</b>	<b>0.00297</b>		0.00200		mg/L		04/13/20 08:26	04/21/20 19:05	1
Nickel	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:05	1
Selenium	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:05	1
<b>Strontium</b>	<b>0.129</b>		0.00100		mg/L		04/13/20 08:26	04/21/20 19:05	1
Vanadium	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:05	1
Zinc	<0.0200		0.0200		mg/L		04/13/20 08:26	04/21/20 19:05	1

# Client Sample Results

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

Job ID: 310-179427-1

**Client Sample ID: MW23**  
 Date Collected: 04/08/20 11:30  
 Date Received: 04/10/20 09:00

**Lab Sample ID: 310-179427-4**  
 Matrix: Ground Water

### Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>15.7</b>		5.00		mg/L			04/14/20 03:43	5
Fluoride	<0.500		0.500		mg/L			04/14/20 03:43	5
<b>Sulfate</b>	<b>25.5</b>		5.00		mg/L			04/14/20 03:43	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>0.552</b>		0.0500		mg/L		04/13/20 08:26	04/21/20 19:09	1
Arsenic	<0.00200		0.00200		mg/L		04/13/20 08:26	04/21/20 19:09	1
<b>Barium</b>	<b>0.0654</b>		0.00200		mg/L		04/13/20 08:26	04/21/20 19:09	1
Beryllium	<0.00100		0.00100		mg/L		04/13/20 08:26	04/21/20 19:09	1
Boron	<0.200		0.200		mg/L		04/13/20 08:26	04/21/20 19:09	1
<b>Calcium</b>	<b>61.0</b>		0.500		mg/L		04/13/20 08:26	04/21/20 19:09	1
<b>Cobalt</b>	<b>0.000817</b>		0.000500		mg/L		04/13/20 08:26	04/21/20 19:09	1
Copper	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:09	1
<b>Iron</b>	<b>0.485</b>		0.100		mg/L		04/13/20 08:26	04/21/20 19:09	1
<b>Lead</b>	<b>0.00116</b>		0.000500		mg/L		04/13/20 08:26	04/21/20 19:09	1
<b>Magnesium</b>	<b>28.5</b>		0.500		mg/L		04/13/20 08:26	04/21/20 19:09	1
<b>Manganese</b>	<b>0.0718</b>		0.0100		mg/L		04/13/20 08:26	04/21/20 19:09	1
Molybdenum	<0.00200		0.00200		mg/L		04/13/20 08:26	04/21/20 19:09	1
Nickel	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:09	1
Selenium	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:09	1
<b>Strontium</b>	<b>0.0661</b>		0.00100		mg/L		04/13/20 08:26	04/21/20 19:09	1
Vanadium	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:09	1
Zinc	<0.0200		0.0200		mg/L		04/13/20 08:26	04/21/20 19:09	1



# Client Sample Results

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

Job ID: 310-179427-1

**Client Sample ID: DUPLICATE**

**Lab Sample ID: 310-179427-5**

Date Collected: 04/08/20 12:00

Matrix: Ground Water

Date Received: 04/10/20 09:00

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>25.9</b>		5.00		mg/L			04/14/20 03:59	5
Fluoride	<0.500		0.500		mg/L			04/14/20 03:59	5
<b>Sulfate</b>	<b>142</b>		5.00		mg/L			04/14/20 03:59	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/13/20 08:26	04/21/20 19:12	1
Arsenic	<0.00200		0.00200		mg/L		04/13/20 08:26	04/21/20 19:12	1
<b>Barium</b>	<b>0.219</b>		0.00200		mg/L		04/13/20 08:26	04/21/20 19:12	1
Beryllium	<0.00100		0.00100		mg/L		04/13/20 08:26	04/21/20 19:12	1
Boron	<0.200		0.200		mg/L		04/13/20 08:26	04/21/20 19:12	1
<b>Calcium</b>	<b>81.1</b>		0.500		mg/L		04/13/20 08:26	04/21/20 19:12	1
Cobalt	<0.000500		0.000500		mg/L		04/13/20 08:26	04/21/20 19:12	1
Copper	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:12	1
Iron	<0.100		0.100		mg/L		04/13/20 08:26	04/21/20 19:12	1
Lead	<0.000500		0.000500		mg/L		04/13/20 08:26	04/21/20 19:12	1
<b>Magnesium</b>	<b>34.0</b>		0.500		mg/L		04/13/20 08:26	04/21/20 19:12	1
<b>Manganese</b>	<b>0.104</b>		0.0100		mg/L		04/13/20 08:26	04/21/20 19:12	1
<b>Molybdenum</b>	<b>0.00362</b>		0.00200		mg/L		04/13/20 08:26	04/21/20 19:12	1
Nickel	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:12	1
Selenium	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:12	1
<b>Strontium</b>	<b>0.128</b>		0.00100		mg/L		04/13/20 08:26	04/21/20 19:12	1
Vanadium	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 19:12	1
Zinc	<0.0200		0.0200		mg/L		04/13/20 08:26	04/21/20 19:12	1

# Definitions/Glossary

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

Job ID: 310-179427-1

## Qualifiers

### Metals

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

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

# QC Sample Results

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

Job ID: 310-179427-1

## Method: 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 310-275733/3**  
**Matrix: Water**  
**Analysis Batch: 275733**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			04/13/20 22:51	1
Fluoride	<0.100		0.100		mg/L			04/13/20 22:51	1
Sulfate	<1.00		1.00		mg/L			04/13/20 22:51	1

**Lab Sample ID: LCS 310-275733/4**  
**Matrix: Water**  
**Analysis Batch: 275733**

**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	10.28		mg/L		103	90 - 110
Fluoride	2.00	2.064		mg/L		103	90 - 110
Sulfate	10.0	10.93		mg/L		109	90 - 110

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

**Lab Sample ID: MB 310-275498/1-A**  
**Matrix: Water**  
**Analysis Batch: 276475**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 275498**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/13/20 08:26	04/21/20 18:29	1
Arsenic	<0.00200		0.00200		mg/L		04/13/20 08:26	04/21/20 18:29	1
Barium	<0.00200		0.00200		mg/L		04/13/20 08:26	04/21/20 18:29	1
Beryllium	<0.00100		0.00100		mg/L		04/13/20 08:26	04/21/20 18:29	1
Boron	<0.200		0.200		mg/L		04/13/20 08:26	04/21/20 18:29	1
Calcium	<0.500		0.500		mg/L		04/13/20 08:26	04/21/20 18:29	1
Cobalt	<0.000500		0.000500		mg/L		04/13/20 08:26	04/21/20 18:29	1
Copper	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 18:29	1
Iron	<0.100		0.100		mg/L		04/13/20 08:26	04/21/20 18:29	1
Lead	<0.000500		0.000500		mg/L		04/13/20 08:26	04/21/20 18:29	1
Magnesium	<0.500		0.500		mg/L		04/13/20 08:26	04/21/20 18:29	1
Manganese	<0.0100		0.0100		mg/L		04/13/20 08:26	04/21/20 18:29	1
Molybdenum	<0.00200		0.00200		mg/L		04/13/20 08:26	04/21/20 18:29	1
Nickel	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 18:29	1
Selenium	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 18:29	1
Strontium	<0.00100		0.00100		mg/L		04/13/20 08:26	04/21/20 18:29	1
Vanadium	<0.00500		0.00500		mg/L		04/13/20 08:26	04/21/20 18:29	1
Zinc	<0.0200		0.0200		mg/L		04/13/20 08:26	04/21/20 18:29	1

**Lab Sample ID: LCS 310-275498/2-A**  
**Matrix: Water**  
**Analysis Batch: 276475**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 275498**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	4.00	4.187		mg/L		105	80 - 120
Arsenic	0.0800	0.07413		mg/L		93	80 - 120
Barium	0.0800	0.08017		mg/L		100	80 - 120
Beryllium	0.0400	0.03926		mg/L		98	80 - 120
Boron	1.76	1.712		mg/L		97	80 - 120

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# QC Sample Results

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

Job ID: 310-179427-1

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

**Lab Sample ID: LCS 310-275498/2-A**  
**Matrix: Water**  
**Analysis Batch: 276475**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 275498**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	4.00	3.840		mg/L		96	80 - 120
Cobalt	0.0400	0.03842		mg/L		96	80 - 120
Copper	0.0800	0.07854		mg/L		98	80 - 120
Iron	4.00	3.992		mg/L		100	80 - 120
Lead	0.0400	0.04223		mg/L		106	80 - 120
Magnesium	4.00	4.255		mg/L		106	80 - 120
Manganese	0.400	0.4139		mg/L		103	80 - 120
Molybdenum	0.0800	0.07368		mg/L		92	80 - 120
Nickel	0.0800	0.08315		mg/L		104	80 - 120
Selenium	0.0800	0.07564		mg/L		95	80 - 120
Strontium	0.0800	0.07988		mg/L		100	80 - 120
Vanadium	0.0800	0.07581		mg/L		95	80 - 120
Zinc	0.0800	0.08093		mg/L		101	80 - 120

**Lab Sample ID: 310-179427-1 MS**  
**Matrix: Ground Water**  
**Analysis Batch: 276475**

**Client Sample ID: MW8**  
**Prep Type: Total/NA**  
**Prep Batch: 275498**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	<0.0500		4.00	4.381		mg/L		110	75 - 125
Arsenic	<0.00200		0.0800	0.07843		mg/L		98	75 - 125
Barium	0.0613		0.0800	0.1456		mg/L		105	75 - 125
Beryllium	<0.00100		0.0400	0.04083		mg/L		102	75 - 125
Boron	<0.200		1.76	1.953		mg/L		103	75 - 125
Calcium	92.4		4.00	98.37	4	mg/L		150	75 - 125
Cobalt	0.000517		0.0400	0.03919		mg/L		97	75 - 125
Copper	<0.00500		0.0800	0.07889		mg/L		99	75 - 125
Iron	<0.100		4.00	4.252		mg/L		106	75 - 125
Lead	<0.000500		0.0400	0.04323		mg/L		108	75 - 125
Magnesium	37.1		4.00	42.74	4	mg/L		141	75 - 125
Manganese	0.119		0.400	0.5447		mg/L		106	75 - 125
Molybdenum	<0.00200		0.0800	0.07904		mg/L		97	75 - 125
Nickel	<0.00500		0.0800	0.08196		mg/L		102	75 - 125
Selenium	<0.00500		0.0800	0.07833		mg/L		97	75 - 125
Strontium	0.233		0.0800	0.3278		mg/L		118	75 - 125
Vanadium	<0.00500		0.0800	0.08019		mg/L		100	75 - 125
Zinc	<0.0200		0.0800	0.08064		mg/L		101	75 - 125

**Lab Sample ID: 310-179427-1 MSD**  
**Matrix: Ground Water**  
**Analysis Batch: 276475**

**Client Sample ID: MW8**  
**Prep Type: Total/NA**  
**Prep Batch: 275498**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	<0.0500		4.00	3.959		mg/L		99	75 - 125	10	20
Arsenic	<0.00200		0.0800	0.07276		mg/L		91	75 - 125	8	20
Barium	0.0613		0.0800	0.1350		mg/L		92	75 - 125	8	20
Beryllium	<0.00100		0.0400	0.03942		mg/L		99	75 - 125	3	20
Boron	<0.200		1.76	1.883		mg/L		99	75 - 125	4	20
Calcium	92.4		4.00	90.90	4	mg/L		-37	75 - 125	8	20

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# QC Sample Results

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

Job ID: 310-179427-1

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

Lab Sample ID: 310-179427-1 MSD

Matrix: Ground Water

Analysis Batch: 276475

Client Sample ID: MW8

Prep Type: Total/NA

Prep Batch: 275498

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cobalt	0.000517		0.0400	0.03619		mg/L		89	75 - 125	8	20
Copper	<0.00500		0.0800	0.07315		mg/L		91	75 - 125	8	20
Iron	<0.100		4.00	3.950		mg/L		99	75 - 125	7	20
Lead	<0.000500		0.0400	0.04006		mg/L		100	75 - 125	8	20
Magnesium	37.1		4.00	39.34	4	mg/L		56	75 - 125	8	20
Manganese	0.119		0.400	0.5035		mg/L		96	75 - 125	8	20
Molybdenum	<0.00200		0.0800	0.07299		mg/L		90	75 - 125	8	20
Nickel	<0.00500		0.0800	0.07633		mg/L		95	75 - 125	7	20
Selenium	<0.00500		0.0800	0.07274		mg/L		90	75 - 125	7	20
Strontium	0.233		0.0800	0.3043		mg/L		89	75 - 125	7	20
Vanadium	<0.00500		0.0800	0.07362		mg/L		92	75 - 125	9	20
Zinc	<0.0200		0.0800	0.07541		mg/L		94	75 - 125	7	20

# QC Association Summary

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

Job ID: 310-179427-1

## HPLC/IC

### Analysis Batch: 275733

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179427-1	MW8	Total/NA	Ground Water	9056A	
310-179427-2	MW10	Total/NA	Ground Water	9056A	
310-179427-3	MW22	Total/NA	Ground Water	9056A	
310-179427-4	MW23	Total/NA	Ground Water	9056A	
310-179427-5	DUPLICATE	Total/NA	Ground Water	9056A	
MB 310-275733/3	Method Blank	Total/NA	Water	9056A	
LCS 310-275733/4	Lab Control Sample	Total/NA	Water	9056A	

## Metals

### Prep Batch: 275498

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179427-1	MW8	Total/NA	Ground Water	3010A	
310-179427-2	MW10	Total/NA	Ground Water	3010A	
310-179427-3	MW22	Total/NA	Ground Water	3010A	
310-179427-4	MW23	Total/NA	Ground Water	3010A	
310-179427-5	DUPLICATE	Total/NA	Ground Water	3010A	
MB 310-275498/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-275498/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-179427-1 MS	MW8	Total/NA	Ground Water	3010A	
310-179427-1 MSD	MW8	Total/NA	Ground Water	3010A	

### Analysis Batch: 276475

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179427-1	MW8	Total/NA	Ground Water	6020A	275498
310-179427-2	MW10	Total/NA	Ground Water	6020A	275498
310-179427-3	MW22	Total/NA	Ground Water	6020A	275498
310-179427-4	MW23	Total/NA	Ground Water	6020A	275498
310-179427-5	DUPLICATE	Total/NA	Ground Water	6020A	275498
MB 310-275498/1-A	Method Blank	Total/NA	Water	6020A	275498
LCS 310-275498/2-A	Lab Control Sample	Total/NA	Water	6020A	275498
310-179427-1 MS	MW8	Total/NA	Ground Water	6020A	275498
310-179427-1 MSD	MW8	Total/NA	Ground Water	6020A	275498

# Lab Chronicle

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

Job ID: 310-179427-1

## Client Sample ID: MW8

Date Collected: 04/08/20 12:45

Date Received: 04/10/20 09:00

Lab Sample ID: 310-179427-1

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	275733	04/14/20 02:54	SAD	TAL CF
Total/NA	Prep	3010A			275498	04/13/20 08:26	HED	TAL CF
Total/NA	Analysis	6020A		1	276475	04/21/20 18:36	SAD	TAL CF

## Client Sample ID: MW10

Date Collected: 04/07/20 18:20

Date Received: 04/10/20 09:00

Lab Sample ID: 310-179427-2

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	275733	04/14/20 03:10	SAD	TAL CF
Total/NA	Prep	3010A			275498	04/13/20 08:26	HED	TAL CF
Total/NA	Analysis	6020A		1	276475	04/21/20 19:02	SAD	TAL CF

## Client Sample ID: MW22

Date Collected: 04/08/20 10:00

Date Received: 04/10/20 09:00

Lab Sample ID: 310-179427-3

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	275733	04/14/20 03:26	SAD	TAL CF
Total/NA	Prep	3010A			275498	04/13/20 08:26	HED	TAL CF
Total/NA	Analysis	6020A		1	276475	04/21/20 19:05	SAD	TAL CF

## Client Sample ID: MW23

Date Collected: 04/08/20 11:30

Date Received: 04/10/20 09:00

Lab Sample ID: 310-179427-4

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	275733	04/14/20 03:43	SAD	TAL CF
Total/NA	Prep	3010A			275498	04/13/20 08:26	HED	TAL CF
Total/NA	Analysis	6020A		1	276475	04/21/20 19:09	SAD	TAL CF

## Client Sample ID: DUPLICATE

Date Collected: 04/08/20 12:00

Date Received: 04/10/20 09:00

Lab Sample ID: 310-179427-5

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	275733	04/14/20 03:59	SAD	TAL CF
Total/NA	Prep	3010A			275498	04/13/20 08:26	HED	TAL CF
Total/NA	Analysis	6020A		1	276475	04/21/20 19:12	SAD	TAL CF

### Laboratory References:

TAL CF = Eurofins TestAmerica, 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: 310-179427-1

## Laboratory: Eurofins TestAmerica, 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
AIHA-LAP, LLC	Industrial Hygiene Laboratory Accreditation Program (IHLAP)	101044	11-01-20
Colorado	Petroleum Storage Tank Program	IA100001 (OR)	09-29-20
Georgia	State	IA100001 (OR)	09-29-20
Illinois	NELAP	200024	11-29-20
Iowa	State	007	12-01-21
Kansas	NELAP	E-10341	01-31-20 *
Minnesota	NELAP	019-999-319	12-31-20
Minnesota (Petrofund)	State	3349	08-22-21
North Dakota	State	R-186	09-30-20
Oregon	NELAP	IA100001	09-29-20
USDA	US Federal Programs	P330-19-00003	01-02-22

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

Eurofins TestAmerica, Cedar Falls



# Method Summary

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

Job ID: 310-179427-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	TAL CF
6020A	Metals (ICP/MS)	SW846	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF

**Protocol References:**

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

**Laboratory References:**

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

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Environment Testing  
TestAmerica



310-179427 Chain of Custody

**Cooler/Sample Receipt and Temperature Log Form**

<b>Client Information</b>		
Client: <i>Muscatine Power + Water</i>		
City/State: <small>CITY</small> <i>Muscatine</i> <small>STATE</small> <i>IA</i>	Project: <i>Muscatine Power + Water CCR Landfill</i>	
<b>Receipt Information</b>		
Date/Time Received: <small>DATE</small> <i>4/10/20</i> <small>TIME</small> <i>0900</i>	Received By: <i>JC</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: _____		
<b>Condition of Cooler/Containers</b>		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <i>125</i>
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? ↓
<b>Temperature Record</b>		
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>M</i>	Correction Factor (°C): <i>+0.1</i>	
• <b>Temp Blank Temperature</b> – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <i>0.3</i>	Corrected Temp (°C): <i>0.4</i>	
• <b>Sample Container Temperature</b>		
Container(s) used:	<small>CONTAINER 1</small>	<small>CONTAINER 2</small>
Uncorrected Temp (°C):		
Corrected Temp (°C):		
<b>Exceptions Noted</b>		
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		
<b>Additional Comments</b>		

**Chain of Custody Record**

<b>Client Information</b>		Sampler: <b>Sam Bennett</b>		Lab PM: <b>Hayes, Shawn M</b>		COC No.:	
Client Contact: <b>Sam Bennett MP&amp;W and Rose Arundson (HR Green)</b>		Phone: <b>303-775-5615</b>		E-Mail: <b>shawn.hayes@testamericainc.com</b>		Page:	
Company: <b>Muscataine Power &amp; Water</b>		Due Date Requested:		Analysis Requested		Job #:	
Address: <b>1700 Dick Drake Way</b>		TAT Requested (days):		Perform HHS/MSD (Yes or No)		Preservation Codes:	
City: <b>Muscataine</b>		PO #: <b>201968</b>		Field Filtered Sample (Yes or No)		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - H2SO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
State, Zip: <b>IA, 52761</b>		WO #: <b>31007896</b>		9020A State Metals List		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecylhydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
Phone: <b>sbennett@mpw.org and ramundson@hrgreen.com</b>		TestAmerica Project #:		9055A Chloride, Fluoride, Sulfate		Special Instructions/Note:	
Project Name: <b>Muscataine Power &amp; Water CCR Landfill</b>		Event: <b>Spring Sampling</b>		Total Number of Containers			
Site: <b>Iowa</b>		Sample Date		Matrix			
Sample Identification		Sample Type (C=comp, G=grab)		Sample Time			
MW4A		GW		GW			
MW5B		GW		GW			
MW6A		GW		GW			
MW6		G		1245		Shipment 1	
MW10		G		1820		Shipment 1	
MW14A		GW		GW			
MW15A		GW		GW			
MW21		GW		GW			
MW22		G		1000		Shipment 1	
MW23		G		1130		Shipment 1	
MW24		GW		GW			
Possible Hazard Identification		Preservation Code:		Return To Client		Archive For	
<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: <b>4/8/20</b>		Disposal By Lab		Months	
Deliverable Requested: I, II, III, IV, Other (specify)		Time:		Special Instructions/QC Requirements:			
Empty Kit Relinquished by:		Date/Time: <b>4/8/20 0900</b>		Method of Shipment:			
Relinquished by: <b>Sam Bennett</b>		Company: <b>MPW</b>		Received by:		Company:	
Relinquished by:		Company:		Received by:		Company:	
Relinquished by:		Company:		Received by: <b>DM</b>		Company:	
Custody Seals Intact: <b>10/20/20</b>		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:			
<input type="checkbox"/> Yes <input type="checkbox"/> No							



<b>Client Information</b> Client Contact: Sam Bennett MP&W and Rose Amundson (HR Green) Address: Muscatine Power & Water 1700 Dick Drake Way City: Muscatine State, Zip: IA, 52761 Phone: 201968 Email: sbennett@mpw.org and ramundson@ingreen.com Project Name: Muscatine Power & Water CCR Landfill Site: Iowa		Sampler: Sam Bennett Phone: 303-775-5615 Lab P.M.: Hayes, Shawn M E-Mail: shawn.hayes@testamericainc.com		Carrier Tracking No(s): Job #: COC No.: Page:	
Due Date Requested: TAT Requested (days): PO #: WO #: TestAmerica Project #: Event: Spring Sampling		Analysis Requested Perform ICMMSD (Yes or No) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 8020A State Metals List <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 9056A Chloride, Fluoride, Sulfate <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Sample Identification MW25B MW26 Duplicate-1 Duplicate-2		Sample Date Sample Time Sample Type (C=Comp, G=grab) Preservation Code: Matrix (W=water, S=solid, O=oxidant, B=biological, A=air)		Total Number of Containers Special Instructions/	
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			
Empty Kit Relinquished by: Relinquished by: Sam Bennett Date/Time: 4/9/20 0900		Method of Shipment: Date/Time:			
Relinquished by: Relinquished by: Relinquished by:		Received by: Received by: Received by:			
Custody Seals Intact <input type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 4/10/20 0900			



Temperature readings: \_\_\_\_\_

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservative</u>	
			<u>pH</u>	<u>Temp</u>	<u>Added (mls)</u>	<u>Lot #</u>
MW8	310-179427-A-1	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW8	310-179427-C-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW8	310-179427-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW10	310-179427-A-2	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW10	310-179427-C-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW10	310-179427-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW22	310-179427-A-3	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW22	310-179427-C-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW22	310-179427-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW23	310-179427-A-4	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW23	310-179427-C-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW23	310-179427-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
DUPLICATE	310-179427-A-5	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
DUPLICATE	310-179427-C-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
DUPLICATE	310-179427-D-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____



## Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-179427-1

SDG Number:

**Login Number: 179427**

**List Number: 1**

**Creator: Homolar, Dana J**

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

Laboratory Job ID: 310-179622-1

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:  
4/24/2020 11:37:41 AM

Shawn Hayes, Senior Project Manager  
(319)229-8211  
[shawn.hayes@testamericainc.com](mailto:shawn.hayes@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*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: 310-179622-1

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## Job ID: 310-179622-1

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### Laboratory: Eurofins TestAmerica, Cedar Falls

#### Narrative

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#### Job Narrative 310-179622-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 4/15/2020 8:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 0.6° C and 1.2° C.

#### HPLC/IC

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

#### Metals

Methods 6020A: The continuing calibration verification (CCV) associated with batch 310-276589 recovered above the upper control limit for Boron. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated samples are impacted: MW-4A (310-179622-1), MW-5B (310-179622-2), MW-6A (310-179622-3) and MW-24 (310-179622-7).

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: 310-179622-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-179622-1	MW-4A	Ground Water	04/13/20 18:40	04/15/20 08:50	
310-179622-2	MW-5B	Ground Water	04/13/20 16:25	04/15/20 08:50	
310-179622-3	MW-6A	Ground Water	04/13/20 17:25	04/15/20 08:50	
310-179622-4	MW-14A	Ground Water	04/13/20 08:25	04/15/20 08:50	
310-179622-5	MW-15A	Ground Water	04/10/20 16:25	04/15/20 08:50	
310-179622-6	MW-21	Ground Water	04/10/20 11:50	04/15/20 08:50	
310-179622-7	MW-24	Ground Water	04/10/20 13:30	04/15/20 08:50	
310-179622-8	DUP-1	Ground Water	04/10/20 12:00	04/15/20 08:50	

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# Detection Summary

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

Job ID: 310-179622-1

## Client Sample ID: MW-4A

## Lab Sample ID: 310-179622-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	14.8		5.00		mg/L	5		9056A	Total/NA
Sulfate	41.5		5.00		mg/L	5		9056A	Total/NA
Barium	0.156		0.00200		mg/L	1		6020A	Total/NA
Calcium	89.6		0.500		mg/L	1		6020A	Total/NA
Iron	5.55		0.100		mg/L	1		6020A	Total/NA
Magnesium	34.0		0.500		mg/L	1		6020A	Total/NA
Manganese	0.130		0.0100		mg/L	1		6020A	Total/NA
Strontium	0.103		0.00100		mg/L	1		6020A	Total/NA

## Client Sample ID: MW-5B

## Lab Sample ID: 310-179622-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	44.0		5.00		mg/L	5		9056A	Total/NA
Sulfate	58.9		5.00		mg/L	5		9056A	Total/NA
Barium	0.250		0.00200		mg/L	1		6020A	Total/NA
Calcium	117		0.500		mg/L	1		6020A	Total/NA
Iron	1.88		0.100		mg/L	1		6020A	Total/NA
Magnesium	39.6		0.500		mg/L	1		6020A	Total/NA
Manganese	0.492		0.0100		mg/L	1		6020A	Total/NA
Strontium	0.166		0.00100		mg/L	1		6020A	Total/NA

## Client Sample ID: MW-6A

## Lab Sample ID: 310-179622-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	12.2		5.00		mg/L	5		9056A	Total/NA
Fluoride	0.652		0.500		mg/L	5		9056A	Total/NA
Sulfate	13.6		5.00		mg/L	5		9056A	Total/NA
Barium	0.216		0.00200		mg/L	1		6020A	Total/NA
Calcium	85.1		0.500		mg/L	1		6020A	Total/NA
Iron	3.47		0.100		mg/L	1		6020A	Total/NA
Magnesium	29.4		0.500		mg/L	1		6020A	Total/NA
Manganese	0.103		0.0100		mg/L	1		6020A	Total/NA
Strontium	0.173		0.00100		mg/L	1		6020A	Total/NA

## Client Sample ID: MW-14A

## Lab Sample ID: 310-179622-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	22.5		5.00		mg/L	5		9056A	Total/NA
Sulfate	888		20.0		mg/L	20		9056A	Total/NA
Barium	0.0266		0.00200		mg/L	1		6020A	Total/NA
Boron	17.4		1.40		mg/L	7		6020A	Total/NA
Calcium	245		0.500		mg/L	1		6020A	Total/NA
Magnesium	102		3.50		mg/L	7		6020A	Total/NA
Strontium	0.246		0.00100		mg/L	1		6020A	Total/NA

## Client Sample ID: MW-15A

## Lab Sample ID: 310-179622-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	13.0		5.00		mg/L	5		9056A	Total/NA
Sulfate	496		5.00		mg/L	5		9056A	Total/NA
Barium	0.0389		0.00200		mg/L	1		6020A	Total/NA
Boron	10.6		1.40		mg/L	7		6020A	Total/NA
Calcium	163		0.500		mg/L	1		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Detection Summary

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

Job ID: 310-179622-1

## Client Sample ID: MW-15A (Continued)

## Lab Sample ID: 310-179622-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	71.0		0.500		mg/L	1		6020A	Total/NA
Strontium	0.154		0.00100		mg/L	1		6020A	Total/NA

## Client Sample ID: MW-21

## Lab Sample ID: 310-179622-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	8.05		5.00		mg/L	5		9056A	Total/NA
Sulfate	373		5.00		mg/L	5		9056A	Total/NA
Barium	0.0352		0.00200		mg/L	1		6020A	Total/NA
Boron	6.76		1.40		mg/L	7		6020A	Total/NA
Calcium	104		0.500		mg/L	1		6020A	Total/NA
Magnesium	46.9		0.500		mg/L	1		6020A	Total/NA
Nickel	0.00576		0.00500		mg/L	1		6020A	Total/NA
Selenium	0.00632		0.00500		mg/L	1		6020A	Total/NA
Strontium	0.175		0.00100		mg/L	1		6020A	Total/NA

## Client Sample ID: MW-24

## Lab Sample ID: 310-179622-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	24.8		5.00		mg/L	5		9056A	Total/NA
Sulfate	164		5.00		mg/L	5		9056A	Total/NA
Barium	0.0840		0.00200		mg/L	1		6020A	Total/NA
Calcium	94.3		0.500		mg/L	1		6020A	Total/NA
Magnesium	43.0		0.500		mg/L	1		6020A	Total/NA
Manganese	0.0156		0.0100		mg/L	1		6020A	Total/NA
Strontium	0.109		0.00100		mg/L	1		6020A	Total/NA

## Client Sample ID: DUP-1

## Lab Sample ID: 310-179622-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	8.05		5.00		mg/L	5		9056A	Total/NA
Sulfate	369		5.00		mg/L	5		9056A	Total/NA
Barium	0.0350		0.00200		mg/L	1		6020A	Total/NA
Boron	6.56		1.40		mg/L	7		6020A	Total/NA
Calcium	104		0.500		mg/L	1		6020A	Total/NA
Magnesium	46.6		0.500		mg/L	1		6020A	Total/NA
Nickel	0.00568		0.00500		mg/L	1		6020A	Total/NA
Selenium	0.00625		0.00500		mg/L	1		6020A	Total/NA
Strontium	0.174		0.00100		mg/L	1		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

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

Job ID: 310-179622-1

**Client Sample ID: MW-4A**

**Date Collected: 04/13/20 18:40**

**Date Received: 04/15/20 08:50**

**Lab Sample ID: 310-179622-1**

**Matrix: Ground Water**

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>14.8</b>		5.00		mg/L			04/17/20 22:14	5
Fluoride	<0.500		0.500		mg/L			04/17/20 22:14	5
<b>Sulfate</b>	<b>41.5</b>		5.00		mg/L			04/17/20 22:14	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/16/20 08:00	04/22/20 19:57	1
Arsenic	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 19:57	1
<b>Barium</b>	<b>0.156</b>		0.00200		mg/L		04/16/20 08:00	04/22/20 19:57	1
Beryllium	<0.00100		0.00100		mg/L		04/16/20 08:00	04/22/20 19:57	1
Boron	<0.200	^	0.200		mg/L		04/16/20 08:00	04/22/20 19:57	1
<b>Calcium</b>	<b>89.6</b>		0.500		mg/L		04/16/20 08:00	04/22/20 19:57	1
Cobalt	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 19:57	1
Copper	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 19:57	1
<b>Iron</b>	<b>5.55</b>		0.100		mg/L		04/16/20 08:00	04/22/20 19:57	1
Lead	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 19:57	1
<b>Magnesium</b>	<b>34.0</b>		0.500		mg/L		04/16/20 08:00	04/22/20 19:57	1
<b>Manganese</b>	<b>0.130</b>		0.0100		mg/L		04/16/20 08:00	04/22/20 19:57	1
Molybdenum	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 19:57	1
Nickel	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 19:57	1
Selenium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 19:57	1
<b>Strontium</b>	<b>0.103</b>		0.00100		mg/L		04/16/20 08:00	04/22/20 19:57	1
Vanadium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 19:57	1
Zinc	<0.0200		0.0200		mg/L		04/16/20 08:00	04/22/20 19:57	1

# Client Sample Results

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

Job ID: 310-179622-1

**Client Sample ID: MW-5B**

**Lab Sample ID: 310-179622-2**

Date Collected: 04/13/20 16:25

Matrix: Ground Water

Date Received: 04/15/20 08:50

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>44.0</b>		5.00		mg/L			04/17/20 22:29	5
Fluoride	<0.500		0.500		mg/L			04/17/20 22:29	5
<b>Sulfate</b>	<b>58.9</b>		5.00		mg/L			04/17/20 22:29	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/16/20 08:00	04/22/20 20:00	1
Arsenic	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 20:00	1
<b>Barium</b>	<b>0.250</b>		0.00200		mg/L		04/16/20 08:00	04/22/20 20:00	1
Beryllium	<0.00100		0.00100		mg/L		04/16/20 08:00	04/22/20 20:00	1
Boron	<0.200	^	0.200		mg/L		04/16/20 08:00	04/22/20 20:00	1
<b>Calcium</b>	<b>117</b>		0.500		mg/L		04/16/20 08:00	04/22/20 20:00	1
Cobalt	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 20:00	1
Copper	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:00	1
<b>Iron</b>	<b>1.88</b>		0.100		mg/L		04/16/20 08:00	04/22/20 20:00	1
Lead	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 20:00	1
<b>Magnesium</b>	<b>39.6</b>		0.500		mg/L		04/16/20 08:00	04/22/20 20:00	1
<b>Manganese</b>	<b>0.492</b>		0.0100		mg/L		04/16/20 08:00	04/22/20 20:00	1
Molybdenum	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 20:00	1
Nickel	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:00	1
Selenium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:00	1
<b>Strontium</b>	<b>0.166</b>		0.00100		mg/L		04/16/20 08:00	04/22/20 20:00	1
Vanadium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:00	1
Zinc	<0.0200		0.0200		mg/L		04/16/20 08:00	04/22/20 20:00	1

# Client Sample Results

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

Job ID: 310-179622-1

**Client Sample ID: MW-6A**  
 Date Collected: 04/13/20 17:25  
 Date Received: 04/15/20 08:50

**Lab Sample ID: 310-179622-3**  
 Matrix: Ground Water

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	12.2		5.00		mg/L			04/17/20 22:45	5
Fluoride	0.652		0.500		mg/L			04/17/20 22:45	5
Sulfate	13.6		5.00		mg/L			04/17/20 22:45	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/16/20 08:00	04/22/20 20:04	1
Arsenic	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 20:04	1
Barium	0.216		0.00200		mg/L		04/16/20 08:00	04/22/20 20:04	1
Beryllium	<0.00100		0.00100		mg/L		04/16/20 08:00	04/22/20 20:04	1
Boron	<0.200	^	0.200		mg/L		04/16/20 08:00	04/22/20 20:04	1
Calcium	85.1		0.500		mg/L		04/16/20 08:00	04/22/20 20:04	1
Cobalt	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 20:04	1
Copper	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:04	1
Iron	3.47		0.100		mg/L		04/16/20 08:00	04/22/20 20:04	1
Lead	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 20:04	1
Magnesium	29.4		0.500		mg/L		04/16/20 08:00	04/22/20 20:04	1
Manganese	0.103		0.0100		mg/L		04/16/20 08:00	04/22/20 20:04	1
Molybdenum	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 20:04	1
Nickel	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:04	1
Selenium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:04	1
Strontium	0.173		0.00100		mg/L		04/16/20 08:00	04/22/20 20:04	1
Vanadium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:04	1
Zinc	<0.0200		0.0200		mg/L		04/16/20 08:00	04/22/20 20:04	1

# Client Sample Results

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

Job ID: 310-179622-1

**Client Sample ID: MW-14A**

**Lab Sample ID: 310-179622-4**

Date Collected: 04/13/20 08:25

Matrix: Ground Water

Date Received: 04/15/20 08:50

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>22.5</b>		5.00		mg/L			04/17/20 23:01	5
Fluoride	<0.500		0.500		mg/L			04/17/20 23:01	5
<b>Sulfate</b>	<b>888</b>		20.0		mg/L			04/17/20 23:16	20

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/16/20 08:00	04/22/20 20:07	1
Arsenic	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 20:07	1
<b>Barium</b>	<b>0.0266</b>		0.00200		mg/L		04/16/20 08:00	04/22/20 20:07	1
Beryllium	<0.00100		0.00100		mg/L		04/16/20 08:00	04/22/20 20:07	1
<b>Boron</b>	<b>17.4</b>		1.40		mg/L		04/16/20 08:00	04/23/20 13:24	7
<b>Calcium</b>	<b>245</b>		0.500		mg/L		04/16/20 08:00	04/22/20 20:07	1
Cobalt	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 20:07	1
Copper	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:07	1
Iron	<0.100		0.100		mg/L		04/16/20 08:00	04/22/20 20:07	1
Lead	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 20:07	1
<b>Magnesium</b>	<b>102</b>		3.50		mg/L		04/16/20 08:00	04/23/20 13:24	7
Manganese	<0.0100		0.0100		mg/L		04/16/20 08:00	04/22/20 20:07	1
Molybdenum	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 20:07	1
Nickel	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:07	1
Selenium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:07	1
<b>Strontium</b>	<b>0.246</b>		0.00100		mg/L		04/16/20 08:00	04/22/20 20:07	1
Vanadium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:07	1
Zinc	<0.0200		0.0200		mg/L		04/16/20 08:00	04/22/20 20:07	1



# Client Sample Results

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

Job ID: 310-179622-1

**Client Sample ID: MW-15A**

**Lab Sample ID: 310-179622-5**

Date Collected: 04/10/20 16:25

Matrix: Ground Water

Date Received: 04/15/20 08:50

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>13.0</b>		5.00		mg/L			04/17/20 23:32	5
Fluoride	<0.500		0.500		mg/L			04/17/20 23:32	5
<b>Sulfate</b>	<b>496</b>		5.00		mg/L			04/17/20 23:32	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/16/20 08:00	04/22/20 20:10	1
Arsenic	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 20:10	1
<b>Barium</b>	<b>0.0389</b>		0.00200		mg/L		04/16/20 08:00	04/22/20 20:10	1
Beryllium	<0.00100		0.00100		mg/L		04/16/20 08:00	04/22/20 20:10	1
<b>Boron</b>	<b>10.6</b>		1.40		mg/L		04/16/20 08:00	04/23/20 13:27	7
<b>Calcium</b>	<b>163</b>		0.500		mg/L		04/16/20 08:00	04/22/20 20:10	1
Cobalt	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 20:10	1
Copper	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:10	1
Iron	<0.100		0.100		mg/L		04/16/20 08:00	04/22/20 20:10	1
Lead	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 20:10	1
<b>Magnesium</b>	<b>71.0</b>		0.500		mg/L		04/16/20 08:00	04/22/20 20:10	1
Manganese	<0.0100		0.0100		mg/L		04/16/20 08:00	04/22/20 20:10	1
Molybdenum	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 20:10	1
Nickel	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:10	1
Selenium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:10	1
<b>Strontium</b>	<b>0.154</b>		0.00100		mg/L		04/16/20 08:00	04/22/20 20:10	1
Vanadium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:10	1
Zinc	<0.0200		0.0200		mg/L		04/16/20 08:00	04/22/20 20:10	1

# Client Sample Results

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

Job ID: 310-179622-1

**Client Sample ID: MW-21**

**Lab Sample ID: 310-179622-6**

**Date Collected: 04/10/20 11:50**

**Matrix: Ground Water**

**Date Received: 04/15/20 08:50**

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>8.05</b>		5.00		mg/L			04/18/20 00:03	5
Fluoride	<0.500		0.500		mg/L			04/18/20 00:03	5
<b>Sulfate</b>	<b>373</b>		5.00		mg/L			04/18/20 00:03	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/16/20 08:00	04/22/20 20:14	1
Arsenic	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 20:14	1
<b>Barium</b>	<b>0.0352</b>		0.00200		mg/L		04/16/20 08:00	04/22/20 20:14	1
Beryllium	<0.00100		0.00100		mg/L		04/16/20 08:00	04/22/20 20:14	1
<b>Boron</b>	<b>6.76</b>		1.40		mg/L		04/16/20 08:00	04/23/20 13:31	7
<b>Calcium</b>	<b>104</b>		0.500		mg/L		04/16/20 08:00	04/22/20 20:14	1
Cobalt	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 20:14	1
Copper	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:14	1
Iron	<0.100		0.100		mg/L		04/16/20 08:00	04/22/20 20:14	1
Lead	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 20:14	1
<b>Magnesium</b>	<b>46.9</b>		0.500		mg/L		04/16/20 08:00	04/22/20 20:14	1
Manganese	<0.0100		0.0100		mg/L		04/16/20 08:00	04/22/20 20:14	1
Molybdenum	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 20:14	1
<b>Nickel</b>	<b>0.00576</b>		0.00500		mg/L		04/16/20 08:00	04/22/20 20:14	1
<b>Selenium</b>	<b>0.00632</b>		0.00500		mg/L		04/16/20 08:00	04/22/20 20:14	1
<b>Strontium</b>	<b>0.175</b>		0.00100		mg/L		04/16/20 08:00	04/22/20 20:14	1
Vanadium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:14	1
Zinc	<0.0200		0.0200		mg/L		04/16/20 08:00	04/22/20 20:14	1

# Client Sample Results

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

Job ID: 310-179622-1

**Client Sample ID: MW-24**

**Date Collected: 04/10/20 13:30**

**Date Received: 04/15/20 08:50**

**Lab Sample ID: 310-179622-7**

**Matrix: Ground Water**

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>24.8</b>		5.00		mg/L			04/18/20 01:06	5
Fluoride	<0.500		0.500		mg/L			04/18/20 01:06	5
<b>Sulfate</b>	<b>164</b>		5.00		mg/L			04/18/20 01:06	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/16/20 08:00	04/22/20 20:27	1
Arsenic	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 20:27	1
<b>Barium</b>	<b>0.0840</b>		0.00200		mg/L		04/16/20 08:00	04/22/20 20:27	1
Beryllium	<0.00100		0.00100		mg/L		04/16/20 08:00	04/22/20 20:27	1
Boron	<0.200	^	0.200		mg/L		04/16/20 08:00	04/22/20 20:27	1
<b>Calcium</b>	<b>94.3</b>		0.500		mg/L		04/16/20 08:00	04/22/20 20:27	1
Cobalt	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 20:27	1
Copper	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:27	1
Iron	<0.100		0.100		mg/L		04/16/20 08:00	04/22/20 20:27	1
Lead	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 20:27	1
<b>Magnesium</b>	<b>43.0</b>		0.500		mg/L		04/16/20 08:00	04/22/20 20:27	1
<b>Manganese</b>	<b>0.0156</b>		0.0100		mg/L		04/16/20 08:00	04/22/20 20:27	1
Molybdenum	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 20:27	1
Nickel	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:27	1
Selenium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:27	1
<b>Strontium</b>	<b>0.109</b>		0.00100		mg/L		04/16/20 08:00	04/22/20 20:27	1
Vanadium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:27	1
Zinc	<0.0200		0.0200		mg/L		04/16/20 08:00	04/22/20 20:27	1

# Client Sample Results

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

Job ID: 310-179622-1

**Client Sample ID: DUP-1**  
**Date Collected: 04/10/20 12:00**  
**Date Received: 04/15/20 08:50**

**Lab Sample ID: 310-179622-8**  
**Matrix: Ground Water**

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>8.05</b>		5.00		mg/L			04/18/20 02:39	5
Fluoride	<0.500		0.500		mg/L			04/18/20 02:39	5
<b>Sulfate</b>	<b>369</b>		5.00		mg/L			04/18/20 02:39	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/16/20 08:00	04/22/20 20:31	1
Arsenic	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 20:31	1
<b>Barium</b>	<b>0.0350</b>		0.00200		mg/L		04/16/20 08:00	04/22/20 20:31	1
Beryllium	<0.00100		0.00100		mg/L		04/16/20 08:00	04/22/20 20:31	1
<b>Boron</b>	<b>6.56</b>		1.40		mg/L		04/16/20 08:00	04/23/20 13:34	7
<b>Calcium</b>	<b>104</b>		0.500		mg/L		04/16/20 08:00	04/22/20 20:31	1
Cobalt	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 20:31	1
Copper	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:31	1
Iron	<0.100		0.100		mg/L		04/16/20 08:00	04/22/20 20:31	1
Lead	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 20:31	1
<b>Magnesium</b>	<b>46.6</b>		0.500		mg/L		04/16/20 08:00	04/22/20 20:31	1
Manganese	<0.0100		0.0100		mg/L		04/16/20 08:00	04/22/20 20:31	1
Molybdenum	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 20:31	1
<b>Nickel</b>	<b>0.00568</b>		0.00500		mg/L		04/16/20 08:00	04/22/20 20:31	1
<b>Selenium</b>	<b>0.00625</b>		0.00500		mg/L		04/16/20 08:00	04/22/20 20:31	1
<b>Strontium</b>	<b>0.174</b>		0.00100		mg/L		04/16/20 08:00	04/22/20 20:31	1
Vanadium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 20:31	1
Zinc	<0.0200		0.0200		mg/L		04/16/20 08:00	04/22/20 20:31	1

# Definitions/Glossary

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

Job ID: 310-179622-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

# QC Sample Results

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

Job ID: 310-179622-1

## Method: 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 310-276530/3**  
**Matrix: Water**  
**Analysis Batch: 276530**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			04/17/20 18:35	1
Fluoride	<0.100		0.100		mg/L			04/17/20 18:35	1
Sulfate	<1.00		1.00		mg/L			04/17/20 18:35	1

**Lab Sample ID: LCS 310-276530/4**  
**Matrix: Water**  
**Analysis Batch: 276530**

**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	10.08		mg/L		101	90 - 110
Fluoride	2.00	2.102		mg/L		105	90 - 110
Sulfate	10.0	10.64		mg/L		106	90 - 110

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

**Lab Sample ID: MB 310-275869/1-A**  
**Matrix: Water**  
**Analysis Batch: 276589**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 275869**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/16/20 08:00	04/22/20 19:20	1
Arsenic	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 19:20	1
Barium	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 19:20	1
Beryllium	<0.00100		0.00100		mg/L		04/16/20 08:00	04/22/20 19:20	1
Boron	<0.200		0.200		mg/L		04/16/20 08:00	04/22/20 19:20	1
Calcium	<0.500		0.500		mg/L		04/16/20 08:00	04/22/20 19:20	1
Cobalt	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 19:20	1
Copper	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 19:20	1
Iron	<0.100		0.100		mg/L		04/16/20 08:00	04/22/20 19:20	1
Lead	<0.000500		0.000500		mg/L		04/16/20 08:00	04/22/20 19:20	1
Magnesium	<0.500		0.500		mg/L		04/16/20 08:00	04/22/20 19:20	1
Manganese	<0.0100		0.0100		mg/L		04/16/20 08:00	04/22/20 19:20	1
Molybdenum	<0.00200		0.00200		mg/L		04/16/20 08:00	04/22/20 19:20	1
Nickel	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 19:20	1
Selenium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 19:20	1
Strontium	<0.00100		0.00100		mg/L		04/16/20 08:00	04/22/20 19:20	1
Vanadium	<0.00500		0.00500		mg/L		04/16/20 08:00	04/22/20 19:20	1
Zinc	<0.0200		0.0200		mg/L		04/16/20 08:00	04/22/20 19:20	1

**Lab Sample ID: LCS 310-275869/2-A**  
**Matrix: Water**  
**Analysis Batch: 276589**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 275869**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	4.00	4.156		mg/L		104	80 - 120
Arsenic	0.0800	0.07718		mg/L		96	80 - 120
Barium	0.0800	0.07699		mg/L		96	80 - 120
Beryllium	0.0400	0.04407		mg/L		110	80 - 120
Boron	1.76	1.723		mg/L		98	80 - 120

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# QC Sample Results

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

Job ID: 310-179622-1

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

**Lab Sample ID: LCS 310-275869/2-A**  
**Matrix: Water**  
**Analysis Batch: 276589**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 275869**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	4.00	3.803		mg/L		95	80 - 120
Cobalt	0.0400	0.04203		mg/L		105	80 - 120
Copper	0.0800	0.07744		mg/L		97	80 - 120
Iron	4.00	3.979		mg/L		99	80 - 120
Lead	0.0400	0.04197		mg/L		105	80 - 120
Magnesium	4.00	4.248		mg/L		106	80 - 120
Manganese	0.400	0.3983		mg/L		100	80 - 120
Nickel	0.0800	0.07861		mg/L		98	80 - 120
Selenium	0.0800	0.07521		mg/L		94	80 - 120
Strontium	0.0800	0.07601		mg/L		95	80 - 120
Vanadium	0.0800	0.08069		mg/L		101	80 - 120
Zinc	0.0800	0.08032		mg/L		100	80 - 120

**Lab Sample ID: LCS 310-275869/2-A**  
**Matrix: Water**  
**Analysis Batch: 276721**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 275869**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Molybdenum	0.0800	0.07688		mg/L		96	80 - 120

**Lab Sample ID: 310-179622-8 DU**  
**Matrix: Ground Water**  
**Analysis Batch: 276589**

**Client Sample ID: DUP-1**  
**Prep Type: Total/NA**  
**Prep Batch: 275869**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	<0.0500		<0.0500		mg/L		NC	20
Arsenic	<0.00200		<0.00200		mg/L		NC	20
Barium	0.0350		0.03594		mg/L		3	20
Beryllium	<0.00100		<0.00100		mg/L		NC	20
Calcium	104		105.3		mg/L		0.8	20
Cobalt	<0.000500		<0.000500		mg/L		NC	20
Copper	<0.00500		<0.00500		mg/L		NC	20
Iron	<0.100		<0.100		mg/L		NC	20
Lead	<0.000500		<0.000500		mg/L		NC	20
Magnesium	46.6		47.75		mg/L		2	20
Manganese	<0.0100		<0.0100		mg/L		NC	20
Molybdenum	<0.00200		<0.00200		mg/L		NC	20
Nickel	0.00568		0.005757		mg/L		1	20
Selenium	0.00625		0.006881		mg/L		10	20
Strontium	0.174		0.1774		mg/L		2	20
Vanadium	<0.00500		<0.00500		mg/L		NC	20
Zinc	<0.0200		<0.0200		mg/L		NC	20

**Lab Sample ID: 310-179622-8 DU**  
**Matrix: Ground Water**  
**Analysis Batch: 276721**

**Client Sample ID: DUP-1**  
**Prep Type: Total/NA**  
**Prep Batch: 275869**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Boron	6.56		6.640		mg/L		1	20

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# QC Association Summary

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

Job ID: 310-179622-1

## HPLC/IC

### Analysis Batch: 276530

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179622-1	MW-4A	Total/NA	Ground Water	9056A	
310-179622-2	MW-5B	Total/NA	Ground Water	9056A	
310-179622-3	MW-6A	Total/NA	Ground Water	9056A	
310-179622-4	MW-14A	Total/NA	Ground Water	9056A	
310-179622-4	MW-14A	Total/NA	Ground Water	9056A	
310-179622-5	MW-15A	Total/NA	Ground Water	9056A	
310-179622-6	MW-21	Total/NA	Ground Water	9056A	
310-179622-7	MW-24	Total/NA	Ground Water	9056A	
310-179622-8	DUP-1	Total/NA	Ground Water	9056A	
MB 310-276530/3	Method Blank	Total/NA	Water	9056A	
LCS 310-276530/4	Lab Control Sample	Total/NA	Water	9056A	

## Metals

### Prep Batch: 275869

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179622-1	MW-4A	Total/NA	Ground Water	3010A	
310-179622-2	MW-5B	Total/NA	Ground Water	3010A	
310-179622-3	MW-6A	Total/NA	Ground Water	3010A	
310-179622-4	MW-14A	Total/NA	Ground Water	3010A	
310-179622-5	MW-15A	Total/NA	Ground Water	3010A	
310-179622-6	MW-21	Total/NA	Ground Water	3010A	
310-179622-7	MW-24	Total/NA	Ground Water	3010A	
310-179622-8	DUP-1	Total/NA	Ground Water	3010A	
MB 310-275869/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-275869/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-179622-8 DU	DUP-1	Total/NA	Ground Water	3010A	

### Analysis Batch: 276589

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179622-1	MW-4A	Total/NA	Ground Water	6020A	275869
310-179622-2	MW-5B	Total/NA	Ground Water	6020A	275869
310-179622-3	MW-6A	Total/NA	Ground Water	6020A	275869
310-179622-4	MW-14A	Total/NA	Ground Water	6020A	275869
310-179622-5	MW-15A	Total/NA	Ground Water	6020A	275869
310-179622-6	MW-21	Total/NA	Ground Water	6020A	275869
310-179622-7	MW-24	Total/NA	Ground Water	6020A	275869
310-179622-8	DUP-1	Total/NA	Ground Water	6020A	275869
MB 310-275869/1-A	Method Blank	Total/NA	Water	6020A	275869
LCS 310-275869/2-A	Lab Control Sample	Total/NA	Water	6020A	275869
310-179622-8 DU	DUP-1	Total/NA	Ground Water	6020A	275869

### Analysis Batch: 276721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179622-4	MW-14A	Total/NA	Ground Water	6020A	275869
310-179622-5	MW-15A	Total/NA	Ground Water	6020A	275869
310-179622-6	MW-21	Total/NA	Ground Water	6020A	275869
310-179622-8	DUP-1	Total/NA	Ground Water	6020A	275869
LCS 310-275869/2-A	Lab Control Sample	Total/NA	Water	6020A	275869
310-179622-8 DU	DUP-1	Total/NA	Ground Water	6020A	275869



# Lab Chronicle

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

Job ID: 310-179622-1

## Client Sample ID: MW-4A

Date Collected: 04/13/20 18:40

Date Received: 04/15/20 08:50

## Lab Sample ID: 310-179622-1

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276530	04/17/20 22:14	ACJ	TAL CF
Total/NA	Prep	3010A			275869	04/16/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276589	04/22/20 19:57	SAD	TAL CF

## Client Sample ID: MW-5B

Date Collected: 04/13/20 16:25

Date Received: 04/15/20 08:50

## Lab Sample ID: 310-179622-2

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276530	04/17/20 22:29	ACJ	TAL CF
Total/NA	Prep	3010A			275869	04/16/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276589	04/22/20 20:00	SAD	TAL CF

## Client Sample ID: MW-6A

Date Collected: 04/13/20 17:25

Date Received: 04/15/20 08:50

## Lab Sample ID: 310-179622-3

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276530	04/17/20 22:45	ACJ	TAL CF
Total/NA	Prep	3010A			275869	04/16/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276589	04/22/20 20:04	SAD	TAL CF

## Client Sample ID: MW-14A

Date Collected: 04/13/20 08:25

Date Received: 04/15/20 08:50

## Lab Sample ID: 310-179622-4

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276530	04/17/20 23:01	ACJ	TAL CF
Total/NA	Analysis	9056A		20	276530	04/17/20 23:16	ACJ	TAL CF
Total/NA	Prep	3010A			275869	04/16/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276589	04/22/20 20:07	SAD	TAL CF
Total/NA	Prep	3010A			275869	04/16/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		7	276721	04/23/20 13:24	SAD	TAL CF

## Client Sample ID: MW-15A

Date Collected: 04/10/20 16:25

Date Received: 04/15/20 08:50

## Lab Sample ID: 310-179622-5

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276530	04/17/20 23:32	ACJ	TAL CF
Total/NA	Prep	3010A			275869	04/16/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276589	04/22/20 20:10	SAD	TAL CF
Total/NA	Prep	3010A			275869	04/16/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		7	276721	04/23/20 13:27	SAD	TAL CF

# Lab Chronicle

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

Job ID: 310-179622-1

## Client Sample ID: MW-21

Date Collected: 04/10/20 11:50

Date Received: 04/15/20 08:50

## Lab Sample ID: 310-179622-6

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276530	04/18/20 00:03	ACJ	TAL CF
Total/NA	Prep	3010A			275869	04/16/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276589	04/22/20 20:14	SAD	TAL CF
Total/NA	Prep	3010A			275869	04/16/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		7	276721	04/23/20 13:31	SAD	TAL CF

## Client Sample ID: MW-24

Date Collected: 04/10/20 13:30

Date Received: 04/15/20 08:50

## Lab Sample ID: 310-179622-7

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276530	04/18/20 01:06	ACJ	TAL CF
Total/NA	Prep	3010A			275869	04/16/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276589	04/22/20 20:27	SAD	TAL CF

## Client Sample ID: DUP-1

Date Collected: 04/10/20 12:00

Date Received: 04/15/20 08:50

## Lab Sample ID: 310-179622-8

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276530	04/18/20 02:39	ACJ	TAL CF
Total/NA	Prep	3010A			275869	04/16/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276589	04/22/20 20:31	SAD	TAL CF
Total/NA	Prep	3010A			275869	04/16/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		7	276721	04/23/20 13:34	SAD	TAL CF

### Laboratory References:

TAL CF = Eurofins TestAmerica, 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: 310-179622-1

## Laboratory: Eurofins TestAmerica, 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
AIHA-LAP, LLC	Industrial Hygiene Laboratory Accreditation Program (IHLAP)	101044	11-01-20
Colorado	Petroleum Storage Tank Program	IA100001 (OR)	09-29-20
Georgia	State	IA100001 (OR)	09-29-20
Illinois	NELAP	200024	11-29-20
Iowa	State	007	12-01-21
Kansas	NELAP	E-10341	01-31-20 *
Minnesota	NELAP	019-999-319	12-31-20
Minnesota (Petrofund)	State	3349	08-22-21
North Dakota	State	R-186	09-30-20
Oregon	NELAP	IA100001	09-29-20
USDA	US Federal Programs	P330-19-00003	01-02-22

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

Eurofins TestAmerica, Cedar Falls

# Method Summary

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

Job ID: 310-179622-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	TAL CF
6020A	Metals (ICP/MS)	SW846	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF

**Protocol References:**

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

**Laboratory References:**

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





Environment Testing  
TestAmerica



310-179622 Chain of Custody

**Cooler/Sample Receipt and Temperature Log Form**

<b>Client Information</b>	
Client: <u>Sam Bennett MP&amp;W &amp; Rose</u>	
City/State: <u>Muscatine IA</u>	Project: <u>Muscatine Power</u>
<b>Receipt Information</b>	
Date/Time Received: DATE <u>4/13/20</u> TIME <u>0930</u>	Received By: <u>ae</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: _____	
<b>Condition of Cooler/Containers</b>	
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>2</u>
Cooler Custody Seals Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? <u>1</u>
<b>Temperature Record</b>	
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>0.0</u>
• <b>Temp Blank Temperature</b> – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature	
Uncorrected Temp (°C): <u>0.6</u>	Corrected Temp (°C): <u>0.6</u>
• <b>Sample Container Temperature</b>	
Container(s) used:	CONTAINER 1                      CONTAINER 2
Uncorrected Temp (°C):	
Corrected Temp (°C):	
<b>Exceptions Noted</b>	
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	
<b>Additional Comments</b>	

Document: CF-LG-WI-002  
Revision: 25  
Date: 06/17/2019


Eurofins TestAmerica, Cedar Falls

General temperature criteria is 0 to 6°C  
Bacteria temperature criteria is 0 to 10°C



**Cooler/Sample Receipt and Temperature Log Form**

<b>Client Information</b>		
Client: <u>Sam Bennett</u>		
City/State: <u>Muscatine IA</u>	Project: <u>Muscatine Power</u>	
<b>Receipt Information</b>		
Date/Time Received: <u>7/15/20</u> <u>0840</u>	Received By: <u>AL</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: _____		
<b>Condition of Cooler/Containers</b>		
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>2</u>
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
<b>Temperature Record</b>		
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>0.0</u>	
• <b>Temp Blank Temperature</b> – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>1.2</u>	Corrected Temp (°C): <u>1.2</u>	
• <b>Sample Container Temperature</b>		
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):		
Corrected Temp (°C):		
<b>Exceptions Noted</b>		
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		
<b>Additional Comments</b>		

<b>Client Information</b>		Lab PM: <b>Hayes, Shawn M</b>		COC No:	
Client Contact: <b>Sam Bennett</b>		E-Mail: <b>shawn.hayes@testamericainc.com</b>		Page:	
Company: <b>Muscatine Power &amp; Water</b>		Due Date Requested:		Job #:	
Address: <b>1700 Dick Drake Way</b>		TAT Requested (days):		Preservation Codes:	
City: <b>Muscatine</b>		PO #: <b>201968</b>		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NiH2SO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
State Zip: <b>IA, 52761</b>		WG #:		M - Hexane N - None O - AsNaO2 P - Na2OAS Q - Na2SO3 R - Na2SO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
Phone:		Event: <b>Spring Sampling</b>		Special Instructions/Note:	
Email: <b>sbennet@mpw.org and ramundson@hrgreen.com</b>		TestAmerica Project #:		Shipment 2 4/14/20	
Project Name: <b>Muscatine Power &amp; Water CCR Landfill</b>		31007856		Shipment 2 4/14/20	
Site: <b>Iowa</b>		Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/>		Shipment 2 4/14/20	
Sample Identification		Perform MS/MSD (Yes or No) <input checked="" type="checkbox"/>		Shipment 1	
Sample ID	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Preservation Code	Method of Shipment
MW4A	4/13/20	1840	G	GW	Shipment 2 4/14/20
MW5B	4/13/20	1625	G	GW	Shipment 2 4/14/20
MW6A	4/13/20	1725	G	GW	Shipment 2 4/14/20
MW6B	4/8/20	4245	G	GW	Shipment 1
MW40	4/7/20	4820	G	GW	Shipment 1
MW14A	4/13/20	0825	G	GW	Shipment 2 4/14/20
MW15A	4/10/20	1625	G	GW	Shipment 2 4/14/20
MW21	4/10/20	1150	G	GW	Shipment 2 4/14/20
MW22	4/8/20	4000	G	GW	Shipment 1
MW23	4/8/20	4130	G	GW	Shipment 1
MW24	4/10/20	1330	G	GW	Shipment 2 4/14/20
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, IV, Other (specify)					
Empty Kit Relinquished by: _____ Date: _____ Relinquished by: Sam Bennett Date/Time: 4/14/20 0900 Relinquished by: _____ Date/Time: _____ Relinquished by: _____ Date/Time: _____					
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:					
Received by:  Date/Time: 4/15/20 Company: <b>0850</b> Received by: _____ Date/Time: _____ Company: _____ Received by: _____ Date/Time: _____ Company: _____					
Cooler Temperature(s) °C and Other Remarks:					



<b>Client Information</b> 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:  Email: sbennett@mpw.org and ramundson@hrgreen.com Project Name: Muscatine Power & Water CCR Landfill Site: Iowa		Lab P.M. Hayes, Shawn M E-Mail shawn.hayes@testamericainc.com		Carrier Tracking No(s):  COC No.:  Page:  Job #: 																																																								
Due Date Requested: TAT Requested (days):  PO #: 201968 WO #:  TestAmerica Project #: 31007856 Event: Spring Sampling		<b>Analysis Requested</b> <table border="1"> <tr> <th>Sample ID</th> <th>Sample Date</th> <th>Sample Time</th> <th>Sample Type (C=comp, G=grab)</th> <th>Preservation Code:</th> <th>Field Filtered Sample (Yes or No)</th> <th>Perform MS/MSD (Yes or No)</th> <th>9020A State Metals List</th> <th>9056A Chloride, Fluoride, Sulfate</th> <th>Total Number of Containers</th> <th>Special Instructions/Note:</th> </tr> <tr> <td>MW25B</td> <td></td> <td></td> <td></td> <td>GW</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>not installed yet</td> </tr> <tr> <td>MW26</td> <td></td> <td></td> <td></td> <td>GW</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>not installed yet</td> </tr> <tr> <td>Duplicate-1</td> <td>4/10/20</td> <td>1200</td> <td>G</td> <td>GW</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>Shipment 2 4/14/20</td> </tr> <tr> <td>Duplicate-2</td> <td>4/8/20</td> <td>4200</td> <td>G</td> <td>GW</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>Shipment 1</td> </tr> </table>				Sample ID	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Preservation Code:	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9020A State Metals List	9056A Chloride, Fluoride, Sulfate	Total Number of Containers	Special Instructions/Note:	MW25B				GW	X	X	X	X	X	not installed yet	MW26				GW	X	X	X	X	X	not installed yet	Duplicate-1	4/10/20	1200	G	GW	X	X	X	X	X	Shipment 2 4/14/20	Duplicate-2	4/8/20	4200	G	GW	X	X	X	X	X	Shipment 1
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Custody Seal No.: Δ Yes Δ No		Received by: Received by: Received by: Cooler Temperature(s) °C and Other Remarks:																																																										





Temperature readings: \_\_\_\_\_

Client Sample ID	Lab ID	Container Type	Container		Preservative	
			pH	Temp	Added (mls)	Lot #
MW-4A	310-179622-A-1	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-4A	310-179622-C-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-4A	310-179622-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-5B	310-179622-A-2	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-5B	310-179622-C-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-5B	310-179622-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-6A	310-179622-A-3	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-6A	310-179622-C-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-6A	310-179622-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-14A	310-179622-A-4	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-14A	310-179622-C-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-14A	310-179622-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-15A	310-179622-A-5	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-15A	310-179622-C-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-15A	310-179622-D-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-21	310-179622-A-6	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-21	310-179622-C-6	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-21	310-179622-D-6	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-24	310-179622-A-7	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
DUP-1	310-179622-A-8	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
DUP-1	310-179622-C-8	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
DUP-1	310-179622-D-8	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____



## Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-179622-1

**Login Number: 179622**

**List Source: Eurofins TestAmerica, Cedar Falls**

**List Number: 1**

**Creator: Lickness, Corina A**

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

Laboratory Job ID: 310-179642-1

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:  
4/28/2020 2:54:54 PM

Shawn Hayes, Senior Project Manager  
(319)229-8211  
[shawn.hayes@testamericainc.com](mailto:shawn.hayes@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*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: 310-179642-1

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## Job ID: 310-179642-1

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### Laboratory: Eurofins TestAmerica, Cedar Falls

#### Narrative

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#### Job Narrative 310-179642-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 4/15/2020 8:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 0.6° C and 1.2° C.

#### HPLC/IC

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

#### Metals

Method 6020A: The continuing calibration verification (CCV) associated with batch 310-276721 recovered above the upper control limit for Selenium. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated sample is impacted: SW-24 (310-179642-3).

Method 6020A: Due to sample matrix effect on the internal standard (ISTD), a dilution was required for the following sample: SW-24 (310-179642-3).

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

Job ID: 310-179642-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-179642-1	SW-22	Surface Water	04/10/20 14:15	04/15/20 08:50	
310-179642-2	SW-23	Surface Water	04/10/20 15:20	04/15/20 08:50	
310-179642-3	SW-24	Surface Water	04/10/20 15:00	04/15/20 08:50	
310-179642-4	SW-25	Surface Water	04/10/20 13:55	04/15/20 08:50	
310-179642-5	SW-26	Surface Water	04/10/20 15:40	04/15/20 08:50	

- 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: 310-179642-1

## Client Sample ID: SW-22

## Lab Sample ID: 310-179642-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	14.5		5.00		mg/L	5		9056A	Total/NA
Sulfate	16.3	F1	5.00		mg/L	5		9056A	Total/NA
Aluminum	0.0821		0.0500		mg/L	1		6020A	Total/NA
Barium	0.0967		0.00200		mg/L	1		6020A	Total/NA
Calcium	59.6		0.500		mg/L	1		6020A	Total/NA
Iron	0.363		0.100		mg/L	1		6020A	Total/NA
Magnesium	26.4		0.500		mg/L	1		6020A	Total/NA
Manganese	0.217		0.0100		mg/L	1		6020A	Total/NA
Strontium	0.128		0.00100		mg/L	1		6020A	Total/NA

## Client Sample ID: SW-23

## Lab Sample ID: 310-179642-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	15.6		5.00		mg/L	5		9056A	Total/NA
Fluoride	0.597		0.500		mg/L	5		9056A	Total/NA
Sulfate	41.5		5.00		mg/L	5		9056A	Total/NA
Aluminum	0.0578		0.0500		mg/L	1		6020A	Total/NA
Barium	0.0806		0.00200		mg/L	1		6020A	Total/NA
Boron	0.898		0.200		mg/L	1		6020A	Total/NA
Calcium	68.6		0.500		mg/L	1		6020A	Total/NA
Iron	0.275		0.100		mg/L	1		6020A	Total/NA
Magnesium	28.5		0.500		mg/L	1		6020A	Total/NA
Manganese	0.140		0.0100		mg/L	1		6020A	Total/NA
Strontium	0.141		0.00100		mg/L	1		6020A	Total/NA

## Client Sample ID: SW-24

## Lab Sample ID: 310-179642-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	17.1		5.00		mg/L	5		9056A	Total/NA
Sulfate	572		20.0		mg/L	20		9056A	Total/NA
Barium	0.0254		0.00200		mg/L	1		6020A	Total/NA
Boron	8.58		0.800		mg/L	4		6020A	Total/NA
Calcium	242		0.500		mg/L	1		6020A	Total/NA
Magnesium	88.1		2.00		mg/L	4		6020A	Total/NA
Strontium	0.358		0.00100		mg/L	1		6020A	Total/NA

## Client Sample ID: SW-25

## Lab Sample ID: 310-179642-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	17.1		5.00		mg/L	5		9056A	Total/NA
Sulfate	322		5.00		mg/L	5		9056A	Total/NA
Barium	0.0548		0.00200		mg/L	1		6020A	Total/NA
Boron	3.80		0.200		mg/L	1		6020A	Total/NA
Calcium	168		0.500		mg/L	1		6020A	Total/NA
Magnesium	53.0		0.500		mg/L	1		6020A	Total/NA
Manganese	0.0156		0.0100		mg/L	1		6020A	Total/NA
Strontium	0.315		0.00100		mg/L	1		6020A	Total/NA

## Client Sample ID: SW-26

## Lab Sample ID: 310-179642-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	15.8		5.00		mg/L	5		9056A	Total/NA
Sulfate	45.9		5.00		mg/L	5		9056A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Detection Summary

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

Job ID: 310-179642-1

**Client Sample ID: SW-26 (Continued)**

**Lab Sample ID: 310-179642-5**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	0.134		0.0500		mg/L	1		6020A	Total/NA
Arsenic	0.00368		0.00200		mg/L	1		6020A	Total/NA
Barium	0.0780		0.00200		mg/L	1		6020A	Total/NA
Boron	0.745		0.200		mg/L	1		6020A	Total/NA
Calcium	65.5		0.500		mg/L	1		6020A	Total/NA
Iron	0.439		0.100		mg/L	1		6020A	Total/NA
Magnesium	28.2		0.500		mg/L	1		6020A	Total/NA
Manganese	0.241		0.0100		mg/L	1		6020A	Total/NA
Strontium	0.156		0.00100		mg/L	1		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls



# Client Sample Results

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

Job ID: 310-179642-1

**Client Sample ID: SW-22**

**Lab Sample ID: 310-179642-1**

Date Collected: 04/10/20 14:15

Matrix: Surface Water

Date Received: 04/15/20 08:50

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>14.5</b>		5.00		mg/L			04/20/20 14:43	5
Fluoride	<0.500		0.500		mg/L			04/20/20 14:43	5
<b>Sulfate</b>	<b>16.3</b>	<b>F1</b>	5.00		mg/L			04/20/20 14:43	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>0.0821</b>		0.0500		mg/L		04/17/20 08:00	04/23/20 19:51	1
Arsenic	<0.00200		0.00200		mg/L		04/17/20 08:00	04/23/20 19:51	1
<b>Barium</b>	<b>0.0967</b>		0.00200		mg/L		04/17/20 08:00	04/23/20 19:51	1
Beryllium	<0.00100		0.00100		mg/L		04/17/20 08:00	04/23/20 19:51	1
Boron	<0.200		0.200		mg/L		04/17/20 08:00	04/24/20 19:28	1
<b>Calcium</b>	<b>59.6</b>		0.500		mg/L		04/17/20 08:00	04/23/20 19:51	1
Cobalt	<0.000500		0.000500		mg/L		04/17/20 08:00	04/23/20 19:51	1
Copper	<0.00500		0.00500		mg/L		04/17/20 08:00	04/23/20 19:51	1
<b>Iron</b>	<b>0.363</b>		0.100		mg/L		04/17/20 08:00	04/23/20 19:51	1
Lead	<0.000500		0.000500		mg/L		04/17/20 08:00	04/23/20 19:51	1
<b>Magnesium</b>	<b>26.4</b>		0.500		mg/L		04/17/20 08:00	04/23/20 19:51	1
<b>Manganese</b>	<b>0.217</b>		0.0100		mg/L		04/17/20 08:00	04/23/20 19:51	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/20 08:00	04/23/20 19:51	1
Nickel	<0.00500		0.00500		mg/L		04/17/20 08:00	04/24/20 19:28	1
Selenium	<0.00500		0.00500		mg/L		04/17/20 08:00	04/24/20 19:28	1
<b>Strontium</b>	<b>0.128</b>		0.00100		mg/L		04/17/20 08:00	04/23/20 19:51	1
Vanadium	<0.00500		0.00500		mg/L		04/17/20 08:00	04/23/20 19:51	1
Zinc	<0.0200		0.0200		mg/L		04/17/20 08:00	04/23/20 19:51	1

# Client Sample Results

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

Job ID: 310-179642-1

**Client Sample ID: SW-23**

**Lab Sample ID: 310-179642-2**

Date Collected: 04/10/20 15:20

Matrix: Surface Water

Date Received: 04/15/20 08:50

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	15.6		5.00		mg/L			04/20/20 23:16	5
Fluoride	0.597		0.500		mg/L			04/20/20 23:16	5
Sulfate	41.5		5.00		mg/L			04/20/20 23:16	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	0.0578		0.0500		mg/L		04/17/20 08:00	04/23/20 20:15	1
Arsenic	<0.00200		0.00200		mg/L		04/17/20 08:00	04/23/20 20:15	1
Barium	0.0806		0.00200		mg/L		04/17/20 08:00	04/23/20 20:15	1
Beryllium	<0.00100		0.00100		mg/L		04/17/20 08:00	04/23/20 20:15	1
Boron	0.898		0.200		mg/L		04/17/20 08:00	04/24/20 19:38	1
Calcium	68.6		0.500		mg/L		04/17/20 08:00	04/23/20 20:15	1
Cobalt	<0.000500		0.000500		mg/L		04/17/20 08:00	04/23/20 20:15	1
Copper	<0.00500		0.00500		mg/L		04/17/20 08:00	04/23/20 20:15	1
Iron	0.275		0.100		mg/L		04/17/20 08:00	04/23/20 20:15	1
Lead	<0.000500		0.000500		mg/L		04/17/20 08:00	04/23/20 20:15	1
Magnesium	28.5		0.500		mg/L		04/17/20 08:00	04/23/20 20:15	1
Manganese	0.140		0.0100		mg/L		04/17/20 08:00	04/23/20 20:15	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/20 08:00	04/23/20 20:15	1
Nickel	<0.00500		0.00500		mg/L		04/17/20 08:00	04/24/20 19:38	1
Selenium	<0.00500		0.00500		mg/L		04/17/20 08:00	04/24/20 19:38	1
Strontium	0.141		0.00100		mg/L		04/17/20 08:00	04/23/20 20:15	1
Vanadium	<0.00500		0.00500		mg/L		04/17/20 08:00	04/23/20 20:15	1
Zinc	<0.0200		0.0200		mg/L		04/17/20 08:00	04/23/20 20:15	1

# Client Sample Results

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

Job ID: 310-179642-1

**Client Sample ID: SW-24**

**Lab Sample ID: 310-179642-3**

**Date Collected: 04/10/20 15:00**

**Matrix: Surface Water**

**Date Received: 04/15/20 08:50**

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>17.1</b>		5.00		mg/L			04/20/20 23:31	5
Fluoride	<0.500		0.500		mg/L			04/20/20 23:31	5
<b>Sulfate</b>	<b>572</b>		20.0		mg/L			04/20/20 23:47	20

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/17/20 08:00	04/23/20 20:18	1
Arsenic	<0.00200		0.00200		mg/L		04/17/20 08:00	04/23/20 20:18	1
<b>Barium</b>	<b>0.0254</b>		0.00200		mg/L		04/17/20 08:00	04/23/20 20:18	1
Beryllium	<0.00100		0.00100		mg/L		04/17/20 08:00	04/23/20 20:18	1
<b>Boron</b>	<b>8.58</b>		0.800		mg/L		04/17/20 08:00	04/24/20 19:42	4
<b>Calcium</b>	<b>242</b>		0.500		mg/L		04/17/20 08:00	04/23/20 20:18	1
Cobalt	<0.000500		0.000500		mg/L		04/17/20 08:00	04/23/20 20:18	1
Copper	<0.00500		0.00500		mg/L		04/17/20 08:00	04/23/20 20:18	1
Iron	<0.100		0.100		mg/L		04/17/20 08:00	04/23/20 20:18	1
Lead	<0.000500		0.000500		mg/L		04/17/20 08:00	04/23/20 20:18	1
<b>Magnesium</b>	<b>88.1</b>		2.00		mg/L		04/17/20 08:00	04/24/20 19:42	4
Manganese	<0.0100		0.0100		mg/L		04/17/20 08:00	04/23/20 20:18	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/20 08:00	04/23/20 20:18	1
Nickel	<0.0200		0.0200		mg/L		04/17/20 08:00	04/24/20 19:42	4
Selenium	<0.00500	^	0.00500		mg/L		04/17/20 08:00	04/23/20 20:18	1
<b>Strontium</b>	<b>0.358</b>		0.00100		mg/L		04/17/20 08:00	04/23/20 20:18	1
Vanadium	<0.00500		0.00500		mg/L		04/17/20 08:00	04/23/20 20:18	1
Zinc	<0.0200		0.0200		mg/L		04/17/20 08:00	04/23/20 20:18	1

# Client Sample Results

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

Job ID: 310-179642-1

**Client Sample ID: SW-25**

**Lab Sample ID: 310-179642-4**

Date Collected: 04/10/20 13:55

Matrix: Surface Water

Date Received: 04/15/20 08:50

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>17.1</b>		5.00		mg/L			04/21/20 00:34	5
Fluoride	<0.500		0.500		mg/L			04/21/20 00:34	5
<b>Sulfate</b>	<b>322</b>		5.00		mg/L			04/21/20 00:34	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/17/20 08:00	04/23/20 20:21	1
Arsenic	<0.00200		0.00200		mg/L		04/17/20 08:00	04/23/20 20:21	1
<b>Barium</b>	<b>0.0548</b>		0.00200		mg/L		04/17/20 08:00	04/23/20 20:21	1
Beryllium	<0.00100		0.00100		mg/L		04/17/20 08:00	04/23/20 20:21	1
<b>Boron</b>	<b>3.80</b>		0.200		mg/L		04/17/20 08:00	04/24/20 19:55	1
<b>Calcium</b>	<b>168</b>		0.500		mg/L		04/17/20 08:00	04/23/20 20:21	1
Cobalt	<0.000500		0.000500		mg/L		04/17/20 08:00	04/23/20 20:21	1
Copper	<0.00500		0.00500		mg/L		04/17/20 08:00	04/23/20 20:21	1
Iron	<0.100		0.100		mg/L		04/17/20 08:00	04/23/20 20:21	1
Lead	<0.000500		0.000500		mg/L		04/17/20 08:00	04/23/20 20:21	1
<b>Magnesium</b>	<b>53.0</b>		0.500		mg/L		04/17/20 08:00	04/23/20 20:21	1
<b>Manganese</b>	<b>0.0156</b>		0.0100		mg/L		04/17/20 08:00	04/23/20 20:21	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/20 08:00	04/23/20 20:21	1
Nickel	<0.00500		0.00500		mg/L		04/17/20 08:00	04/24/20 19:55	1
Selenium	<0.00500		0.00500		mg/L		04/17/20 08:00	04/24/20 19:55	1
<b>Strontium</b>	<b>0.315</b>		0.00100		mg/L		04/17/20 08:00	04/23/20 20:21	1
Vanadium	<0.00500		0.00500		mg/L		04/17/20 08:00	04/23/20 20:21	1
Zinc	<0.0200		0.0200		mg/L		04/17/20 08:00	04/23/20 20:21	1

# Client Sample Results

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

Job ID: 310-179642-1

**Client Sample ID: SW-26**

**Lab Sample ID: 310-179642-5**

Date Collected: 04/10/20 15:40

Matrix: Surface Water

Date Received: 04/15/20 08:50

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>15.8</b>		5.00		mg/L			04/20/20 17:32	5
Fluoride	<0.500		0.500		mg/L			04/20/20 17:32	5
<b>Sulfate</b>	<b>45.9</b>		5.00		mg/L			04/20/20 17:32	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>0.134</b>		0.0500		mg/L		04/17/20 08:00	04/23/20 20:25	1
<b>Arsenic</b>	<b>0.00368</b>		0.00200		mg/L		04/17/20 08:00	04/23/20 20:25	1
<b>Barium</b>	<b>0.0780</b>		0.00200		mg/L		04/17/20 08:00	04/23/20 20:25	1
Beryllium	<0.00100		0.00100		mg/L		04/17/20 08:00	04/23/20 20:25	1
<b>Boron</b>	<b>0.745</b>		0.200		mg/L		04/17/20 08:00	04/24/20 19:58	1
<b>Calcium</b>	<b>65.5</b>		0.500		mg/L		04/17/20 08:00	04/23/20 20:25	1
Cobalt	<0.000500		0.000500		mg/L		04/17/20 08:00	04/23/20 20:25	1
Copper	<0.00500		0.00500		mg/L		04/17/20 08:00	04/23/20 20:25	1
<b>Iron</b>	<b>0.439</b>		0.100		mg/L		04/17/20 08:00	04/23/20 20:25	1
Lead	<0.000500		0.000500		mg/L		04/17/20 08:00	04/23/20 20:25	1
<b>Magnesium</b>	<b>28.2</b>		0.500		mg/L		04/17/20 08:00	04/23/20 20:25	1
<b>Manganese</b>	<b>0.241</b>		0.0100		mg/L		04/17/20 08:00	04/23/20 20:25	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/20 08:00	04/23/20 20:25	1
Nickel	<0.00500		0.00500		mg/L		04/17/20 08:00	04/24/20 19:58	1
Selenium	<0.00500		0.00500		mg/L		04/17/20 08:00	04/24/20 19:58	1
<b>Strontium</b>	<b>0.156</b>		0.00100		mg/L		04/17/20 08:00	04/23/20 20:25	1
Vanadium	<0.00500		0.00500		mg/L		04/17/20 08:00	04/23/20 20:25	1
Zinc	<0.0200		0.0200		mg/L		04/17/20 08:00	04/23/20 20:25	1

# Definitions/Glossary

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

Job ID: 310-179642-1

## Qualifiers

### HPLC/IC

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.

### Metals

Qualifier	Qualifier Description
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
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
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)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
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)

# QC Sample Results

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

Job ID: 310-179642-1

## Method: 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 310-276540/3**  
**Matrix: Water**  
**Analysis Batch: 276540**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			04/20/20 13:04	1
Fluoride	<0.100		0.100		mg/L			04/20/20 13:04	1
Sulfate	<1.00		1.00		mg/L			04/20/20 13:04	1

**Lab Sample ID: LCS 310-276540/4**  
**Matrix: Water**  
**Analysis Batch: 276540**

**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	9.611		mg/L		96	90 - 110
Fluoride	2.00	2.118		mg/L		106	90 - 110
Sulfate	10.0	9.934		mg/L		99	90 - 110

**Lab Sample ID: 310-179642-1 MS**  
**Matrix: Surface Water**  
**Analysis Batch: 276540**

**Client Sample ID: SW-22**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	14.5		25.0	36.27		mg/L		87	80 - 120
Fluoride	<0.500		5.00	5.339		mg/L		100	80 - 120
Sulfate	16.3	F1	25.0	35.88	F1	mg/L		78	80 - 120

**Lab Sample ID: 310-179642-1 MSD**  
**Matrix: Surface Water**  
**Analysis Batch: 276540**

**Client Sample ID: SW-22**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	14.5		25.0	36.89		mg/L		90	80 - 120	2	15
Fluoride	<0.500		5.00	5.530		mg/L		104	80 - 120	4	15
Sulfate	16.3	F1	25.0	41.02		mg/L		99	80 - 120	13	15

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

**Lab Sample ID: MB 310-276018/1-A**  
**Matrix: Water**  
**Analysis Batch: 276721**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 276018**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0500		0.0500		mg/L		04/17/20 08:00	04/23/20 19:45	1
Arsenic	<0.00200		0.00200		mg/L		04/17/20 08:00	04/23/20 19:45	1
Barium	<0.00200		0.00200		mg/L		04/17/20 08:00	04/23/20 19:45	1
Beryllium	<0.00100		0.00100		mg/L		04/17/20 08:00	04/23/20 19:45	1
Calcium	<0.500		0.500		mg/L		04/17/20 08:00	04/23/20 19:45	1
Cobalt	<0.000500		0.000500		mg/L		04/17/20 08:00	04/23/20 19:45	1
Copper	<0.00500		0.00500		mg/L		04/17/20 08:00	04/23/20 19:45	1
Iron	<0.100		0.100		mg/L		04/17/20 08:00	04/23/20 19:45	1
Lead	<0.000500		0.000500		mg/L		04/17/20 08:00	04/23/20 19:45	1
Magnesium	<0.500		0.500		mg/L		04/17/20 08:00	04/23/20 19:45	1
Manganese	<0.0100		0.0100		mg/L		04/17/20 08:00	04/23/20 19:45	1
Molybdenum	<0.00200		0.00200		mg/L		04/17/20 08:00	04/23/20 19:45	1

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

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

Job ID: 310-179642-1

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

**Lab Sample ID: MB 310-276018/1-A**  
**Matrix: Water**  
**Analysis Batch: 276721**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 276018**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Strontium	<0.00100		0.00100		mg/L		04/17/20 08:00	04/23/20 19:45	1
Vanadium	<0.00500		0.00500		mg/L		04/17/20 08:00	04/23/20 19:45	1
Zinc	<0.0200		0.0200		mg/L		04/17/20 08:00	04/23/20 19:45	1

**Lab Sample ID: MB 310-276018/1-A**  
**Matrix: Water**  
**Analysis Batch: 276834**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 276018**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	<0.200		0.200		mg/L		04/17/20 08:00	04/24/20 19:22	1
Nickel	<0.00500		0.00500		mg/L		04/17/20 08:00	04/24/20 19:22	1
Selenium	<0.00500		0.00500		mg/L		04/17/20 08:00	04/24/20 19:22	1

**Lab Sample ID: LCS 310-276018/2-A**  
**Matrix: Water**  
**Analysis Batch: 276721**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 276018**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Aluminum	4.00	4.490		mg/L		112	80 - 120
Arsenic	0.0800	0.08392		mg/L		105	80 - 120
Barium	0.0800	0.08757		mg/L		109	80 - 120
Beryllium	0.0400	0.04313		mg/L		108	80 - 120
Calcium	4.00	4.490		mg/L		112	80 - 120
Cobalt	0.0400	0.04458		mg/L		111	80 - 120
Copper	0.0800	0.08819		mg/L		110	80 - 120
Iron	4.00	4.509		mg/L		113	80 - 120
Lead	0.0400	0.04536		mg/L		113	80 - 120
Magnesium	4.00	4.532		mg/L		113	80 - 120
Manganese	0.400	0.4708		mg/L		118	80 - 120
Molybdenum	0.0800	0.06632		mg/L		83	80 - 120
Strontium	0.0800	0.08667		mg/L		108	80 - 120
Vanadium	0.0800	0.08468		mg/L		106	80 - 120
Zinc	0.0800	0.09239		mg/L		115	80 - 120

**Lab Sample ID: LCS 310-276018/2-A**  
**Matrix: Water**  
**Analysis Batch: 276834**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 276018**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	1.76	1.789		mg/L		102	80 - 120
Nickel	0.0800	0.07918		mg/L		99	80 - 120
Selenium	0.0800	0.07943		mg/L		99	80 - 120

**Lab Sample ID: 310-179642-1 MS**  
**Matrix: Surface Water**  
**Analysis Batch: 276721**

**Client Sample ID: SW-22**  
**Prep Type: Total/NA**  
**Prep Batch: 276018**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Aluminum	0.0821		4.00	4.533		mg/L		111	75 - 125
Arsenic	<0.00200		0.0800	0.08852		mg/L		109	75 - 125

Eurofins TestAmerica, Cedar Falls



# QC Sample Results

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

Job ID: 310-179642-1

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

**Lab Sample ID: 310-179642-1 MS**  
**Matrix: Surface Water**  
**Analysis Batch: 276721**

**Client Sample ID: SW-22**  
**Prep Type: Total/NA**  
**Prep Batch: 276018**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Barium	0.0967		0.0800	0.1808		mg/L		105	75 - 125
Beryllium	<0.00100		0.0400	0.04336		mg/L		108	75 - 125
Boron	<0.200		1.76	2.087		mg/L		119	75 - 125
Calcium	59.6		4.00	63.49	4	mg/L		98	75 - 125
Cobalt	<0.000500		0.0400	0.04347		mg/L		108	75 - 125
Copper	<0.00500		0.0800	0.08547		mg/L		107	75 - 125
Iron	0.363		4.00	4.907		mg/L		114	75 - 125
Lead	<0.000500		0.0400	0.04462		mg/L		112	75 - 125
Magnesium	26.4		4.00	30.36	4	mg/L		99	75 - 125
Manganese	0.217		0.400	0.6855		mg/L		117	75 - 125
Molybdenum	<0.00200		0.0800	0.08666		mg/L		108	75 - 125
Nickel	<0.00500		0.0800	0.08183		mg/L		102	75 - 125
Selenium	<0.00500		0.0800	0.09185		mg/L		113	75 - 125
Strontium	0.128		0.0800	0.2165		mg/L		110	75 - 125
Vanadium	<0.00500		0.0800	0.08708		mg/L		106	75 - 125
Zinc	<0.0200		0.0800	0.08980		mg/L		112	75 - 125

**Lab Sample ID: 310-179642-1 MS**  
**Matrix: Surface Water**  
**Analysis Batch: 276834**

**Client Sample ID: SW-22**  
**Prep Type: Total/NA**  
**Prep Batch: 276018**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	<0.200		1.76	1.913		mg/L		109	75 - 125
Nickel	<0.00500		0.0800	0.08097		mg/L		101	75 - 125
Selenium	<0.00500		0.0800	0.08510		mg/L		106	75 - 125

**Lab Sample ID: 310-179642-1 MSD**  
**Matrix: Surface Water**  
**Analysis Batch: 276721**

**Client Sample ID: SW-22**  
**Prep Type: Total/NA**  
**Prep Batch: 276018**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Aluminum	0.0821		4.00	4.140		mg/L		101	75 - 125	9	20
Arsenic	<0.00200		0.0800	0.08018		mg/L		98	75 - 125	10	20
Barium	0.0967		0.0800	0.1675		mg/L		89	75 - 125	8	20
Beryllium	<0.00100		0.0400	0.04141		mg/L		104	75 - 125	5	20
Boron	<0.200		1.76	1.893		mg/L		108	75 - 125	10	20
Calcium	59.6		4.00	57.97	4	mg/L		-40	75 - 125	9	20
Cobalt	<0.000500		0.0400	0.03949		mg/L		98	75 - 125	10	20
Copper	<0.00500		0.0800	0.07743		mg/L		97	75 - 125	10	20
Iron	0.363		4.00	4.447		mg/L		102	75 - 125	10	20
Lead	<0.000500		0.0400	0.04113		mg/L		103	75 - 125	8	20
Magnesium	26.4		4.00	27.80	4	mg/L		35	75 - 125	9	20
Manganese	0.217		0.400	0.6159		mg/L		100	75 - 125	11	20
Molybdenum	<0.00200		0.0800	0.07882		mg/L		99	75 - 125	9	20
Nickel	<0.00500		0.0800	0.07474		mg/L		93	75 - 125	9	20
Selenium	<0.00500		0.0800	0.08441		mg/L		104	75 - 125	8	20
Strontium	0.128		0.0800	0.1986		mg/L		88	75 - 125	9	20
Vanadium	<0.00500		0.0800	0.07899		mg/L		96	75 - 125	10	20
Zinc	<0.0200		0.0800	0.08157		mg/L		102	75 - 125	10	20

# QC Sample Results

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

Job ID: 310-179642-1

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

Lab Sample ID: 310-179642-1 MSD  
 Matrix: Surface Water  
 Analysis Batch: 276834

Client Sample ID: SW-22  
 Prep Type: Total/NA  
 Prep Batch: 276018

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	<0.200		1.76	1.870		mg/L		106	75 - 125	2	20
Nickel	<0.00500		0.0800	0.07811		mg/L		98	75 - 125	4	20
Selenium	<0.00500		0.0800	0.08374		mg/L		105	75 - 125	2	20

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# QC Association Summary

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

Job ID: 310-179642-1

## HPLC/IC

### Analysis Batch: 276540

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179642-1	SW-22	Total/NA	Surface Water	9056A	
310-179642-2	SW-23	Total/NA	Surface Water	9056A	
310-179642-3	SW-24	Total/NA	Surface Water	9056A	
310-179642-3	SW-24	Total/NA	Surface Water	9056A	
310-179642-4	SW-25	Total/NA	Surface Water	9056A	
310-179642-5	SW-26	Total/NA	Surface Water	9056A	
MB 310-276540/3	Method Blank	Total/NA	Water	9056A	
LCS 310-276540/4	Lab Control Sample	Total/NA	Water	9056A	
310-179642-1 MS	SW-22	Total/NA	Surface Water	9056A	
310-179642-1 MSD	SW-22	Total/NA	Surface Water	9056A	

## Metals

### Prep Batch: 276018

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179642-1	SW-22	Total/NA	Surface Water	3010A	
310-179642-2	SW-23	Total/NA	Surface Water	3010A	
310-179642-3	SW-24	Total/NA	Surface Water	3010A	
310-179642-4	SW-25	Total/NA	Surface Water	3010A	
310-179642-5	SW-26	Total/NA	Surface Water	3010A	
MB 310-276018/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-276018/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-179642-1 MS	SW-22	Total/NA	Surface Water	3010A	
310-179642-1 MSD	SW-22	Total/NA	Surface Water	3010A	

### Analysis Batch: 276721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179642-1	SW-22	Total/NA	Surface Water	6020A	276018
310-179642-2	SW-23	Total/NA	Surface Water	6020A	276018
310-179642-3	SW-24	Total/NA	Surface Water	6020A	276018
310-179642-4	SW-25	Total/NA	Surface Water	6020A	276018
310-179642-5	SW-26	Total/NA	Surface Water	6020A	276018
MB 310-276018/1-A	Method Blank	Total/NA	Water	6020A	276018
LCS 310-276018/2-A	Lab Control Sample	Total/NA	Water	6020A	276018
310-179642-1 MS	SW-22	Total/NA	Surface Water	6020A	276018
310-179642-1 MSD	SW-22	Total/NA	Surface Water	6020A	276018

### Analysis Batch: 276834

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179642-1	SW-22	Total/NA	Surface Water	6020A	276018
310-179642-2	SW-23	Total/NA	Surface Water	6020A	276018
310-179642-3	SW-24	Total/NA	Surface Water	6020A	276018
310-179642-4	SW-25	Total/NA	Surface Water	6020A	276018
310-179642-5	SW-26	Total/NA	Surface Water	6020A	276018
MB 310-276018/1-A	Method Blank	Total/NA	Water	6020A	276018
LCS 310-276018/2-A	Lab Control Sample	Total/NA	Water	6020A	276018
310-179642-1 MS	SW-22	Total/NA	Surface Water	6020A	276018
310-179642-1 MSD	SW-22	Total/NA	Surface Water	6020A	276018

# Lab Chronicle

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

Job ID: 310-179642-1

## Client Sample ID: SW-22

Date Collected: 04/10/20 14:15

Date Received: 04/15/20 08:50

## Lab Sample ID: 310-179642-1

Matrix: Surface Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276540	04/20/20 14:43	ACJ	TAL CF
Total/NA	Prep	3010A			276018	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276721	04/23/20 19:51	SAD	TAL CF
Total/NA	Prep	3010A			276018	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276834	04/24/20 19:28	SAD	TAL CF

## Client Sample ID: SW-23

Date Collected: 04/10/20 15:20

Date Received: 04/15/20 08:50

## Lab Sample ID: 310-179642-2

Matrix: Surface Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276540	04/20/20 23:16	ACJ	TAL CF
Total/NA	Prep	3010A			276018	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276721	04/23/20 20:15	SAD	TAL CF
Total/NA	Prep	3010A			276018	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276834	04/24/20 19:38	SAD	TAL CF

## Client Sample ID: SW-24

Date Collected: 04/10/20 15:00

Date Received: 04/15/20 08:50

## Lab Sample ID: 310-179642-3

Matrix: Surface Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276540	04/20/20 23:31	ACJ	TAL CF
Total/NA	Analysis	9056A		20	276540	04/20/20 23:47	ACJ	TAL CF
Total/NA	Prep	3010A			276018	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276721	04/23/20 20:18	SAD	TAL CF
Total/NA	Prep	3010A			276018	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		4	276834	04/24/20 19:42	SAD	TAL CF

## Client Sample ID: SW-25

Date Collected: 04/10/20 13:55

Date Received: 04/15/20 08:50

## Lab Sample ID: 310-179642-4

Matrix: Surface Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276540	04/21/20 00:34	ACJ	TAL CF
Total/NA	Prep	3010A			276018	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276721	04/23/20 20:21	SAD	TAL CF
Total/NA	Prep	3010A			276018	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276834	04/24/20 19:55	SAD	TAL CF

# Lab Chronicle

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

Job ID: 310-179642-1

**Client Sample ID: SW-26**

**Date Collected: 04/10/20 15:40**

**Date Received: 04/15/20 08:50**

**Lab Sample ID: 310-179642-5**

**Matrix: Surface 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	276540	04/20/20 17:32	ACJ	TAL CF
Total/NA	Prep	3010A			276018	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276721	04/23/20 20:25	SAD	TAL CF
Total/NA	Prep	3010A			276018	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276834	04/24/20 19:58	SAD	TAL CF

**Laboratory References:**

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

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# Accreditation/Certification Summary

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

Job ID: 310-179642-1

## Laboratory: Eurofins TestAmerica, 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
AIHA-LAP, LLC	Industrial Hygiene Laboratory Accreditation Program (IHLAP)	101044	11-01-20
Colorado	Petroleum Storage Tank Program	IA100001 (OR)	09-29-20
Georgia	State	IA100001 (OR)	09-29-20
Illinois	NELAP	200024	11-29-20
Iowa	State	007	12-01-21
Kansas	NELAP	E-10341	01-31-21
Minnesota	NELAP	019-999-319	12-31-20
Minnesota (Petrofund)	State	3349	08-22-21
North Dakota	State	R-186	09-30-20
Oregon	NELAP	IA100001	09-29-20
USDA	US Federal Programs	P330-19-00003	01-02-22

# Method Summary

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

Job ID: 310-179642-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	TAL CF
6020A	Metals (ICP/MS)	SW846	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF

**Protocol References:**

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

**Laboratory References:**

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





310-179642 Chain of Custody

**Cooler/Sample Receipt and Temperature Log Form**

Client Information		
Client: <u>Sam Bennett MP&amp;W &amp; Rose</u>		
City/State: <small>CITY</small> <u>Muscatine</u> <small>STATE</small> <u>IA</u>	Project: <u>Muscatine Power</u>	
Receipt Information		
Date/Time Received: <small>DATE</small> <u>4/15/20</u> <small>TIME</small> <u>0950</u>	Received By: <u>ae</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>2</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>N</u>	Correction Factor (°C): <u>0.0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>0.6</u>	Corrected Temp (°C): <u>0.6</u>	
• Sample Container Temperature		
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):		
Corrected Temp (°C):		
Exceptions Noted		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
Additional Comments		





Cooler/Sample Receipt and Temperature Log Form

<b>Client Information</b>			
Client: <u>Sam Bennett</u>			
City/State:	<small>CITY</small> <u>Muscatine</u>	<small>STATE</small> <u>IA</u>	Project: <u>Muscatine Power</u>
<b>Receipt Information</b>			
Date/Time Received:	<small>DATE</small> <u>4/15/20</u>	<small>TIME</small> <u>0840</u>	Received By: <u>ac</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: _____			
<b>Condition of Cooler/Containers</b>			
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>2</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
<b>Temperature Record</b>			
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>0.0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>1.2</u>		Corrected Temp (°C): <u>1.2</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
<b>Exceptions Noted</b>			
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			
<b>Additional Comments</b>			

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**TestAmerica Cedar Falls**

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

**Chain of Custody Record**



Client Information		Sampler:		Lab PM:		Carrier Tracking No(s):		COC No:		
Client Contact: Sam Bennett MP&W and Rose Amundson (HR Green)		Sam Bennett		Hayes, Shawn M						
Company: Muscatine Power & Water		Phone: 303-775-5615		E-Mail: shawn.hayes@testamericainc.com						
Address: 1700 Dick Drake Way		Due Date Requested:		Analysis Requested						
City: Muscatine		TAT Requested (days):								
State Zip: IA, 52761		PO #: 201968								
Phone: sbennett@mpw.org and ramundson@hrgreen.com		WO #: 31007856								
Project Name: Muscatine Power & Water State Parameters		TestAmerica Project #: 31007856								
Site: Iowa		Event:								
Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wastewater, BT=tissue, A=air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020A State Metals List	9056A Chloride, Fluoride, Sulfate	Total Number of Containers	Special Instructions/Note:
SW-22	4/10/20	1415	G	SW	X	X	X	X		Shipment 2 4/14/20
SW-23	4/10/20	1520	G	SW	X	X	X	X		Shipment 2 4/14/20
SW-24	4/10/20	1500	G	SW	X	X	X	X		Shipment 2 4/14/20
SW-25	4/10/20	1355	G	SW	X	X	X	X		Shipment 2 4/14/20
SW-26	4/10/20	1540	G	SW	X	X	X	X		Shipment 2 4/14/20
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: _____ Relinquished by: _____ Date/Time: _____ Company: 43931 Company Relinquished by: _____ Date/Time: _____ Company: Company										
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:										
Custody Seals Intact: _____ Δ Yes Δ No										



Temperature readings: \_\_\_\_\_

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservative</u>	
			<u>pH</u>	<u>Temp</u>	<u>Added (mls)</u>	<u>Lot #</u>
SW-22	310-179642-A-1	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
SW-23	310-179642-A-2	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
SW-24	310-179642-A-3	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
SW-25	310-179642-A-4	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
SW-26	310-179642-A-5	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____

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## Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-179642-1

**Login Number: 179642**

**List Source: Eurofins TestAmerica, Cedar Falls**

**List Number: 1**

**Creator: Lickness, Corina A**

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



## 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-4A  
**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** 713.45 **Ground Elevation** 711.18

**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	4/13/2020 18:05	4.56	708.89
*After Purging	4/13/2020 18:40	5.37	708.08
*Before Purging			

### \*C. WELL PURGING

**Quantity of Water Removed from Well (gallons)** 0.92

**No. of Well Volumes (based on current water level)** 0.28

**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 9<sup>th</sup> St, Des Moines IA 50319.

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

**\*D. FIELD MEASUREMENT**

**Weather Conditions** Mostly Cloudy, 35DF NW wind 5-10 mph

**Field Measurements (after stabilization):**

**Temperature** 10.06 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.46

**Equipment Used** Horiba U-50

**Specific Conductance** 0.679 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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

**Signature**  **Date** 4/17/2020

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

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

\*Omit if only measuring groundwater elevations.

## GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

**Site Name** Muscatine Power and Water **Permit No.** 70-SDP-6\_82P  
**Monitoring Well/Piezometer No.** MW-5B  
**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 ( $\pm 0.01$ foot, MSL)

**Elevation:**

**Top of inner well casing** 709.10 **Ground Elevation** 706.73

**Depth of Well** 25.30 **Inside Casing Diameter (in inches)** 2"

**Equipment Used** Slope Indicator Co. Water level indicator Model 51453

**Groundwater Level ( $\pm 0.01$  foot below top of inner casing, MSL):**

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/13/2020 15:55	1.30	707.8
*After Purging	4/13/2020 16:25	1.93	707.17
*Before Purging			

### \*C. WELL PURGING

**Quantity of Water Removed from Well (gallons)** 0.79

**No. of Well Volumes (based on current water level)** 0.20

**Was well pumped/bailed dry?** No

**Equipment used:**

**Bailer type** \_\_\_\_\_ **Dedicated Bailer?** \_\_\_\_\_

**Pump type** Peristaltic **Dedicated Pump?** Yes

**If not dedicated, method of cleaning** \_\_\_\_\_

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**\*D. FIELD MEASUREMENT**

**Weather Conditions** Mostly Cloudy, 45DF NW wind 10-15 mph

**Field Measurements (after stabilization):**

**Temperature** 10.33 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.24

**Equipment Used** Horiba U-50

**Specific Conductance** 0.813 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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

**Signature**  **Date** 4/17/2020

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

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Questions? Call or Email: Nina Booker Environmental Engineer Sr., 515-725-8309, [nina.booker@dnr.iowa.gov](mailto: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-6A  
**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 ( $\pm 0.01$ foot, MSL)

**Elevation:**

**Top of inner well casing** 708.92 **Ground Elevation** 706.49

**Depth of Well** 25.35 **Inside Casing Diameter (in inches)** 2"

**Equipment Used** Slope Indicator Co. Water level indicator Model 51453

**Groundwater Level ( $\pm 0.01$  foot below top of inner casing, MSL):**

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/13/2020 17:00	2.40	706.52
*After Purging	4/13/2020 17:25	2.73	706.19
*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** \_\_\_\_\_

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**\*D. FIELD MEASUREMENT**

**Weather Conditions** Mostly Cloudy 35DF, NW wind 3-8 mph

**Field Measurements (after stabilization):**

**Temperature** 10.39 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.30

**Equipment Used** Horiba U-50

**Specific Conductance** 0.627 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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

**Signature**  **Date** 4/17/2020

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

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

\*Omit if only measuring groundwater elevations.

## GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

**Site Name** Muscatine Power and Water **Permit No.** 70-SDP-6\_82P  
**Monitoring Well/Piezometer No.** MW-08  
**Upgradient**  **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 (+ 0.01 foot below top of inner casing, MSL):**

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/8/2020 12:15	12.16	735.2
*After Purging	4/8/2020 12:45	16.11	731.25
*Before Purging			

### \*C. WELL PURGING

**Quantity of Water Removed from Well (gallons)** 0.79

**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** \_\_\_\_\_

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

**\*D. FIELD MEASUREMENT**

**Weather Conditions** Clear, 73DF, E wind 1-3 mph

**Field Measurements (after stabilization):**

**Temperature** 17.42 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.21

**Equipment Used** Horiba U-50

**Specific Conductance** 0.784 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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**Signature**  **Date** 4/17/2020

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

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

\*Omit if only measuring groundwater elevations.

## GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

**Site Name** Muscatine Power and Water **Permit No.** 70-SDP-6\_82P  
**Monitoring Well/Piezometer No.** MW-10  
**Upgradient**  **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 ( $\pm 0.01$ foot, MSL)

**Elevation:**

**Top of inner well casing** 718.51 **Ground Elevation** 716.32

**Depth of Well** 20.32 **Inside Casing Diameter (in inches)** 2"

**Equipment Used** Slope Indicator Co. Water level indicator Model 51453

**Groundwater Level ( $\pm 0.01$  foot below top of inner casing, MSL):**

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/7/2020 17:45	3.58	714.93
*After Purging	4/7/2020 18:20	3.63	714.88
*Before Purging			

### \*C. WELL PURGING

**Quantity of Water Removed from Well (gallons)** 0.92

**No. of Well Volumes (based on current water level)** 0.34

**Was well pumped/bailed dry?** No

**Equipment used:**

**Bailer type** \_\_\_\_\_ **Dedicated Bailer?** \_\_\_\_\_

**Pump type** Peristaltic **Dedicated Pump?** Yes

**If not dedicated, method of cleaning** \_\_\_\_\_

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**\*D. FIELD MEASUREMENT**

**Weather Conditions** Clear, 72DF, W wind 5 mph

**Field Measurements (after stabilization):**

**Temperature** 13.51 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.26

**Equipment Used** Horiba U-50

**Specific Conductance** 0.633 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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

**Signature**  **Date** 4/17/2020

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

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

\*Omit if only measuring groundwater elevations.

# GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water Permit No. 70-SDP-6\_82P  
 Monitoring Well/Piezometer No. MW-14A  
 Upgradient \_\_\_\_\_ Downgradient 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 729.00 Ground Elevation 726.19  
 Depth of Well 20.50 Inside Casing Diameter (in inches) 2"  
 Equipment Used Slope Indicator Co. Water level indicator Model 51453

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/13/2020 7:30	10.42	718.58
*After Purging	4/13/2020 8:25	13.00	716
*Before Purging			

## \*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 1.45  
 No. of Well Volumes (based on current water level) 0.88  
 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, 30DF, NW wind 20 mph

**Field Measurements (after stabilization):**

**Temperature** 8.04 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.32

**Equipment Used** Horiba U-50

**Specific Conductance** 1.71 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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

**Signature**  **Date** 4/17/2020

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

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

\*Omit if only measuring groundwater elevations.

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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  NO  
 If no, explain \_\_\_\_\_  
**Standing Water or Litter?** (please check)  YES  NO  
 If yes, explain \_\_\_\_\_

## B. GROUNDWATER ELEVATION MEASUREMENT (+ 0.01 foot, MSL)

**Elevation:**  
**Top of inner well casing** 729.99 **Ground Elevation** 727.12  
**Depth of Well** 20.50 **Inside Casing Diameter (in inches)** 2"  
**Equipment Used** Slope Indicator Co. Water level indicator Model 51453

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/10/2020 16:00	8.82	721.17
*After Purging	4/10/2020 16:25	11.13	718.86
*Before Purging			

## \*C. WELL PURGING

**Quantity of Water Removed from Well (gallons)** 0.66  
**No. of Well Volumes (based on current water level)** 0.35  
**Was well pumped/bailed dry?** No  
**Equipment used:**  
**Bailer type** \_\_\_\_\_ **Dedicated Bailer?** \_\_\_\_\_  
**Pump type** Peristaltic **Dedicated Pump?** Yes  
**If not dedicated, method of cleaning** \_\_\_\_\_

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

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

**\*D. FIELD MEASUREMENT**

**Weather Conditions** Clear, 58DF W wind 10-15 mph

**Field Measurements (after stabilization):**

**Temperature** 10.48 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.54

**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**  **Date** 4/17/2020

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

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

\*Omit if only measuring groundwater elevations.

## GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

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

### A. MONITORING WELL/PIEZOMETER CONDITIONS

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

If no, explain \_\_\_\_\_

**Standing Water or Litter?** (please check)  YES  NO

If yes, explain \_\_\_\_\_

### B. GROUNDWATER ELEVATION MEASUREMENT (+ 0.01 foot, MSL)

**Elevation:**

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

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

**Equipment Used** Slope Indicator Co. Water level indicator Model 51453

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/10/2020 11:15	9.88	715.87
*After Purging	4/10/2020 11:50	10.18	715.57
*Before Purging			

### \*C. WELL PURGING

**Quantity of Water Removed from Well (gallons)** 0.92

**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 9<sup>th</sup> St, Des Moines IA 50319.

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

**\*D. FIELD MEASUREMENT**

**Weather Conditions** Clear, 45DF NW wind 15-20 mph

**Field Measurements (after stabilization):**

**Temperature** 10.32 **Units** C

**Equipment Used** Horiba U-50

**pH** 6.55

**Equipment Used** Horiba U-50

**Specific Conductance** 1.08 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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

**Signature**  **Date** 4/17/2020

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

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

\*Omit if only measuring groundwater elevations.

# GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water Permit No. 70-SDP-6\_82P  
 Monitoring Well/Piezometer No. MW-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 (+ 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/8/2020 9:20	13.09	731.18
*After Purging	4/8/2020 10:00	19.18	725.09
*Before Purging			

### \*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 1.06  
 No. of Well Volumes (based on current water level) 0.21  
 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 9<sup>th</sup> St, Des Moines IA 50319.

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

**\*D. FIELD MEASUREMENT**

**Weather Conditions** Clear, 65DF, E Wind 5-10 mph

**Field Measurements (after stabilization):**

**Temperature** 13.96 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.32

**Equipment Used** Horiba U-50

**Specific Conductance** 0.813 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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

**Signature**  **Date** 4/17/2020

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

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

\*Omit if only measuring groundwater elevations.

## GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

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

### A. MONITORING WELL/PIEZOMETER CONDITIONS

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

If no, explain \_\_\_\_\_

**Standing Water or Litter?** (please check)  YES  NO

If yes, explain \_\_\_\_\_

### B. GROUNDWATER ELEVATION MEASUREMENT (+ 0.01 foot, MSL)

**Elevation:**

**Top of inner well casing** 726.90 **Ground Elevation** 723.73

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

**Equipment Used** Slope Indicator Co. Water level indicator Model 51453

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/8/2020 11:10	3.88	723.02
*After Purging	4/8/2020 11:30	6.70	720.2
*Before Purging			

### \*C. WELL PURGING

**Quantity of Water Removed from Well (gallons)** 0.53

**No. of Well Volumes (based on current water level)** 0.14

**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 9<sup>th</sup> St, Des Moines IA 50319.

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

**\*D. FIELD MEASUREMENT**

Weather Conditions Clear, 72DF, Calm

**Field Measurements (after stabilization):**

Temperature 12.86 Units C

Equipment Used Horiba U-50

pH 7.33

Equipment Used Horiba U-50

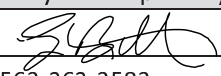
Specific Conductance 0.605 Units mS/m

Equipment Used Horiba U-50

**Comments**

**CERTIFICATION**

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

Signature  Date 4/17/2020

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

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

\*Omit if only measuring groundwater elevations.



# GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water Permit No. 70-SDP-6\_82P  
 Monitoring Well/Piezometer No. MW-24  
 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 735.32 Ground Elevation 732.10

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

Equipment Used Slope Indicator Co. Water level indicator Model 51453

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	4/10/2020 13:10	12.44	722.88
*After Purging	4/10/2020 13:30	12.95	722.37
*Before Purging			

## \*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.53

No. of Well Volumes (based on current water level) 0.33

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 9<sup>th</sup> St, Des Moines IA 50319.

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

**\*D. FIELD MEASUREMENT**

**Weather Conditions** Clear, 52°F NW wind 10 mph

**Field Measurements (after stabilization):**

**Temperature** 14.62 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.29

**Equipment Used** Horiba U-50

**Specific Conductance** 0.761 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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

**Signature**  **Date** 4/17/2020

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

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

\*Omit if only measuring groundwater elevations.

# LOW FLOW SAMPLING FORM

DATE 4/13/2020 WELL ID MW-4A SAMPLE DATE / TIME 4/13/2020 18:40  
 SITE Muscatine Power & Water DTW 4.56 NOTE redish brown material coming through line @1815  
 PROJECT # Spring 2020 sampling WELL DEPTH 24.55  
 WEATHER Mostly Cloudy, 35DF NW wind 5-10 mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 19.5'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
18:05			4.56									
18:10	100	500	4.77	10.58	7.46	-17	0.630	615.0	0.00			
18:15	100	1000	4.98							cleared sample cell		
18:20	100	1500	5.20	10.28	4.54	-22	0.666	42.3	0.00			
18:25	100	2000	5.33	10.04	7.44	-51	0.676	9.4	2.21			
18:30	100	2500	5.35	10.06	7.46	-60	0.672	2.9	0.00			
18:35	100	3000	5.37	10.06	7.47	-65	0.678	1.9	0.00			
18:40	100	3500	5.37	10.06	7.46	-70	0.679	3.0	0.00	Sample Start @1840		
			5.55							Sample End@ 1905		
										Preservative	# of Containers	
										HCl		
										HNO <sub>3</sub>	3	
										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 4/13/2020 WELL ID MW-5B SAMPLE DATE / TIME 4/13/2020 16:25  
 SITE Muscatine Power & Water DTW 1.30 NOTE \_\_\_\_\_  
 PROJECT # Spring 2020 sampling WELL DEPTH 25.30 \_\_\_\_\_  
 WEATHER Mostly Cloudy, 45DF NW wind 10-15 mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 25'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
15:55			1.30									
16:00	100	500	1.94	10.78	7.27	8	0.787	0.0	0.00			
16:05	100	1000	1.94	10.67	7.24	-29	0.796	0.0	0.00			
16:10	100	1500	1.94	10.52	7.23	-35	0.802	0.0	0.00			
16:15	100	2000	1.94	10.45	7.24	-42	0.807	0.0	0.00			
16:20	100	2500	1.94	10.36	7.24	-46	0.813	0.0	0.00			
16:25	100	3000	1.93	10.33	7.24	-49	0.813	0.0	0.00	Sample Start @1625		
			2.12							Sample End @1647		
										Preservative	# of Containers	
										HCl		
										HNO <sub>3</sub>	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 4/13/2020 WELL ID MW-6A SAMPLE DATE / TIME 4/13/2020 17:25  
 SITE Muscatine Power & Water DTW 2.40 NOTE \_\_\_\_\_  
 PROJECT # Spring 2020 sampling WELL DEPTH 25.35 \_\_\_\_\_  
 WEATHER Mostly Coudy 35DF, NW wind 3-8 mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 20'

TIME	PURGE RATE(ml)	VOL REMOVED(m)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
17:00			2.40									
17:05	100	500	2.74	10.32	7.30	-52	0.618	1.3	0.00			
17:10	100	1000	2.72	10.36	7.29	-59	0.620	0.6	0.00			
17:15	100	1500	2.73	10.37	7.30	-70	0.623	0.8	0.00			
17:20	100	2000	2.73	10.38	7.30	-75	0.627	1.3	0.00			
17:25	100	2500	2.73	10.39	7.30	-80	0.627	0.9	0.00	Sample Start @1725		
			2.78							Sample End @1750		
										Preservative	# of Containers	
										HCl		
										HNO <sub>3</sub>	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 4/8/2020 WELL ID MW-08 SAMPLE DATE / TIME 4/8/2020 12:45  
 SITE Muscatine Power & Water DTW 12.16 NOTE \_\_\_\_\_  
 PROJECT # Spring 2020 sampling WELL DEPTH 42.95 \_\_\_\_\_  
 WEATHER Clear 73DF E wind 1-3 mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 38'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
12:15			12.16									
12:20	100	500	13.19	20.52	7.33	88	0.808	0.0	0.03			
12:25	100	1000	14.03	17.96	7.26	2	0.791	0.0	0.00			
12:30	100	1500	14.68	16.85	7.22	-29	0.799	0.0	0.00			
12:35	100	2000	15.23	16.71	7.20	-25	0.793	0.0	0.00			
12:40	100	2500	15.75	17.33	7.20	-20	0.787	0.0	0.00			
12:45	100	3000	16.11	17.42	7.21	-22	0.784	0.0	0.00	Sample Start @1245		
			17.68							Sample End @1315		
										Preservative	# of Containers	
										HCl		
										HNO <sub>3</sub>	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 4/7/2020 WELL ID MW-10 SAMPLE DATE / TIME 4/7/2020 18:20  
 SITE Muscatine Power & Water DTW 3.58 NOTE \_\_\_\_\_  
 PROJECT # Spring 2020 sampling WELL DEPTH 20.32 \_\_\_\_\_  
 WEATHER Clear, 72DF W wind 5 mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 15.5'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
17:45			3.58									
17:50	100	500	3.64	18.21	6.56	5	0.655	0.8	0.00			
17:55	100	1000	3.65	15.86	7.09	-50	0.647	11.0	0.00			
18:00	100	1500	3.63	13.73	7.18	-78	0.653	0.0	0.00			
18:05	100	2000	3.63	13.17	7.22	-88	0.647	0.0	0.00			
18:10	100	2500	3.64	13.06	7.26	-96	0.642	0.0	0.00			
18:15	100	3000	3.63	13.31	7.26	-102	0.635	0.0	0.00			
18:20	100	3500	3.63	13.51	7.26	-104	0.633	0.0	0.00	Sample Start @1820		
			3.66							Sample End @1846		
										Preservative	# of Containers	
										HCl		
										HNO <sub>3</sub>	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 4/13/2020 WELL ID MW-14A SAMPLE DATE / TIME 4/13/2020 8:25  
 SITE Muscatine Power & Water DTW 10.42 NOTE \_\_\_\_\_  
 PROJECT # Spring 2020 sampling WELL DEPTH 20.50  
 WEATHER Clear, 30DF, NW wind 20 mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 15.5'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES
7:30			10.42							
7:35	100	500	10.87	8.47	5.84	260	1.93	4.2	9.38	
7:40	100	1000	11.27	8.34	6.73	230	1.90	0.0	4.91	
7:45	100	1500	11.56	8.36	6.91	224	1.90	0.0	4.86	
7:50	100	2000	11.80	8.36	6.99	220	1.90	0.0	4.61	
7:55	100	2500	11.97	8.39	7.02	219	1.90	0.0	4.79	
8:00	100	3000	12.23	8.27	7.08	216	1.81	0.0	6.11	
8:05	100	3500	12.37	8.17	7.13	215	1.79	0.0	6.26	
8:10	100	4000	12.56	8.04	7.23	214	1.73	0.0	7.89	
8:15	100	4500	12.72	8.04	7.29	212	1.71	0.0	8.35	
8:20	100	5000	12.90	8.02	7.32	211	1.70	0.0	8.52	
8:25	100	5500	13.00	8.04	7.32	211	1.71	0.0	8.20	Sample Start @825
			13.97							Sample End @850
										Preservative
										# of Containers
										DUP-1
										HCl
										HNO <sub>3</sub>
										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 4/10/2020 WELL ID MW-15A SAMPLE DATE / TIME 4/10/2020 16:25  
 SITE Muscatine Power & Water DTW 8.82 NOTE \_\_\_\_\_  
 PROJECT # Spring 2020 sampling WELL DEPTH 20.50 \_\_\_\_\_  
 WEATHER Clear, 58DF W wind 10-15 mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 15'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES
16:00			8.82							
16:05	100	500	9.54	13.51	8.15	124	1.25	0.0	6.50	
16:10	100	1000	10.22	12.00	7.76	130	1.30	0.0	5.03	
16:15	100	1500	10.70	11.61	7.62	131	1.32	0.0	4.83	
16:20	100	2000	10.79	11.43	7.58	131	1.33	0.0	4.89	
16:25	100	2500	11.13	10.48	7.54	130	1.36	0.0	5.17	Sample Start @1625
			12.01							Sample End @1650

0.5-5.0 min	200-500 ml	---	minimize	---	+/- 0.1	+/-10 mV	+/- 3%	+/- 10%	+/- 10%	HCl		
										or +/-0.2 mg	3	
										NaOH		
										None	1	

Limits

# LOW FLOW SAMPLING FORM

DATE 4/10/2020 WELL ID MW-21 SAMPLE DATE / TIME 4/10/2020 11:50  
 SITE Muscatine Power & Water DTW 9.88 NOTE Duplicate-1 marked 4/10/20 1200  
 PROJECT # Spring 2020 sampling WELL DEPTH 22.20  
 WEATHER Clear, 45DF NW wind 15-20 mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 17'

TIME	PURGE RATE(ml)	VOL REMOVED(m)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES	
11:15			9.88								
11:20	100	500	10.07	12.49	6.14	223	1.06	0.0	4.79		
11:25	100	1000	10.08	11.31	6.47	208	1.08	0.0	4.39		
11:30	100	1500	10.12	11.20	6.52	195	1.06	0.0	4.12		
11:35	100	2000	10.14	11.05	6.55	187	1.06	0.0	3.66		
11:40	100	2500	10.15	10.42	6.53	182	1.08	0.0	4.50		
11:45	100	3000	10.18	10.34	6.53	177	1.08	0.0	4.60		
11:50	100	3500	10.18	10.32	6.55	172	1.08	0.0	4.57	Sample Start @1150	
			10.17							Sample End @1220	
			10.18							Duplicate End @1245	
										Preservative	# of Containers
										HCl	
										HNO <sub>3</sub>	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 4/8/2020 WELL ID MW-22 SAMPLE DATE / TIME 4/8/2020 10:00  
 SITE Muscatine Power & Water DTW 13.09 NOTE Duplicate-2 marked 4/8/20 1200  
 PROJECT # Spring 2020 sampling WELL DEPTH 43.33  
 WEATHER Clear, 65DF E Wind 5-10 mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 38'

TIME	PURGE RATE(ml)	VOL REMOVED(m)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
9:20			13.09									
9:25	100	500	13.97	15.64	6.29	166	0.828	0.0	1.38			
9:30	100	1000	14.84	15.04	6.87	138	0.803	0.0	2.06			
9:35	100	1500	15.56	15.26	7.08	122	0.794	1.3	0.00			
9:40	100	2000	16.16	14.21	7.16	116	0.820	0.0	0.00			
9:45	100	2500	16.95	13.95	7.23	107	0.818	0.0	0.00			
9:50	100	3000	17.73	13.84	7.29	98	0.816	0.0	0.00			
9:55	100	3500	18.45	13.85	7.31	93	0.814	0.0	0.00			
10:00	100	4000	19.18	13.96	7.32	89	0.813	0.0	0.00	Sample Start @1000		
			22.35							Sample End @1030		
			24.97							Duplicate End @1100		
										Preservative	# of Containers	
										HCl		
										HNO <sub>3</sub>	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 4/8/2020 WELL ID MW-23 SAMPLE DATE / TIME 4/8/2020 11:30  
 SITE Muscatine Power & Water DTW 3.88 NOTE \_\_\_\_\_  
 PROJECT # Spring 2020 sampling WELL DEPTH 43.33 \_\_\_\_\_  
 WEATHER Clear, 72DF, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 38'

TIME	PURGE RATE(ml)	VOL REMOVED(m)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES	
11:10			3.88								
11:15	100	500	5.29	14.30	7.46	88	0.597	0.0	0.00		
11:20	100	1000	5.82	13.29	7.37	83	0.606	0.0	0.00		
11:25	100	1500	6.28	13.09	7.35	81	0.606	0.0	0.00		
11:30	100	2000	6.70	12.86	7.33	79	0.605	0.0	0.00	Sample Start @1130	
			8.80							Sample End @1155	
										Preservative	# of Containers
										HCl	
										HNO <sub>3</sub>	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 4/10/2020 WELL ID MW-24 SAMPLE DATE / TIME 4/10/2020 13:30  
 SITE Muscatine Power & Water DTW 12.44 NOTE \_\_\_\_\_  
 PROJECT # Spring 2020 sampling WELL DEPTH 43.33 \_\_\_\_\_  
 WEATHER Clear, 52°F NW wind 10 mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 38'

TIME	PURGE RATE(ml)	VOL REMOVED(m)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES	
13:10			12.44								
13:15	100	500	12.83	16.20	7.20	124	0.762	0.0	1.92		
13:20	100	1000	12.93	15.26	7.22	121	0.761	0.0	0.19		
13:25	100	1500	12.95	14.86	7.27	119	0.763	0.0	0.00		
13:30	100	2000	12.95	14.62	7.29	118	0.761	0.0	0.00		
			12.95							Sample Started @1330	
										Sample Ended @1358	
										Preservative	# of Containers
										HCl	
										HNO <sub>3</sub>	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 TestAmerica, Cedar Falls  
3019 Venture Way  
Cedar Falls, IA 50613  
Tel: (319)277-2401

Laboratory Job ID: 310-191598-1

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:  
10/12/2020 3:23:46 PM*

Shawn Hayes, Senior Project Manager  
(319)229-8211  
[Shawn.Hayes@Eurofinset.com](mailto:Shawn.Hayes@Eurofinset.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:

[www.eurofinsus.com/Env](http://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: 310-191598-1

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## Job ID: 310-191598-1

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Laboratory: Eurofins TestAmerica, Cedar Falls

### Narrative

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#### Job Narrative 310-191598-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 9/25/2020 8:50 AM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.5° 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

Method SM 2540C: The following samples were received with less than 2 days remaining on the holding time or less than one shift (8 hours) remaining on a test with a holding time of 48 hours or less. As such, the laboratory had insufficient time remaining to perform the analysis within holding time: MW-8 (310-191598-3), MW-10 (310-191598-4), MW-22 (310-191598-8), MW-23 (310-191598-9), MW-24 (310-191598-10), Duplicate-1 (310-191598-13) and Duplicate-2 (310-191598-14).

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: 310-191598-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-191598-1	MW-4B	Ground Water	09/23/20 13:40	09/25/20 08:50	
310-191598-2	MW-5B	Ground Water	09/23/20 12:25	09/25/20 08:50	
310-191598-3	MW-8	Ground Water	09/18/20 12:30	09/25/20 08:50	
310-191598-4	MW-10	Ground Water	09/18/20 11:25	09/25/20 08:50	
310-191598-5	MW-14A	Ground Water	09/22/20 10:40	09/25/20 08:50	
310-191598-6	MW-15A	Ground Water	09/22/20 09:50	09/25/20 08:50	
310-191598-7	MW-21	Ground Water	09/22/20 11:40	09/25/20 08:50	
310-191598-8	MW-22	Ground Water	09/18/20 09:20	09/25/20 08:50	
310-191598-9	MW-23	Ground Water	09/18/20 10:15	09/25/20 08:50	
310-191598-10	MW-24	Ground Water	09/18/20 14:30	09/25/20 08:50	
310-191598-13	Duplicate-1	Ground Water	09/18/20 12:00	09/25/20 08:50	
310-191598-14	Duplicate-2	Ground Water	09/18/20 12:00	09/25/20 08:50	

# Detection Summary

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

Job ID: 310-191598-1

## Client Sample ID: MW-4B

## Lab Sample ID: 310-191598-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	15.1		5.00		mg/L	5		9056A	Total/NA
Sulfate	46.9		5.00		mg/L	5		9056A	Total/NA
Barium	0.147		0.00200		mg/L	1		6020A	Total/NA
Calcium	89.0		0.500		mg/L	1		6020A	Total/NA
Cobalt	0.00147		0.000500		mg/L	1		6020A	Total/NA
Lead	0.000532		0.000500		mg/L	1		6020A	Total/NA
Molybdenum	0.00296		0.00200		mg/L	1		6020A	Total/NA
Total Dissolved Solids	360		30.0		mg/L	1		SM 2540C	Total/NA
pH	7.7	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

## Client Sample ID: MW-5B

## Lab Sample ID: 310-191598-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	41.0		5.00		mg/L	5		9056A	Total/NA
Sulfate	61.9		5.00		mg/L	5		9056A	Total/NA
Barium	0.239		0.00200		mg/L	1		6020A	Total/NA
Calcium	108		0.500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	436		30.0		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-8

## Lab Sample ID: 310-191598-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	14.7		5.00		mg/L	5		9056A	Total/NA
Sulfate	100		5.00		mg/L	5		9056A	Total/NA
Barium	0.0549		0.00200		mg/L	1		6020A	Total/NA
Calcium	77.7		0.500		mg/L	1		6020A	Total/NA
Cobalt	0.000738		0.000500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	350	H	30.0		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-10

## Lab Sample ID: 310-191598-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	36.5		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00748		0.00200		mg/L	1		6020A	Total/NA
Barium	0.227		0.00200		mg/L	1		6020A	Total/NA
Calcium	74.2		0.500		mg/L	1		6020A	Total/NA
Cobalt	0.000751		0.000500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	344	H	30.0		mg/L	1		SM 2540C	Total/NA
pH	7.1	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

## Client Sample ID: MW-14A

## Lab Sample ID: 310-191598-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	22.8		5.00		mg/L	5		9056A	Total/NA
Sulfate	924		20.0		mg/L	20		9056A	Total/NA
Barium	0.0328		0.00200		mg/L	1		6020A	Total/NA
Boron	19.5		1.00		mg/L	10		6020A	Total/NA
Calcium	244		0.500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	1620		30.0		mg/L	1		SM 2540C	Total/NA
pH	7.1	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Detection Summary

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

Job ID: 310-191598-1

## Client Sample ID: MW-15A

## Lab Sample ID: 310-191598-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	8.63		5.00		mg/L	5		9056A	Total/NA
Sulfate	403		5.00		mg/L	5		9056A	Total/NA
Barium	0.0416		0.00200		mg/L	1		6020A	Total/NA
Boron	14.5		1.00		mg/L	10		6020A	Total/NA
Calcium	134		0.500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	920		30.0		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-21

## Lab Sample ID: 310-191598-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	7.21		5.00		mg/L	5		9056A	Total/NA
Sulfate	356		5.00		mg/L	5		9056A	Total/NA
Barium	0.0407		0.00200		mg/L	1		6020A	Total/NA
Boron	6.82		0.700		mg/L	7		6020A	Total/NA
Calcium	101		0.500		mg/L	1		6020A	Total/NA
Chromium	0.00589		0.00500		mg/L	1		6020A	Total/NA
Lithium	0.0225		0.0100		mg/L	1		6020A	Total/NA
Selenium	0.00762		0.00500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	738		30.0		mg/L	1		SM 2540C	Total/NA
pH	6.6	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

## Client Sample ID: MW-22

## Lab Sample ID: 310-191598-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	23.2		5.00		mg/L	5		9056A	Total/NA
Sulfate	151		5.00		mg/L	5		9056A	Total/NA
Barium	0.222		0.00200		mg/L	1		6020A	Total/NA
Boron	0.263		0.100		mg/L	1		6020A	Total/NA
Calcium	75.5		0.500		mg/L	1		6020A	Total/NA
Molybdenum	0.00529		0.00200		mg/L	1		6020A	Total/NA
Total Dissolved Solids	398	H	30.0		mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

## Client Sample ID: MW-23

## Lab Sample ID: 310-191598-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	14.4		5.00		mg/L	5		9056A	Total/NA
Sulfate	25.8		5.00		mg/L	5		9056A	Total/NA
Barium	0.0491		0.00200		mg/L	1		6020A	Total/NA
Boron	0.150		0.100		mg/L	1		6020A	Total/NA
Calcium	52.1		0.500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	250	H	30.0		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-24

## Lab Sample ID: 310-191598-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	19.5		5.00		mg/L	5		9056A	Total/NA
Sulfate	81.0		5.00		mg/L	5		9056A	Total/NA
Barium	0.0969		0.00200		mg/L	1		6020A	Total/NA
Boron	0.109		0.100		mg/L	1		6020A	Total/NA
Calcium	69.9		0.500		mg/L	1		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Detection Summary

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

Job ID: 310-191598-1

## Client Sample ID: MW-24 (Continued)

## Lab Sample ID: 310-191598-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	280	H	30.0		mg/L	1		SM 2540C	Total/NA
pH	7.4	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

## Client Sample ID: Duplicate-1

## Lab Sample ID: 310-191598-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	36.2		5.00		mg/L	5		9056A	Total/NA
Arsenic	0.00687		0.00200		mg/L	1		6020A	Total/NA
Barium	0.226		0.00200		mg/L	1		6020A	Total/NA
Calcium	73.8		0.500		mg/L	1		6020A	Total/NA
Cobalt	0.000741		0.000500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	278	H	30.0		mg/L	1		SM 2540C	Total/NA
pH	7.2	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

## Client Sample ID: Duplicate-2

## Lab Sample ID: 310-191598-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	14.7		5.00		mg/L	5		9056A	Total/NA
Sulfate	99.6		5.00		mg/L	5		9056A	Total/NA
Barium	0.0549		0.00200		mg/L	1		6020A	Total/NA
Calcium	77.5		0.500		mg/L	1		6020A	Total/NA
Cobalt	0.000782		0.000500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	304	H	30.0		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 TestAmerica, Cedar Falls

# Client Sample Results

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

Job ID: 310-191598-1

**Client Sample ID: MW-4B**

**Lab Sample ID: 310-191598-1**

Date Collected: 09/23/20 13:40

Matrix: Ground Water

Date Received: 09/25/20 08:50

### Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>15.1</b>		5.00		mg/L			10/05/20 15:10	5
Fluoride	<0.500		0.500		mg/L			10/05/20 15:10	5
<b>Sulfate</b>	<b>46.9</b>		5.00		mg/L			10/05/20 15:10	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:32	1
Arsenic	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 19:32	1
<b>Barium</b>	<b>0.147</b>		0.00200		mg/L		09/28/20 09:04	09/30/20 19:32	1
Beryllium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:32	1
Boron	<0.100		0.100		mg/L		09/28/20 09:04	09/30/20 19:32	1
Cadmium	<0.000100		0.000100		mg/L		09/28/20 09:04	09/30/20 19:32	1
<b>Calcium</b>	<b>89.0</b>		0.500		mg/L		09/28/20 09:04	09/30/20 19:32	1
Chromium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 19:32	1
<b>Cobalt</b>	<b>0.00147</b>		0.000500		mg/L		09/28/20 09:04	09/30/20 19:32	1
<b>Lead</b>	<b>0.000532</b>		0.000500		mg/L		09/28/20 09:04	09/30/20 19:32	1
Lithium	<0.0100		0.0100		mg/L		09/28/20 09:04	09/30/20 19:32	1
<b>Molybdenum</b>	<b>0.00296</b>		0.00200		mg/L		09/28/20 09:04	09/30/20 19:32	1
Selenium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 19:32	1
Thallium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:32	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/28/20 12:13	09/29/20 11:30	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>360</b>		30.0		mg/L			09/29/20 11:26	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>pH</b>	<b>7.7</b>	<b>HF</b>	0.1		SU			09/25/20 14:36	1

# Client Sample Results

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

Job ID: 310-191598-1

**Client Sample ID: MW-5B**  
 Date Collected: 09/23/20 12:25  
 Date Received: 09/25/20 08:50

**Lab Sample ID: 310-191598-2**  
 Matrix: Ground Water

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>41.0</b>		5.00		mg/L			10/05/20 15:10	5
Fluoride	<0.500		0.500		mg/L			10/05/20 15:10	5
<b>Sulfate</b>	<b>61.9</b>		5.00		mg/L			10/05/20 15:10	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:34	1
Arsenic	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 19:34	1
<b>Barium</b>	<b>0.239</b>		0.00200		mg/L		09/28/20 09:04	09/30/20 19:34	1
Beryllium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:34	1
Boron	<0.100		0.100		mg/L		09/28/20 09:04	09/30/20 19:34	1
Cadmium	<0.000100		0.000100		mg/L		09/28/20 09:04	09/30/20 19:34	1
<b>Calcium</b>	<b>108</b>		0.500		mg/L		09/28/20 09:04	09/30/20 19:34	1
Chromium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 19:34	1
Cobalt	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 19:34	1
Lead	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 19:34	1
Lithium	<0.0100		0.0100		mg/L		09/28/20 09:04	09/30/20 19:34	1
Molybdenum	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 19:34	1
Selenium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 19:34	1
Thallium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:34	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/30/20 12:19	10/01/20 09:59	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>436</b>		30.0		mg/L			09/29/20 11:26	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>pH</b>	<b>7.2</b>	<b>HF</b>	0.1		SU			09/25/20 14:37	1

# Client Sample Results

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

Job ID: 310-191598-1

**Client Sample ID: MW-8**

**Lab Sample ID: 310-191598-3**

Date Collected: 09/18/20 12:30

Matrix: Ground Water

Date Received: 09/25/20 08:50

### Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>14.7</b>		5.00		mg/L			10/05/20 15:10	5
Fluoride	<0.500		0.500		mg/L			10/05/20 15:10	5
<b>Sulfate</b>	<b>100</b>		5.00		mg/L			10/05/20 15:10	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:37	1
Arsenic	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 19:37	1
<b>Barium</b>	<b>0.0549</b>		0.00200		mg/L		09/28/20 09:04	09/30/20 19:37	1
Beryllium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:37	1
Boron	<0.100		0.100		mg/L		09/28/20 09:04	09/30/20 19:37	1
Cadmium	<0.000100		0.000100		mg/L		09/28/20 09:04	09/30/20 19:37	1
<b>Calcium</b>	<b>77.7</b>		0.500		mg/L		09/28/20 09:04	09/30/20 19:37	1
Chromium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 19:37	1
<b>Cobalt</b>	<b>0.000738</b>		0.000500		mg/L		09/28/20 09:04	09/30/20 19:37	1
Lead	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 19:37	1
Lithium	<0.0100		0.0100		mg/L		09/28/20 09:04	09/30/20 19:37	1
Molybdenum	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 19:37	1
Selenium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 19:37	1
Thallium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:37	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/28/20 12:13	09/29/20 11:32	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>350</b>	<b>H</b>	30.0		mg/L			09/28/20 14:54	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>pH</b>	<b>7.2</b>	<b>HF</b>	0.1		SU			09/25/20 14:34	1

# Client Sample Results

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

Job ID: 310-191598-1

**Client Sample ID: MW-10**

**Lab Sample ID: 310-191598-4**

**Date Collected: 09/18/20 11:25**

**Matrix: Ground Water**

**Date Received: 09/25/20 08:50**

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			10/05/20 15:10	5
Fluoride	<0.500		0.500		mg/L			10/05/20 15:10	5
<b>Sulfate</b>	<b>36.5</b>		5.00		mg/L			10/05/20 15:10	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:47	1
<b>Arsenic</b>	<b>0.00748</b>		0.00200		mg/L		09/28/20 09:04	09/30/20 19:47	1
<b>Barium</b>	<b>0.227</b>		0.00200		mg/L		09/28/20 09:04	09/30/20 19:47	1
Beryllium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:47	1
Boron	<0.100		0.100		mg/L		09/28/20 09:04	09/30/20 19:47	1
Cadmium	<0.000100		0.000100		mg/L		09/28/20 09:04	09/30/20 19:47	1
<b>Calcium</b>	<b>74.2</b>		0.500		mg/L		09/28/20 09:04	09/30/20 19:47	1
Chromium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 19:47	1
<b>Cobalt</b>	<b>0.000751</b>		0.000500		mg/L		09/28/20 09:04	09/30/20 19:47	1
Lead	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 19:47	1
Lithium	<0.0100		0.0100		mg/L		09/28/20 09:04	09/30/20 19:47	1
Molybdenum	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 19:47	1
Selenium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 19:47	1
Thallium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:47	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/28/20 12:13	09/29/20 11:35	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>344</b>	<b>H</b>	30.0		mg/L			09/28/20 14:54	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>pH</b>	<b>7.1</b>	<b>HF</b>	0.1		SU			09/25/20 14:38	1



# Client Sample Results

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

Job ID: 310-191598-1

**Client Sample ID: MW-14A**

**Lab Sample ID: 310-191598-5**

Date Collected: 09/22/20 10:40

Matrix: Ground Water

Date Received: 09/25/20 08:50

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	22.8		5.00		mg/L			10/05/20 15:10	5
Fluoride	<0.500		0.500		mg/L			10/05/20 15:10	5
Sulfate	924		20.0		mg/L			10/05/20 15:10	20

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:50	1
Arsenic	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 19:50	1
Barium	0.0328		0.00200		mg/L		09/28/20 09:04	09/30/20 19:50	1
Beryllium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:50	1
Boron	19.5		1.00		mg/L		09/28/20 09:04	10/01/20 14:15	10
Cadmium	<0.000100		0.000100		mg/L		09/28/20 09:04	09/30/20 19:50	1
Calcium	244		0.500		mg/L		09/28/20 09:04	09/30/20 19:50	1
Chromium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 19:50	1
Cobalt	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 19:50	1
Lead	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 19:50	1
Lithium	<0.0100		0.0100		mg/L		09/28/20 09:04	09/30/20 19:50	1
Molybdenum	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 19:50	1
Selenium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 19:50	1
Thallium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:50	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/28/20 12:13	09/29/20 11:37	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1620		30.0		mg/L			09/28/20 14:54	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.1	HF	0.1		SU			09/25/20 14:40	1

# Client Sample Results

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

Job ID: 310-191598-1

**Client Sample ID: MW-15A**

**Lab Sample ID: 310-191598-6**

Date Collected: 09/22/20 09:50

Matrix: Ground Water

Date Received: 09/25/20 08:50

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>8.63</b>		5.00		mg/L			10/05/20 15:10	5
Fluoride	<0.500		0.500		mg/L			10/05/20 15:10	5
<b>Sulfate</b>	<b>403</b>		5.00		mg/L			10/05/20 15:10	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:52	1
Arsenic	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 19:52	1
<b>Barium</b>	<b>0.0416</b>		0.00200		mg/L		09/28/20 09:04	09/30/20 19:52	1
Beryllium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:52	1
<b>Boron</b>	<b>14.5</b>		1.00		mg/L		09/28/20 09:04	10/01/20 14:18	10
Cadmium	<0.000100		0.000100		mg/L		09/28/20 09:04	09/30/20 19:52	1
<b>Calcium</b>	<b>134</b>		0.500		mg/L		09/28/20 09:04	09/30/20 19:52	1
Chromium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 19:52	1
Cobalt	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 19:52	1
Lead	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 19:52	1
Lithium	<0.0100		0.0100		mg/L		09/28/20 09:04	09/30/20 19:52	1
Molybdenum	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 19:52	1
Selenium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 19:52	1
Thallium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/28/20 12:13	09/29/20 11:39	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>920</b>		30.0		mg/L			09/28/20 14:54	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>pH</b>	<b>7.2</b>	<b>HF</b>	0.1		SU			09/25/20 14:43	1

# Client Sample Results

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

Job ID: 310-191598-1

**Client Sample ID: MW-21**

**Lab Sample ID: 310-191598-7**

Date Collected: 09/22/20 11:40

Matrix: Ground Water

Date Received: 09/25/20 08:50

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>7.21</b>		5.00		mg/L			10/05/20 15:10	5
Fluoride	<0.500		0.500		mg/L			10/05/20 15:10	5
<b>Sulfate</b>	<b>356</b>		5.00		mg/L			10/05/20 15:10	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:55	1
Arsenic	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 19:55	1
<b>Barium</b>	<b>0.0407</b>		0.00200		mg/L		09/28/20 09:04	09/30/20 19:55	1
Beryllium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:55	1
<b>Boron</b>	<b>6.82</b>		0.700		mg/L		09/28/20 09:04	10/01/20 14:21	7
Cadmium	<0.000100		0.000100		mg/L		09/28/20 09:04	09/30/20 19:55	1
<b>Calcium</b>	<b>101</b>		0.500		mg/L		09/28/20 09:04	09/30/20 19:55	1
<b>Chromium</b>	<b>0.00589</b>		0.00500		mg/L		09/28/20 09:04	09/30/20 19:55	1
Cobalt	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 19:55	1
Lead	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 19:55	1
<b>Lithium</b>	<b>0.0225</b>		0.0100		mg/L		09/28/20 09:04	09/30/20 19:55	1
Molybdenum	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 19:55	1
<b>Selenium</b>	<b>0.00762</b>		0.00500		mg/L		09/28/20 09:04	09/30/20 19:55	1
Thallium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 19:55	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/28/20 12:13	09/29/20 12:13	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>738</b>		30.0		mg/L			09/28/20 14:54	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>pH</b>	<b>6.6</b>	<b>HF</b>	0.1		SU			09/25/20 14:45	1

# Client Sample Results

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

Job ID: 310-191598-1

**Client Sample ID: MW-22**

**Lab Sample ID: 310-191598-8**

Date Collected: 09/18/20 09:20

Matrix: Ground Water

Date Received: 09/25/20 08:50

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>23.2</b>		5.00		mg/L			10/05/20 15:10	5
Fluoride	<0.500		0.500		mg/L			10/05/20 15:10	5
<b>Sulfate</b>	<b>151</b>		5.00		mg/L			10/05/20 15:10	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 20:00	1
Arsenic	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 20:00	1
<b>Barium</b>	<b>0.222</b>		0.00200		mg/L		09/28/20 09:04	09/30/20 20:00	1
Beryllium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 20:00	1
<b>Boron</b>	<b>0.263</b>		0.100		mg/L		09/28/20 09:04	09/30/20 20:00	1
Cadmium	<0.000100		0.000100		mg/L		09/28/20 09:04	09/30/20 20:00	1
<b>Calcium</b>	<b>75.5</b>		0.500		mg/L		09/28/20 09:04	09/30/20 20:00	1
Chromium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 20:00	1
Cobalt	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 20:00	1
Lead	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 20:00	1
Lithium	<0.0100		0.0100		mg/L		09/28/20 09:04	09/30/20 20:00	1
<b>Molybdenum</b>	<b>0.00529</b>		0.00200		mg/L		09/28/20 09:04	09/30/20 20:00	1
Selenium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 20:00	1
Thallium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 20:00	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/28/20 12:13	09/29/20 12:16	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>398</b>	<b>H</b>	30.0		mg/L			09/28/20 14:54	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
<b>pH</b>	<b>7.5</b>	<b>HF</b>	0.1		SU			09/25/20 14:24	1

# Client Sample Results

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

Job ID: 310-191598-1

**Client Sample ID: MW-23**

**Lab Sample ID: 310-191598-9**

Date Collected: 09/18/20 10:15

Matrix: Ground Water

Date Received: 09/25/20 08:50

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	14.4		5.00		mg/L			10/05/20 16:35	5
Fluoride	<0.500		0.500		mg/L			10/05/20 16:35	5
Sulfate	25.8		5.00		mg/L			10/05/20 16:35	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 20:03	1
Arsenic	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 20:03	1
Barium	0.0491		0.00200		mg/L		09/28/20 09:04	09/30/20 20:03	1
Beryllium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 20:03	1
Boron	0.150		0.100		mg/L		09/28/20 09:04	09/30/20 20:03	1
Cadmium	<0.000100		0.000100		mg/L		09/28/20 09:04	09/30/20 20:03	1
Calcium	52.1		0.500		mg/L		09/28/20 09:04	09/30/20 20:03	1
Chromium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 20:03	1
Cobalt	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 20:03	1
Lead	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 20:03	1
Lithium	<0.0100		0.0100		mg/L		09/28/20 09:04	09/30/20 20:03	1
Molybdenum	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 20:03	1
Selenium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 20:03	1
Thallium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 20:03	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/28/20 12:13	09/29/20 12:18	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	250	H	30.0		mg/L			09/28/20 14:54	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.3	HF	0.1		SU			09/25/20 14:27	1

# Client Sample Results

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

Job ID: 310-191598-1

**Client Sample ID: MW-24**

**Lab Sample ID: 310-191598-10**

Date Collected: 09/18/20 14:30

Matrix: Ground Water

Date Received: 09/25/20 08:50

### Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	19.5		5.00		mg/L			10/05/20 17:22	5
Fluoride	<0.500		0.500		mg/L			10/05/20 17:22	5
Sulfate	81.0		5.00		mg/L			10/05/20 17:22	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 20:06	1
Arsenic	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 20:06	1
Barium	0.0969		0.00200		mg/L		09/28/20 09:04	09/30/20 20:06	1
Beryllium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 20:06	1
Boron	0.109		0.100		mg/L		09/28/20 09:04	09/30/20 20:06	1
Cadmium	<0.000100		0.000100		mg/L		09/28/20 09:04	09/30/20 20:06	1
Calcium	69.9		0.500		mg/L		09/28/20 09:04	09/30/20 20:06	1
Chromium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 20:06	1
Cobalt	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 20:06	1
Lead	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 20:06	1
Lithium	<0.0100		0.0100		mg/L		09/28/20 09:04	09/30/20 20:06	1
Molybdenum	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 20:06	1
Selenium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 20:06	1
Thallium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 20:06	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/28/20 12:15	09/29/20 12:26	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	280	H	30.0		mg/L			09/28/20 14:54	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.4	HF	0.1		SU			09/25/20 14:28	1

# Client Sample Results

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

Job ID: 310-191598-1

**Client Sample ID: Duplicate-1**

**Lab Sample ID: 310-191598-13**

Date Collected: 09/18/20 12:00

Matrix: Ground Water

Date Received: 09/25/20 08:50

### Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			10/05/20 18:09	5
Fluoride	<0.500		0.500		mg/L			10/05/20 18:09	5
<b>Sulfate</b>	<b>36.2</b>		5.00		mg/L			10/05/20 18:09	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 20:21	1
<b>Arsenic</b>	<b>0.00687</b>		0.00200		mg/L		09/28/20 09:04	09/30/20 20:21	1
<b>Barium</b>	<b>0.226</b>		0.00200		mg/L		09/28/20 09:04	09/30/20 20:21	1
Beryllium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 20:21	1
Boron	<0.100		0.100		mg/L		09/28/20 09:04	09/30/20 20:21	1
Cadmium	<0.000100		0.000100		mg/L		09/28/20 09:04	09/30/20 20:21	1
<b>Calcium</b>	<b>73.8</b>		0.500		mg/L		09/28/20 09:04	09/30/20 20:21	1
Chromium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 20:21	1
<b>Cobalt</b>	<b>0.000741</b>		0.000500		mg/L		09/28/20 09:04	09/30/20 20:21	1
Lead	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 20:21	1
Lithium	<0.0100		0.0100		mg/L		09/28/20 09:04	09/30/20 20:21	1
Molybdenum	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 20:21	1
Selenium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 20:21	1
Thallium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 20:21	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/28/20 12:15	09/29/20 12:28	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>278</b>	<b>H</b>	30.0		mg/L			09/28/20 14:54	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
<b>pH</b>	<b>7.2</b>	<b>HF</b>	0.1		SU			09/25/20 14:30	1

# Client Sample Results

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

Job ID: 310-191598-1

**Client Sample ID: Duplicate-2**

**Lab Sample ID: 310-191598-14**

Date Collected: 09/18/20 12:00

Matrix: Ground Water

Date Received: 09/25/20 08:50

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	14.7		5.00		mg/L			10/05/20 18:24	5
Fluoride	<0.500		0.500		mg/L			10/05/20 18:24	5
Sulfate	99.6		5.00		mg/L			10/05/20 18:24	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00100		0.00100		mg/L		09/28/20 09:05	09/30/20 20:24	1
Arsenic	<0.00200		0.00200		mg/L		09/28/20 09:05	09/30/20 20:24	1
Barium	0.0549		0.00200		mg/L		09/28/20 09:05	09/30/20 20:24	1
Beryllium	<0.00100		0.00100		mg/L		09/28/20 09:05	09/30/20 20:24	1
Boron	<0.100		0.100		mg/L		09/28/20 09:05	09/30/20 20:24	1
Cadmium	<0.000100		0.000100		mg/L		09/28/20 09:05	09/30/20 20:24	1
Calcium	77.5		0.500		mg/L		09/28/20 09:05	09/30/20 20:24	1
Chromium	<0.00500		0.00500		mg/L		09/28/20 09:05	09/30/20 20:24	1
Cobalt	0.000782		0.000500		mg/L		09/28/20 09:05	09/30/20 20:24	1
Lead	<0.000500		0.000500		mg/L		09/28/20 09:05	09/30/20 20:24	1
Lithium	<0.0100		0.0100		mg/L		09/28/20 09:05	09/30/20 20:24	1
Molybdenum	<0.00200		0.00200		mg/L		09/28/20 09:05	09/30/20 20:24	1
Selenium	<0.00500		0.00500		mg/L		09/28/20 09:05	09/30/20 20:24	1
Thallium	<0.00100		0.00100		mg/L		09/28/20 09:05	09/30/20 20:24	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/28/20 12:15	09/29/20 12:30	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	304	H	30.0		mg/L			09/28/20 14:54	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.3	HF	0.1		SU			09/25/20 14:31	1



# Definitions/Glossary

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

Job ID: 310-191598-1

## Qualifiers

### General Chemistry

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time
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: 310-191598-1

## Method: 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 310-294401/3**  
**Matrix: Water**  
**Analysis Batch: 294401**

**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			10/02/20 15:10	1
Fluoride	<0.100		0.100		mg/L			10/02/20 15:10	1
Sulfate	<1.00		1.00		mg/L			10/02/20 15:10	1

**Lab Sample ID: LCS 310-294401/4**  
**Matrix: Water**  
**Analysis Batch: 294401**

**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	9.696		mg/L		97	90 - 110
Fluoride	2.00	1.964		mg/L		98	90 - 110
Sulfate	10.0	10.40		mg/L		104	90 - 110

**Lab Sample ID: MB 310-294404/3**  
**Matrix: Water**  
**Analysis Batch: 294404**

**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			10/05/20 15:02	1
Fluoride	<0.100		0.100		mg/L			10/05/20 15:02	1
Sulfate	<1.00		1.00		mg/L			10/05/20 15:02	1

**Lab Sample ID: LCS 310-294404/4**  
**Matrix: Water**  
**Analysis Batch: 294404**

**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	10.39		mg/L		104	90 - 110
Fluoride	2.00	1.975		mg/L		99	90 - 110
Sulfate	10.0	10.36		mg/L		104	90 - 110

**Lab Sample ID: 310-191598-9 MS**  
**Matrix: Ground Water**  
**Analysis Batch: 294404**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	14.4		25.0	39.64		mg/L		101	80 - 120
Fluoride	<0.500		5.00	4.645		mg/L		93	80 - 120
Sulfate	25.8		25.0	51.94		mg/L		104	80 - 120

**Lab Sample ID: 310-191598-9 MSD**  
**Matrix: Ground Water**  
**Analysis Batch: 294404**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	14.4		25.0	39.79		mg/L		101	80 - 120	0	15
Fluoride	<0.500		5.00	4.951		mg/L		99	80 - 120	6	15
Sulfate	25.8		25.0	51.12		mg/L		101	80 - 120	2	15

# QC Sample Results

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

Job ID: 310-191598-1

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

**Lab Sample ID: MB 310-293335/1-A**  
**Matrix: Water**  
**Analysis Batch: 293825**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 293335**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 18:58	1
Arsenic	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 18:58	1
Barium	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 18:58	1
Beryllium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 18:58	1
Cadmium	<0.000100		0.000100		mg/L		09/28/20 09:04	09/30/20 18:58	1
Calcium	<0.500		0.500		mg/L		09/28/20 09:04	09/30/20 18:58	1
Chromium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 18:58	1
Cobalt	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 18:58	1
Lead	<0.000500		0.000500		mg/L		09/28/20 09:04	09/30/20 18:58	1
Lithium	<0.0100		0.0100		mg/L		09/28/20 09:04	09/30/20 18:58	1
Molybdenum	<0.00200		0.00200		mg/L		09/28/20 09:04	09/30/20 18:58	1
Selenium	<0.00500		0.00500		mg/L		09/28/20 09:04	09/30/20 18:58	1
Thallium	<0.00100		0.00100		mg/L		09/28/20 09:04	09/30/20 18:58	1

**Lab Sample ID: MB 310-293335/1-A**  
**Matrix: Water**  
**Analysis Batch: 293986**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 293335**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	<0.100		0.100		mg/L		09/28/20 09:04	10/01/20 14:10	1

**Lab Sample ID: LCS 310-293335/2-A**  
**Matrix: Water**  
**Analysis Batch: 293825**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 293335**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.200	0.2073		mg/L		104	80 - 120
Arsenic	0.200	0.2043		mg/L		102	80 - 120
Barium	0.100	0.1033		mg/L		103	80 - 120
Beryllium	0.100	0.1047		mg/L		105	80 - 120
Cadmium	0.100	0.1017		mg/L		102	80 - 120
Calcium	2.00	1.797		mg/L		90	80 - 120
Chromium	0.100	0.09801		mg/L		98	80 - 120
Cobalt	0.100	0.1014		mg/L		101	80 - 120
Lead	0.200	0.2090		mg/L		104	80 - 120
Lithium	0.200	0.1994		mg/L		100	80 - 120
Molybdenum	0.200	0.1971		mg/L		99	80 - 120
Selenium	0.400	0.3941		mg/L		99	80 - 120

**Lab Sample ID: LCS 310-293335/2-A**  
**Matrix: Water**  
**Analysis Batch: 293986**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 293335**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	0.200	0.2087		mg/L		104	80 - 120

# QC Sample Results

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

Job ID: 310-191598-1

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

**Lab Sample ID: LCS 310-293335/2-A ^10**  
**Matrix: Water**  
**Analysis Batch: 293825**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 293335**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Thallium	0.200	0.1778		mg/L		89	80 - 120

**Lab Sample ID: 310-191598-7 DU**  
**Matrix: Ground Water**  
**Analysis Batch: 293825**

**Client Sample ID: MW-21**  
**Prep Type: Total/NA**  
**Prep Batch: 293335**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Antimony	<0.00100		<0.00100		mg/L		NC	20
Arsenic	<0.00200		<0.00200		mg/L		NC	20
Barium	0.0407		0.04038		mg/L		0.7	20
Beryllium	<0.00100		<0.00100		mg/L		NC	20
Cadmium	<0.000100		<0.000100		mg/L		NC	20
Calcium	101		99.40		mg/L		1	20
Chromium	0.00589		0.005798		mg/L		2	20
Cobalt	<0.000500		<0.000500		mg/L		NC	20
Lead	<0.000500		<0.000500		mg/L		NC	20
Lithium	0.0225		0.02291		mg/L		2	20
Molybdenum	<0.00200		<0.00200		mg/L		NC	20
Selenium	0.00762		0.007911		mg/L		4	20
Thallium	<0.00100		<0.00100		mg/L		NC	20

**Lab Sample ID: 310-191598-7 DU**  
**Matrix: Ground Water**  
**Analysis Batch: 293986**

**Client Sample ID: MW-21**  
**Prep Type: Total/NA**  
**Prep Batch: 293335**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Boron	6.82		6.799		mg/L		0.3	20

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID: MB 310-293386/1-A**  
**Matrix: Water**  
**Analysis Batch: 293554**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 293386**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/28/20 12:13	09/29/20 10:48	1

**Lab Sample ID: LCS 310-293386/2-A**  
**Matrix: Water**  
**Analysis Batch: 293554**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 293386**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00167	0.001750		mg/L		105	80 - 120

**Lab Sample ID: MB 310-293387/1-A**  
**Matrix: Water**  
**Analysis Batch: 293554**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 293387**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/28/20 12:15	09/29/20 12:20	1

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# QC Sample Results

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

Job ID: 310-191598-1

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID:** LCS 310-293387/2-A  
**Matrix:** Water  
**Analysis Batch:** 293554

**Client Sample ID:** Lab Control Sample  
**Prep Type:** Total/NA  
**Prep Batch:** 293387  
 %Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00167	0.001758		mg/L		105	80 - 120

**Lab Sample ID:** MB 310-293716/1-A  
**Matrix:** Water  
**Analysis Batch:** 293903

**Client Sample ID:** Method Blank  
**Prep Type:** Total/NA  
**Prep Batch:** 293716

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/30/20 12:19	10/01/20 09:55	1

**Lab Sample ID:** LCS 310-293716/2-A  
**Matrix:** Water  
**Analysis Batch:** 293903

**Client Sample ID:** Lab Control Sample  
**Prep Type:** Total/NA  
**Prep Batch:** 293716  
 %Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00167	0.001747		mg/L		105	80 - 120

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

**Lab Sample ID:** MB 310-293399/1  
**Matrix:** Water  
**Analysis Batch:** 293399

**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	<30.0		30.0		mg/L			09/28/20 14:54	1

**Lab Sample ID:** LCS 310-293399/2  
**Matrix:** Water  
**Analysis Batch:** 293399

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Total Dissolved Solids	1000	970.0		mg/L		97	90 - 110

**Lab Sample ID:** MB 310-293525/1  
**Matrix:** Water  
**Analysis Batch:** 293525

**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	<30.0		30.0		mg/L			09/29/20 11:26	1

**Lab Sample ID:** LCS 310-293525/2  
**Matrix:** Water  
**Analysis Batch:** 293525

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Total Dissolved Solids	1000	972.0		mg/L		97	90 - 110

# QC Sample Results

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

Job ID: 310-191598-1

## Method: SM 4500 H+ B - pH

**Lab Sample ID: LCS 310-293182/1**  
**Matrix: Water**  
**Analysis Batch: 293182**

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

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

**Lab Sample ID: LCS 310-293182/28**  
**Matrix: Water**  
**Analysis Batch: 293182**

**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: 310-191598-6 DU**  
**Matrix: Ground Water**  
**Analysis Batch: 293182**

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

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.2	HF	7.2		SU		0.1	20

**Lab Sample ID: 310-191598-8 DU**  
**Matrix: Ground Water**  
**Analysis Batch: 293182**

**Client Sample ID: MW-22**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.5	HF	7.5		SU		0.8	20

- 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: 310-191598-1

## HPLC/IC

### Analysis Batch: 294401

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-1	MW-4B	Total/NA	Ground Water	9056A	
310-191598-2	MW-5B	Total/NA	Ground Water	9056A	
310-191598-3	MW-8	Total/NA	Ground Water	9056A	
310-191598-4	MW-10	Total/NA	Ground Water	9056A	
310-191598-5	MW-14A	Total/NA	Ground Water	9056A	
310-191598-5	MW-14A	Total/NA	Ground Water	9056A	
310-191598-6	MW-15A	Total/NA	Ground Water	9056A	
310-191598-7	MW-21	Total/NA	Ground Water	9056A	
310-191598-8	MW-22	Total/NA	Ground Water	9056A	
MB 310-294401/3	Method Blank	Total/NA	Water	9056A	
LCS 310-294401/4	Lab Control Sample	Total/NA	Water	9056A	

### Analysis Batch: 294404

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-9	MW-23	Total/NA	Ground Water	9056A	
310-191598-10	MW-24	Total/NA	Ground Water	9056A	
310-191598-13	Duplicate-1	Total/NA	Ground Water	9056A	
310-191598-14	Duplicate-2	Total/NA	Ground Water	9056A	
MB 310-294404/3	Method Blank	Total/NA	Water	9056A	
LCS 310-294404/4	Lab Control Sample	Total/NA	Water	9056A	
310-191598-9 MS	MW-23	Total/NA	Ground Water	9056A	
310-191598-9 MSD	MW-23	Total/NA	Ground Water	9056A	

## Metals

### Prep Batch: 293335

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-1	MW-4B	Total/NA	Ground Water	3010A	
310-191598-2	MW-5B	Total/NA	Ground Water	3010A	
310-191598-3	MW-8	Total/NA	Ground Water	3010A	
310-191598-4	MW-10	Total/NA	Ground Water	3010A	
310-191598-5	MW-14A	Total/NA	Ground Water	3010A	
310-191598-6	MW-15A	Total/NA	Ground Water	3010A	
310-191598-7	MW-21	Total/NA	Ground Water	3010A	
310-191598-8	MW-22	Total/NA	Ground Water	3010A	
310-191598-9	MW-23	Total/NA	Ground Water	3010A	
310-191598-10	MW-24	Total/NA	Ground Water	3010A	
310-191598-13	Duplicate-1	Total/NA	Ground Water	3010A	
310-191598-14	Duplicate-2	Total/NA	Ground Water	3010A	
MB 310-293335/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-293335/2-A	Lab Control Sample	Total/NA	Water	3010A	
LCS 310-293335/2-A ^10	Lab Control Sample	Total/NA	Water	3010A	
310-191598-7 DU	MW-21	Total/NA	Ground Water	3010A	

### Prep Batch: 293386

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-1	MW-4B	Total/NA	Ground Water	7470A	
310-191598-3	MW-8	Total/NA	Ground Water	7470A	
310-191598-4	MW-10	Total/NA	Ground Water	7470A	
310-191598-5	MW-14A	Total/NA	Ground Water	7470A	
310-191598-6	MW-15A	Total/NA	Ground Water	7470A	

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# QC Association Summary

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

Job ID: 310-191598-1

## Metals (Continued)

### Prep Batch: 293386 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-7	MW-21	Total/NA	Ground Water	7470A	
310-191598-8	MW-22	Total/NA	Ground Water	7470A	
310-191598-9	MW-23	Total/NA	Ground Water	7470A	
MB 310-293386/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-293386/2-A	Lab Control Sample	Total/NA	Water	7470A	

### Prep Batch: 293387

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-10	MW-24	Total/NA	Ground Water	7470A	
310-191598-13	Duplicate-1	Total/NA	Ground Water	7470A	
310-191598-14	Duplicate-2	Total/NA	Ground Water	7470A	
MB 310-293387/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-293387/2-A	Lab Control Sample	Total/NA	Water	7470A	

### Analysis Batch: 293554

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-1	MW-4B	Total/NA	Ground Water	7470A	293386
310-191598-3	MW-8	Total/NA	Ground Water	7470A	293386
310-191598-4	MW-10	Total/NA	Ground Water	7470A	293386
310-191598-5	MW-14A	Total/NA	Ground Water	7470A	293386
310-191598-6	MW-15A	Total/NA	Ground Water	7470A	293386
310-191598-7	MW-21	Total/NA	Ground Water	7470A	293386
310-191598-8	MW-22	Total/NA	Ground Water	7470A	293386
310-191598-9	MW-23	Total/NA	Ground Water	7470A	293386
310-191598-10	MW-24	Total/NA	Ground Water	7470A	293387
310-191598-13	Duplicate-1	Total/NA	Ground Water	7470A	293387
310-191598-14	Duplicate-2	Total/NA	Ground Water	7470A	293387
MB 310-293386/1-A	Method Blank	Total/NA	Water	7470A	293386
MB 310-293387/1-A	Method Blank	Total/NA	Water	7470A	293387
LCS 310-293386/2-A	Lab Control Sample	Total/NA	Water	7470A	293386
LCS 310-293387/2-A	Lab Control Sample	Total/NA	Water	7470A	293387

### Prep Batch: 293716

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-2	MW-5B	Total/NA	Ground Water	7470A	
MB 310-293716/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-293716/2-A	Lab Control Sample	Total/NA	Water	7470A	

### Analysis Batch: 293825

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-1	MW-4B	Total/NA	Ground Water	6020A	293335
310-191598-2	MW-5B	Total/NA	Ground Water	6020A	293335
310-191598-3	MW-8	Total/NA	Ground Water	6020A	293335
310-191598-4	MW-10	Total/NA	Ground Water	6020A	293335
310-191598-5	MW-14A	Total/NA	Ground Water	6020A	293335
310-191598-6	MW-15A	Total/NA	Ground Water	6020A	293335
310-191598-7	MW-21	Total/NA	Ground Water	6020A	293335
310-191598-8	MW-22	Total/NA	Ground Water	6020A	293335
310-191598-9	MW-23	Total/NA	Ground Water	6020A	293335
310-191598-10	MW-24	Total/NA	Ground Water	6020A	293335
310-191598-13	Duplicate-1	Total/NA	Ground Water	6020A	293335

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# QC Association Summary

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

Job ID: 310-191598-1

## Metals (Continued)

### Analysis Batch: 293825 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-14	Duplicate-2	Total/NA	Ground Water	6020A	293335
MB 310-293335/1-A	Method Blank	Total/NA	Water	6020A	293335
LCS 310-293335/2-A	Lab Control Sample	Total/NA	Water	6020A	293335
LCS 310-293335/2-A ^10	Lab Control Sample	Total/NA	Water	6020A	293335
310-191598-7 DU	MW-21	Total/NA	Ground Water	6020A	293335

### Analysis Batch: 293829

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-4	MW-10	Total/NA	Ground Water	6020A	293335
310-191598-8	MW-22	Total/NA	Ground Water	6020A	293335
310-191598-9	MW-23	Total/NA	Ground Water	6020A	293335
310-191598-10	MW-24	Total/NA	Ground Water	6020A	293335
310-191598-13	Duplicate-1	Total/NA	Ground Water	6020A	293335
310-191598-14	Duplicate-2	Total/NA	Ground Water	6020A	293335

### Analysis Batch: 293903

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-2	MW-5B	Total/NA	Ground Water	7470A	293716
MB 310-293716/1-A	Method Blank	Total/NA	Water	7470A	293716
LCS 310-293716/2-A	Lab Control Sample	Total/NA	Water	7470A	293716

### Analysis Batch: 293986

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-5	MW-14A	Total/NA	Ground Water	6020A	293335
310-191598-6	MW-15A	Total/NA	Ground Water	6020A	293335
310-191598-7	MW-21	Total/NA	Ground Water	6020A	293335
MB 310-293335/1-A	Method Blank	Total/NA	Water	6020A	293335
LCS 310-293335/2-A	Lab Control Sample	Total/NA	Water	6020A	293335
310-191598-7 DU	MW-21	Total/NA	Ground Water	6020A	293335

## General Chemistry

### Analysis Batch: 293182

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-1	MW-4B	Total/NA	Ground Water	SM 4500 H+ B	
310-191598-2	MW-5B	Total/NA	Ground Water	SM 4500 H+ B	
310-191598-3	MW-8	Total/NA	Ground Water	SM 4500 H+ B	
310-191598-4	MW-10	Total/NA	Ground Water	SM 4500 H+ B	
310-191598-5	MW-14A	Total/NA	Ground Water	SM 4500 H+ B	
310-191598-6	MW-15A	Total/NA	Ground Water	SM 4500 H+ B	
310-191598-7	MW-21	Total/NA	Ground Water	SM 4500 H+ B	
310-191598-8	MW-22	Total/NA	Ground Water	SM 4500 H+ B	
310-191598-9	MW-23	Total/NA	Ground Water	SM 4500 H+ B	
310-191598-10	MW-24	Total/NA	Ground Water	SM 4500 H+ B	
310-191598-13	Duplicate-1	Total/NA	Ground Water	SM 4500 H+ B	
310-191598-14	Duplicate-2	Total/NA	Ground Water	SM 4500 H+ B	
LCS 310-293182/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCS 310-293182/28	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-191598-6 DU	MW-15A	Total/NA	Ground Water	SM 4500 H+ B	
310-191598-8 DU	MW-22	Total/NA	Ground Water	SM 4500 H+ B	

# QC Association Summary

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

Job ID: 310-191598-1

## General Chemistry

### Analysis Batch: 293399

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-3	MW-8	Total/NA	Ground Water	SM 2540C	
310-191598-4	MW-10	Total/NA	Ground Water	SM 2540C	
310-191598-5	MW-14A	Total/NA	Ground Water	SM 2540C	
310-191598-6	MW-15A	Total/NA	Ground Water	SM 2540C	
310-191598-7	MW-21	Total/NA	Ground Water	SM 2540C	
310-191598-8	MW-22	Total/NA	Ground Water	SM 2540C	
310-191598-9	MW-23	Total/NA	Ground Water	SM 2540C	
310-191598-10	MW-24	Total/NA	Ground Water	SM 2540C	
310-191598-13	Duplicate-1	Total/NA	Ground Water	SM 2540C	
310-191598-14	Duplicate-2	Total/NA	Ground Water	SM 2540C	
MB 310-293399/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-293399/2	Lab Control Sample	Total/NA	Water	SM 2540C	

### Analysis Batch: 293525

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191598-1	MW-4B	Total/NA	Ground Water	SM 2540C	
310-191598-2	MW-5B	Total/NA	Ground Water	SM 2540C	
MB 310-293525/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-293525/2	Lab Control Sample	Total/NA	Water	SM 2540C	

# Lab Chronicle

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

Job ID: 310-191598-1

## Client Sample ID: MW-4B

Date Collected: 09/23/20 13:40

Date Received: 09/25/20 08:50

## Lab Sample ID: 310-191598-1

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	294401	10/05/20 15:10	ACJ	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293825	09/30/20 19:32	SAD	TAL CF
Total/NA	Prep	7470A			293386	09/28/20 12:13	ACJ	TAL CF
Total/NA	Analysis	7470A		1	293554	09/29/20 11:30	ACJ	TAL CF
Total/NA	Analysis	SM 2540C		1	293525	09/29/20 11:26	LBB	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	293182	09/25/20 14:36	JAJ	TAL CF

## Client Sample ID: MW-5B

Date Collected: 09/23/20 12:25

Date Received: 09/25/20 08:50

## Lab Sample ID: 310-191598-2

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	294401	10/05/20 15:10	ACJ	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293825	09/30/20 19:34	SAD	TAL CF
Total/NA	Prep	7470A			293716	09/30/20 12:19	ACJ	TAL CF
Total/NA	Analysis	7470A		1	293903	10/01/20 09:59	ACJ	TAL CF
Total/NA	Analysis	SM 2540C		1	293525	09/29/20 11:26	LBB	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	293182	09/25/20 14:37	JAJ	TAL CF

## Client Sample ID: MW-8

Date Collected: 09/18/20 12:30

Date Received: 09/25/20 08:50

## Lab Sample ID: 310-191598-3

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	294401	10/05/20 15:10	ACJ	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293825	09/30/20 19:37	SAD	TAL CF
Total/NA	Prep	7470A			293386	09/28/20 12:13	ACJ	TAL CF
Total/NA	Analysis	7470A		1	293554	09/29/20 11:32	ACJ	TAL CF
Total/NA	Analysis	SM 2540C		1	293399	09/28/20 14:54	LBB	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	293182	09/25/20 14:34	JAJ	TAL CF

## Client Sample ID: MW-10

Date Collected: 09/18/20 11:25

Date Received: 09/25/20 08:50

## Lab Sample ID: 310-191598-4

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	294401	10/05/20 15:10	ACJ	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293825	09/30/20 19:47	SAD	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293829	09/30/20 19:47	SAD	TAL CF

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# Lab Chronicle

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

Job ID: 310-191598-1

**Client Sample ID: MW-10**  
**Date Collected: 09/18/20 11:25**  
**Date Received: 09/25/20 08:50**

**Lab Sample ID: 310-191598-4**  
**Matrix: Ground Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			293386	09/28/20 12:13	ACJ	TAL CF
Total/NA	Analysis	7470A		1	293554	09/29/20 11:35	ACJ	TAL CF
Total/NA	Analysis	SM 2540C		1	293399	09/28/20 14:54	LBB	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	293182	09/25/20 14:38	JAJ	TAL CF

**Client Sample ID: MW-14A**  
**Date Collected: 09/22/20 10:40**  
**Date Received: 09/25/20 08:50**

**Lab Sample ID: 310-191598-5**  
**Matrix: Ground Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	294401	10/05/20 15:10	ACJ	TAL CF
Total/NA	Analysis	9056A		20	294401	10/05/20 15:10	ACJ	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293825	09/30/20 19:50	SAD	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		10	293986	10/01/20 14:15	SAD	TAL CF
Total/NA	Prep	7470A			293386	09/28/20 12:13	ACJ	TAL CF
Total/NA	Analysis	7470A		1	293554	09/29/20 11:37	ACJ	TAL CF
Total/NA	Analysis	SM 2540C		1	293399	09/28/20 14:54	LBB	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	293182	09/25/20 14:40	JAJ	TAL CF

**Client Sample ID: MW-15A**  
**Date Collected: 09/22/20 09:50**  
**Date Received: 09/25/20 08:50**

**Lab Sample ID: 310-191598-6**  
**Matrix: Ground Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	294401	10/05/20 15:10	ACJ	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293825	09/30/20 19:52	SAD	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		10	293986	10/01/20 14:18	SAD	TAL CF
Total/NA	Prep	7470A			293386	09/28/20 12:13	ACJ	TAL CF
Total/NA	Analysis	7470A		1	293554	09/29/20 11:39	ACJ	TAL CF
Total/NA	Analysis	SM 2540C		1	293399	09/28/20 14:54	LBB	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	293182	09/25/20 14:43	JAJ	TAL CF

**Client Sample ID: MW-21**  
**Date Collected: 09/22/20 11:40**  
**Date Received: 09/25/20 08:50**

**Lab Sample ID: 310-191598-7**  
**Matrix: Ground Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	294401	10/05/20 15:10	ACJ	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293825	09/30/20 19:55	SAD	TAL CF

# Lab Chronicle

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

Job ID: 310-191598-1

**Client Sample ID: MW-21**  
**Date Collected: 09/22/20 11:40**  
**Date Received: 09/25/20 08:50**

**Lab Sample ID: 310-191598-7**  
**Matrix: Ground Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		7	293986	10/01/20 14:21	SAD	TAL CF
Total/NA	Prep	7470A			293386	09/28/20 12:13	ACJ	TAL CF
Total/NA	Analysis	7470A		1	293554	09/29/20 12:13	ACJ	TAL CF
Total/NA	Analysis	SM 2540C		1	293399	09/28/20 14:54	LBB	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	293182	09/25/20 14:45	JAJ	TAL CF

**Client Sample ID: MW-22**  
**Date Collected: 09/18/20 09:20**  
**Date Received: 09/25/20 08:50**

**Lab Sample ID: 310-191598-8**  
**Matrix: Ground Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	294401	10/05/20 15:10	ACJ	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293825	09/30/20 20:00	SAD	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293829	09/30/20 20:00	SAD	TAL CF
Total/NA	Prep	7470A			293386	09/28/20 12:13	ACJ	TAL CF
Total/NA	Analysis	7470A		1	293554	09/29/20 12:16	ACJ	TAL CF
Total/NA	Analysis	SM 2540C		1	293399	09/28/20 14:54	LBB	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	293182	09/25/20 14:24	JAJ	TAL CF

**Client Sample ID: MW-23**  
**Date Collected: 09/18/20 10:15**  
**Date Received: 09/25/20 08:50**

**Lab Sample ID: 310-191598-9**  
**Matrix: Ground Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	294404	10/05/20 16:35	ACJ	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293825	09/30/20 20:03	SAD	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293829	09/30/20 20:03	SAD	TAL CF
Total/NA	Prep	7470A			293386	09/28/20 12:13	ACJ	TAL CF
Total/NA	Analysis	7470A		1	293554	09/29/20 12:18	ACJ	TAL CF
Total/NA	Analysis	SM 2540C		1	293399	09/28/20 14:54	LBB	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	293182	09/25/20 14:27	JAJ	TAL CF

**Client Sample ID: MW-24**  
**Date Collected: 09/18/20 14:30**  
**Date Received: 09/25/20 08:50**

**Lab Sample ID: 310-191598-10**  
**Matrix: Ground Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	294404	10/05/20 17:22	ACJ	TAL CF

# Lab Chronicle

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

Job ID: 310-191598-1

## Client Sample ID: MW-24

Date Collected: 09/18/20 14:30

Date Received: 09/25/20 08:50

## Lab Sample ID: 310-191598-10

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293825	09/30/20 20:06	SAD	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293829	09/30/20 20:06	SAD	TAL CF
Total/NA	Prep	7470A			293387	09/28/20 12:15	ACJ	TAL CF
Total/NA	Analysis	7470A		1	293554	09/29/20 12:26	ACJ	TAL CF
Total/NA	Analysis	SM 2540C		1	293399	09/28/20 14:54	LBB	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	293182	09/25/20 14:28	JAJ	TAL CF

## Client Sample ID: Duplicate-1

Date Collected: 09/18/20 12:00

Date Received: 09/25/20 08:50

## Lab Sample ID: 310-191598-13

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	294404	10/05/20 18:09	ACJ	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293825	09/30/20 20:21	SAD	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:04	HED	TAL CF
Total/NA	Analysis	6020A		1	293829	09/30/20 20:21	SAD	TAL CF
Total/NA	Prep	7470A			293387	09/28/20 12:15	ACJ	TAL CF
Total/NA	Analysis	7470A		1	293554	09/29/20 12:28	ACJ	TAL CF
Total/NA	Analysis	SM 2540C		1	293399	09/28/20 14:54	LBB	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	293182	09/25/20 14:30	JAJ	TAL CF

## Client Sample ID: Duplicate-2

Date Collected: 09/18/20 12:00

Date Received: 09/25/20 08:50

## Lab Sample ID: 310-191598-14

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	294404	10/05/20 18:24	ACJ	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:05	HED	TAL CF
Total/NA	Analysis	6020A		1	293825	09/30/20 20:24	SAD	TAL CF
Total/NA	Prep	3010A			293335	09/28/20 09:05	HED	TAL CF
Total/NA	Analysis	6020A		1	293829	09/30/20 20:24	SAD	TAL CF
Total/NA	Prep	7470A			293387	09/28/20 12:15	ACJ	TAL CF
Total/NA	Analysis	7470A		1	293554	09/29/20 12:30	ACJ	TAL CF
Total/NA	Analysis	SM 2540C		1	293399	09/28/20 14:54	LBB	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	293182	09/25/20 14:31	JAJ	TAL CF

### Laboratory References:

TAL CF = Eurofins TestAmerica, 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: 310-191598-1

## Laboratory: Eurofins TestAmerica, 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
AIHA-LAP, LLC	Industrial Hygiene Laboratory Accreditation Program (IHLAP)	101044	11-01-20
Colorado	Petroleum Storage Tank Program	IA100001 (OR)	09-29-21
Georgia	State	IA100001 (OR)	09-29-21
Illinois	NELAP	200024	11-29-20
Iowa	State	007	12-01-21
Kansas	NELAP	E-10341	01-31-21
Minnesota	NELAP	019-999-319	12-31-20
Minnesota (Petrofund)	State	3349	08-22-21
North Dakota	State	R-186	09-30-20 *
Oregon	NELAP	IA100001	09-29-21
USDA	US Federal Programs	P330-19-00003	01-02-22

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



# Method Summary

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

Job ID: 310-191598-1

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
3010A	Preparation, Total Metals	SW846	TAL CF
7470A	Preparation, Mercury	SW846	TAL CF

**Protocol References:**

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

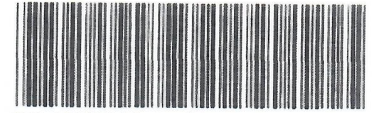
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

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







**Cooler/Sample Receipt and Temperature Log Form**

<b>Client Information</b>		
Client: <u>Muscataine Power + Water</u>		
City/State: <u>Muscataine</u> <small>CITY</small> <u>IA</u> <small>STATE</small>	Project: <u>Muscataine Power + Water State Landfill</u>	
<b>Receipt Information</b>		
Date/Time Received: <u>9/25/20</u> <small>DATE</small> <u>0850</u> <small>TIME</small>	Received By: <u>JR</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: _____		
<b>Condition of Cooler/Containers</b>		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>BAC-01</u>
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? ↓
<b>Temperature Record</b>		
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>M</u>	Correction Factor (°C): <u>+0.1</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>1.4</u>	Corrected Temp (°C): <u>1.5</u>	
<b>• Sample Container Temperature</b>		
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):		
Corrected Temp (°C):		
<b>Exceptions Noted</b>		
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		
<b>Additional Comments</b>		



Chain of Custody Record

<b>Client Information</b> 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: 204585 Email: sbennett@mpw.org and ramundson@hrgreen.com Project Name: Muscatine Power & Water CCR Landfill Site: Iowa		Lab PM: Hayes, Shawn M E-Mail: shawn.hayes@testamericainc.com Carrier Tracking No(s): Job #:		COC No: Page: 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)	
<b>Due Date Requested:</b> TAT Requested (days): PO #: 204585 WO #: TestAmerica Project #: 31007856 Event:		<b>Analysis Requested</b>			
<b>Sample Identification</b>		Perform MS/MSD (Yes or No)		Field Filtered Sample (Yes or No)	
Sample ID: MW-4A MW-5B MW-6A MW-8 MW-10 MW-14A MW-15A MW-21 MW-22 MW-23 MW-24	Sample Date: 9/23/20 9/23/20 9/18/20 9/18/20 9/22/20 9/22/20 9/18/20 9/18/20 9/18/20	Sample Time: 1340 1225 1230 1125 1040 0950 1140 0920 1015 14230	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=water/O)	Preservation Code:
Possible Hazard Identification <input checked="" 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)		Special Instructions/Note: Old well damaged new well MW-4B In next cooler shipment	
Empty Kit Relinquished by: Sam Bennett Relinquished by:		Date: 9/24/20 0800 Date/Time:		Method of Shipment:	
Relinquished by:		Date/Time:		Received by: Company:	
Relinquished by:		Date/Time:		Received by: Company:	
Custody Seals Intact:		Date/Time:		Received by: Company:	
Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For Months:	



**Chain of Custody Record**

<b>Client Information</b>		Sampler: <b>Sam Bennett/ Neil Hoskins</b>		Lab PM: <b>Hayes, Shawn M</b>		Carrier Tracking No(s):	
Client Contact: <b>Sam Bennett MP&amp;W and Ross Amundson (HR Green)</b>		Phone: <b>563-262-3583</b>		E-Mail: <b>shawn.hayes@testamericainc.com</b>		COC No	
Company: <b>Muscatine Power &amp; Water</b>		Due Date Requested:		Analysis Requested		Job #	
Address: <b>1700 Dick Drake Way</b>		TAT Requested (days):		9056A Chloride, Fluoride, Sulfate		Preservation Codes:	
City: <b>Muscaline</b>		PO #: <b>204585</b>		25400 TDS, SM4500, H+ pH		A - HCL M - Hexate N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Duetralhydrate U - Acetone V - MCAA W - ph 4-5 Z - other (specify)	
State Zip: <b>IA, 52761</b>		WO #:		6020A CCR Liel, 7470A Mercury		H - Amchlor I - Ics J - DI Water K - EDTA L - EDA Other:	
Phone: <b>sbennett@mpw.org and ramundson@hrgreen.com</b>		TestAmerica Project #:		Perform MSM/SD (Yes or No)		Total Number of containers	
Project Name: <b>Muscatine Power &amp; Water CCR Landfill</b>		31007856		Field Filtered Sample (Yes or No)		Special Instructions/Note:	
Site: <b>Iowa</b>		Event: <b>Federal List</b>		X		X	
<b>Sample Identification</b>		<b>Sample Date</b>		<b>Sample Time</b>		<b>Sample Type (C=comp, G=grab)</b>	
Duplicate-1		9/18/20		1200		G GW	
Duplicate-2		9/18/20		1200		G GW	
<b>Possible Hazard Identification</b>		<b>Sample Date</b>		<b>Sample Time</b>		<b>Matrix (W=water, S=solid, U=unknown, BT=Trace Analy)</b>	
<input checked="" 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		9/18/20		1200		GW	
Deliverable Requested: I, II, III, IV, Other (specify)		9/18/20		1200		GW	
<b>Empty Kit Relinquished by:</b>		<b>Date</b>		<b>Time</b>		<b>Method of Shipment</b>	
Relinquished by: <b>Sam Bennett</b>		Date/Time: <b>9/24/20 0800</b>		Company: <b>MPW</b>		Received by: <b>RM</b>	
Relinquished by:		Date/Time:		Company:		Received by: <b>9.25.20 950</b>	
Relinquished by:		Date/Time:		Company:		Received by:	
Custody Seals Intact: <b>Yes</b>		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		Company: <b>ETA</b>	



# Login Sample Receipt Checklist

Client: Muscatine Power & Water

Job Number: 310-191598-1

**Login Number: 191598**

**List Source: Eurofins TestAmerica, Cedar Falls**

**List Number: 1**

**Creator: Marzen, Brita K**

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



## ANALYTICAL REPORT

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

Laboratory Job ID: 310-191872-1

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:  
10/12/2020 3:55:59 PM*

Shawn Hayes, Senior Project Manager  
(319)229-8211  
[Shawn.Hayes@Eurofinset.com](mailto:Shawn.Hayes@Eurofinset.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:

[www.eurofinsus.com/Env](http://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: 310-191872-1

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## Job ID: 310-191872-1

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Laboratory: Eurofins TestAmerica, Cedar Falls

### Narrative

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Job Narrative  
310-191872-1

### Comments

No additional comments.

### Receipt

The sample was received on 9/30/2020 8:40 AM; the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.0° 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: 310-191872-1

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-191872-1	MW-6A	Ground Water	09/24/20 12:35	09/30/20 08:40	

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- 1
- 2
- 3
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- 7
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- 10
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- 12
- 13
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# Detection Summary

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

Job ID: 310-191872-1

**Client Sample ID: MW-6A**

**Lab Sample ID: 310-191872-1**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	15.6		5.00		mg/L	5		9056A	Total/NA
Sulfate	19.1		5.00		mg/L	5		9056A	Total/NA
Barium	0.231		0.00200		mg/L	1		6020A	Total/NA
Calcium	87.9		0.500		mg/L	1		6020A	Total/NA
Total Dissolved Solids	374		30.0		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 TestAmerica, Cedar Falls

# Client Sample Results

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

Job ID: 310-191872-1

**Client Sample ID: MW-6A**  
 Date Collected: 09/24/20 12:35  
 Date Received: 09/30/20 08:40

**Lab Sample ID: 310-191872-1**  
 Matrix: Ground Water

**Method: 9056A - Anions, Ion Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>15.6</b>		5.00		mg/L			10/05/20 20:29	5
Fluoride	<0.500		0.500		mg/L			10/05/20 20:29	5
<b>Sulfate</b>	<b>19.1</b>		5.00		mg/L			10/05/20 20:29	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00100		0.00100		mg/L		10/01/20 08:31	10/01/20 21:45	1
Arsenic	<0.00200		0.00200		mg/L		10/01/20 08:31	10/01/20 21:45	1
<b>Barium</b>	<b>0.231</b>		0.00200		mg/L		10/01/20 08:31	10/01/20 21:45	1
Beryllium	<0.00100		0.00100		mg/L		10/01/20 08:31	10/01/20 21:45	1
Boron	<0.100		0.100		mg/L		10/01/20 08:31	10/01/20 21:45	1
Cadmium	<0.000100		0.000100		mg/L		10/01/20 08:31	10/01/20 21:45	1
<b>Calcium</b>	<b>87.9</b>		0.500		mg/L		10/01/20 08:31	10/01/20 21:45	1
Chromium	<0.00500		0.00500		mg/L		10/01/20 08:31	10/01/20 21:45	1
Cobalt	<0.000500		0.000500		mg/L		10/01/20 08:31	10/01/20 21:45	1
Lead	<0.000500		0.000500		mg/L		10/01/20 08:31	10/01/20 21:45	1
Lithium	<0.0100		0.0100		mg/L		10/01/20 08:31	10/01/20 21:45	1
Molybdenum	<0.00200		0.00200		mg/L		10/01/20 08:31	10/01/20 21:45	1
Selenium	<0.00500		0.00500		mg/L		10/01/20 08:31	10/01/20 21:45	1
Thallium	<0.00100		0.00100		mg/L		10/01/20 08:31	10/01/20 21:45	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/01/20 09:52	10/01/20 13:32	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>374</b>		30.0		mg/L			09/30/20 15:46	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>pH</b>	<b>7.4</b>	<b>HF</b>	0.1		SU			09/30/20 21:43	1

# Definitions/Glossary

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

Job ID: 310-191872-1

## 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: 310-191872-1

## Method: 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 310-294404/3**  
**Matrix: Water**  
**Analysis Batch: 294404**

**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			10/05/20 15:02	1
Fluoride	<0.100		0.100		mg/L			10/05/20 15:02	1
Sulfate	<1.00		1.00		mg/L			10/05/20 15:02	1

**Lab Sample ID: LCS 310-294404/4**  
**Matrix: Water**  
**Analysis Batch: 294404**

**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	10.39		mg/L		104	90 - 110
Fluoride	2.00	1.975		mg/L		99	90 - 110
Sulfate	10.0	10.36		mg/L		104	90 - 110

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

**Lab Sample ID: MB 310-293819/1-A**  
**Matrix: Water**  
**Analysis Batch: 293986**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 293819**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00100		0.00100		mg/L		10/01/20 08:31	10/01/20 20:22	1
Arsenic	<0.00200		0.00200		mg/L		10/01/20 08:31	10/01/20 20:22	1
Barium	<0.00200		0.00200		mg/L		10/01/20 08:31	10/01/20 20:22	1
Beryllium	<0.00100		0.00100		mg/L		10/01/20 08:31	10/01/20 20:22	1
Boron	<0.100		0.100		mg/L		10/01/20 08:31	10/01/20 20:22	1
Cadmium	<0.000100		0.000100		mg/L		10/01/20 08:31	10/01/20 20:22	1
Calcium	<0.500		0.500		mg/L		10/01/20 08:31	10/01/20 20:22	1
Chromium	<0.00500		0.00500		mg/L		10/01/20 08:31	10/01/20 20:22	1
Cobalt	<0.000500		0.000500		mg/L		10/01/20 08:31	10/01/20 20:22	1
Lead	<0.000500		0.000500		mg/L		10/01/20 08:31	10/01/20 20:22	1
Lithium	<0.0100		0.0100		mg/L		10/01/20 08:31	10/01/20 20:22	1
Molybdenum	<0.00200		0.00200		mg/L		10/01/20 08:31	10/01/20 20:22	1
Selenium	<0.00500		0.00500		mg/L		10/01/20 08:31	10/01/20 20:22	1
Thallium	<0.00100		0.00100		mg/L		10/01/20 08:31	10/01/20 20:22	1

**Lab Sample ID: LCS 310-293819/2-A**  
**Matrix: Water**  
**Analysis Batch: 293986**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 293819**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.200	0.2064		mg/L		103	80 - 120
Arsenic	0.200	0.2006		mg/L		100	80 - 120
Barium	0.100	0.1062		mg/L		106	80 - 120
Beryllium	0.100	0.09686		mg/L		97	80 - 120
Boron	0.200	0.2092		mg/L		105	80 - 120
Cadmium	0.100	0.09870		mg/L		99	80 - 120
Calcium	2.00	1.858		mg/L		93	80 - 120
Chromium	0.100	0.09623		mg/L		96	80 - 120
Cobalt	0.100	0.1038		mg/L		104	80 - 120

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

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

Job ID: 310-191872-1

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

Lab Sample ID: LCS 310-293819/2-A  
 Matrix: Water  
 Analysis Batch: 293986

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 293819

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	0.200	0.2066		mg/L		103	80 - 120
Lithium	0.200	0.1874		mg/L		94	80 - 120
Molybdenum	0.200	0.1953		mg/L		98	80 - 120
Selenium	0.400	0.3901		mg/L		98	80 - 120
Strontium	0.200	0.2038		mg/L		102	80 - 120
Zinc	0.200	0.2029		mg/L		101	80 - 120

## Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-293848/1-A  
 Matrix: Water  
 Analysis Batch: 293903

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 293848

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		10/01/20 09:52	10/01/20 12:53	1

Lab Sample ID: LCS 310-293848/2-A  
 Matrix: Water  
 Analysis Batch: 293903

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 293848

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00167	0.001860		mg/L		112	80 - 120

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

Lab Sample ID: MB 310-293749/1  
 Matrix: Water  
 Analysis Batch: 293749

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	<30.0		30.0		mg/L			09/30/20 15:46	1

Lab Sample ID: LCS 310-293749/2  
 Matrix: Water  
 Analysis Batch: 293749

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	970.0		mg/L		97	90 - 110

## Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-293763/1  
 Matrix: Water  
 Analysis Batch: 293763

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		99	98 - 102

# QC Sample Results

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

Job ID: 310-191872-1

## Method: SM 4500 H+ B - pH (Continued)

Lab Sample ID: 310-191872-1 DU  
Matrix: Ground Water  
Analysis Batch: 293763

Client Sample ID: MW-6A  
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.4	HF	7.4		SU		0.3	20

- 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: 310-191872-1

## HPLC/IC

### Analysis Batch: 294404

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191872-1	MW-6A	Total/NA	Ground Water	9056A	
MB 310-294404/3	Method Blank	Total/NA	Water	9056A	
LCS 310-294404/4	Lab Control Sample	Total/NA	Water	9056A	

## Metals

### Prep Batch: 293819

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191872-1	MW-6A	Total/NA	Ground Water	3010A	
MB 310-293819/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-293819/2-A	Lab Control Sample	Total/NA	Water	3010A	
LCS 310-293819/2-A ^10	Lab Control Sample	Total/NA	Water	3010A	

### Prep Batch: 293848

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191872-1	MW-6A	Total/NA	Ground Water	7470A	
MB 310-293848/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-293848/2-A	Lab Control Sample	Total/NA	Water	7470A	

### Analysis Batch: 293903

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191872-1	MW-6A	Total/NA	Ground Water	7470A	293848
MB 310-293848/1-A	Method Blank	Total/NA	Water	7470A	293848
LCS 310-293848/2-A	Lab Control Sample	Total/NA	Water	7470A	293848

### Analysis Batch: 293986

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191872-1	MW-6A	Total/NA	Ground Water	6020A	293819
MB 310-293819/1-A	Method Blank	Total/NA	Water	6020A	293819
LCS 310-293819/2-A	Lab Control Sample	Total/NA	Water	6020A	293819
LCS 310-293819/2-A ^10	Lab Control Sample	Total/NA	Water	6020A	293819

## General Chemistry

### Analysis Batch: 293749

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191872-1	MW-6A	Total/NA	Ground Water	SM 2540C	
MB 310-293749/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-293749/2	Lab Control Sample	Total/NA	Water	SM 2540C	

### Analysis Batch: 293763

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-191872-1	MW-6A	Total/NA	Ground Water	SM 4500 H+ B	
LCS 310-293763/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-191872-1 DU	MW-6A	Total/NA	Ground Water	SM 4500 H+ B	

# Lab Chronicle

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

Job ID: 310-191872-1

**Client Sample ID: MW-6A**

**Date Collected: 09/24/20 12:35**

**Date Received: 09/30/20 08:40**

**Lab Sample ID: 310-191872-1**

**Matrix: Ground Water**

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Prepared or Analyzed</u>	<u>Analyst</u>	<u>Lab</u>
Total/NA	Analysis	9056A		5	294404	10/05/20 20:29	ACJ	TAL CF
Total/NA	Prep	3010A			293819	10/01/20 08:31	HED	TAL CF
Total/NA	Analysis	6020A		1	293986	10/01/20 21:45	SAD	TAL CF
Total/NA	Prep	7470A			293848	10/01/20 09:52	ACJ	TAL CF
Total/NA	Analysis	7470A		1	293903	10/01/20 13:32	ACJ	TAL CF
Total/NA	Analysis	SM 2540C		1	293749	09/30/20 15:46	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	293763	09/30/20 21:43	JMH	TAL CF

## Laboratory References:

TAL CF = Eurofins TestAmerica, 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: 310-191872-1

## Laboratory: Eurofins TestAmerica, 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
AIHA-LAP, LLC	Industrial Hygiene Laboratory Accreditation Program (IHLAP)	101044	11-01-20
Colorado	Petroleum Storage Tank Program	IA100001 (OR)	09-29-21
Georgia	State	IA100001 (OR)	09-29-21
Illinois	NELAP	200024	11-29-20
Iowa	State	007	12-01-21
Kansas	NELAP	E-10341	01-31-21
Minnesota	NELAP	019-999-319	12-31-20
Minnesota (Petrofund)	State	3349	08-22-21
North Dakota	State	R-186	09-30-20 *
Oregon	NELAP	IA100001	09-29-21
USDA	US Federal Programs	P330-19-00003	01-02-22

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

Eurofins TestAmerica, Cedar Falls

# Method Summary

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

Job ID: 310-191872-1

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
3010A	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 TestAmerica, Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401



**TestAmerica 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/Neil Hoskins  
 Phone: 563-262-3583  
 E-Mail: shawn.hayes@testamericainc.com  
 Company: Muscatine Power & Water

Address: 1700 Dick Drake Way  
 City: Muscatine  
 State/Zip: IA, 52761  
 Phone: 204585  
 Email: sbennett@mpw.org and ramundson@hrgreen.com  
 Project Name: Muscatine Power & Water CCR Landfill  
 Site: Iowa

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=other)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020A CCR List, 7470A Mercury	2540C TDS, SM4500, H+PH	9056A Chloride, Fluoride, Sulfate	Total Number of Containers	Special Instructions/Note:
MW-4A				GW	X	X	X	X	X		Old well damaged, new well MW-4B
MW-5B				GW	X	X	X	X	X		
MW-6A	9/24/20	12:35	G	GW	X	X	X	X	X		In next cooler shipment
MW-8				GW	X	X	X	X	X		
MW-10				GW	X	X	X	X	X		
MW-14A				GW	X	X	X	X	X		
MW-15A				GW	X	X	X	X	X		
MW-21				GW	X	X	X	X	X		
MW-22				GW	X	X	X	X	X		
MW-23				GW	X	X	X	X	X		
MW-24				GW	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: \_\_\_\_\_ Date: \_\_\_\_\_

Relinquished by: Sam Bennett Date/Time: 9/29/20 0800

Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Custody Seals Intact:  Yes  No  
 Custody Seal No.: \_\_\_\_\_

Special Instructions/QC Requirements: \_\_\_\_\_

Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

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

Received by: *Shawn Hayes* Date/Time: 9-30-20 0940

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: 310-191872-1

**Login Number: 191872**

**List Source: Eurofins TestAmerica, Cedar Falls**

**List Number: 1**

**Creator: Ramos, Eric F**

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

## 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 ( $\pm 0.01$ foot, MSL)

**Elevation:**

**Top of inner well casing** 715.87 **Ground Elevation** 712.04

**Depth of Well** 28.03 **Inside Casing Diameter (in inches)** 2"

**Equipment Used** Slope Indicator Co. Water level indicator Model 51453

**Groundwater Level ( $\pm 0.01$  foot below top of inner casing, MSL):**

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/23/2020 13:00	7.63	
*After Purging	9/23/2020 13:40	9.33	
*Before Purging			

### \*C. WELL PURGING

**Quantity of Water Removed from Well (gallons)** 1.06

**No. of Well Volumes (based on current water level)** 0.32

**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 9<sup>th</sup> St, Des Moines IA 50319.

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

**\*D. FIELD MEASUREMENT**

**Weather Conditions** Partly Cloudy, 77DF, calm

**Field Measurements (after stabilization):**

**Temperature** 19.68 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.93

**Equipment Used** Horiba U-50

**Specific Conductance** 0.644 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

New well, Replacement for MW-4A after it was damaged.

**CERTIFICATION**

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

**Signature**  **Date** 9/25/2020

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

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

\*Omit if only measuring groundwater elevations.

## GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

**Site Name** Muscatine Power and Water **Permit No.** 70-SDP-6\_82P  
**Monitoring Well/Piezometer No.** MW-5B  
**Upgradient** \_\_\_\_\_ **Downgradient** X  
**Name of person sampling** Neil Hoskins

### A. MONITORING WELL/PIEZOMETER CONDITIONS

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

If no, explain \_\_\_\_\_

**Standing Water or Litter?** (please check)  YES  NO

If yes, explain \_\_\_\_\_

### B. GROUNDWATER ELEVATION MEASUREMENT (+ 0.01 foot, MSL)

**Elevation:**

**Top of inner well casing** 709.10 **Ground Elevation** 706.73

**Depth of Well** 25.30 **Inside Casing Diameter (in inches)** 2"

**Equipment Used** Slope Indicator Co. Water level indicator Model 51453

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/23/2020 11:40	0.89	708.21
*After Purging	9/23/2020 12:25	1.8	707.3
*Before Purging			

### \*C. WELL PURGING

**Quantity of Water Removed from Well (gallons)** 1.19

**No. of Well Volumes (based on current water level)** 0.30

**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 9<sup>th</sup> St, Des Moines IA 50319.

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



**\*D. FIELD MEASUREMENT**

**Weather Conditions** Partly Cloudy, 74DF, Calm

**Field Measurements (after stabilization):**

**Temperature** 20.81 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.33

**Equipment Used** Horiba U-50

**Specific Conductance** 0.727 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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

**Signature**  **Date** 9/25/2020

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

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

\*Omit if only measuring groundwater elevations.

## GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

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

### A. MONITORING WELL/PIEZOMETER CONDITIONS

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

If no, explain \_\_\_\_\_

**Standing Water or Litter?** (please check)  **YES**  **NO**

If yes, explain \_\_\_\_\_

### B. GROUNDWATER ELEVATION MEASUREMENT ( $\pm 0.01$ foot, MSL)

**Elevation:**

**Top of inner well casing** 708.92 **Ground Elevation** 706.49

**Depth of Well** 25.35 **Inside Casing Diameter (in inches)** 2"

**Equipment Used** Slope Indicator Co. Water level indicator Model 51453

**Groundwater Level ( $\pm 0.01$  foot below top of inner casing, MSL):**

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/24/2020 12:10	2.63	706.29
*After Purging	9/24/2020 12:35	2.82	706.1
*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** \_\_\_\_\_

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**\*D. FIELD MEASUREMENT**

**Weather Conditions** Cloudy 72DF, slight breeze 3-8 mph

**Field Measurements (after stabilization):**

**Temperature** 18.36 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.24

**Equipment Used** Horiba U-50

**Specific Conductance** 0.610 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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**Signature**  **Date** 9/25/2020

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

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

\*Omit if only measuring groundwater elevations.

# GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water Permit No. 70-SDP-6\_82P  
 Monitoring Well/Piezometer No. MW-08  
 Upgradient  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 (+ 0.01 foot below top of inner casing, MSL):

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/18/2020 12:10	16.13	731.23
*After Purging	9/18/2020 12:30	19.64	727.72
*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 \_\_\_\_\_

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

**\*D. FIELD MEASUREMENT**

**Weather Conditions** Partly Cloudy, 65DF, Calm

**Field Measurements (after stabilization):**

**Temperature** 16.75 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.40

**Equipment Used** Horiba U-50

**Specific Conductance** 0.635 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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

**Signature**  **Date** 9/25/2020

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

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

\*Omit if only measuring groundwater elevations.

## GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

**Site Name** Muscatine Power and Water **Permit No.** 70-SDP-6\_82P  
**Monitoring Well/Piezometer No.** MW-10  
**Upgradient**  **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 (+ 0.01 foot below top of inner casing, MSL):**

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/18/2020 17:45	4.66	713.85
*After Purging	9/18/2020 18:20	4.73	713.78
*Before Purging			

### \*C. WELL PURGING

**Quantity of Water Removed from Well (gallons)** 1.32

**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** \_\_\_\_\_

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**\*D. FIELD MEASUREMENT**

Weather Conditions Clear, 65DF, Calm

**Field Measurements (after stabilization):**

Temperature 16.18 Units C

Equipment Used Horiba U-50

pH 7.33

Equipment Used Horiba U-50

Specific Conductance 0.648 Units mS/m

Equipment Used Horiba U-50

**Comments**

**CERTIFICATION**

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

Signature  Date 9/25/2020

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

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

\*Omit if only measuring groundwater elevations.

## GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

**Site Name** Muscatine Power and Water **Permit No.** 70-SDP-6\_82P  
**Monitoring Well/Piezometer No.** MW-14A  
**Upgradient** \_\_\_\_\_ **Downgradient** X  
**Name of person sampling** Neil Hoskins

### A. MONITORING WELL/PIEZOMETER CONDITIONS

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

If no, explain \_\_\_\_\_

**Standing Water or Litter?** (please check)  YES  NO

If yes, explain \_\_\_\_\_

### B. GROUNDWATER ELEVATION MEASUREMENT ( $\pm 0.01$ foot, MSL)

**Elevation:**

**Top of inner well casing** 729.00 **Ground Elevation** 726.19

**Depth of Well** 20.50 **Inside Casing Diameter (in inches)** 2"

**Equipment Used** Slope Indicator Co. Water level indicator Model 51453

**Groundwater Level ( $\pm 0.01$  foot below top of inner casing, MSL):**

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/22/2020 10:15	12.79	716.21
*After Purging	9/22/2020 10:40	13.89	715.11
*Before Purging			

### \*C. WELL PURGING

**Quantity of Water Removed from Well (gallons)** 0.66

**No. of Well Volumes (based on current water level)** 0.53

**Was well pumped/bailed dry?** No

**Equipment used:**

**Bailer type** \_\_\_\_\_ **Dedicated Bailer?** \_\_\_\_\_

**Pump type** Peristaltic **Dedicated Pump?** Yes

**If not dedicated, method of cleaning** \_\_\_\_\_

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**\*D. FIELD MEASUREMENT**

**Weather Conditions** Clear, 65DF, Calm

**Field Measurements (after stabilization):**

**Temperature** 17.09 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.21

**Equipment Used** Horiba U-50

**Specific Conductance** 1.67 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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**Signature**  **Date** 9/25/2020

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

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

\*Omit if only measuring groundwater elevations.

# GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

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

## A. MONITORING WELL/PIEZOMETER CONDITIONS

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

## B. GROUNDWATER ELEVATION MEASUREMENT (+ 0.01 foot, MSL)

Elevation:  
 Top of inner well casing 729.99 Ground Elevation 727.12  
 Depth of Well 20.50 Inside Casing Diameter (in inches) 2"  
 Equipment Used Slope Indicator Co. Water level indicator Model 51453

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/22/2020 9:20	11.55	718.44
*After Purging	9/22/2020 9:50	12.51	717.48
*Before Purging			

## \*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.79  
 No. of Well Volumes (based on current water level) 0.54  
 Was well pumped/bailed dry? No  
 Equipment used:  
 Bailer type \_\_\_\_\_ Dedicated Bailer? \_\_\_\_\_  
 Pump type Peristaltic Dedicated Pump? Yes  
 If not dedicated, method of cleaning \_\_\_\_\_

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**\*D. FIELD MEASUREMENT**

**Weather Conditions** Clear, 64DF, Calm

**Field Measurements (after stabilization):**

**Temperature** 18.19 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.28

**Equipment Used** Horiba U-50

**Specific Conductance** 1.00 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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

**Signature**  **Date** 9/25/2020

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

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

\*Omit if only measuring groundwater elevations.

# GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water Permit No. 70-SDP-6\_82P  
 Monitoring Well/Piezometer No. MW-21  
 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 725.75 Ground Elevation 722.81  
 Depth of Well 22.20 Inside Casing Diameter (in inches) 2"  
 Equipment Used Slope Indicator Co. Water level indicator Model 51453

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/22/2020 11:00	10.82	714.93
*After Purging	9/22/2020 11:40	11.08	714.67
*Before Purging			

## \*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 1.06  
 No. of Well Volumes (based on current water level) 0.57  
 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, 69DF, Calm

**Field Measurements (after stabilization):**

Temperature 21.71 Units C

Equipment Used Horiba U-50

pH 6.80

Equipment Used Horiba U-50

Specific Conductance 0.824 Units mS/m

Equipment Used Horiba U-50

**Comments**

**CERTIFICATION**

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

Signature  Date 9/25/2020

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

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

\*Omit if only measuring groundwater elevations.

# GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

Site Name Muscatine Power and Water Permit No. 70-SDP-6\_82P  
 Monitoring Well/Piezometer No. MW-22  
 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 744.27 Ground Elevation 741.00  
 Depth of Well 44.27 Inside Casing Diameter (in inches) 2"  
 Equipment Used Slope Indicator Co. Water level indicator Model 51453

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/18/2020 8:50	16.64	727.63
*After Purging	9/18/2020 9:20	21.37	722.9
*Before Purging			

### \*C. WELL PURGING

Quantity of Water Removed from Well (gallons) 0.79  
 No. of Well Volumes (based on current water level) 0.18  
 Was well pumped/bailed dry? No  
 Equipment used:  
 Bailer type \_\_\_\_\_ Dedicated Bailer? \_\_\_\_\_  
 Pump type Peristaltic Dedicated Pump? Yes  
 If not dedicated, method of cleaning \_\_\_\_\_

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

**\*D. FIELD MEASUREMENT**

Weather Conditions Clear, 65DF, Calm

**Field Measurements (after stabilization):**

Temperature 13.81 Units C

Equipment Used Horiba U-50

pH 7.53

Equipment Used Horiba U-50

Specific Conductance 0.733 Units mS/m

Equipment Used Horiba U-50

**Comments**

**CERTIFICATION**

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

Signature  Date 9/25/2020

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

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

\*Omit if only measuring groundwater elevations.

# GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

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

## A. MONITORING WELL/PIEZOMETER CONDITIONS

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

If no, explain \_\_\_\_\_

**Standing Water or Litter?** (please check)  YES  NO

If yes, explain \_\_\_\_\_

## B. GROUNDWATER ELEVATION MEASUREMENT (+ 0.01 foot, MSL)

**Elevation:**

**Top of inner well casing** 726.90 **Ground Elevation** 723.73

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

**Equipment Used** Slope Indicator Co. Water level indicator Model 51453

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/18/2020 9:45	5.65	721.25
*After Purging	9/18/2020 10:05	8.17	718.73
*Before Purging			

## \*C. WELL PURGING

**Quantity of Water Removed from Well (gallons)** 0.53

**No. of Well Volumes (based on current water level)** 0.15

**Was well pumped/bailed dry?** No

**Equipment used:**

**Bailer type** \_\_\_\_\_ **Dedicated Bailer?** \_\_\_\_\_

**Pump type** Peristaltic **Dedicated Pump?** Yes

**If not dedicated, method of cleaning** \_\_\_\_\_

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**\*D. FIELD MEASUREMENT**

**Weather Conditions** Clear, 68DF, SE 1-5mph

**Field Measurements (after stabilization):**

**Temperature** 18.25 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.53

**Equipment Used** Horiba U-50

**Specific Conductance** 0.531 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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

**Signature**  **Date** 9/25/2020

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

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

\*Omit if only measuring groundwater elevations.

## GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

**Site Name** Muscatine Power and Water **Permit No.** 70-SDP-6\_82P  
**Monitoring Well/Piezometer No.** MW-24  
**Upgradient**  **Downgradient** \_\_\_\_\_  
**Name of person sampling** 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** 735.32 **Ground Elevation** 732.10

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

**Equipment Used** Slope Indicator Co. Water level indicator Model 51453

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/18/2020 13:15	16.43	718.89
*After Purging	9/18/2020 14:30	17.18	718.14
*Before Purging			

### \*C. WELL PURGING

**Quantity of Water Removed from Well (gallons)** 1.98

**No. of Well Volumes (based on current water level)** 2.10

**Was well pumped/bailed dry?** No

**Equipment used:**

**Bailer type** \_\_\_\_\_ **Dedicated Bailer?** \_\_\_\_\_

**Pump type** Peristaltic **Dedicated Pump?** Yes

**If not dedicated, method of cleaning** \_\_\_\_\_

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**\*D. FIELD MEASUREMENT**

**Weather Conditions** Partly Cloudy, 68°F, Calm

**Field Measurements (after stabilization):**

**Temperature** 16.20 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.47

**Equipment Used** Horiba U-50

**Specific Conductance** 0.628 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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

**Signature**  **Date** 9/25/2020

**Telephone** 563-262-3583 **Fax** \_\_\_\_\_ **Email** sbennett@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-26  
**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** 731.08 **Ground Elevation** 727.35

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

**Equipment Used** Slope Indicator Co. Water level indicator Model 51453

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/22/2020 12:40	18.43	712.65
*After Purging	9/22/2020 13:40	21.96	709.12
*Before Purging			

### \*C. WELL PURGING

**Quantity of Water Removed from Well (gallons)** 1.59

**No. of Well Volumes (based on current water level)** 0.49

**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 9<sup>th</sup> St, Des Moines IA 50319.

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

**\*D. FIELD MEASUREMENT**

**Weather Conditions** Clear, 77°F, Calm

**Field Measurements (after stabilization):**

**Temperature** 23.38 **Units** C

**Equipment Used** Horiba U-50

**pH** 7.88

**Equipment Used** Horiba U-50

**Specific Conductance** 0.853 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

**CERTIFICATION**

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

**Signature**  **Date** 9/25/2020

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

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

\*Omit if only measuring groundwater elevations.

## GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT FORM

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

### A. MONITORING WELL/PIEZOMETER CONDITIONS

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

If no, explain \_\_\_\_\_

**Standing Water or Litter?** (please check)  YES  NO

If yes, explain \_\_\_\_\_

### B. GROUNDWATER ELEVATION MEASUREMENT (+ 0.01 foot, MSL)

**Elevation:**

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

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

**Equipment Used** Slope Indicator Co. Water level indicator Model 51453

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

	Date/Time	Depth to Groundwater	Groundwater Elevation
Before Purging	9/23/2020 9:35	14.18	716.08
*After Purging	9/23/2020 11:10	18.91	711.35
*Before Purging			

### \*C. WELL PURGING

**Quantity of Water Removed from Well (gallons)** 1.98

**No. of Well Volumes (based on current water level)** 2.31

**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 9<sup>th</sup> St, Des Moines IA 50319.

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

**\*D. FIELD MEASUREMENT**

**Weather Conditions** Clear, 77°F, Calm

**Field Measurements (after stabilization):**

**Temperature** 20.48 **Units** C

**Equipment Used** Horiba U-50

**pH** 6.69

**Equipment Used** Horiba U-50

**Specific Conductance** 0.524 **Units** mS/m

**Equipment Used** Horiba U-50

**Comments**

Paused to adjust tubing at 10:00. Well ran dry at 10:20 and had to pause for well to recharge.

**CERTIFICATION**

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

**Signature**  **Date** 9/25/2020

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

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

\*Omit if only measuring groundwater elevations.

# LOW FLOW SAMPLING FORM

DATE 9/23/2020 WELL ID MW-4B SAMPLE DATE / TIME 9/23/2020 13:40  
 SITE Muscatine Power & Water DTW 7.63 NOTE \_\_\_\_\_  
 PROJECT # Fall 2020 sampling WELL DEPTH 28.03 \_\_\_\_\_  
 WEATHER Partly Cloudy, 77DF, calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 19.5'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
13:00			7.63									
13:05	100	500	8.45	23.28	7.67	197	0.626	63.9	0.43			
13:10	100	1000	8.82	20.94	7.83	189	0.637	57.3	0.00			
13:15	100	1500	9.15	19.56	7.89	181	0.641	28.7	0.00			
13:20	100	2000	9.28	19.60	7.91	181	0.647	44.7	0.00			
13:25	100	2500	9.28	19.97	7.93	187	0.645	37.8	0.00			
13:30	100	3000	9.28	20.02	7.93	188	0.645	31.7	0.00			
13:35	100	3500	9.31	19.93	7.94	187	0.643	25.8	0.00			
13:40	100	4000	9.33	19.68	7.93	186	0.644	29.3	0.00	Sample Start		
13:50			9.35							Sample End		
										Preservative	# of Containers	
										HCl		
										HNO <sub>3</sub>	1	
										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 9/23/2020 WELL ID MW-5B SAMPLE DATE / TIME 9/23/2020 12:25  
 SITE Muscatine Power & Water DTW 0.89 NOTE \_\_\_\_\_  
 PROJECT # Fall 2020 sampling WELL DEPTH 25.30 \_\_\_\_\_  
 WEATHER Partly Cloudy, 74DF, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 25'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
11:40			0.89									
11:45	100	500	1.45	21.73	7.23	156	0.728	17.5	1.35			
11:50	100	1000	1.51	21.49	7.29	141	0.729	16.0	0.46			
11:55	100	1500	1.59	21.11	7.30	138	0.732	17.7	0.19			
12:00	100	2000	1.63	20.82	7.33	133	0.731	17.9	0.01			
12:05	100	2500	1.69	20.17	7.32	129	0.731	16.2	0.00			
12:10	100	3000	1.73	20.20	7.32	126	0.730	15.0	0.00			
12:15	100	3500	1.75	20.71	7.35	126	0.727	7.6	0.00			
12:20	100	4000	1.78	20.79	7.35	126	0.726	6.9	0.00			
12:25	100	4500	1.80	20.81	7.33	127	0.727	7.2	0.00	Sample Start		
12:35			1.85							Sample End		
										Preservative	# of Containers	
										HCl		
										HNO <sub>3</sub>	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 9/24/2020 WELL ID MW-6A SAMPLE DATE / TIME 9/24/2020 12:35  
 SITE Muscatine Power & Water DTW 2.63 NOTE \_\_\_\_\_  
 PROJECT # Fall 2020 sampling WELL DEPTH 25.35 \_\_\_\_\_  
 WEATHER Cloudy 72DF, slight breeze PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 20'

TIME	PURGE RATE(ml)	VOL REMOVED(m)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
12:10			2.63									
12:15	100	500	2.72	20.10	6.31	67	1.390	0.0	7.69			
12:20	100	1000	2.77	18.96	7.10	102	0.620	0.0	0.00			
12:25	100	1500	2.81	18.57	7.20	92	0.612	0.0	0.00			
12:30	100	2000	2.82	18.45	7.21	90	0.611	0.0	0.00			
12:35	100	2500	2.82	18.36	7.24	89	0.610	0.0	0.00	Sample Start		
12:45			2.82							Sample End		
										Preservative	# of Containers	
										HCl		
										HNO <sub>3</sub>	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 9/18/2020 WELL ID MW-08 SAMPLE DATE / TIME 9/18/2020 12:30  
 SITE Muscatine Power & Water DTW 16.13 NOTE Duplicate- 2 - marked 12:00  
 PROJECT # Fall 2020 sampling WELL DEPTH 42.95  
 WEATHER Partly Cloudy, 65DF, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 38'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
12:10			16.13									
12:15	100	500	17.68	18.08	7.33	138	0.650	0.0	0.03			
12:20	100	1000	18.43	17.48	7.39	138	0.643	0.0	0.00			
12:25	100	1500	19.12	16.97	7.40	138	0.642	0.0	0.00			
12:30	100	2000	19.64	16.75	7.40	136	0.635	0.0	0.00	Sample Start		
12:40			20.21							Sample End		
12:50			20.89							Dupe End		
										Preservative	# of Containers	DUP-2
										HCl		
										HNO <sub>3</sub>	1	1
										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 9/18/2020 WELL ID MW-10 SAMPLE DATE / TIME 9/18/2020 11:25  
 SITE Muscatine Power & Water DTW 4.66 NOTE Duplicate - 1 marked 12:00  
 PROJECT # Fall 2020 sampling WELL DEPTH 20.32  
 WEATHER Clear, 65DF, 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		
10:35			4.66									
10:40	100	500	4.73	17.28	7.42	34	0.670	0.0	3.32			
10:45	100	1000	4.74	17.28	7.43	46	0.652	0.0	2.07			
10:50	100	1500	4.75	16.67	7.41	55	0.656	0.0	1.64			
10:55	100	2000	4.75	16.58	7.34	65	0.655	0.0	1.21			
11:00	100	2500	4.75	16.38	7.33	72	0.654	0.0	1.03			
11:05	100	3000	4.75	16.33	7.23	84	0.651	0.0	0.85			
11:10	100	3500	4.75	16.27	7.26	87	0.650	0.0	0.65			
11:15	100	4000	4.76	16.07	7.16	95	0.651	0.0	0.38			
11:20	100	4500	4.74	16.23	7.35	89	0.646	0.0	0.35			
11:25	100	5000	4.73	16.18	7.33	92	0.648	0.0	0.26	Sample Start		
11:35			4.74							Sample End		
11:45										Dup-1 end		
										Preservative	# of Containers	DUP-1
										HCl		
										HNO <sub>3</sub>	1	1
										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 9/22/2020 WELL ID MW-14A SAMPLE DATE / TIME 9/22/2020 10:40  
 SITE Muscatine Power & Water DTW 12.79 NOTE \_\_\_\_\_  
 PROJECT # Fall 2020 sampling WELL DEPTH 20.50 \_\_\_\_\_  
 WEATHER Clear, 65DF, 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		
10:15			12.79									
10:20	100	500	13.31	16.68	7.21	212	1.68	163.0	2.83			
10:25	100	1000	13.44	16.63	7.22	213	1.69	33.6	2.77			
10:30	100	1500	13.52	17.01	7.19	213	1.68	0.0	3.49			
10:35	100	2000	13.66	16.86	7.20	213	1.68	0.0	3.47			
10:40	100	2500	13.89	17.09	7.21	212	1.67	0.0	3.42	Sample Start		
10:50			14.25							Sample End		
										Preservative	# of Containers	DUP-1
										HCl		
										HNO <sub>3</sub>	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 9/22/2020 WELL ID MW-15A SAMPLE DATE / TIME 9/22/2020 9:50  
 SITE Muscatine Power & Water DTW 11.55 NOTE \_\_\_\_\_  
 PROJECT # Fall 2020 sampling WELL DEPTH 20.50 \_\_\_\_\_  
 WEATHER Clear, 64DF, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 15'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES									
9:20			11.55																
9:25	100	500	11.93	19.58	5.50	222	2.42	0.0	5.46										
9:30	100	1000	12.01	18.93	7.18	198	1.03	0.0	1.21										
9:35	100	1500	12.38	17.14	7.09	203	1.05	0.0	1.43										
9:40	100	2000	12.41	17.87	7.25	201	1.02	0.0	1.22										
9:45	100	2500	12.45	18.27	7.26	200	1.00	0.0	1.15										
9:50	100	3000	12.51	18.19	7.28	199	1.00	0.0	1.14	Sample Start									
10:00			12.97							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>HNO<sub>3</sub></td> <td>1</td> </tr> <tr> <td>NaOH</td> <td></td> </tr> <tr> <td>None</td> <td>1</td> </tr> </tbody> </table>										Preservative	# of Containers	HCl		HNO <sub>3</sub>	1	NaOH		None	1
Preservative	# of Containers																		
HCl																			
HNO <sub>3</sub>	1																		
NaOH																			
None	1																		

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

Limits

# LOW FLOW SAMPLING FORM

DATE 9/22/2020 WELL ID MW-21 SAMPLE DATE / TIME 9/22/2020 11:40  
 SITE Muscatine Power & Water DTW 10.82 NOTE \_\_\_\_\_  
 PROJECT # Fall 2020 sampling WELL DEPTH 22.20 \_\_\_\_\_  
 WEATHER Clear, 69DF, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 17'

TIME	PURGE RATE(ml)	VOL REMOVED(m)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
11:00			10.82									
11:05	100	500	10.95	20.33	7.28	228	0.851	0.0	4.26			
11:10	100	1000	11.01	20.57	6.95	232	0.825	0.0	3.87			
11:15	100	1500	11.03	20.61	6.84	235	0.820	0.0	3.62			
11:20	100	2000	11.04	20.68	6.82	236	0.819	0.0	3.41			
11:25	100	2500	11.05	21.20	6.82	236	0.814	0.0	3.12			
11:30	100	3000	11.05	21.24	6.81	239	0.819	0.0	2.97			
11:35	100	3500	11.08	21.50	6.81	240	0.823	0.0	2.82			
11:40	100	4000	11.08	21.71	6.80	241	0.824	0.0	2.71	Sample Start		
11:50			11.08							Sample End		
										Preservative	# of Containers	
										HCl		
										HNO <sub>3</sub>	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 9/18/2020 WELL ID MW-22 SAMPLE DATE / TIME 9/18/2020 9:20  
 SITE Muscatine Power & Water DTW 16.64 NOTE Duplicate-2 marked 4/8/20 1200  
 PROJECT # Fall 2020 sampling WELL DEPTH 43.33  
 WEATHER Clear, 65DF, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 38'

TIME	PURGE RATE(ml)	VOL REMOVED(m)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
8:50			16.64									
8:55	100	500	17.70	13.81	6.75	164	0.745	0.0	2.15			
9:00	100	1000	18.51	13.46	7.10	158	0.744	0.0	0.00			
9:05	100	1500	19.35	13.43	7.33	154	0.740	0.0	0.00			
9:10	100	2000	20.16	13.44	7.46	151	0.736	0.0	0.00			
9:15	100	2500	20.86	13.63	7.52	149	0.733	0.0	0.00			
9:20	100	3000	21.37	13.81	7.53	148	0.733	0.0	0.00	Sample Start		
9:30			22.29							Sample End		
										Preservative	# of Containers	
										HCl		
										HNO <sub>3</sub>	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 9/18/2020 WELL ID MW-23 SAMPLE DATE / TIME 9/18/2020 10:15  
 SITE Muscatine Power & Water DTW 5.65 NOTE \_\_\_\_\_  
 PROJECT # Fall 2020 sampling WELL DEPTH 43.33 \_\_\_\_\_  
 WEATHER Clear, 68DF, SE 1-5mph PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 38'

TIME	PURGE RATE(ml)	VOL REMOVED(m)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES	
9:45			5.65								
9:50	100	500	6.61	17.46	7.73	148	0.542	0.0	1.12		
9:55	100	1000	7.22	17.80	7.59	150	0.540	0.0	0.71		
10:00	100	1500	7.76	18.07	7.55	152	0.533	0.0	0.65		
10:05	100	2000	8.17	18.25	7.53	151	0.531	0.0	0.63	Sample Start	
10:15			9.08							Sample End	
										Preservative	# of Containers
										HCl	
										HNO <sub>3</sub>	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 9/18/2020 WELL ID MW-24 SAMPLE DATE / TIME 9/18/2020 14:30  
 SITE Muscatine Power & Water DTW 16.43 NOTE \_\_\_\_\_  
 PROJECT # Fall 2020 sampling WELL DEPTH 43.33 \_\_\_\_\_  
 WEATHER Partly Cloudy, 68°F, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 38'

TIME	PURGE RATE(ml)	VOL REMOVED(m)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES		
13:15			16.43									
13:20	100	500	16.93	17.88	7.20	190	0.634	0.0	4.11			
13:25	100	1000	16.97	16.96	7.49	189	0.626	0.0	2.96			
13:30	100	1500	17.03	16.70	7.46	189	0.628	0.0	2.59			
13:35	100	2000	17.08	16.39	7.41	191	0.630	0.0	2.33			
13:40	100	2500	17.12	16.12	7.34	193	0.640	0.0	2.09			
13:45	100	3000	17.14	15.97	7.32	194	0.640	0.0	1.92			
13:50	100	3500	17.17	15.96	7.29	195	0.640	0.0	1.71			
13:55	100	4000	17.17	16.06	7.29	195	0.638	0.0	1.58			
14:00	100	4500	17.17	16.07	7.28	196	0.632	0.0	1.44			
14:05	100	5000	17.19	16.02	7.29	195	0.632	0.0	1.33			
14:10	100	5500	17.18	16.07	7.52	184	0.629	0.0	1.21			
14:15	100	6000	17.18	16.10	7.46	186	0.627	0.0	1.10			
14:20	100	6500	17.18	16.17	7.47	185	0.622	0.0	1.00			
14:25	100	7000	17.18	16.14	7.47	185	0.622	0.0	0.94			
14:30	100	7500	17.18	16.20	7.47	186	0.628	0.0	0.92	Sample Start		
14:40			17.19							Sample End		
										Preservative	# of Containers	
										HCl		
										HNO <sub>3</sub>	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 9/23/2020 WELL ID MW-27 SAMPLE DATE / TIME 9/23/2019 11:10  
 SITE Muscatine Power & Water DTW 14.18 NOTE \_\_\_\_\_  
 PROJECT # Fall 2020 sampling WELL DEPTH 19.44 \_\_\_\_\_  
 WEATHER Partly Cloudy, 70°F, Calm PUMP TYPE GeoTech Peristaltic DEPTH TO INTAKE 18'

TIME	PURGE RATE(ml)	VOL REMOVED(ml)	DTW	TEMP	Ph	ORP	SpecCond	Turbidity	DO	NOTES	
9:35			14.18								
9:40	100	500	15.17	19.05	6.20	103	0.899	17.4	6.27		
9:45	100	1000	15.45	19.42	6.50	171	0.431	27.5	2.55		
9:50	100	1500	15.83	19.53	6.55	171	0.433	28.3	2.34		
9:55	100	2000	16.42	19.53	6.61	168	0.449	30.1	2.27		
10:00										Paused to adjust tubing	
10:05	100	2500	17.21	19.20	6.71	163	0.446	483.0	2.27		
10:10	100	3000	17.75	18.86	6.65	162	0.472	472.0	2.17		
10:15	100	3500	18.32	17.65	6.58	159	0.502	627.0	2.99		
10:20	100	4000	18.50	18.56	6.64	162	0.486	328.0	2.10		
10:25										Paused for recharge	
10:30										Well Dry	
10:35											
10:40	100	4500	18.13	18.95	6.67	166	0.512	166.0	2.05	Resumed	
10:45	100	5000	18.51	19.47	6.7	172	0.517	162.0	2.04		
10:50	100	5500	18.52	19.33	6.66	171	0.519	82.0	2.45		
10:55	100	6000	18.67	19.57	6.67	176	0.524	67.0	2.61		
11:00	100	6500	18.82	20.34	6.7	186	0.536	46.4	2.78		
11:05	100	7000	18.85	20.44	6.74	187	0.519	43.4	2.75		
11:10	100	7500	18.91	20.48	6.69	181	0.524	46.2	2.81	Sample Start	
11:20			19.19								
										Preservative	# of Containers
										HCl	
										HNO <sub>3</sub>	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																			
	MW-08 Upgradient	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	

**Appendix III Parameters:**

Boron	mg/L	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	0.205	< .2	< .1
Calcium	mg/L	152	117	118	109	89.9	96.5	113	91.3	77	74.7	115	83.6	97.6	132	92.4	77.7	
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	
Fluoride	mg/L	< .5	< .5	< .5	0.72	< .5	1.69	< .5	< .5	< .5	< .5	0.826	< .5	< .5	0.643	0.864	< .5	
pH	SU	8.26	6.82	7.03	7.03	7.05	7.05	7.59	6.77	7.24	7.3	7.56	7.2	7.08	6.64	7.21	7.4	
Sulfate	mg/L	366	187	187	149	145	145	190	119	106	87.3	136	94.7	223	276	123	100	
Total Dissolved Solids	mg/L	836	664	708	634	578	624	656	488	470	376	502	414	612	702	418	350	

**Appendix IV Parameters:**

Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	0.001	< .001	< .001	< .001	< .001
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	0.002	< .002	< .002	< .002	< .002
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
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	0.001	< .001	< .001	< .001	< .001
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005
Cobalt	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	0.000601	0.00051		< .0005	< .0005	< .0005	0.00177	0.00558	0.000517	0.000738
Fluoride	mg/L	< .5	< .5	< .5	0.72	< .5	1.69	< .5	< .5	< .5	< .5	0.826	< .5	< .5	0.643	0.864	< .5
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	0.0022	< .002	0.00224	< .002	< .002	< .002	< .002
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001
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	
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	
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	

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
	MW-10 Upgradient																

Appendix III Parameters:

Boron	mg/L	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .1
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
Chloride	mg/L	6.22	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Fluoride	mg/L	0.731	< .5	< .5	< .5	< .5	0.774	< .5	< .5	< .5	< .5	< .5	< .5	< .5	0.596	< .5	< .5
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	
Sulfate	mg/L	42.1	7.3	36.4	38.4	47.3	38.3	35.4	39	46.9	51.4	37.3	34.3	42.8	28.8	18.6	36.5
Total Dissolved Solids	mg/L	468	412	444	428	498	538	524	458	414	314	396	392	326	320	316	344

Appendix IV Parameters:

Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001
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
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
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001		< .001	< .001	< .001	< .001	< .001	< .001	< .001
Cadmium	mg/L	89.3	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005		< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005		< .005	< .005	< .005	< .005	< .005	< .005	< .005
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
Fluoride	mg/L	0.731	< .5	< .5	< .5	< .5	0.774	< .5	< .5		< .5	< .5	< .5	< .5	0.596	< .5	< .5
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005		< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05		< .01	< .01	< .01	< .01	< .01	< .01	< .01
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002		< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002		< .002	< .002	0.0022	0.00341	0.00219	0.00215	< .002
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005		< .005	< .005	< .005	< .005	< .005	< .005	< .005
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001		< .001	< .001	< .001	< .001	< .001	< .001	< .001
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	
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	
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	

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
	MW-4A Downgradient																

Appendix III Parameters:																	
Boron	mg/L	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	0.66	< .2	< .2	< .2	< .2	< .1
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
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
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.664	0.801	< .5	< .5	< .5	< .5	< .5	< .5	0.771	0.525	< .5	< .5
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
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
Total Dissolved Solids	mg/L	507	426	450	450	460	442	452	420	466	586	440	420	398	422	366	360

Appendix IV Parameters:																	
Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .0002	< .002	< .002	< .002	< .002
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
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0001
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005
Cobalt	mg/L	< .000681	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	0.00147
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.664	0.801	< .5	< .5			< .5	< .5	< .5	0.771	0.525	< .5
Lead	mg/L	< .00147	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	0.000532
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05			< .01	< .01	< .01	< .01	< .01	< .01
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002	< .0002	< .0002	< .0002
Molybdenum	mg/L	< .002	< .002	M.002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002	< .002	< .002	0.00296
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001
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
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
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

<b>Muscatine Power &amp; Water CCR Landfill Federal Parameters Job # 10100095</b>																				
	<b>MW-5B Downgradient</b>	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		

**Appendix III Parameters:**

Boron	mg/L	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .1
Calcium	mg/L	147	< .0005	140	147	126	130	140	139	136	134	147	146	134	139	117	108			
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		
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
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			
Sulfate	mg/L	109	109	105	109	111	108	108	114	135		122	119	120	85	112	58.9	61.9		
Total Dissolved Solids	mg/L	920	672	646	636	684	680	656	734	688		620	828	622	562	596	494	436		

**Appendix IV Parameters:**

Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002
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		
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005
Cobalt	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005
Fluoride	mg/L	< .5	< .5	< .5	1.88	2.14	0.627	< .5	< .5			< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05			< .01	< .01	< .0005	< .0005	< .0005	< .01	< .01	< .01	< .01
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002	0.00212	< .002	< .002	< .002	< .002	< .002
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001
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			
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			
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			



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
	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
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
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
Fluoride	mg/L	< .5	< .5	< .5	2.02	1.89	0.814	< .5	< .5	< .5	< .5	< .5	< .5	< .5	0.535	0.652	< .5
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	
Sulfate	mg/L	< 5	< 5	< 5	< 5	5.94	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	13.6	19.1
Total Dissolved Solids	mg/L	440	340	370	368	336	402	486	364	424	292	368	298	320	308	336	374

**Appendix IV Parameters:**

Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002
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
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001		< .001	< .001	< .001	< .001	< .001	< .001	< .001
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005		< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005		< .005	< .005	< .005	< .005	< .005	< .005	< .005
Cobalt	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005		< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005
Fluoride	mg/L	< .5	< .5	< .5	2.02	1.89	0.814	< .5	< .5		< .5	< .5	< .5	< .5	0.535	0.652	< .5
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005		< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05		< .01	< .01	< .01	< .01	< .01	< .01	< .01
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002		< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002		< .002	< .002	< .002	< .002	< .002	< .002	< .002
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005		< .005	< .005	< .005	< .005	< .005	< .005	< .005
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001		< .001	< .001	< .001	< .001	< .001	< .001	< .001
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	
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	
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	

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
	MW-13 Downgradient																

**Appendix III Parameters:**

Boron	mg/L	47.2	13.3	74.8	7.03	4.35	5.93	2.77	2.72	50	2.92	21.7	1.34	1.45			
Calcium	mg/L	218	112	276	105	87.6	97.5	92.8	95.4	208	93.2	149	89.5	93.1			
Chloride	mg/L	22.9	17.1	29.8	12.7	14.8	12.8	9.17	9.62	15.2		19.9	5.84	7.24			
Fluoride	mg/L	< .5	1.21	3.25	< .5	< .5	0.997	< .5	< .5	< .5		2.08	0.528	< .5			
pH	SU	7.82	7.3	7.1		7.72	7.31	7.76	7.08	7.14	7.04	7.72	8.03	7.37			
Sulfate	mg/L	975	197	1170	117	110	174	86.7	99.4	931	102	506	62.1	72.7			
Total Dissolved Solids	mg/L	1970	694	2740	616	554	574	502	536	2150	562	1120	472	384			

**Appendix IV Parameters:**

Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001			
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002			
Barium	mg/L	0.0302	0.0616	477	0.0945	0.0872	0.0559	0.0783	0.0857			0.132	0.118	0.122			
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001			
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005			
Chromium	mg/L	0.0191	< .005	< .005	< .005	< .005	< .005	< .005	0.00658			< .005	< .005	< .005			
Cobalt	mg/L	0.00172	0.000637	0.00179	0.000717	0.000727	0.000695	0.000682	0.000686			0.000964	< .0005	< .0005			
Fluoride	mg/L	< .5	1.21	3.25	< .5	< .5	0.997	< .5	< .5			2.08	0.528	< .5			
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005			
Lithium	mg/L	< .100	< .05	< .150	< .05	< .05	< .05	< .05	< .05			0.0122	< .01	< .01			
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002			
Molybdenum	mg/L	0.0227	0.00867	0.0176	0.00676	0.00416	0.00443	0.00346	0.00329			0.00732	0.00296	0.00278			
Selenium	mg/L	< .005	< .005	0.0364	< .005	< .005	< .005	< .005	< .005			0.0195	< .005	< .005			
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001			
Radium-226	mg/L	0.0909	0.142	0.312	0.0896	0.11	0.103	0.179	0.164			0.12					
Radium-228	mg/L	0.114	0.0795	0.832	0.173	0.241	0.262	0.0132	0.359			0.665					
Combined Radium 226 + 228	mg/L	0.205	0.222	1.14	0.262	0.35	0.365	0.192	0.523			0.785					

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095	June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20
	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
Calcium	mg/L	281	311	308	333	268	310	307	296	310	301	278	297	309	290	255	245	244
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
Fluoride	mg/L	< .5	< .5	0.867	< .5	< .5	1.93	< .5	< .5	< .5	< .5	< .5	0.684	< .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	
Sulfate	mg/L	1050	1040	1010	1140	1190	1200	1020	1110	1210	1140	1110	1090	1070	1050	837	888	924
Total Dissolved Solids	mg/L	2000	1980	2500	2080	1010	2260	2250	2170	2080	2650	1820	1800	1900	1690	1510	1510	1620

**Appendix IV Parameters:**

Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001				< .001	< .001	< .001	< .001	< .004	< .001	< .001
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002				< .002	< .002	< .002	< .002	< .008	< .002	< .002
Barium	mg/L	0.0443	0.0402	0.0391	0.0383	0.0306	0.0341	0.0338	0.031				0.0285	0.0314	0.0344	0.0328	0.0398	0.0266	0.0328
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001				< .001	< .001	< .001	< .001	< .004	< .001	< .001
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005				< .0005	< .0005	< .0005	< .0005	< .002	< .0001	< .0001
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005				< .005	< .005	< .005	< .005	< .02	< .005	< .005
Cobalt	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005				< .0005	< .0005	< .0005	< .0005	< .002	< .0005	< .0005
Fluoride	mg/L	< .5	< .5	0.867	< .5	< .5	1.93	< .5	< .5				< .5	0.684	< .5	< .5	< .5	< .5	< .5
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .05	< .0005	< .0005	< .0005				< .0005	< .0005	< .0005	< .0005	< .002	< .0005	< .0005
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05				< .01	< .01	< .01	< .01	< .04	< .01	< .01
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002				< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002				< .002	< .002	< .002	< .002	< .008	< .002	< .002
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
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001				< .001	< .001	< .001	< .001	< .004	< .001	< .001
Radium-226	mg/L	0.0496	0.095	0.0604	0.137	0.0624	0.0561	0.0545	0.0506				0.0335			< .0588		0.0647	
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	
Combined Radium 226 + 228	mg/L	0.145	0.202	0.523	0.26	0.293	0.48	0.0131	0.456				0.258			< .0223		0.397	

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
	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
Calcium	mg/L	206	199	203	244	233	226	186	206	218	217	278	102	155	118	111	163	134
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
Fluoride	mg/L	< .5	0.549	< .5	< .5	< .5	6.7	< .5	< .5	< .5	< .5	< .5	< .5	< .5	0.523	0.625	< .5	< .5
pH	SU	7.97	7.16	7.27	7.2	7.31	7.84	6.96	6.94	7	7.35	7.5	7.25	7.76	7.11	7.54	7.28	
Sulfate	mg/L	827	605	607	732	849	853	537	664	835	779	1110	210	400	351	327	496	403
Total Dissolved Solids	mg/L	1620	1270	1500	1600	1470	1780	1280	1390	1520	1670	1820	676	948	724	786	942	920

Appendix IV Parameters:

Antimony	mg/L	< .05	< .001	< .001	< .001	< .001	< .001	< .001	< .001				< .001	< .001	< .001	< .001	< .001	< .001
Arsenic	mg/L	< .1	< .002	< .002	< .002	< .002	< .002	< .002	< .002				< .002	< .002	< .002	< .002	< .002	< .002
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
Beryllium	mg/L	< .05	< .001	< .001	< .001	< .001	< .001	< .001	< .001				< .001	< .001	< .001	< .001	< .001	< .001
Cadmium	mg/L	< .025	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005				< .0005	< .0005	< .0005	< .0005	< .0005	< .0001
Chromium	mg/L	< .250	< .005	< .005	< .005	< .005	< .005	< .005	< .005				< .005	< .005	< .005	< .005	< .005	< .005
Cobalt	mg/L	< .025	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005				< .0005	< .0005	< .0005	< .0005	< .0005	< .0005
Fluoride	mg/L	< .5	0.549	< .5	< .5	< .5	6.7	< .5	< .5				< .5	< .5	< .5	< .5	0.625	< .5
Lead	mg/L	< .025	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005				< .0005	< .0005	< .0005	< .0005	< .0005	< .0005
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05				< .0005	< .01	< .01	< .01	< .01	< .01
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002				< .0002	< .0002	< .0002	< .0002	< .0002	< .0002
Molybdenum	mg/L	< .1	< .002	< .002	< .002	< .002	< .002	< .002	< .002				< .002	< .002	< .002	< .002	< .002	< .002
Selenium	mg/L	< .25	< .005	< .005	< .005	< .005	< .005	< .005	< .005				< .005	< .005	< .005	< .005	< .005	< .005
Thallium	mg/L	< .05	< .001	< .001	< .001	< .001	< .001	< .001	< .001				< .001	< .001	< .001	< .001	< .001	< .001
Radium-226	mg/L	0.0942	0.0703	0.164	0.106	0.0814	0.0124	0.100	0.047				0.0518			<.0609		
Radium-228	mg/L	0.216	0.18	0.123	0.145	0.0218	0.0842	0.121	0.197				0.0715			<.33		
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		

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
	MW-18A Downgradient																

**Appendix III Parameters:**

Boron	mg/L	13.7	15.1	14.2	11.8	12.7	10.5	11.5	10.8	13.1	10.7	8.81	13.3	10.5			
Calcium	mg/L	294	294	280	291	266	237	255	258	239	232	191	264	223			
Chloride	mg/L	30.4	27.6	35.3	29.2	28.1	44.2	27.2	27	29.3	27.4	27.1	25.6	26.9			
Fluoride	mg/L	< .5	< .5	0.791	< .5	< .5	3.16	< .5	< .5	< .5	< .5	< .5	< .5	< .5			
pH	SU	7.88	7.1	7.2		7.18	7.05	7.38	6.96	6.34	7	7.28	7.19	7.12			
Sulfate	mg/L	1100	874	855	886	917	863	796	801	808	737	624	709	675			
Total Dissolved Solids	mg/L	1750	1720	1850	2320	1800	4160	1970	1530	1420	1430	1150	1890	1330			

**Appendix IV Parameters:**

Antimony	mg/L	< .05	< .001	< .001	< .001	< .001	< .001	< .001	< .001			0.00195	< .001	< .001			
Arsenic	mg/L	< .1	< .002	< .002	< .002	< .002	< .002	< .002	< .002			0.00265	< .002	< .002			
Barium	mg/L	< .1	0.0391	0.0381	0.0394	0.0403	0.0297	0.0313	0.0329			0.0281	0.0352	0.036			
Beryllium	mg/L	< .05	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001			
Cadmium	mg/L	< .025	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005			
Chromium	mg/L	< .250	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005			
Cobalt	mg/L	< .025	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005			
Fluoride	mg/L	< .5	< .5	0.791	< .5	< .5	3.16	< .5	< .5			< .5	< .5	< .5			
Lead	mg/L	< .025	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005			
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05			< .0005	< .01	< .01			
Mercury	mg/L	0.000245	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002			
Molybdenum	mg/L	< .1	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	< .002	< .002			
Selenium	mg/L	< .25	< .005	< .005	< .005	< .005	< .005	< .005	< .005			< .005	< .005	< .005			
Thallium	mg/L	< .05	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001			
Radium-226	mg/L	0.0607	-0.00906	0.106	0.226	0.0909	0.0175	-0.000744	0.0546			0.0456					
Radium-228	mg/L	0.344	0.228	0.605	0.407	0.195	0.387	0.185	0.23			0.339					
Combined Radium 226 + 228	mg/L	0.405	0.218	0.711	0.633	0.286	0.405	0.184	0.284			0.384					

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095	June-16	August-16	October-16	December-16	February-17	April-17	June-17	August-17	October-17	November-17	March-18	June-18	August-18	March-19	August-19	April-20	September-20
	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
Calcium	mg/L	37.2	146	185	178	118	110	149	163	62.3		191	159	78.7	142	145	104	101
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
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.993	0.768	< .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
Sulfate	mg/L	713	520	603	645	415	461	541	590	206		624	489	96.6	442	529	373	356
Total Dissolved Solids	mg/L	1440	1110	1420	1240	1010	1060	1140	1220	514		1150	952	416	872	960	698	738

Appendix IV Parameters:

Antimony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			0.00195	< .001	< .001	< .001	< .001	< .001	< .001
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			0.00265	< .002	< .002	< .002	< .002	< .002	< .002
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
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005
Chromium	mg/L	0.00694	0.00538	0.00582	0.00561	< .005	< .005	0.00586	0.00572			< .005	0.00726	< .005	0.00647	0.00637	0.00644	0.00589
Cobalt	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.993	0.768	< .5	< .5			< .5	< .5	< .5	< .5	< .5	< .5	< .5
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005			< .0005	0.000633	< .0005	< .0005	< .0005	< .0005	< .0005
Lithium	mg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05			< .01	0.0189	< .01	0.0277	0.0279	0.0213	0.0225
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002			< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002
Molybdenum	mg/L	< .002	< .002	< .002	< .002	< .002	< .002	< .002	< .002			< .002	0.00383	< .002	< .002	< .002	< .002	< .002
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
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001	< .001			< .001	< .001	< .001	< .001	< .001	< .001	< .001
Radium-226	mg/L	0.299	0.148	0.427	0.128	0.0502	-0.00511	0.0379	0.209			0.0141			0.117		0.0383	
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	
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	

<b>Muscatine Power &amp; Water CCR Landfill</b> <b>Federal Parameters</b> <b>Job # 10100095</b>								
	<b>MW-22</b> <b>Downgradient</b>	<b>March-18</b>	<b>June-18</b>	<b>August-18</b>	<b>March-19</b>	<b>August-19</b>	<b>April-20</b>	<b>September-20</b>

**Appendix III Parameters:**

Boron	mg/L	< .2	< .2	< .2	0.299	<.2	<.2	0.263
Calcium	mg/L	69.8	91.5	80.7	91.6	83.8	80.9	75.5
Chloride	mg/L	30	27.2	29.8	27.6	26.9	24.8	23.2
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.507	< .5	< .5
pH	SU	7.36	7.9	7.42	7.21	7.12	7.32	7.53
Sulfate	mg/L	123	134	125	134	139	143	151
Total Dissolved Solids	mg/L	424	434	420	456	428	422	398

**Appendix IV Parameters:**

Anitmony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001
Arsenic	mg/L	<. 002	0.00245	0.00261	<. 002	< .002	< .002	< .002
Barium	mg/L	0.15	0.184	0.181	0.209	0.215	0.222	0.222
Beryllium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005
Cobalt	mg/L	0.00142	0.00129	0.00149	<.0005	<.0005	<.0005	<.0005
Fluoride	mg/L	< .5	< .5	< .5	< .5	0.507	< .5	< .5
Lead	mg/L	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005	< .0005
Lithium	mg/L	< .01	< .01	< .01	< .01	< .01	< .01	< .01
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002
Molybdenum	mg/L	0.00568	0.00423	0.00424	0.00263	0.00574	0.00297	0.00529
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001	< .001
Radium-226	mg/L	0.122	0.284		0.116		0.137	
Radium-228	mg/L	0.135	0.128		<.226		0.303	
Combined Radium 226 + 228	mg/L	0.257	0.412		<.343		0.44	

<b>Muscatine Power &amp; Water CCR Landfill</b> <b>Federal Parameters</b> <b>Job # 10100095</b>  <b>MW-23</b> <b>Downgradient</b>	June-18	August-18	March-19	August-19	April-20	September-20

**Appendix III Parameters:**

Boron	mg/L	< .2	< .2	< .2	< .2	< .2	0.15
Calcium	mg/L	70.5	63.9	59.7	59.5	61	52.1
Chloride	mg/L	15.9	14.2	10.5	13.8	15.7	14.4
Fluoride	mg/L	< .5	< .5	< .5	< .5	< .5	< .5
pH	SU	7.69	7.55	7.24	6.75	7.33	7.53
Sulfate	mg/L	38.4	31.7	26.2	29.7	25.5	25.8
Total Dissolved Solids	mg/L	384	340	296	336	298	250

**Appendix IV Parameters:**

Anitmony	mg/L	< .001	< .001	< .001	< .001	< .001	< .001
Arsenic	mg/L	< .002	< .002	< .002	< .002	< .002	< .002
Barium	mg/L	0.106	0.0779	0.0922	0.0635	0.0654	0.0491
Beryllium	mg/L	< .001	< .001	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	< .0005	< .0005	< .0005	< .0005	< .0001	< .0001
Chromium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005
Cobalt	mg/L	0.00161	0.00066	0.00176	< .0005	0.000817	< .0005
Fluoride	mg/L	< .5	< .5	< .5	< .5	< .5	< .5
Lead	mg/L	0.00151	0.000626	0.00204	0.000663	0.00116	< .0005
Lithium	mg/L	< .01	< .01	< .01	< .01	< .01	< .01
Mercury	mg/L	< .0002	< .0002	< .0002	< .0002	< .0002	< .0002
Molybdenum	mg/L	0.00822	0.00617	< .002	< .002	< .002	< .002
Selenium	mg/L	< .005	< .005	< .005	< .005	< .005	< .005
Thallium	mg/L	< .001	< .001	< .001	< .001	< .001	< .001
Radium-226	mg/L	0.161		0.215		0.0587	
Radium-228	mg/L	-0.419		0.785		0.517	
Combined Radium 226 + 228	mg/L	0.0129		1.00		0.576	



<b>Muscatine Power &amp; Water CCR Landfill</b>						
<b>Federal Parameters</b>						
<b>Job # 10100095</b>						
<b>MW-24</b>	June-18	August-18	March-19	August-19	April-20	September-20
<b>Downgradient</b>						

**Appendix III Parameters:**

Boron	mg/L	< .2	< .2		< .2	< .2	0.109
Calcium	mg/L	88	72.8		103	94.3	69.9
Chloride	mg/L	19.9	18.1		22.4	24.8	19.5
Fluoride	mg/L	0.653	< .5		< .5	< .5	< .5
pH	SU	7.47	7.39		6.87	7.29	7.47
Sulfate	mg/L	101	70		169	164	81
Total Dissolved Solids	mg/L	474	368		542		

**Appendix IV Parameters:**

Anitmony	mg/L	< .001	< .001		< .001		
Arsenic	mg/L	< .002	< .002		< .002	< .002	< .002
Barium	mg/L	0.0695	0.0776		0.128	0.084	0.0969
Beryllium	mg/L	< .001	< .001		< .001	< .001	< .001
Cadmium	mg/L	< .0005	< .0005		< .0005		
Chromium	mg/L	< .005	< .005		< .005		
Cobalt	mg/L	< .0005	< .0005		< .0005	< .0005	< .0005
Fluoride	mg/L	0.653	< .5		< .5	< .5	< .5
Lead	mg/L	< .0005	< .0005		< .0005	< .0005	< .0005
Lithium	mg/L	< .01	< .01		< .01		
Mercury	mg/L	< .0002	< .0002		< .0002		
Molybdenum	mg/L	0.00447	< .002		< .002	< .002	< .002
Selenium	mg/L	< .005	< .005		< .005	< .005	< .005
Thallium	mg/L	< .001	< .001		< .001		
Radium-226	mg/L	-0.0261					
Radium-228	mg/L	0.19					
Combined Radium 226 + 228	mg/L	0.164					

Muscatine Power & Water CCR Landfill Federal Parameters Job # 10100095		June-18	August-18	March-19	August-19	April-20	September-20
MW-25 Downgradient							
<b>Appendix III Parameters:</b>							
Boron	mg/L	14	14.4	14.5	11.5		
Calcium	mg/L	171	141	157	160		
Chloride	mg/L	11.4	11.4	11.4	11.6		
Fluoride	mg/L	0.551	< .5	< .5	< .5		
pH	SU	7.96	7.31	7.15	6.91		
Sulfate	mg/L	382	343	360	325		
Total Dissolved Solids	mg/L	962	NC	NC	768		
<b>Appendix IV Parameters:</b>							
Anitmony	mg/L	< .001	< .001		< .004		
Arsenic	mg/L	< .002	< .002	< .002	< .008		
Barium	mg/L	0.0828	0.0487	0.0342	0.0448		
Beryllium	mg/L	< .001	< .001	< .004	<.004		
Cadmium	mg/L	< .0005	< .0005		< .002		
Chromium	mg/L	< .005	< .005		< .02		
Cobalt	mg/L	< .0005	< .0005	< .0002	<.002		
Fluoride	mg/L	0.551	< .5	< .5	< .5		
Lead	mg/L	< .0005	< .0005	< .0005	< .002		
Lithium	mg/L	< .01	< .01		< .04		
Mercury	mg/L	< .0002	< .0002		< .0002		
Molybdenum	mg/L	0.00279	< .002	< .002	< .008		
Selenium	mg/L	< .005	< .005	< .005	< .02		
Thallium	mg/L	< .001	< .001		< .004		
Radium-226	mg/L	0.0532					
Radium-228	mg/L	0.635					
Combined Radium 226 + 228	mg/L	0.688					

<b>Muscatine Power &amp; Water CCR Landfill</b> <b>Federal Parameters</b> <b>Job # 10100095</b>  <b>MW-26</b> <b>Downgradient</b>	<b>April-20</b>	<b>September-20</b>
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**Appendix III Parameters:**

Boron	mg/L		2.5
Calcium	mg/L		134
Chloride	mg/L		19.7
Fluoride	mg/L		< .5
pH	SU		7.88
Sulfate	mg/L		376
Total Dissolved Solids	mg/L		

**Appendix IV Parameters:**

Anitmony	mg/L		
Arsenic	mg/L		< .002
Barium	mg/L		0.114
Beryllium	mg/L		< .001
Cadmium	mg/L		
Chromium	mg/L		
Cobalt	mg/L		< .005
Fluoride	mg/L		< .5
Lead	mg/L		< .0005
Lithium	mg/L		
Mercury	mg/L		
Molybdenum	mg/L		< .002
Selenium	mg/L		< .005
Thallium	mg/L		
Radium-226	mg/L		
Radium-228	mg/L		
Combined Radium 226 + 228	mg/L		

<b>Muscatine Power &amp; Water CCR Landfill</b> <b>Federal Parameters</b> <b>Job # 10100095</b>  <b>MW-27</b> <b>Downgradient</b>	<b>April-20</b>	<b>September-20</b>
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**Appendix III Parameters:**

Boron	mg/L		3.25
Calcium	mg/L		61
Chloride	mg/L		13.6
Fluoride	mg/L		< .5
pH	SU		6.69
Sulfate	mg/L		119
Total Dissolved Solids	mg/L		

**Appendix IV Parameters:**

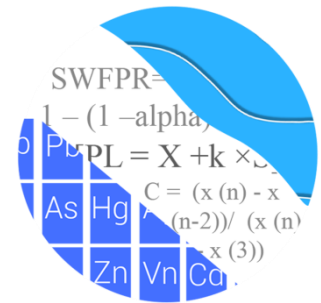
Anitmony	mg/L		
Arsenic	mg/L		< .002
Barium	mg/L		0.0738
Beryllium	mg/L		< .001
Cadmium	mg/L		
Chromium	mg/L		
Cobalt	mg/L		< .005
Fluoride	mg/L		< .5
Lead	mg/L		< .0005
Lithium	mg/L		
Mercury	mg/L		
Molybdenum	mg/L		< .002
Selenium	mg/L		< .005
Thallium	mg/L		
Radium-226	mg/L		
Radium-228	mg/L		
Combined Radium 226 + 228	mg/L		

## **APPENDIX D**

### **STATISTICAL RESULTS AND METHODOLOGIES**

- Annual Statistical Results Report, November 13, 2020
- Flow Charts showing statistical procedure methodologies

# GROUNDWATER STATS CONSULTING



November 13, 2020

HR Green, Inc.  
Attn: Ms. Rose Amundson  
8710 Earhart Ln, SW  
Cedar Rapids, Iowa 52404

Re: Muscatine Power & Water –  
September 2020 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 2020 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 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-4A, 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, Groundwater Statistician and Founder of Groundwater Stats Consulting. Note that Combined Radium 226 + 228 is sampled annually and therefore, does not have any September 2020 samples.

When there are no detections present in downgradient wells for a given constituent, statistical analyses are not required. A summary of well/constituent pairs with 100% nondetects 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 nondetects, 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% nondetects (USEPA Unified Guidance, 2009, Chapter 6).
- When data contain <15% nondetects in background, simple substitution of one-half the reporting limit is utilized in the statistical analysis. The reporting limit utilized for nondetects is the practical quantification limit (PQL) as reported by the laboratory.
- When data contain between 15-50% nondetects, the Kaplan-Meier nondetect 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% nondetects.

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.

### **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 and Trend Tests

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.

No seasonal patterns were visually apparent in the 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.

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.

## Determination of Statistical Method

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 2020**

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 2020 (Figure D). Interwell prediction limits pool upgradient well data to establish a background limit for an individual constituent. The most recent sample from each downgradient well is compared to the background limit to determine whether there are statistically significant increases (SSIs).

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% nondetects, 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 and MW-15A
- Chloride: MW-5B
- pH: MW-21 and MW-4A
- Sulfate: MW-14A and MW-15A
- TDS: MW-14A, MW-15A, and MW-21

When prediction limit exceedances are identified in downgradient wells, data are further evaluated using the Sen's Slope/Mann Kendall trend test 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. No statistically significant increasing trends were identified; but statistically significant decreasing trends were noted for the following well/constituent pairs:

- Boron: MW-15A
- TDS: MW-08 (upgradient), MW-10 (upgradient), MW-15A, and MW-21

### **Confidence Intervals – Appendix IV Parameters September 2020**

Parametric tolerance limits were used to calculate background limits from pooled upgradient well data through September 2020 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. These 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 were then constructed on downgradient wells with data through September 2020 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,

Handwritten signature of Abdul Diane in cursive script.

Abdul Diane  
Groundwater Analyst

Handwritten signature of Kristina Rayner in cursive script.

Kristina L. Rayner  
Groundwater Statistician

# 100% Non-Detects

Analysis Run 11/12/2020 5:59 PM View: Appendix IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

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**Antimony (mg/L)**

MW-08, MW-10, MW-14A, MW-15A, MW-21, MW-22, MW-23, MW-4A, MW-5B, MW-6A

**Arsenic (mg/L)**

MW-08, MW-14A, MW-15A, MW-21, MW-23, MW-4A, MW-5B, MW-6A

**Beryllium (mg/L)**

MW-08, MW-10, MW-14A, MW-15A, MW-21, MW-22, MW-23, MW-4A, MW-5B, MW-6A

**Cadmium (mg/L)**

MW-08, MW-10, MW-14A, MW-15A, MW-21, MW-22, MW-23, MW-4A, MW-5B, MW-6A

**Chromium (mg/L)**

MW-08, MW-10, MW-14A, MW-15A, MW-22, MW-23, MW-4A, MW-5B, MW-6A

**Cobalt (mg/L)**

MW-14A, MW-15A, MW-21, MW-5B, MW-6A

**Fluoride (mg/L)**

MW-23

**Lead (mg/L)**

MW-08, MW-10, MW-14A, MW-15A, MW-22, MW-5B, MW-6A

**Lithium (mg/L)**

MW-08, MW-10, MW-14A, MW-15A, MW-22, MW-23, MW-4A, MW-5B, MW-6A

**Mercury (mg/L)**

MW-08, MW-10, MW-14A, MW-15A, MW-21, MW-22, MW-23, MW-4A, MW-5B, MW-6A

**Molybdenum (mg/L)**

MW-14A, MW-15A, MW-6A

**Selenium (mg/L)**

MW-08, MW-10, MW-22, MW-23, MW-4A, MW-5B, MW-6A

**Thallium (mg/L)**

MW-08, MW-10, MW-14A, MW-15A, MW-21, MW-22, MW-23, MW-4A, MW-5B, MW-6A

# Interwell Prediction Limit - Significant Results

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/12/2020, 5:55 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bq N	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-14A	0.299	n/a	9/18/2020	19.5	Yes	45	91.11	n/a	n/a	0.0009347	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-15A	0.299	n/a	9/18/2020	14.5	Yes	45	91.11	n/a	n/a	0.0009347	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-21	0.299	n/a	9/18/2020	6.82	Yes	45	91.11	n/a	n/a	0.0009347	NP Inter (NDs) 1 of 2
Calcium (mg/L)	MW-14A	124.1	n/a	9/18/2020	244	Yes	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Calcium (mg/L)	MW-15A	124.1	n/a	9/18/2020	134	Yes	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Chloride (mg/L)	MW-5B	30	n/a	9/18/2020	41	Yes	45	33.33	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
pH (SU)	MW-21	7.753	6.838	9/18/2020	6.8	Yes	45	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-4A	7.753	6.838	9/18/2020	7.93	Yes	45	0	None	No	0.0006268	Param Inter 1 of 2
Sulfate (mg/L)	MW-14A	366	n/a	9/18/2020	924	Yes	45	0	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-15A	366	n/a	9/18/2020	403	Yes	45	0	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-14A	713	n/a	9/18/2020	1620	Yes	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-15A	713	n/a	9/18/2020	920	Yes	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-21	713	n/a	9/18/2020	738	Yes	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2

# Interwell Prediction Limit - All Results

Muscatine Power & Water    Client: HR Green, Inc.    Data: Muscatine Power & Water    Printed 11/12/2020, 5:55 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Obsrv.	Sig.	Bg N	%NDs	ND Adj.	Transform	Alpha	Method
<b>Boron (mg/L)</b>	<b>MW-14A</b>	<b>0.299</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>19.5</b>	<b>Yes</b>	<b>45</b>	<b>91.11</b>	<b>n/a</b>	<b>n/a</b>	<b>0.0009347</b>	<b>NP Inter (NDs) 1 of 2</b>
<b>Boron (mg/L)</b>	<b>MW-15A</b>	<b>0.299</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>14.5</b>	<b>Yes</b>	<b>45</b>	<b>91.11</b>	<b>n/a</b>	<b>n/a</b>	<b>0.0009347</b>	<b>NP Inter (NDs) 1 of 2</b>
<b>Boron (mg/L)</b>	<b>MW-21</b>	<b>0.299</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>6.82</b>	<b>Yes</b>	<b>45</b>	<b>91.11</b>	<b>n/a</b>	<b>n/a</b>	<b>0.0009347</b>	<b>NP Inter (NDs) 1 of 2</b>
Boron (mg/L)	MW-4A	0.299	n/a	9/18/2020	0.1ND	No	45	91.11	n/a	n/a	0.0009347	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-5B	0.299	n/a	9/18/2020	0.1ND	No	45	91.11	n/a	n/a	0.0009347	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-6A	0.299	n/a	9/18/2020	0.1ND	No	45	91.11	n/a	n/a	0.0009347	NP Inter (NDs) 1 of 2
<b>Calcium (mg/L)</b>	<b>MW-14A</b>	<b>124.1</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>244</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>None</b>	<b>sqrt(x)</b>	<b>0.001254</b>	<b>Param Inter 1 of 2</b>
<b>Calcium (mg/L)</b>	<b>MW-15A</b>	<b>124.1</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>134</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>None</b>	<b>sqrt(x)</b>	<b>0.001254</b>	<b>Param Inter 1 of 2</b>
Calcium (mg/L)	MW-21	124.1	n/a	9/18/2020	101	No	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Calcium (mg/L)	MW-4A	124.1	n/a	9/18/2020	89	No	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Calcium (mg/L)	MW-5B	124.1	n/a	9/18/2020	108	No	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Calcium (mg/L)	MW-6A	124.1	n/a	9/18/2020	87.9	No	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Chloride (mg/L)	MW-14A	30	n/a	9/18/2020	22.8	No	45	33.33	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-15A	30	n/a	9/18/2020	8.63	No	45	33.33	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-21	30	n/a	9/18/2020	7.21	No	45	33.33	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-4A	30	n/a	9/18/2020	15.1	No	45	33.33	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
<b>Chloride (mg/L)</b>	<b>MW-5B</b>	<b>30</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>41</b>	<b>Yes</b>	<b>45</b>	<b>33.33</b>	<b>n/a</b>	<b>n/a</b>	<b>0.0009347</b>	<b>NP Inter (normality) 1 of 2</b>
Chloride (mg/L)	MW-6A	30	n/a	9/18/2020	15.6	No	45	33.33	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Fluoride (mg/L)	MW-14A	0.864	n/a	9/18/2020	0.5ND	No	44	81.82	n/a	n/a	0.0009736	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-15A	0.864	n/a	9/18/2020	0.5ND	No	44	81.82	n/a	n/a	0.0009736	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-21	0.864	n/a	9/18/2020	0.5ND	No	44	81.82	n/a	n/a	0.0009736	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-4A	0.864	n/a	9/18/2020	0.5ND	No	44	81.82	n/a	n/a	0.0009736	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-5B	0.864	n/a	9/18/2020	0.5ND	No	44	81.82	n/a	n/a	0.0009736	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-6A	0.864	n/a	9/18/2020	0.5ND	No	44	81.82	n/a	n/a	0.0009736	NP Inter (NDs) 1 of 2
pH (SU)	MW-14A	7.753	6.838	9/18/2020	7.21	No	45	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-15A	7.753	6.838	9/18/2020	7.28	No	45	0	None	No	0.0006268	Param Inter 1 of 2
<b>pH (SU)</b>	<b>MW-21</b>	<b>7.753</b>	<b>6.838</b>	<b>9/18/2020</b>	<b>6.8</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.0006268</b>	<b>Param Inter 1 of 2</b>
<b>pH (SU)</b>	<b>MW-4A</b>	<b>7.753</b>	<b>6.838</b>	<b>9/18/2020</b>	<b>7.93</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.0006268</b>	<b>Param Inter 1 of 2</b>
pH (SU)	MW-5B	7.753	6.838	9/18/2020	7.33	No	45	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-6A	7.753	6.838	9/18/2020	7.24	No	45	0	None	No	0.0006268	Param Inter 1 of 2
<b>Sulfate (mg/L)</b>	<b>MW-14A</b>	<b>366</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>924</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>	<b>0.0009347</b>	<b>NP Inter (normality) 1 of 2</b>
<b>Sulfate (mg/L)</b>	<b>MW-15A</b>	<b>366</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>403</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>	<b>0.0009347</b>	<b>NP Inter (normality) 1 of 2</b>
Sulfate (mg/L)	MW-21	366	n/a	9/18/2020	356	No	45	0	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-4A	366	n/a	9/18/2020	46.9	No	45	0	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-5B	366	n/a	9/18/2020	61.9	No	45	0	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-6A	366	n/a	9/18/2020	19.1	No	45	0	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
<b>Total Dissolved Solids (mg/L)</b>	<b>MW-14A</b>	<b>713</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>1620</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>None</b>	<b>sqrt(x)</b>	<b>0.001254</b>	<b>Param Inter 1 of 2</b>
<b>Total Dissolved Solids (mg/L)</b>	<b>MW-15A</b>	<b>713</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>920</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>None</b>	<b>sqrt(x)</b>	<b>0.001254</b>	<b>Param Inter 1 of 2</b>
<b>Total Dissolved Solids (mg/L)</b>	<b>MW-21</b>	<b>713</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>738</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>None</b>	<b>sqrt(x)</b>	<b>0.001254</b>	<b>Param Inter 1 of 2</b>
Total Dissolved Solids (mg/L)	MW-4A	713	n/a	9/18/2020	360	No	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-5B	713	n/a	9/18/2020	436	No	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-6A	713	n/a	9/18/2020	374	No	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2

# Trend Test - Significant Results

Muscatine Power & Water    Client: HR Green, Inc.    Data: Muscatine Power & Water    Printed 11/12/2020, 5:58 PM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Boron (mg/L)	MW-15A	-2.726	-81	-63	Yes	17	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-08 (bg)	-83.97	-64	-58	Yes	16	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-10 (bg)	-39.58	-62	-58	Yes	16	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-15A	-197.3	-65	-63	Yes	17	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-21	-160	-64	-58	Yes	16	0	n/a	n/a	0.01	NP



# Trend Test - All Results

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/12/2020, 5:58 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron (mg/L)	MW-08 (bg)	0	11	58	No	16	93.75	n/a	n/a	0.01	NP
Boron (mg/L)	MW-10 (bg)	0	0	58	No	16	100	n/a	n/a	0.01	NP
Boron (mg/L)	MW-14A	0.4085	14	63	No	17	0	n/a	n/a	0.01	NP
<b>Boron (mg/L)</b>	<b>MW-15A</b>	<b>-2.726</b>	<b>-81</b>	<b>-63</b>	<b>Yes</b>	<b>17</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
Boron (mg/L)	MW-21	-0.0679	-12	-63	No	17	5.882	n/a	n/a	0.01	NP
Boron (mg/L)	MW-22 (bg)	0	5	18	No	7	71.43	n/a	n/a	0.01	NP
Boron (mg/L)	MW-23 (bg)	0	-5	-14	No	6	83.33	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-08 (bg)	-7.908	-40	-58	No	16	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-10 (bg)	-2.195	-51	-58	No	16	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-14A	-13.54	-63	-63	No	17	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-15A	-22.88	-53	-63	No	17	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-22 (bg)	-2.521	-1	-18	No	7	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-23 (bg)	-5.72	-11	-14	No	6	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-08 (bg)	-0.3792	-20	-58	No	16	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-10 (bg)	0	-15	-58	No	16	93.75	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-22 (bg)	-2.655	-17	-18	No	7	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-23 (bg)	-0.1111	-1	-14	No	6	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-5B	-2.724	-33	-63	No	17	0	n/a	n/a	0.01	NP
pH (SU)	MW-08 (bg)	0	3	58	No	16	0	n/a	n/a	0.01	NP
pH (SU)	MW-10 (bg)	-0.01624	-17	-58	No	16	0	n/a	n/a	0.01	NP
pH (SU)	MW-21	0	-7	-63	No	17	0	n/a	n/a	0.01	NP
pH (SU)	MW-22 (bg)	-0.06197	-3	-18	No	7	0	n/a	n/a	0.01	NP
pH (SU)	MW-23 (bg)	-0.1363	-5	-14	No	6	0	n/a	n/a	0.01	NP
pH (SU)	MW-4A	-0.04074	-23	-58	No	16	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-08 (bg)	-22.55	-42	-58	No	16	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-10 (bg)	-1.212	-20	-58	No	16	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-14A	-44.23	-37	-63	No	17	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-15A	-98.27	-50	-63	No	17	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-22 (bg)	10.71	18	18	No	7	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-23 (bg)	-3.842	-11	-14	No	6	0	n/a	n/a	0.01	NP
<b>Total Dissolved Solids (mg/L)</b>	<b>MW-08 (bg)</b>	<b>-83.97</b>	<b>-64</b>	<b>-58</b>	<b>Yes</b>	<b>16</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
<b>Total Dissolved Solids (mg/L)</b>	<b>MW-10 (bg)</b>	<b>-39.58</b>	<b>-62</b>	<b>-58</b>	<b>Yes</b>	<b>16</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
Total Dissolved Solids (mg/L)	MW-14A	-159.5	-56	-63	No	17	0	n/a	n/a	0.01	NP
<b>Total Dissolved Solids (mg/L)</b>	<b>MW-15A</b>	<b>-197.3</b>	<b>-65</b>	<b>-63</b>	<b>Yes</b>	<b>17</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
<b>Total Dissolved Solids (mg/L)</b>	<b>MW-21</b>	<b>-160</b>	<b>-64</b>	<b>-58</b>	<b>Yes</b>	<b>16</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
Total Dissolved Solids (mg/L)	MW-22 (bg)	-8.391	-7	-18	No	7	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-23 (bg)	-47.78	-11	-14	No	6	0	n/a	n/a	0.01	NP

# Upper Tolerance Limits

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/12/2020, 4:45 PM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Antimony (mg/L)	n/a	0.001	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)
Arsenic (mg/L)	n/a	0.00784	n/a	n/a	n/a	43	65.12	n/a	0.1102	NP Inter(NDs)
Barium (mg/L)	n/a	0.227	n/a	n/a	n/a	43	0	n/a	0.1102	NP Inter(normal...
Beryllium (mg/L)	n/a	0.001	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)
Cadmium (mg/L)	n/a	0.0001	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)
Chromium (mg/L)	n/a	0.005	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)
Cobalt (mg/L)	n/a	0.00558	n/a	n/a	n/a	44	36.36	n/a	0.1047	NP Inter(normal...
Combined Radium 226 + 228 (pCi/L)	n/a	1.007	n/a	n/a	n/a	29	0	No	0.05	Inter
Fluoride (mg/L)	n/a	0.864	n/a	n/a	n/a	44	81.82	n/a	0.1047	NP Inter(NDs)
Lead (mg/L)	n/a	0.00204	n/a	n/a	n/a	43	88.37	n/a	0.1102	NP Inter(NDs)
Lithium (mg/L)	n/a	0.01	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)
Mercury (mg/L)	n/a	0.0002	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)
Molybdenum (mg/L)	n/a	0.00822	n/a	n/a	n/a	45	64.44	n/a	0.09944	NP Inter(NDs)
Selenium (mg/L)	n/a	0.005	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)
Thallium (mg/L)	n/a	0.001	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)

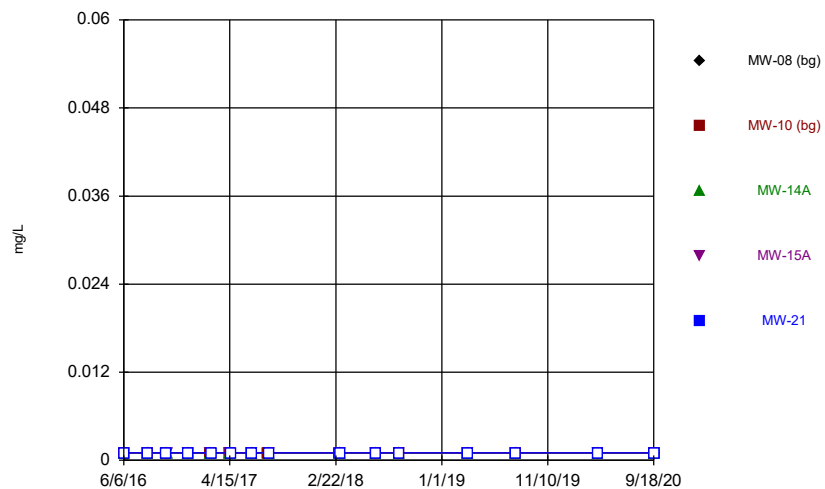
# Confidence Intervals - All Results (No Significant)

Muscatine Power & Water    Client: HR Green, Inc.    Data: Muscatine Power & Water    Printed 11/13/2020, 1:01 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Barium (mg/L)	MW-14A	0.03782	0.0312	2	No	15	0.03451	0.004885	0	None	No	0.01	Param.
Barium (mg/L)	MW-15A	0.04153	0.03523	2	No	14	0.03838	0.004442	0	None	No	0.01	Param.
Barium (mg/L)	MW-21	0.05931	0.04004	2	No	15	0.04967	0.01421	0	None	No	0.01	Param.
Barium (mg/L)	MW-24	0.119	0.06267	2	No	6	0.09082	0.02049	0	None	No	0.01	Param.
Barium (mg/L)	MW-4A	0.1487	0.1299	2	No	15	0.1393	0.01385	0	None	No	0.01	Param.
Barium (mg/L)	MW-5B	0.3291	0.2865	2	No	15	0.3078	0.03141	0	None	No	0.01	Param.
Barium (mg/L)	MW-6A	0.2151	0.1921	2	No	15	0.2032	0.01796	0	None	x^2	0.01	Param.
Chromium (mg/L)	MW-21	0.006326	0.005376	0.1	No	15	0.005851	0.0007254	26.67	Kaplan-Meier	No	0.01	Param.
Cobalt (mg/L)	MW-4A	0.000681	0.0005	0.006	No	15	0.0005767	0.0002515	86.67	None	No	0.01	NP (NDs)
Combined Radium 226 + 228 (pCi/L)	MW-14A	0.4231	0.1313	5	No	11	0.2772	0.1751	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-15A	0.3948	0.1364	5	No	11	0.2656	0.155	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-21	0.5805	0.1357	5	No	11	0.3581	0.2669	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-4A	0.6948	0.3748	5	No	11	0.5348	0.192	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-5B	1.033	0.6173	5	No	11	0.8249	0.2492	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-6A	0.7261	0.3571	5	No	11	0.5416	0.2214	0	None	No	0.01	Param.
Fluoride (mg/L)	MW-14A	0.684	0.5	4	No	15	0.5367	0.1029	86.67	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-15A	0.523	0.5	4	No	15	0.5131	0.03377	80	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-21	0.768	0.5	4	No	16	0.5476	0.1363	87.5	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-24	0.653	0.5	4	No	6	0.5255	0.06246	83.33	None	No	0.0155	NP (NDs)
Fluoride (mg/L)	MW-4A	0.664	0.5	4	No	16	0.5476	0.1018	75	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-5B	0.627	0.5	4	No	16	0.6967	0.5158	81.25	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-6A	0.814	0.5	4	No	16	0.7132	0.4925	68.75	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-21	0.000633	0.0005	0.015	No	15	0.0005089	0.00003434	93.33	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-4A	0.000532	0.0005	0.015	No	14	0.0005023	0.000008552	92.86	None	No	0.01	NP (NDs)
Lithium (mg/L)	MW-21	0.0225	0.01	0.04	No	15	0.01455	0.006999	66.67	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-21	0.00383	0.002	0.1	No	15	0.002122	0.0004725	93.33	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-24	0.00447	0.002	0.1	No	6	0.002412	0.001008	83.33	None	No	0.0155	NP (NDs)
Molybdenum (mg/L)	MW-4A	0.00296	0.002	0.1	No	15	0.002064	0.0002479	93.33	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-5B	0.00212	0.002	0.1	No	15	0.002008	0.00003098	93.33	None	No	0.01	NP (NDs)
Selenium (mg/L)	MW-14A	0.00827	0.005	0.05	No	15	0.006983	0.001408	26.67	None	No	0.01	NP (normality)
Selenium (mg/L)	MW-15A	0.00502	0.005	0.05	No	15	0.005001	0.000005164	93.33	None	No	0.01	NP (NDs)
Selenium (mg/L)	MW-21	0.01167	0.007314	0.05	No	15	0.009491	0.003214	13.33	None	No	0.01	Param.

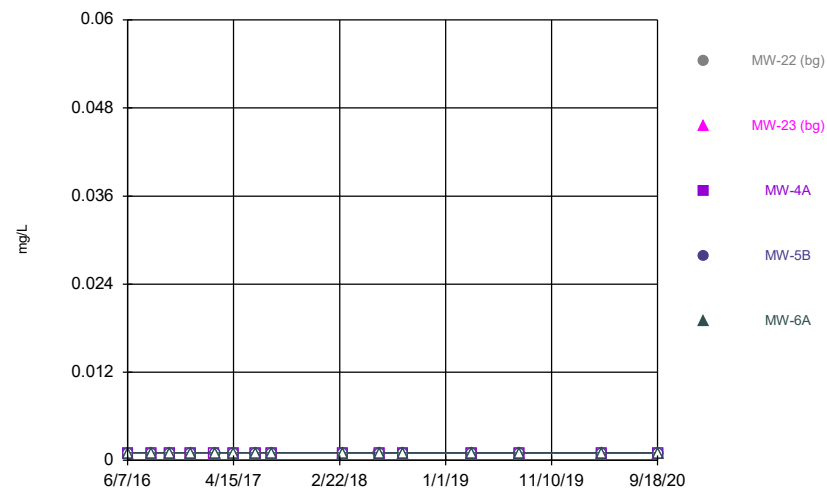
FIGURE A.

### Time Series



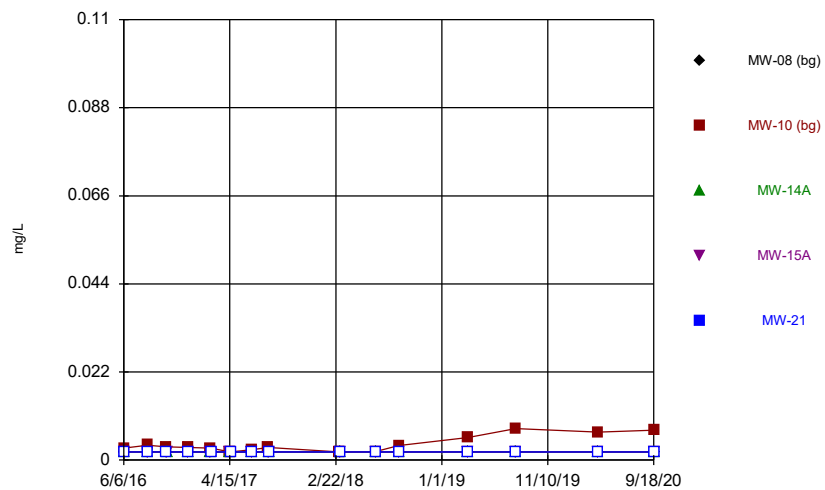
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



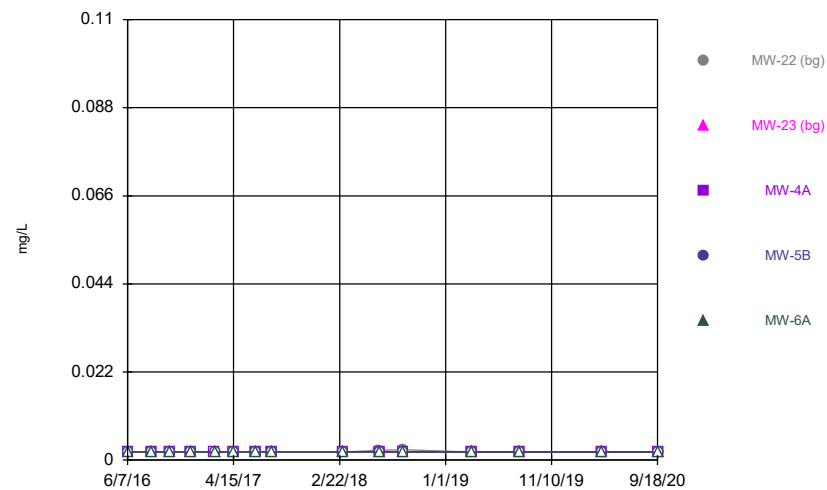
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



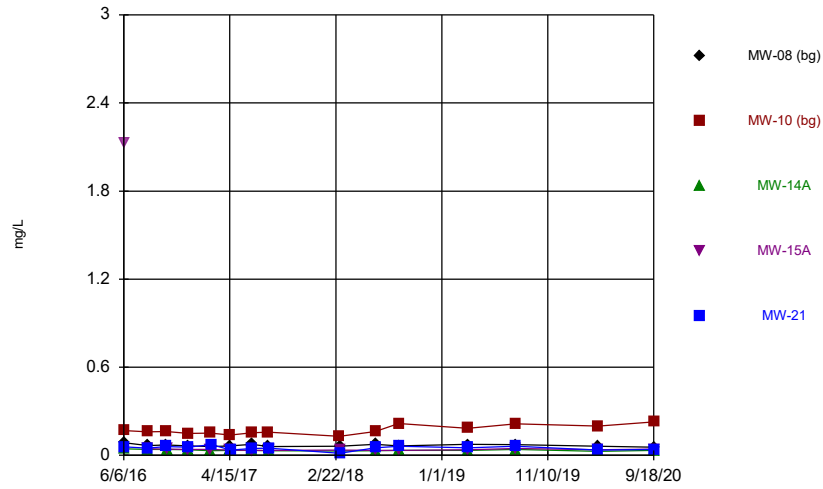
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



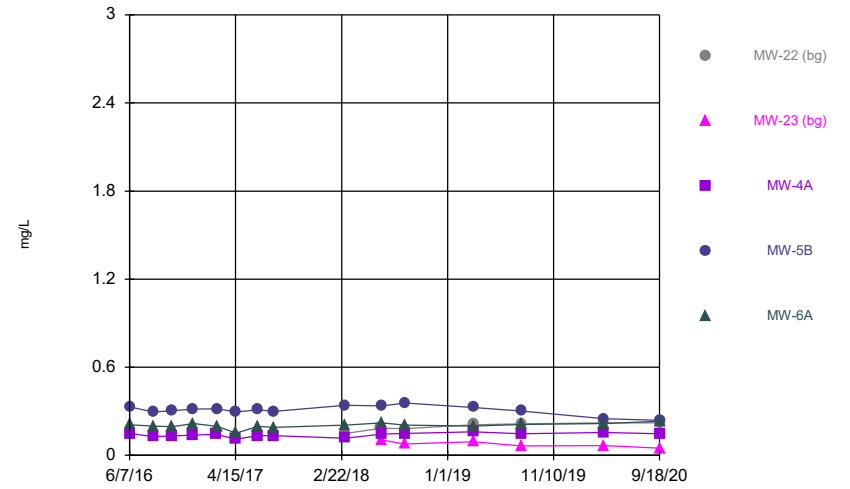
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



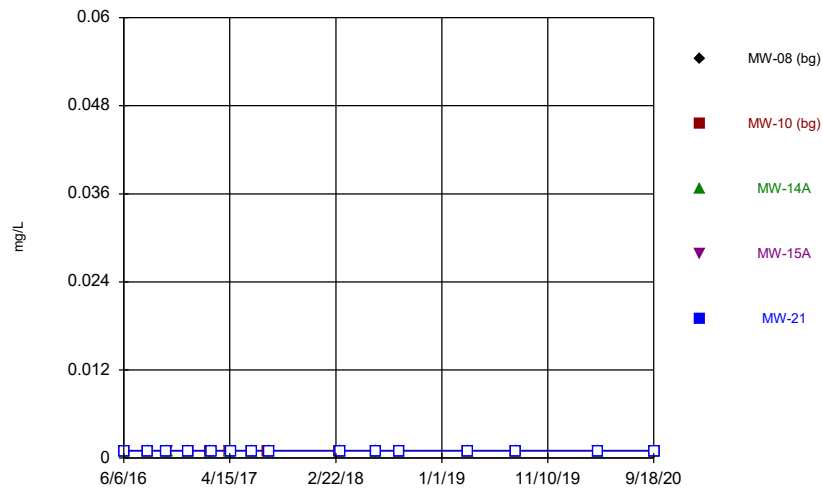
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 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



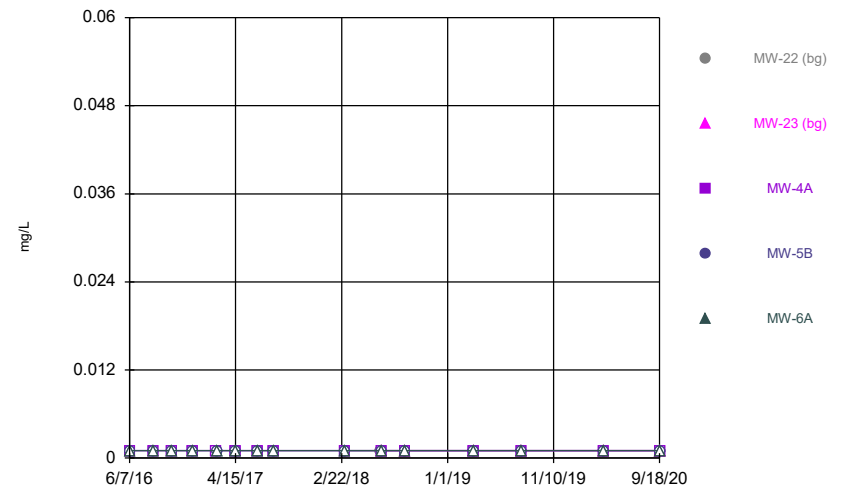
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### Time Series



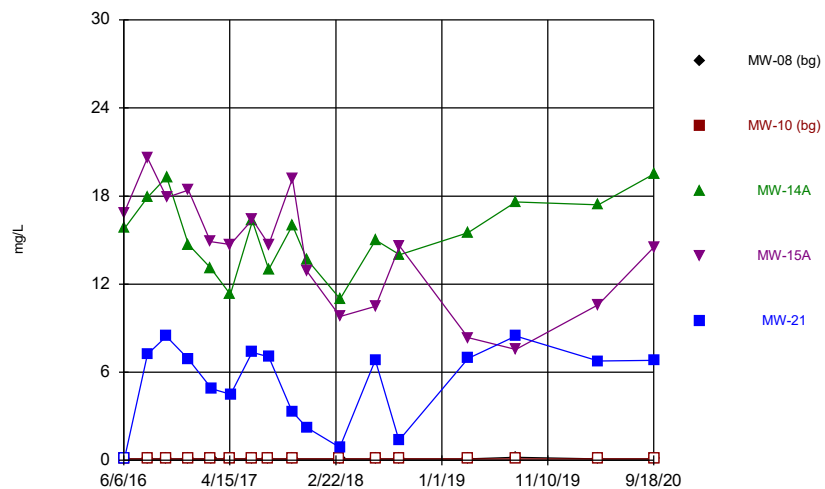
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 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



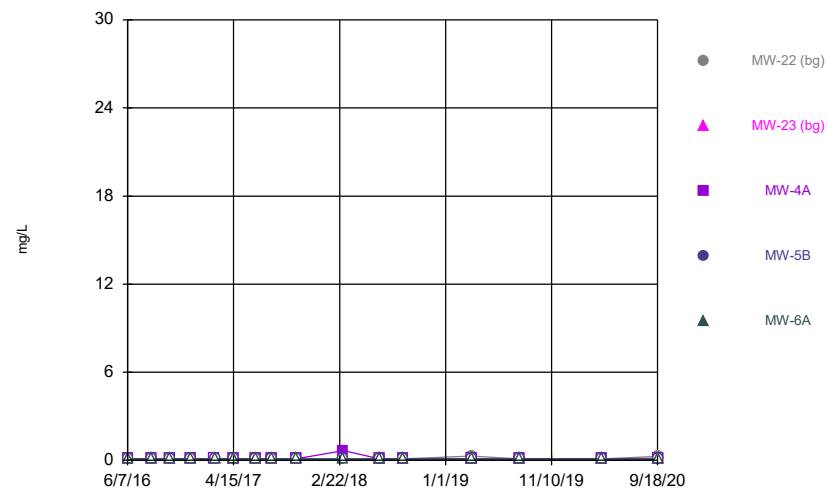
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 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



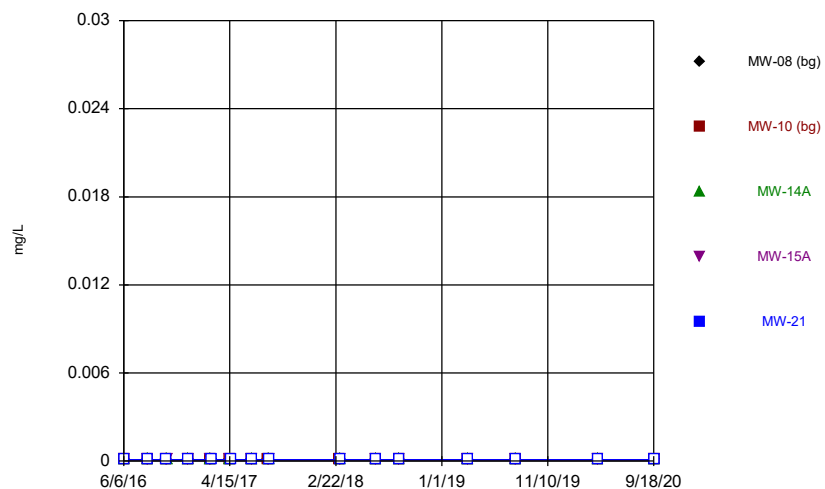
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



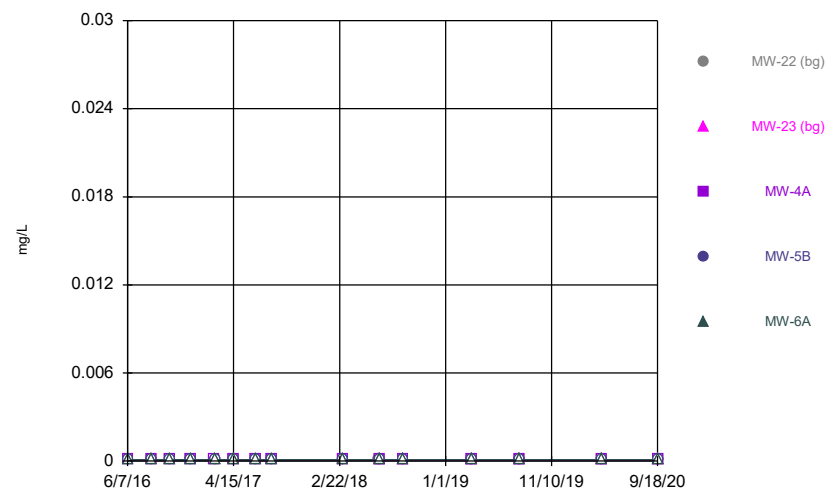
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



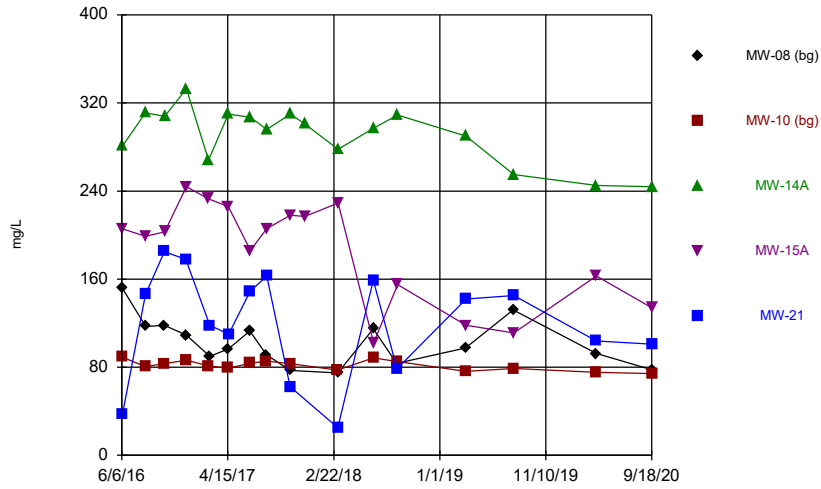
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



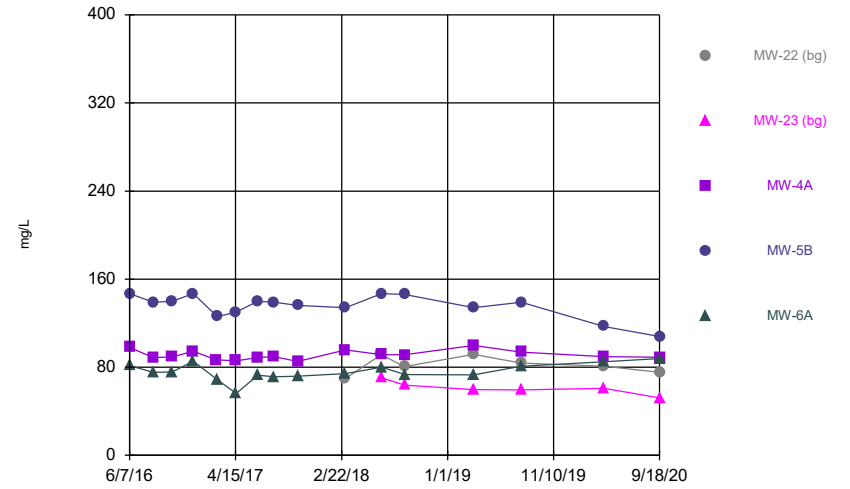
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



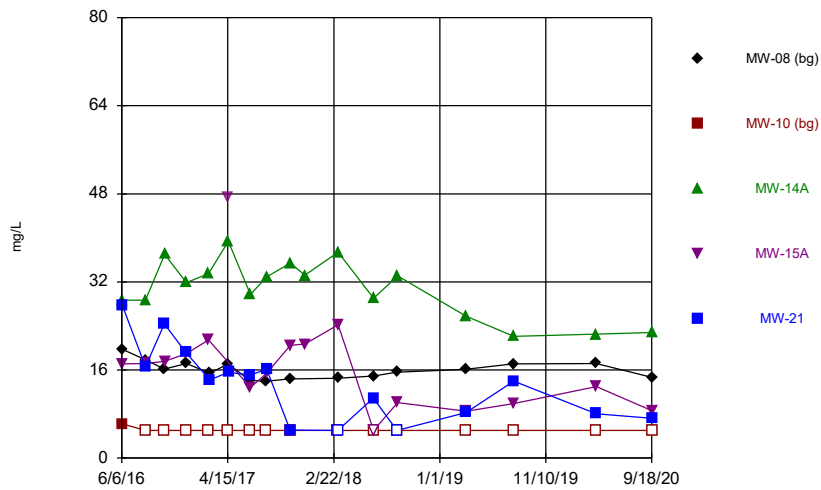
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



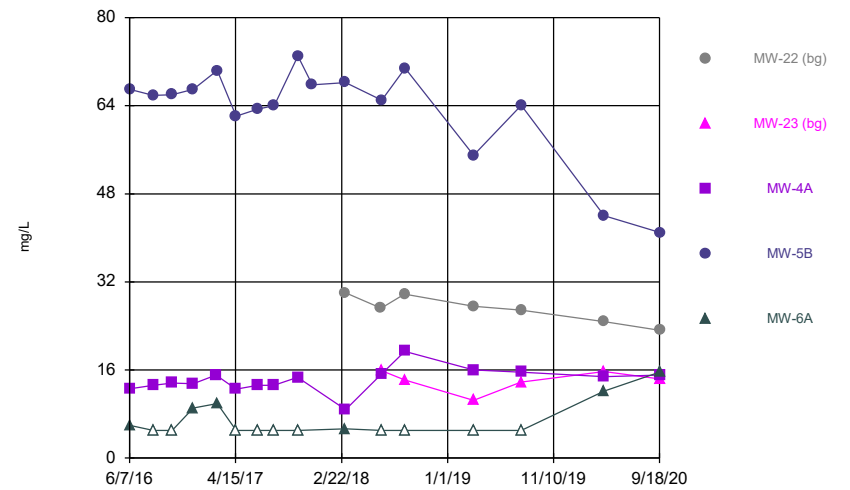
Constituent: Calcium Analysis Run 11/12/2020 5:50 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



Constituent: Chloride Analysis Run 11/12/2020 5:50 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

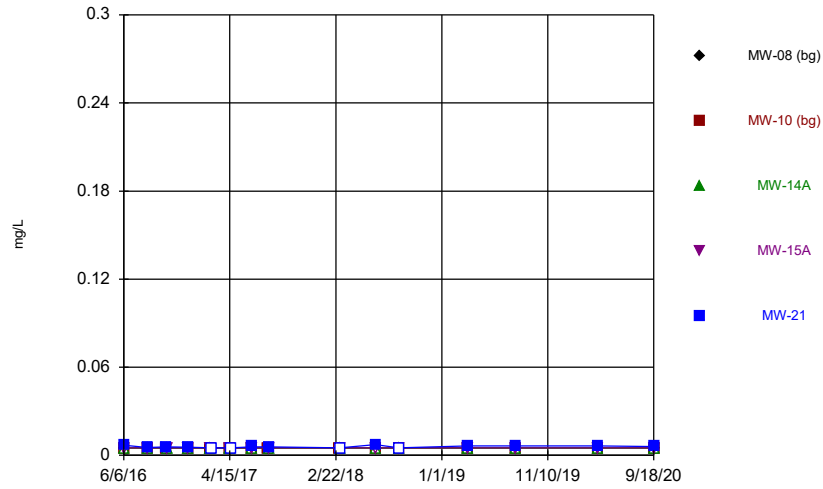
Time Series



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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

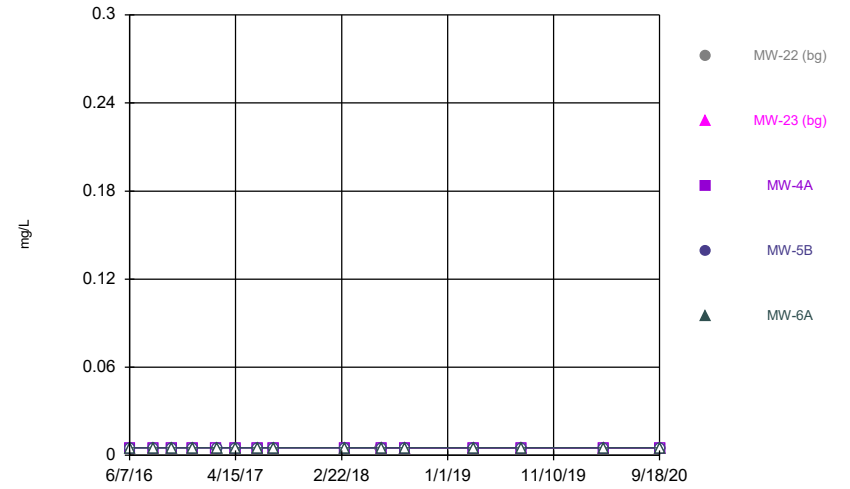


### Time Series



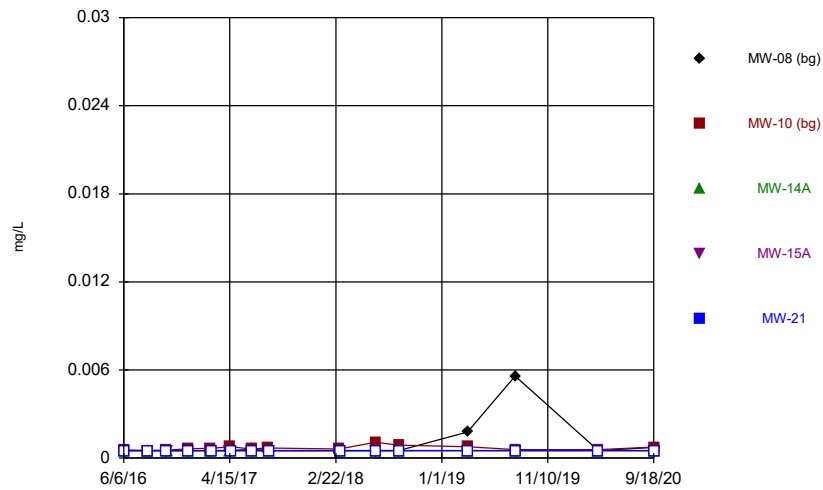
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



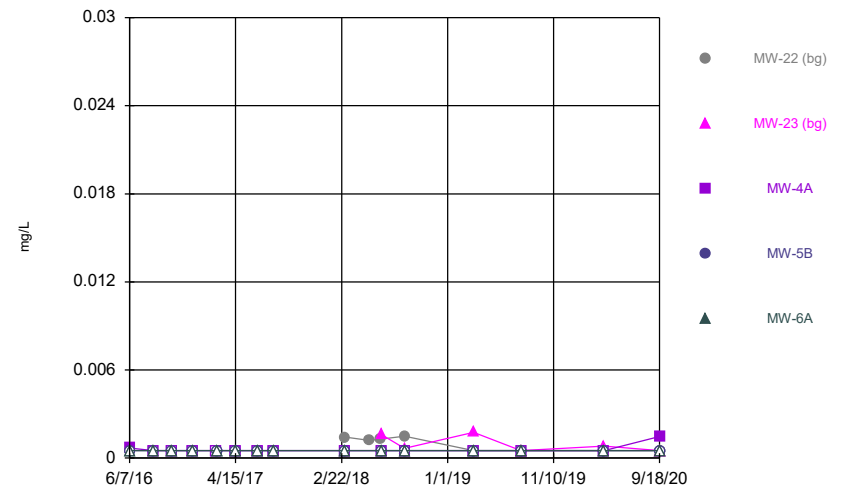
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



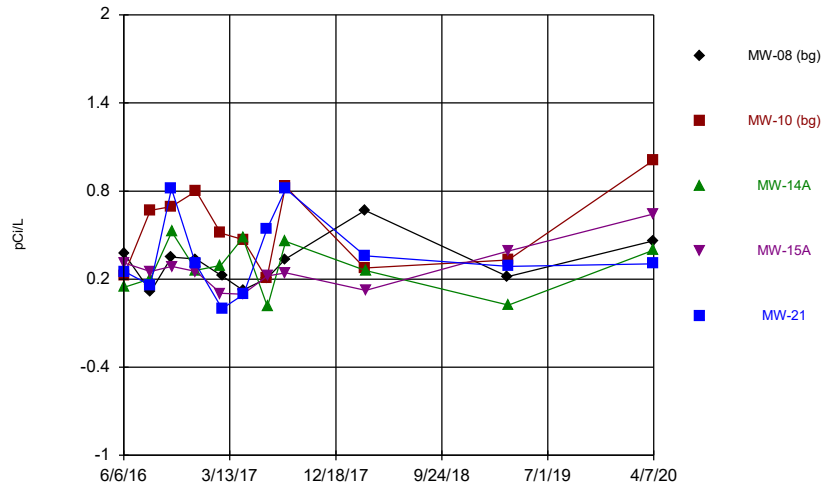
Constituent: Cobalt Analysis Run 11/12/2020 5:50 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



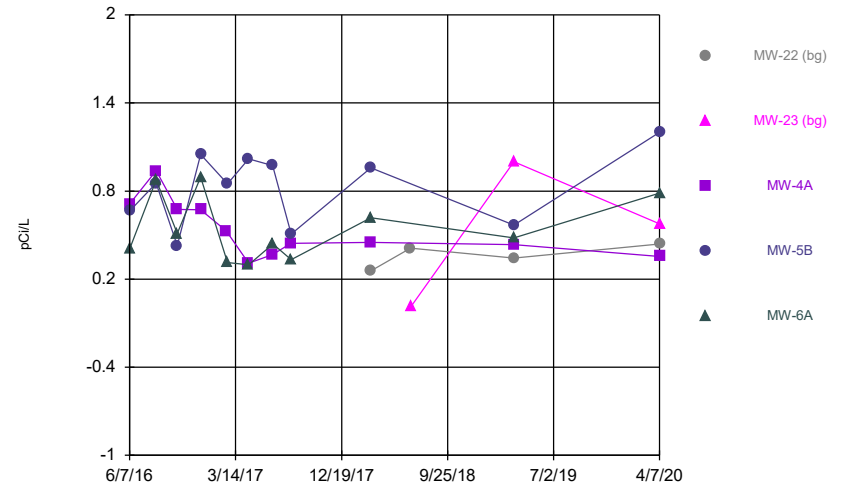
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



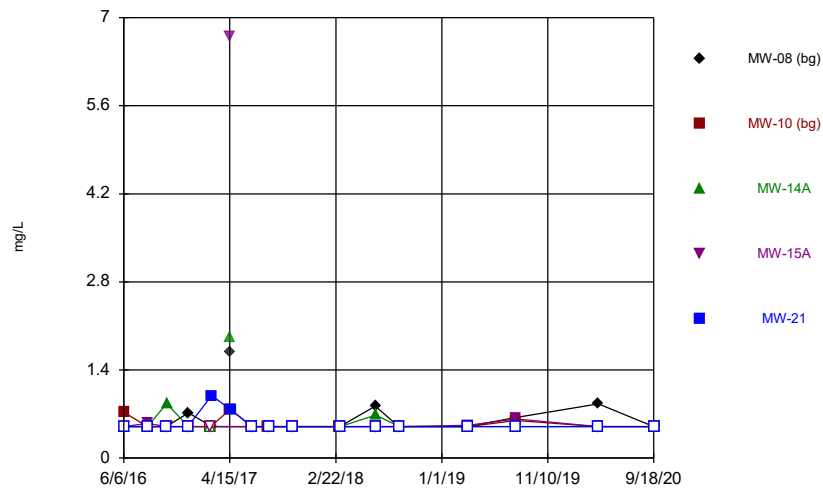
Constituent: Combined Radium 226 + 228 Analysis Run 11/12/2020 5:50 PM View: Appendix III and IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



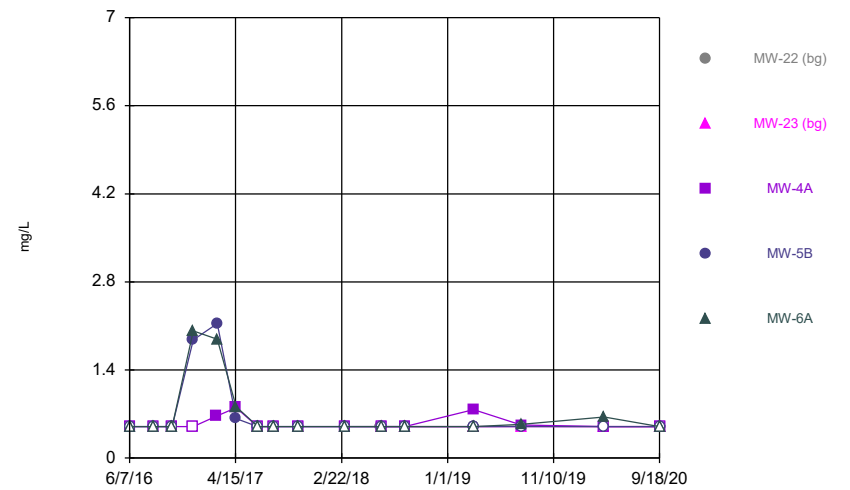
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 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



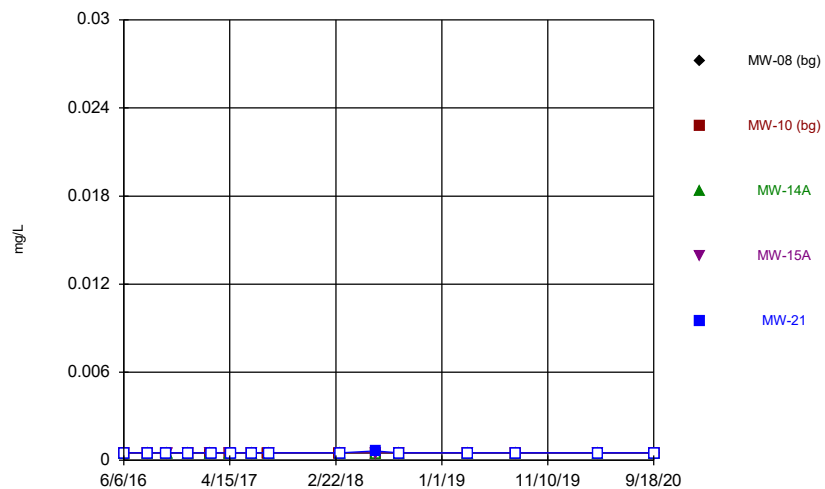
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 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



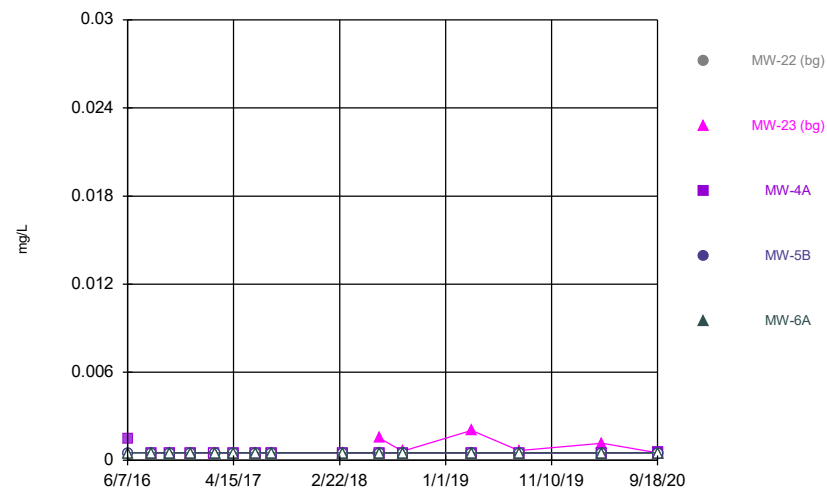
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 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



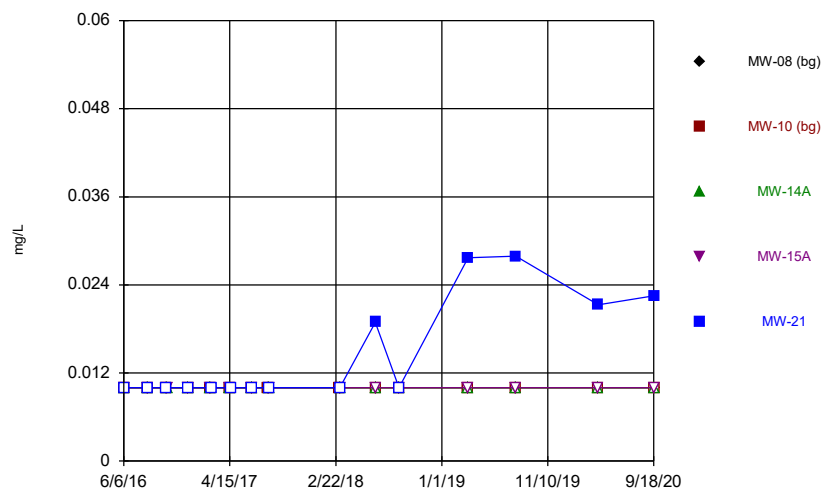
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



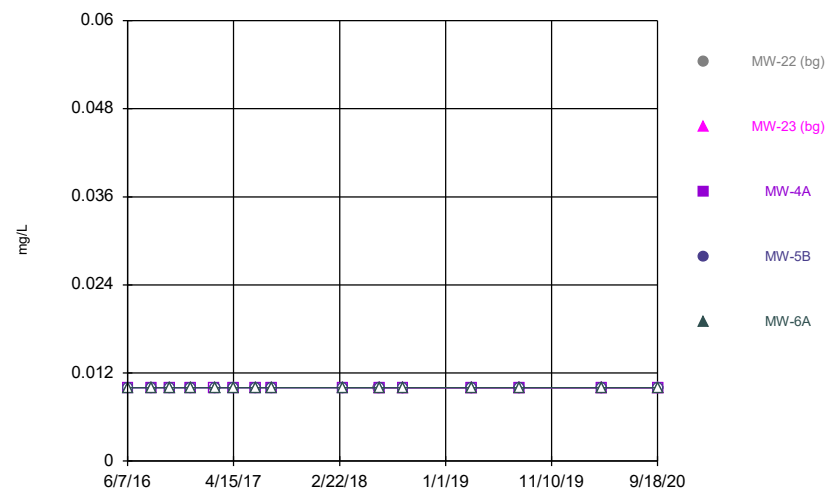
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### Time Series



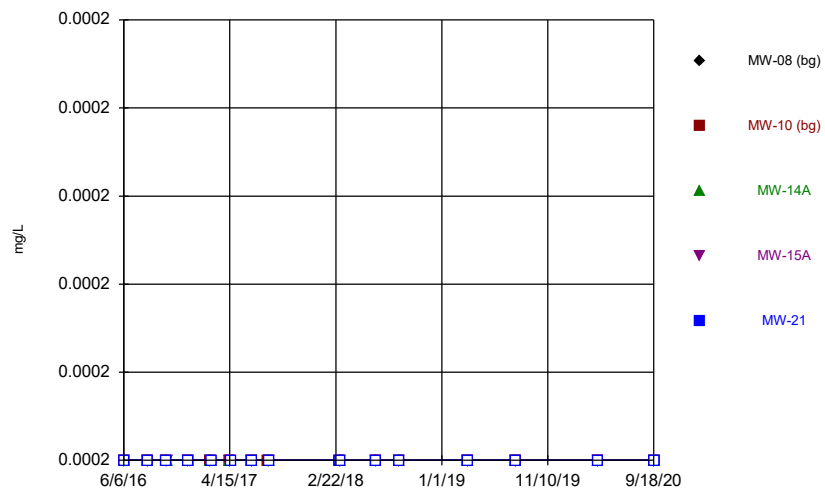
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



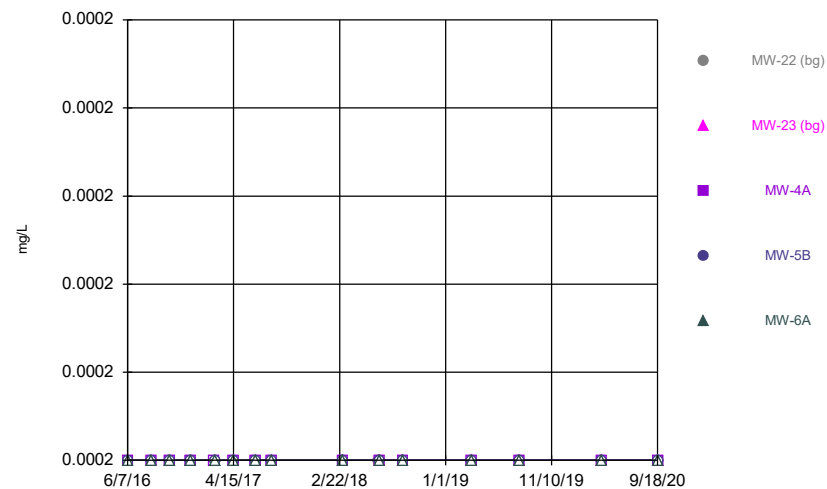
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



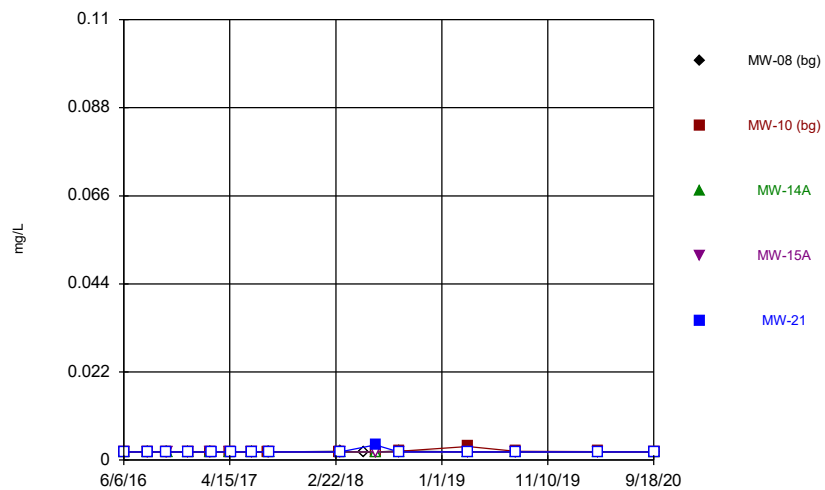
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



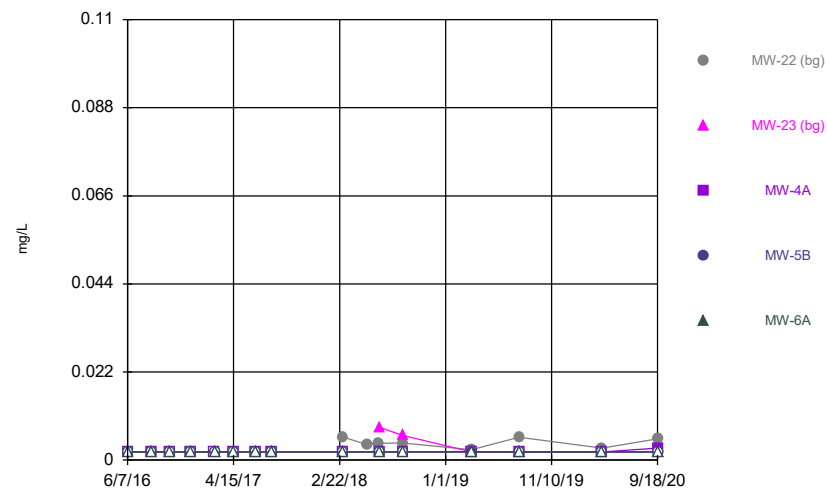
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



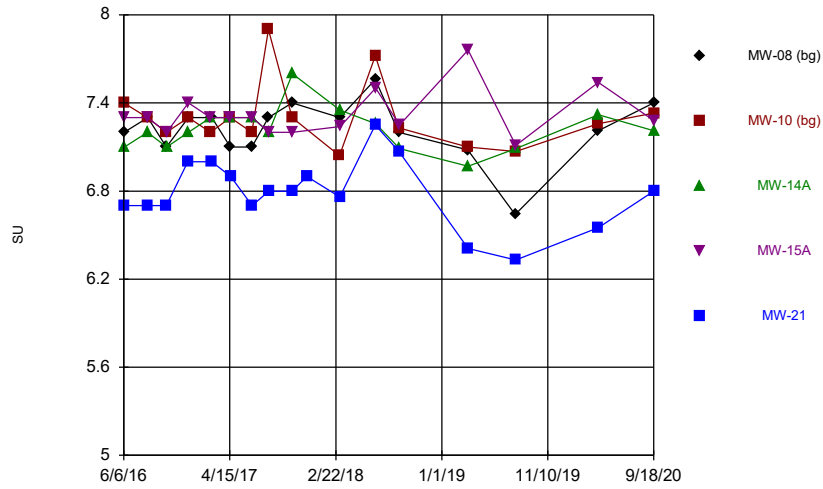
Constituent: Molybdenum Analysis Run 11/12/2020 5:50 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Time Series



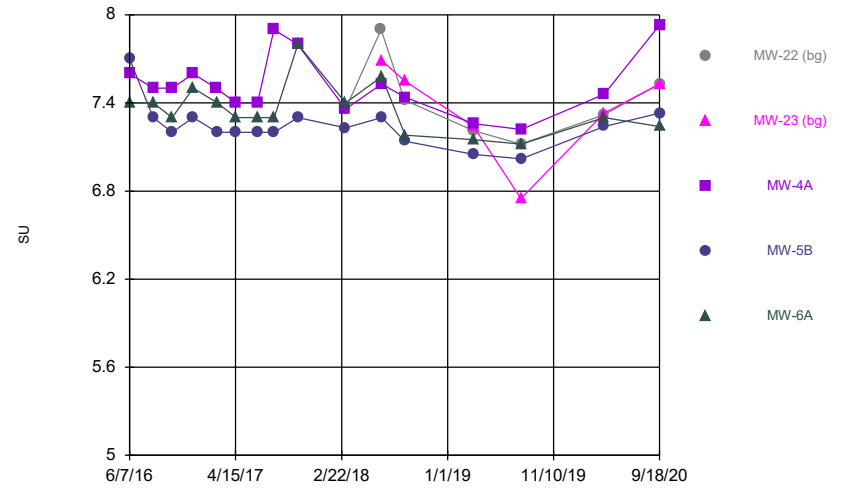
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



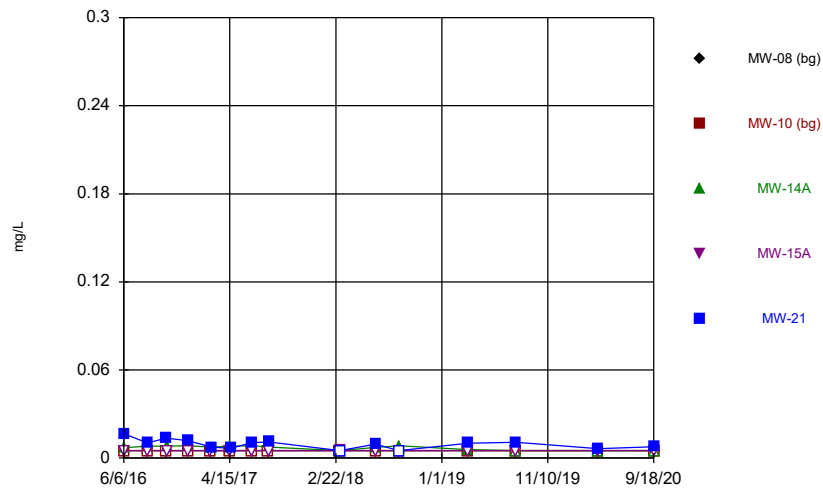
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



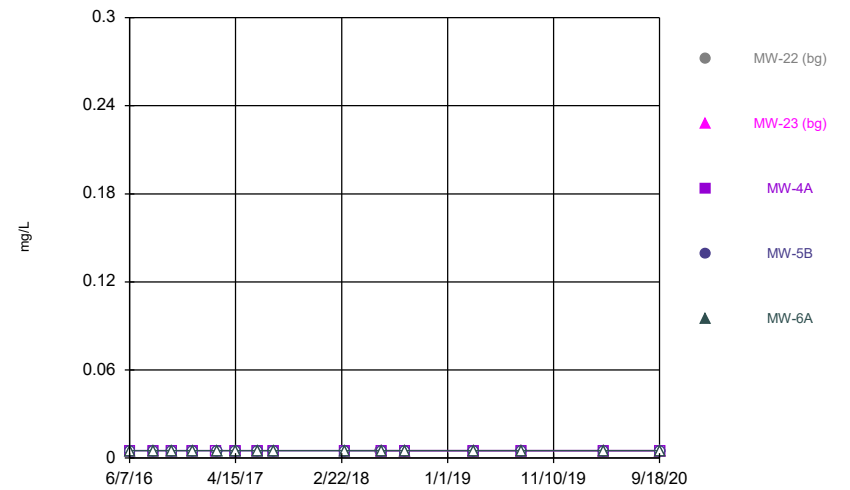
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



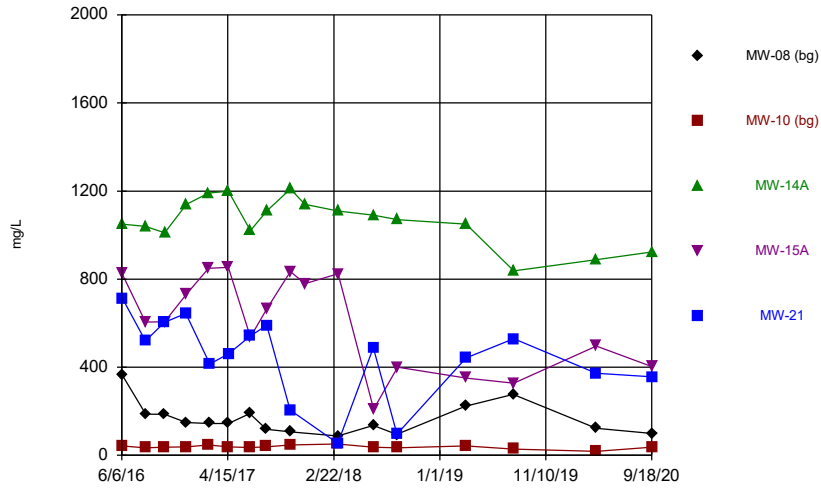
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



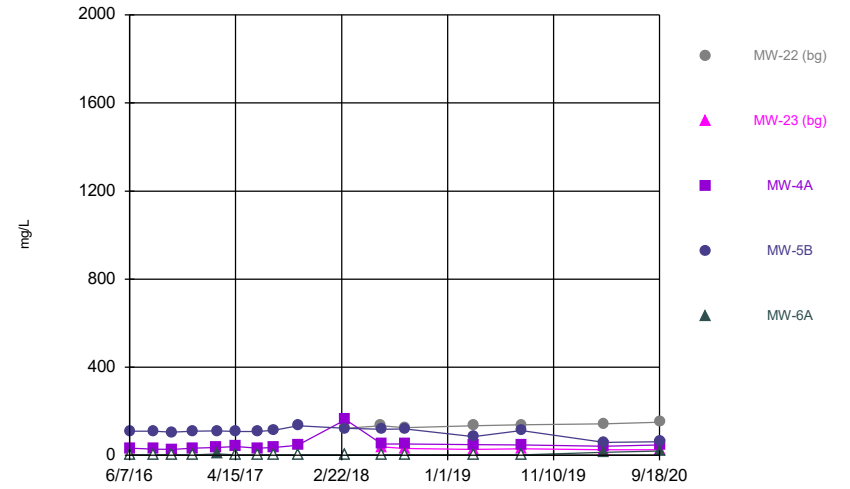
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



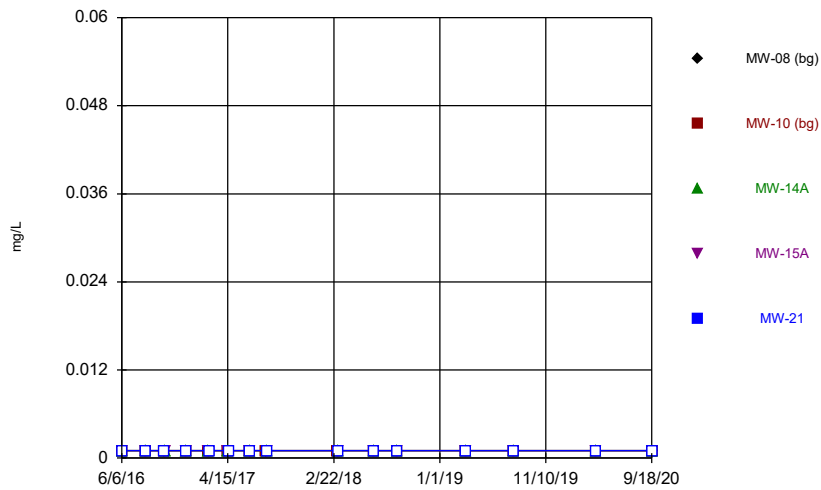
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



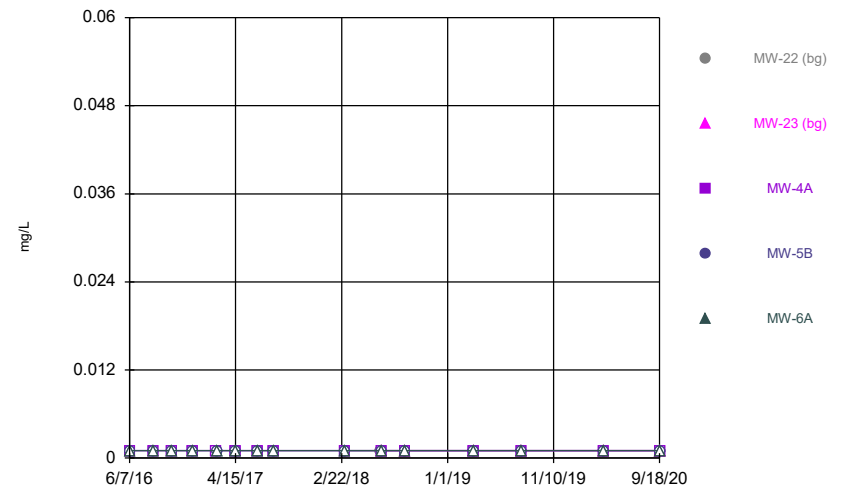
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



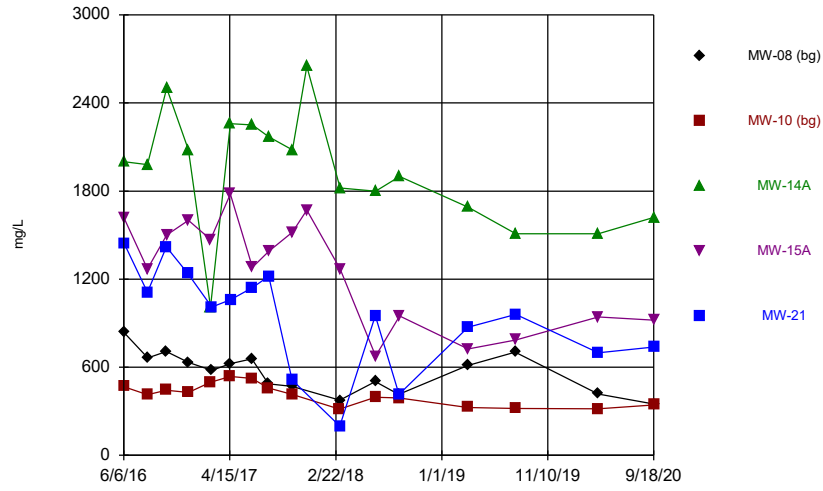
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



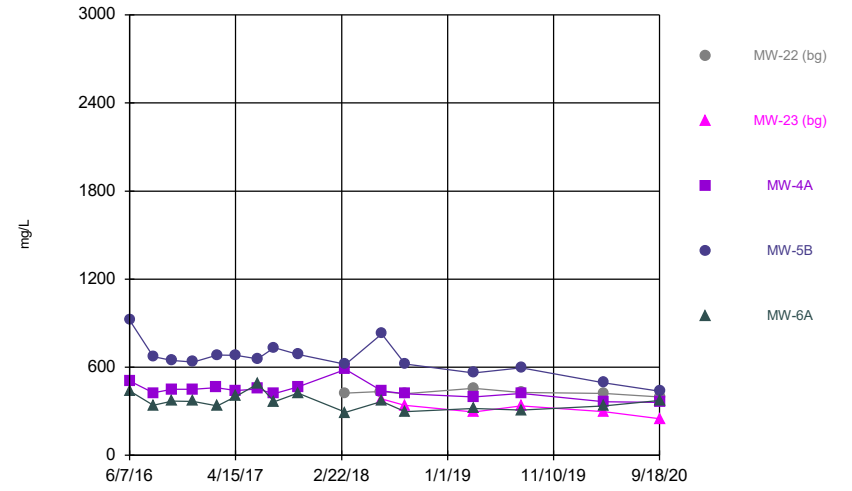
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



Constituent: Total Dissolved Solids Analysis Run 11/12/2020 5:50 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Time Series



Constituent: Total Dissolved Solids Analysis Run 11/12/2020 5:50 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

# Time Series

Constituent: Antimony (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

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



# Time Series

Constituent: Antimony (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Arsenic (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
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

# Time Series

Constituent: Arsenic (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Barium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
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

# Time Series

Constituent: Barium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Beryllium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
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

# Time Series

Constituent: Beryllium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Boron (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

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



# Time Series

Constituent: Boron (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Cadmium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
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

# Time Series

Constituent: Cadmium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Calcium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
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

# Time Series

Constituent: Calcium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Chloride (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
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

# Time Series

Constituent: Chloride (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Chromium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
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



# Time Series

Constituent: Chromium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Cobalt (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

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

# Time Series

Constituent: Cobalt (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Combined Radium 226 + 228 (pCi/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

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)

# Time Series

Constituent: Combined Radium 226 + 228 (pCi/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

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	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Fluoride (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

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

# Time Series

Constituent: Fluoride (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Lead (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

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



# Time Series

Constituent: Lead (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Lithium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
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

# Time Series

Constituent: Lithium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Mercury (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
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

# Time Series

Constituent: Mercury (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Molybdenum (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
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

# Time Series

Constituent: Molybdenum (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: pH (SU) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
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



# Time Series

Constituent: pH (SU) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Selenium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

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

# Time Series

Constituent: Selenium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Sulfate (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

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

# Time Series

Constituent: Sulfate (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Thallium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
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

# Time Series

Constituent: Thallium (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

# Time Series

Constituent: Total Dissolved Solids (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

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



# Time Series

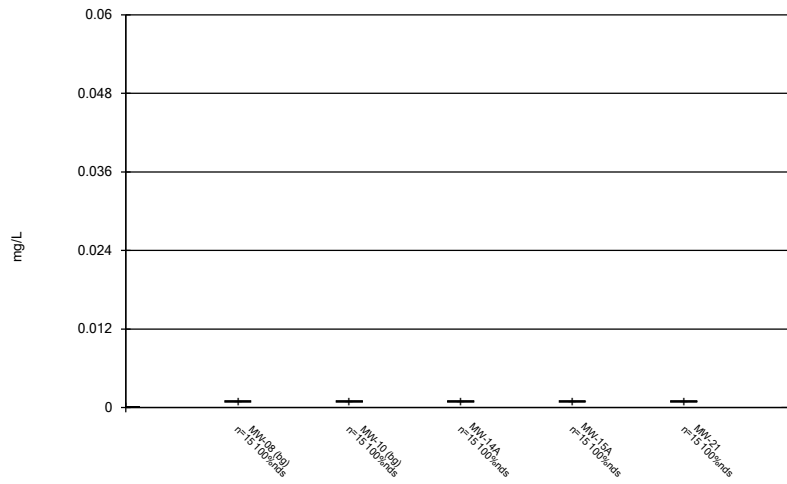
Constituent: Total Dissolved Solids (mg/L) Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-22 (bg)	MW-23 (bg)	MW-4A	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

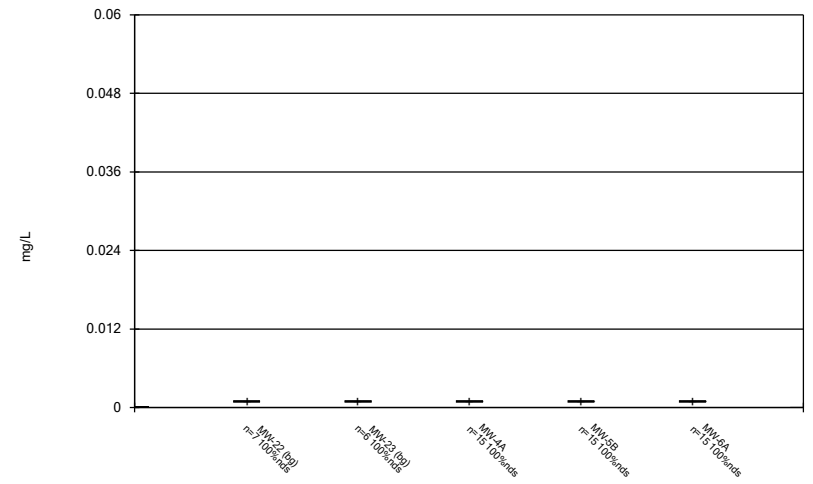
FIGURE B.

Box & Whiskers Plot



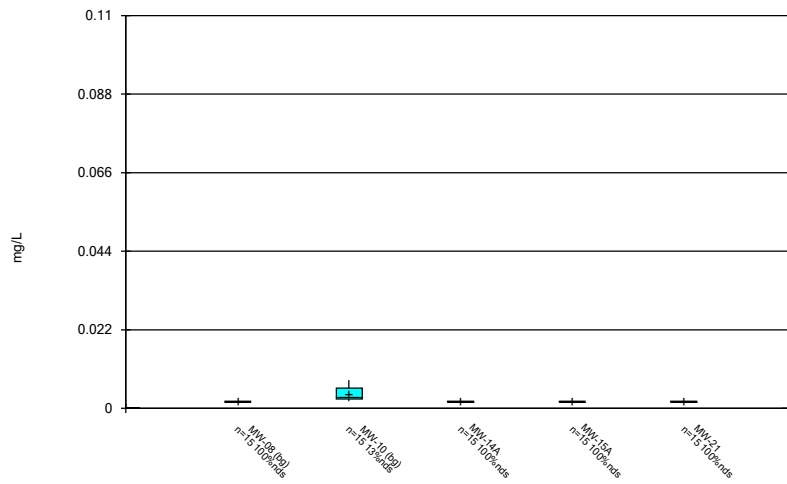
Constituent: Antimony Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



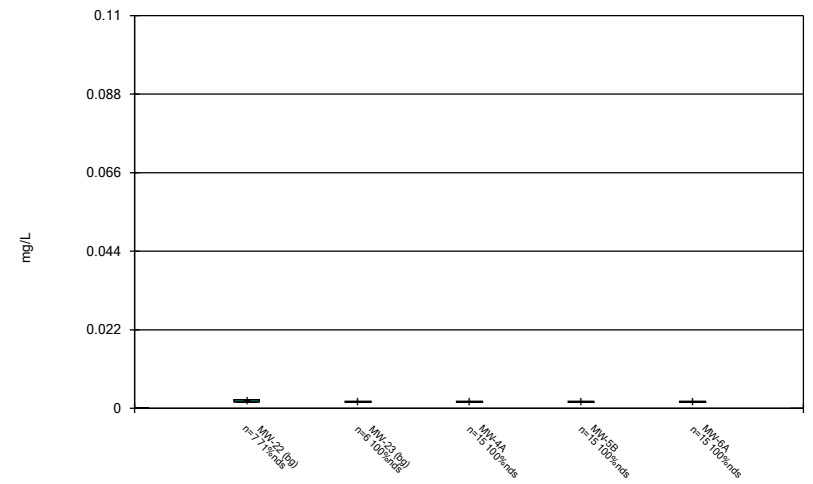
Constituent: Antimony Analysis Run 11/12/2020 5:51 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



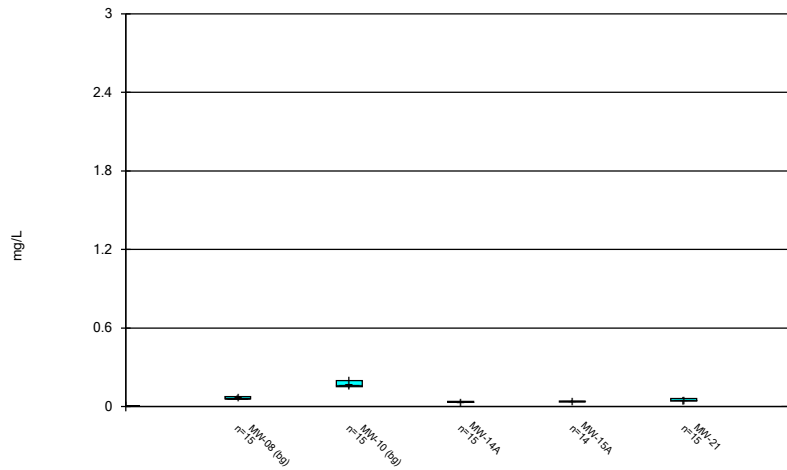
Constituent: Arsenic Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



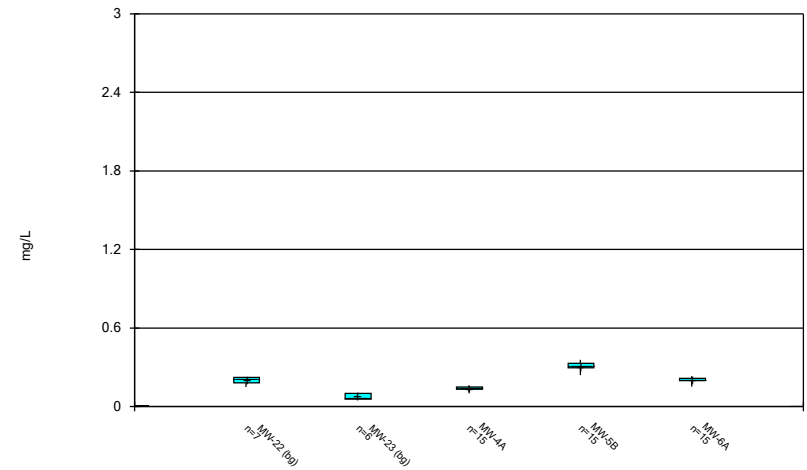
Constituent: Arsenic Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



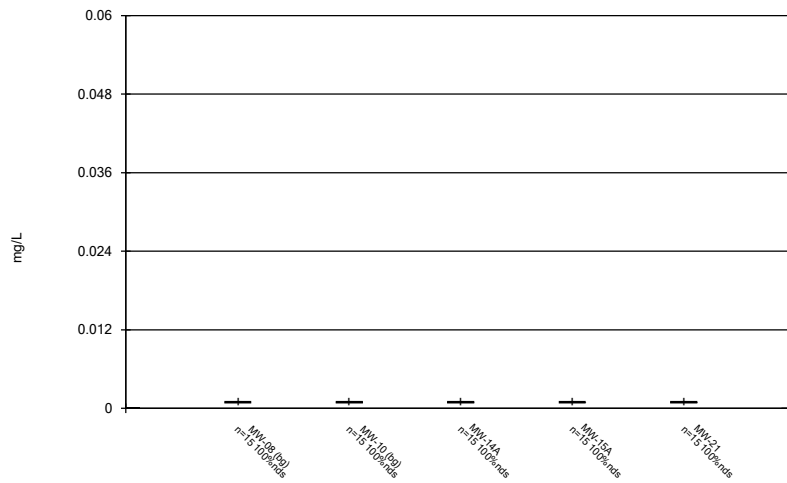
Constituent: Barium Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



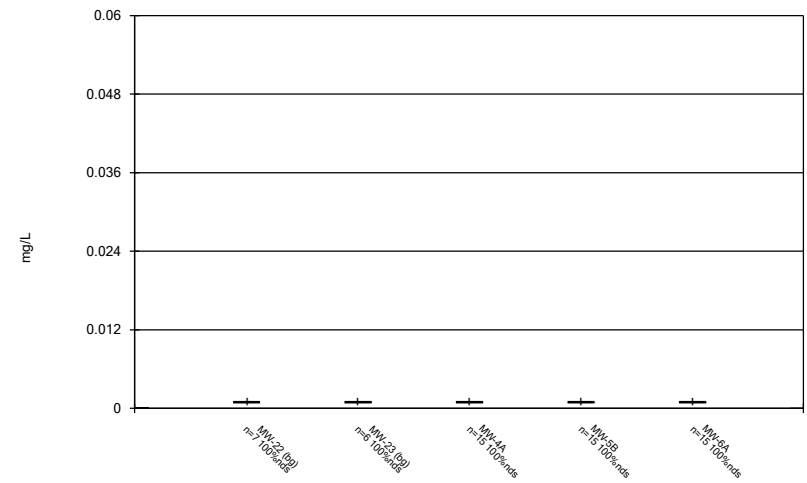
Constituent: Barium Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



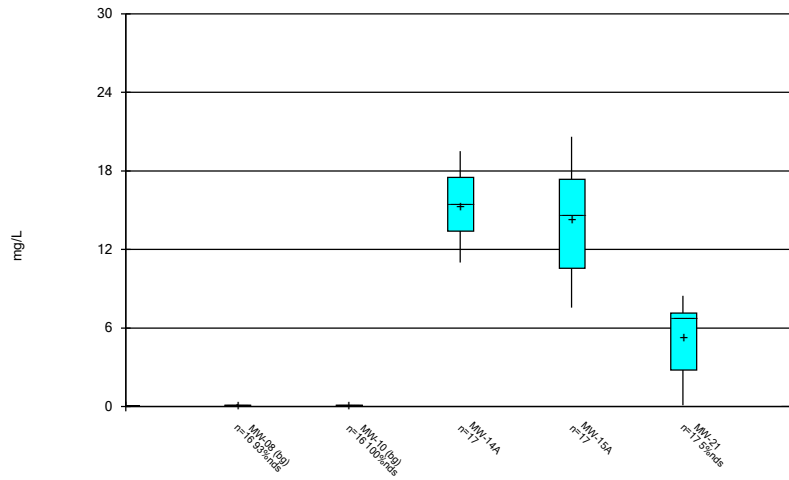
Constituent: Beryllium Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



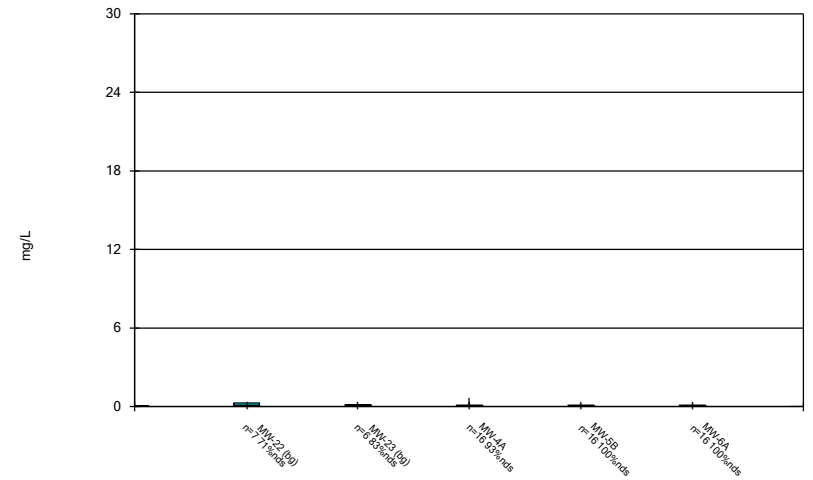
Constituent: Beryllium Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



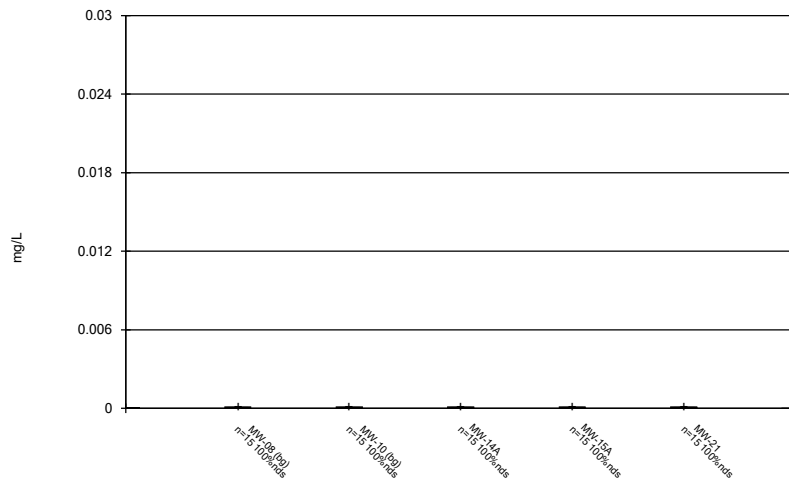
Constituent: Boron Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



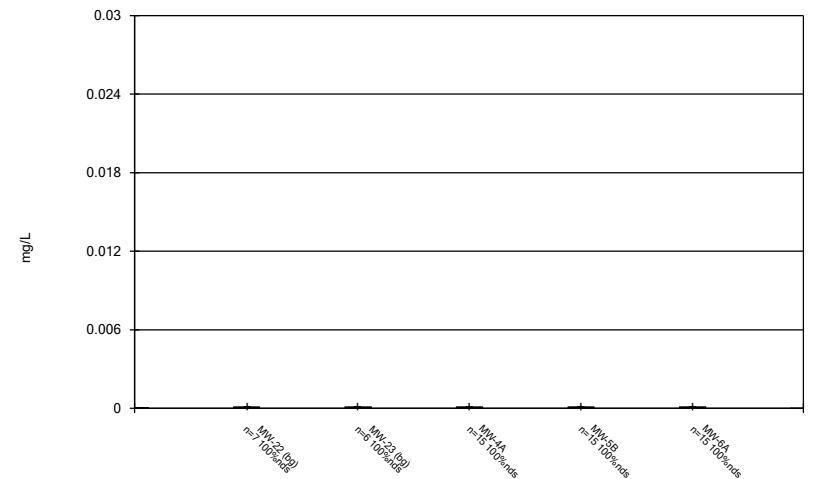
Constituent: Boron Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



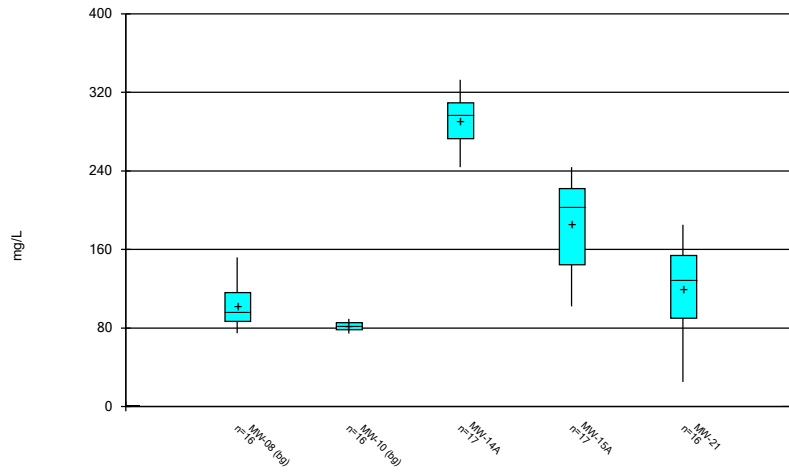
Constituent: Cadmium Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



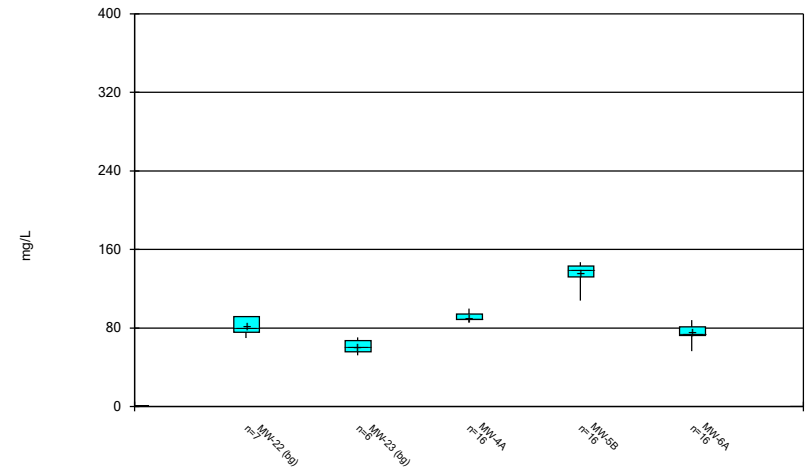
Constituent: Cadmium Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



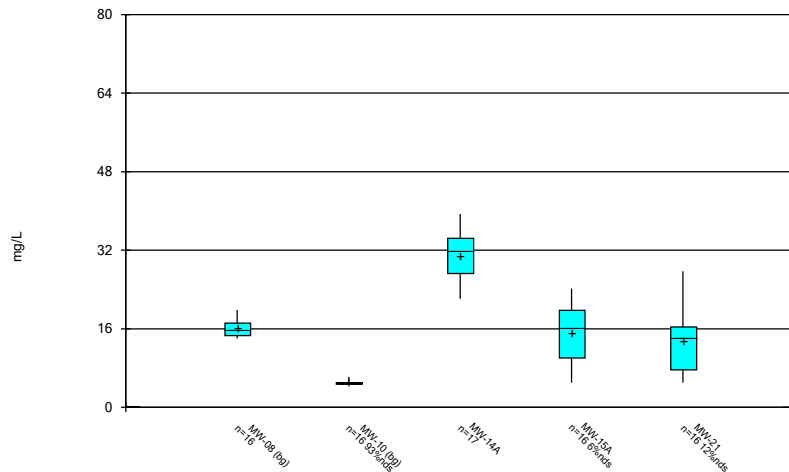
Constituent: Calcium Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



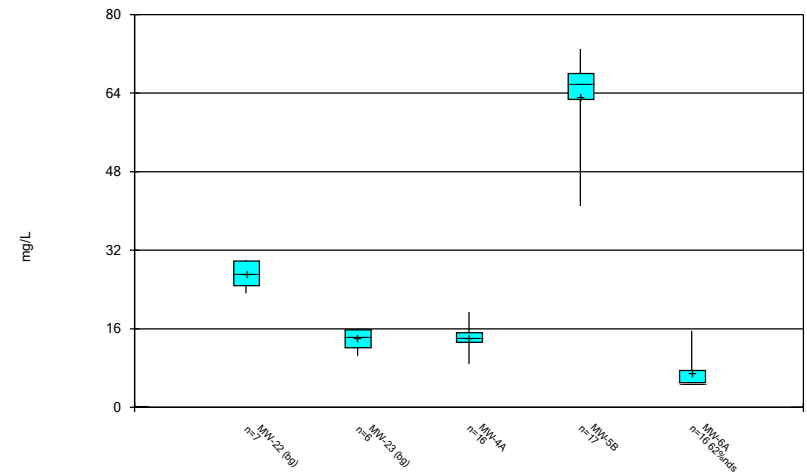
Constituent: Calcium Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



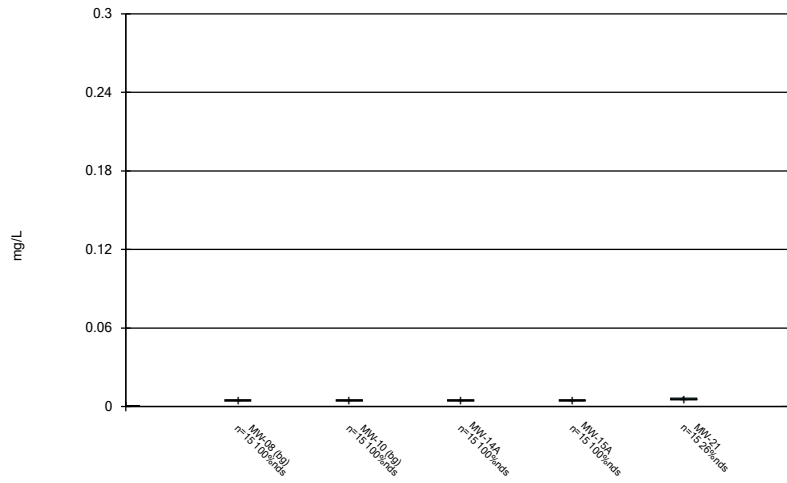
Constituent: Chloride Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



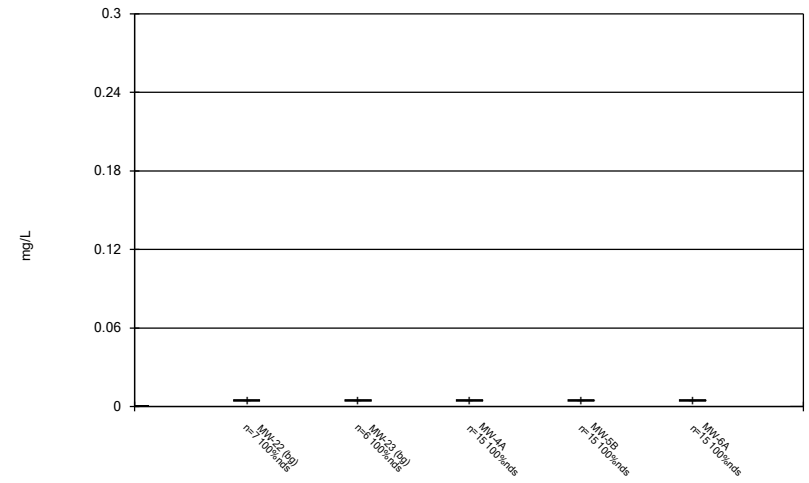
Constituent: Chloride Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



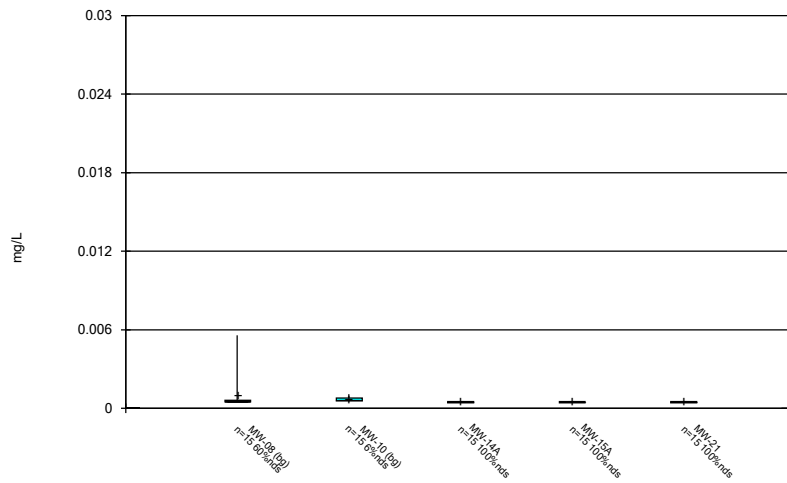
Constituent: Chromium Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



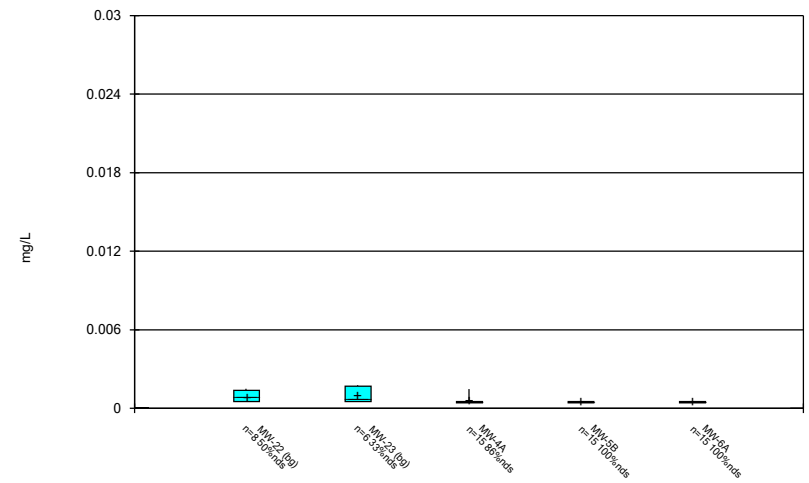
Constituent: Chromium Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



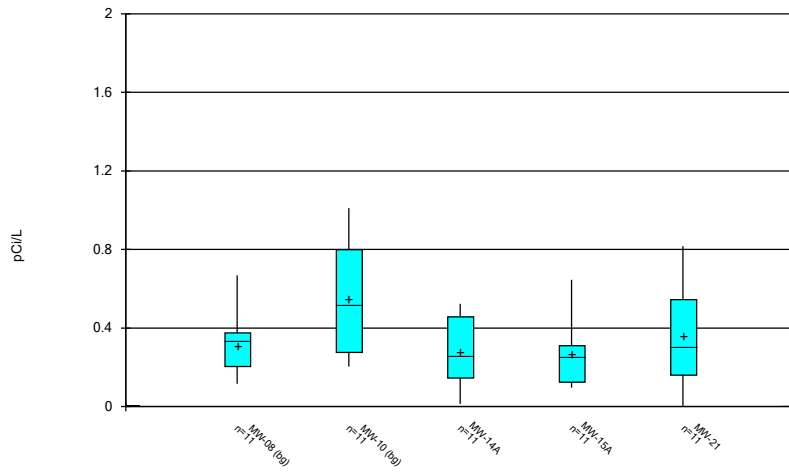
Constituent: Cobalt Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



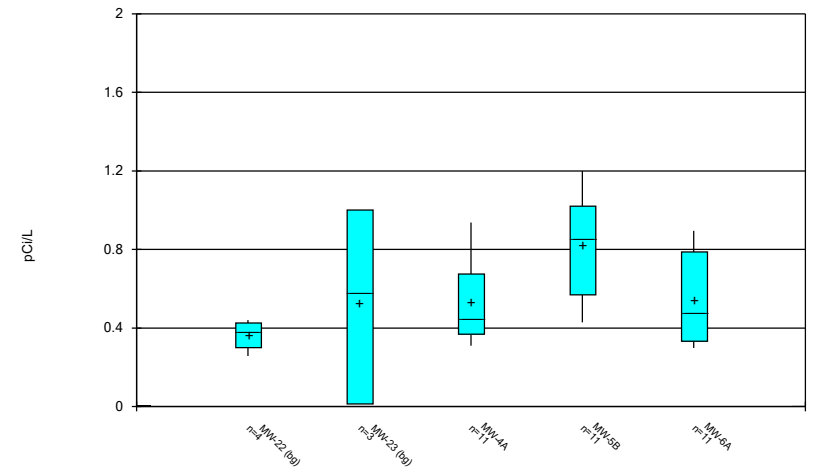
Constituent: Cobalt Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



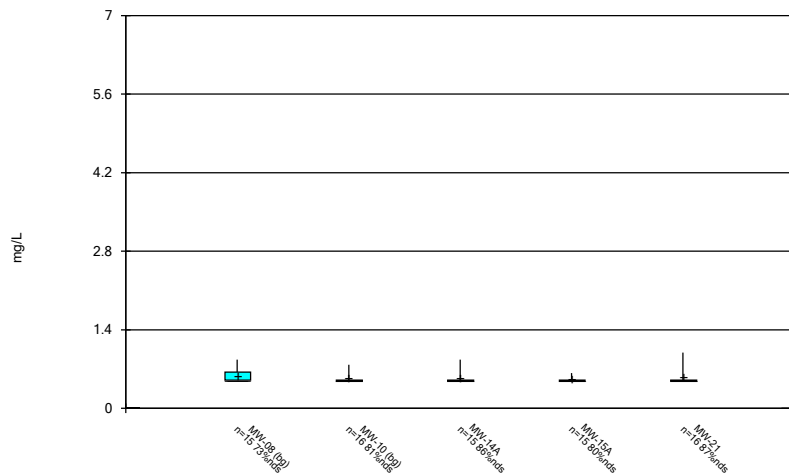
Constituent: Combined Radium 226 + 228 Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



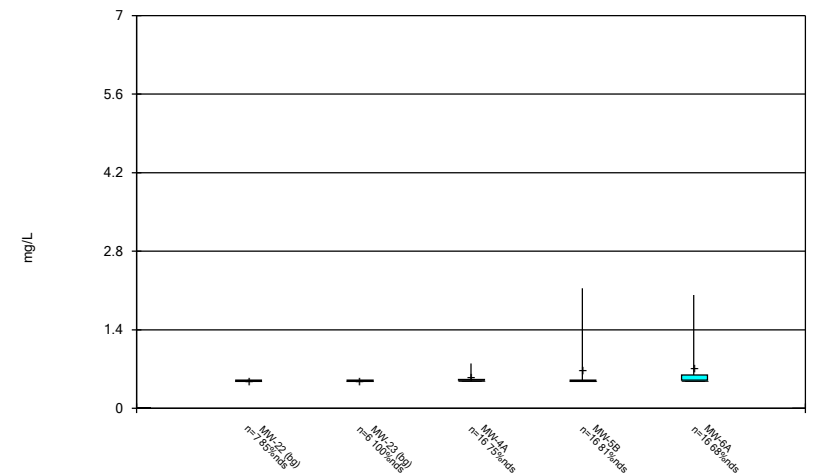
Constituent: Combined Radium 226 + 228 Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



Constituent: Fluoride Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

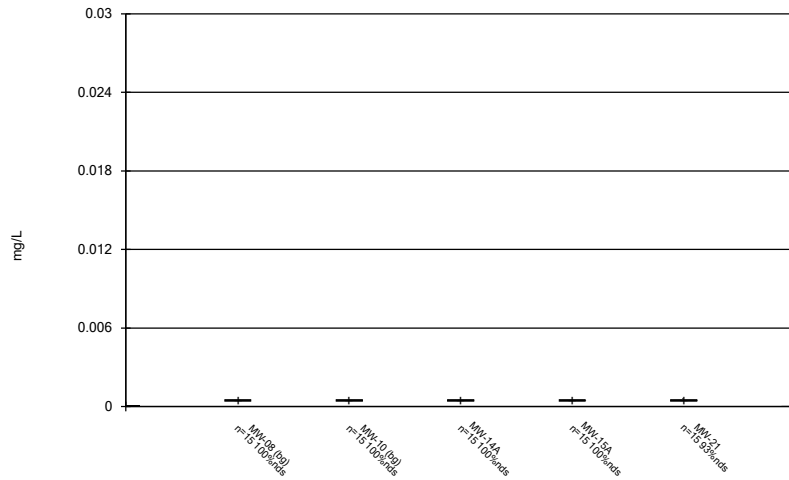
Box & Whiskers Plot



Constituent: Fluoride Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

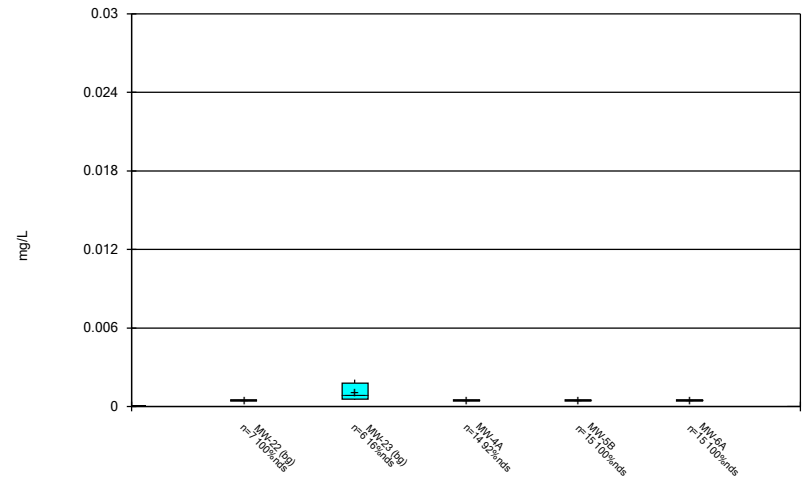


Box & Whiskers Plot



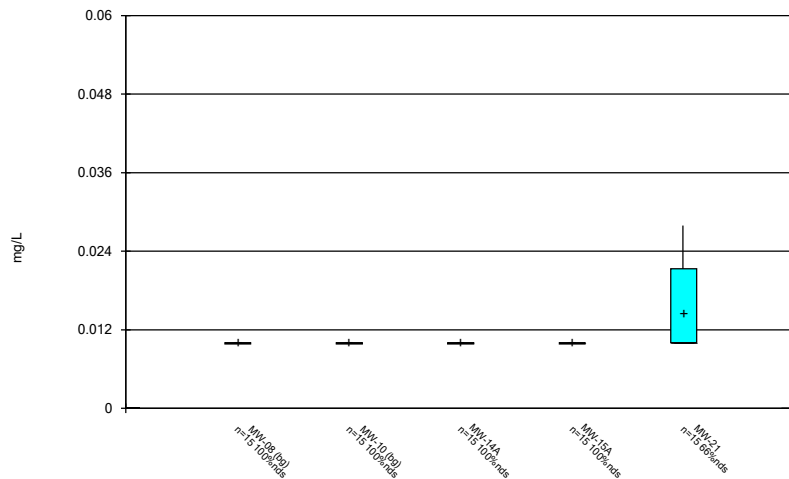
Constituent: Lead Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



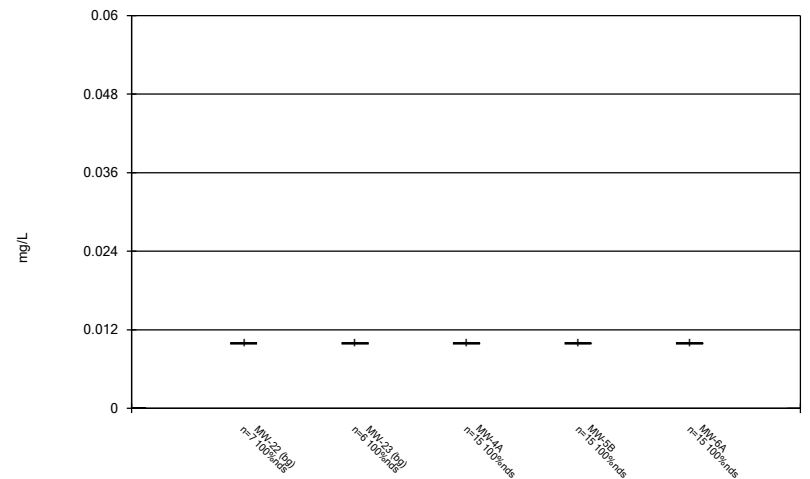
Constituent: Lead Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



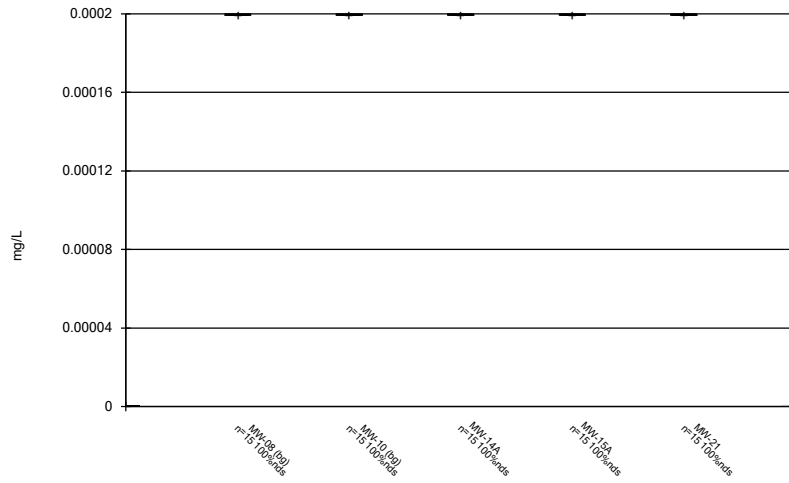
Constituent: Lithium Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



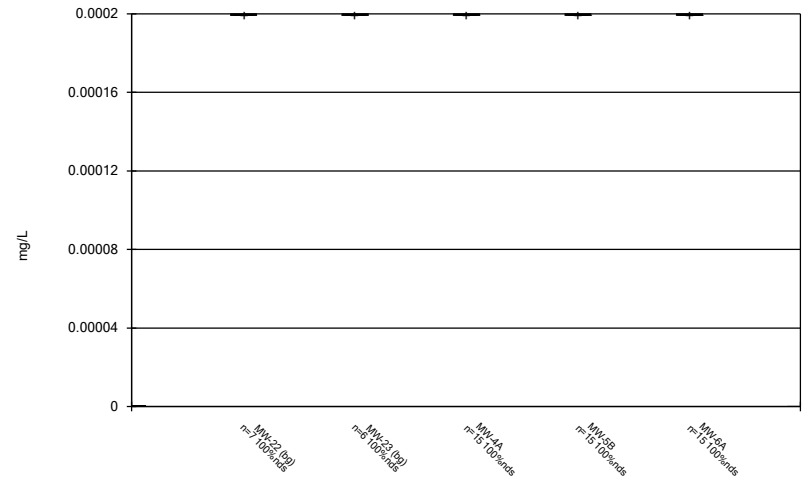
Constituent: Lithium Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



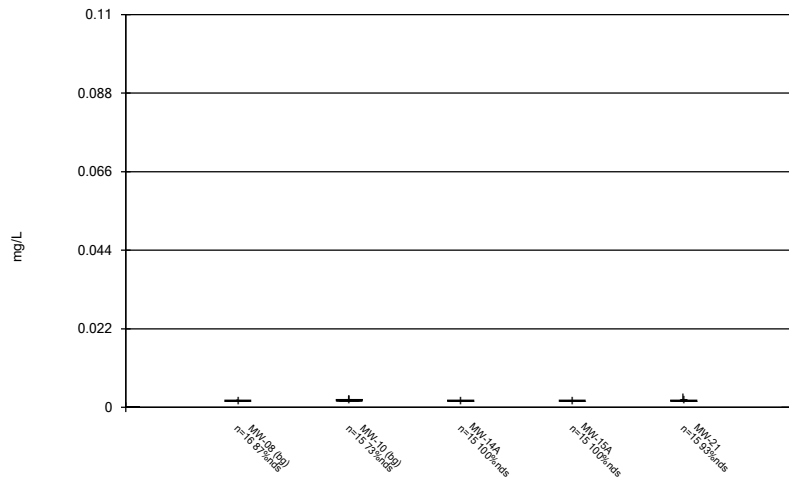
Constituent: Mercury Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



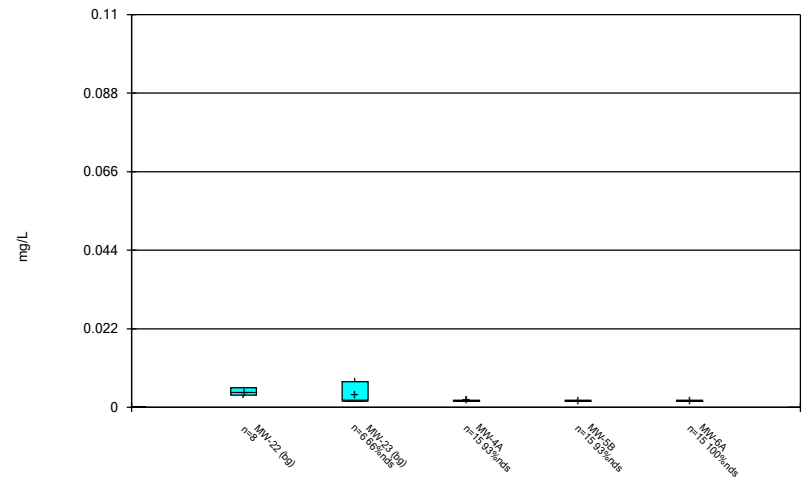
Constituent: Mercury Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



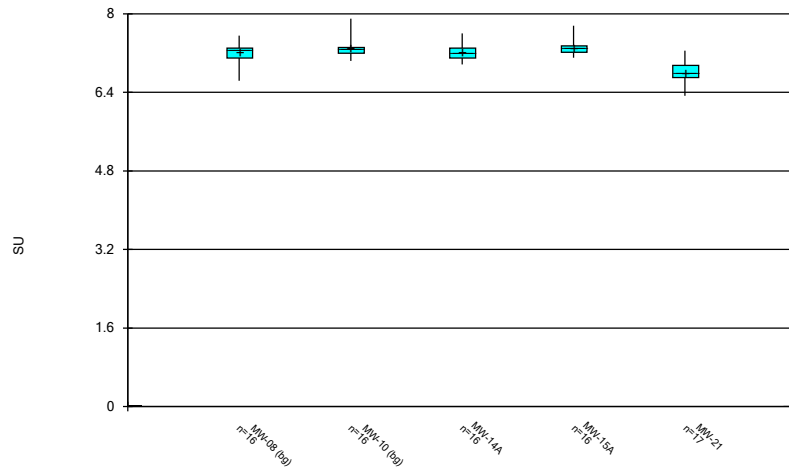
Constituent: Molybdenum Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



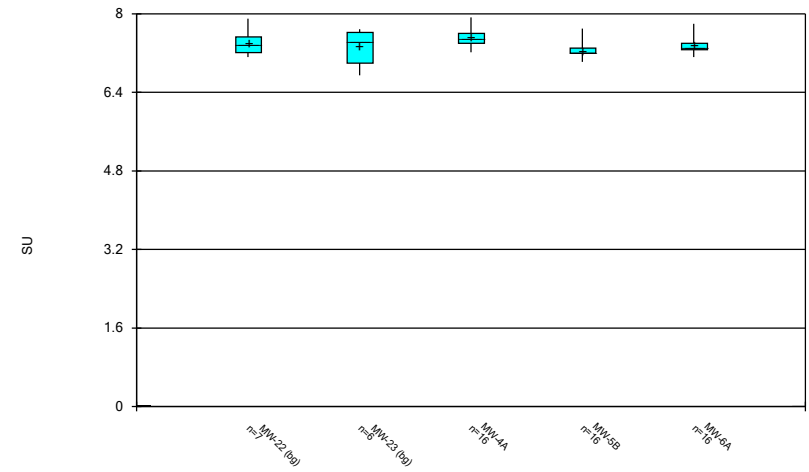
Constituent: Molybdenum Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



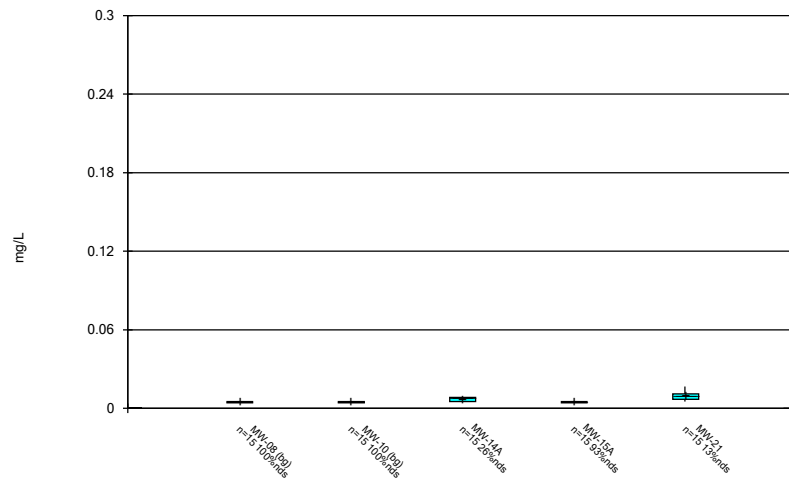
Constituent: pH Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



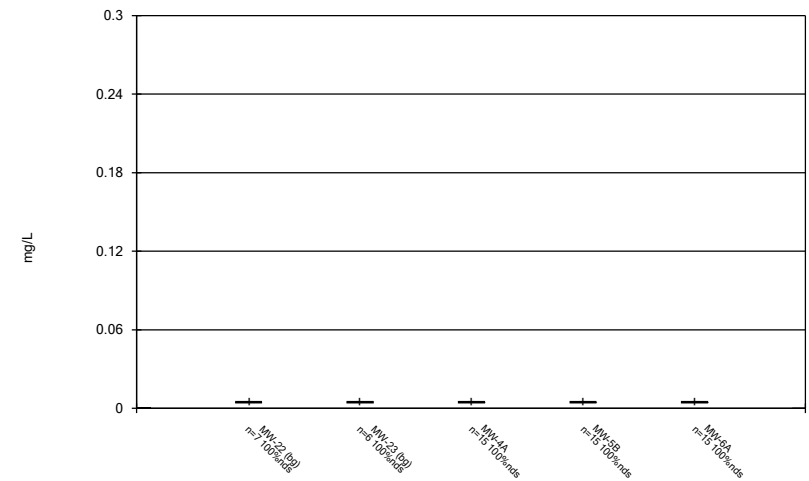
Constituent: pH Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



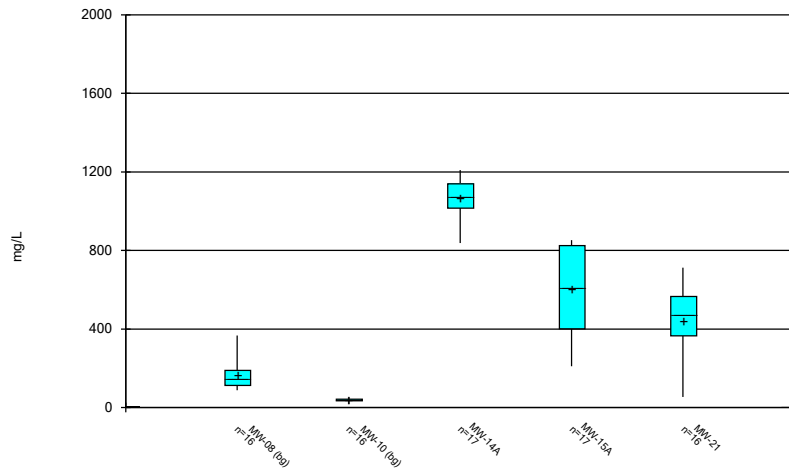
Constituent: Selenium Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



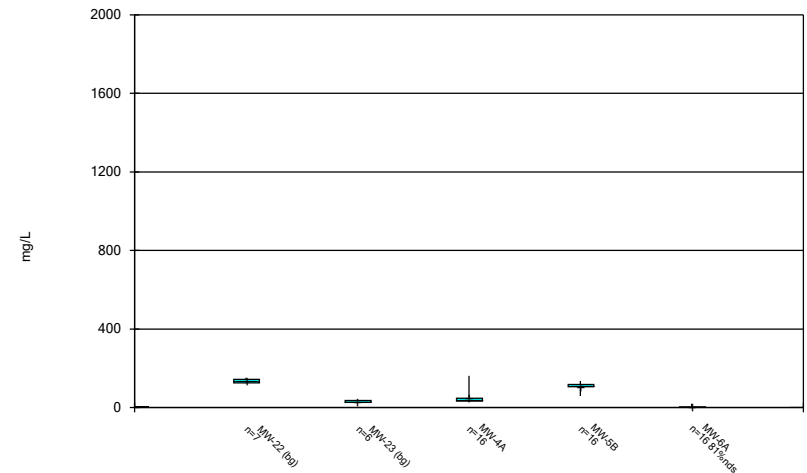
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



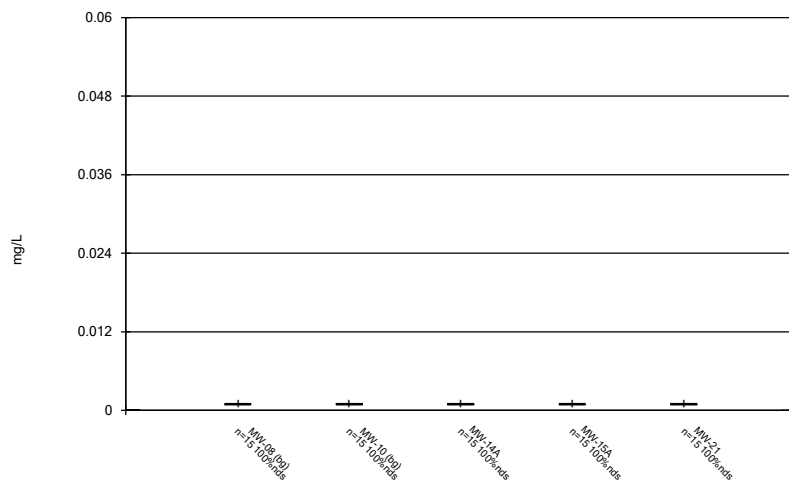
Constituent: Sulfate Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



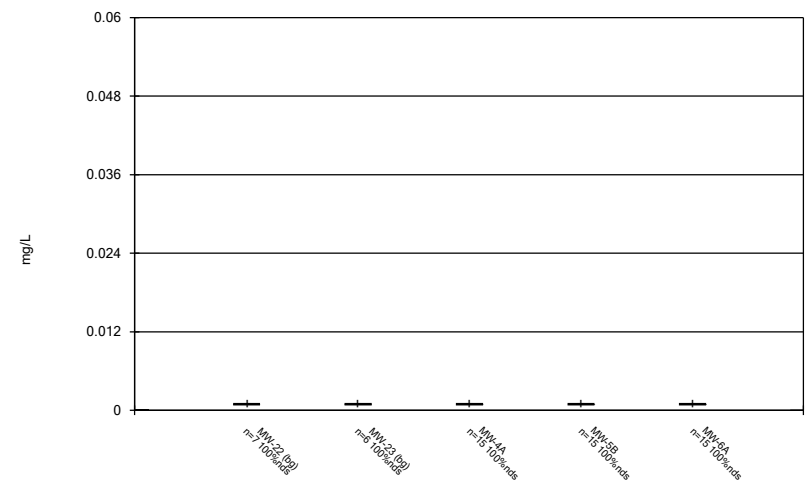
Constituent: Sulfate Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



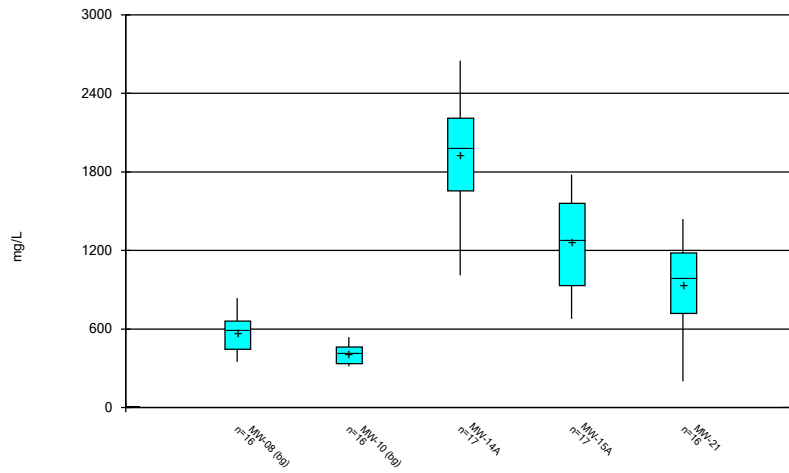
Constituent: Thallium Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



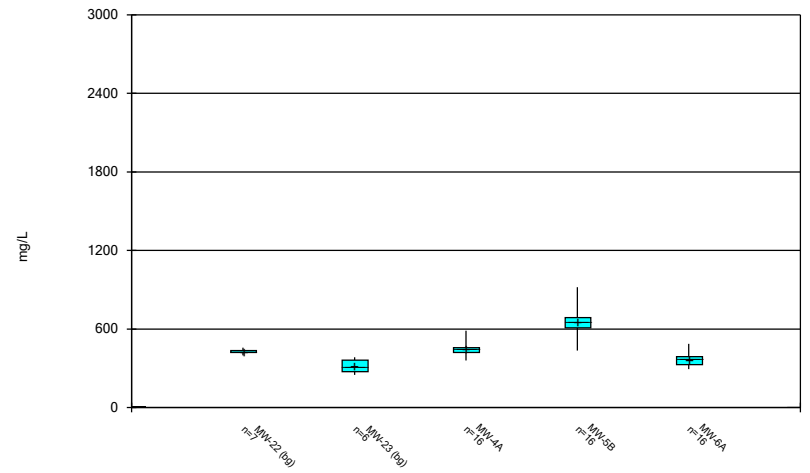
Constituent: Thallium Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



Constituent: Total Dissolved Solids Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Box & Whiskers Plot



Constituent: Total Dissolved Solids Analysis Run 11/12/2020 5:52 PM View: Appendix III and IV  
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 11/12/2020, 5:54 PM

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	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-4A 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 Limit - Significant Results

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/12/2020, 5:55 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bq N	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-14A	0.299	n/a	9/18/2020	19.5	Yes	45	91.11	n/a	n/a	0.0009347	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-15A	0.299	n/a	9/18/2020	14.5	Yes	45	91.11	n/a	n/a	0.0009347	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-21	0.299	n/a	9/18/2020	6.82	Yes	45	91.11	n/a	n/a	0.0009347	NP Inter (NDs) 1 of 2
Calcium (mg/L)	MW-14A	124.1	n/a	9/18/2020	244	Yes	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Calcium (mg/L)	MW-15A	124.1	n/a	9/18/2020	134	Yes	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Chloride (mg/L)	MW-5B	30	n/a	9/18/2020	41	Yes	45	33.33	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
pH (SU)	MW-21	7.753	6.838	9/18/2020	6.8	Yes	45	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-4A	7.753	6.838	9/18/2020	7.93	Yes	45	0	None	No	0.0006268	Param Inter 1 of 2
Sulfate (mg/L)	MW-14A	366	n/a	9/18/2020	924	Yes	45	0	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-15A	366	n/a	9/18/2020	403	Yes	45	0	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Total Dissolved Solids (mg/L)	MW-14A	713	n/a	9/18/2020	1620	Yes	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-15A	713	n/a	9/18/2020	920	Yes	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-21	713	n/a	9/18/2020	738	Yes	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2

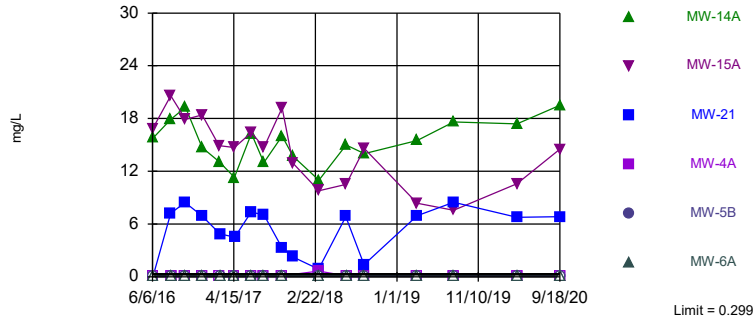
# Interwell Prediction Limit - All Results

Muscatine Power & Water    Client: HR Green, Inc.    Data: Muscatine Power & Water    Printed 11/12/2020, 5:55 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Obsrv.	Sig.	Bg N	%NDs	ND Adj.	Transform	Alpha	Method
<b>Boron (mg/L)</b>	<b>MW-14A</b>	<b>0.299</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>19.5</b>	<b>Yes</b>	<b>45</b>	<b>91.11</b>	<b>n/a</b>	<b>n/a</b>	<b>0.0009347</b>	<b>NP Inter (NDs) 1 of 2</b>
<b>Boron (mg/L)</b>	<b>MW-15A</b>	<b>0.299</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>14.5</b>	<b>Yes</b>	<b>45</b>	<b>91.11</b>	<b>n/a</b>	<b>n/a</b>	<b>0.0009347</b>	<b>NP Inter (NDs) 1 of 2</b>
<b>Boron (mg/L)</b>	<b>MW-21</b>	<b>0.299</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>6.82</b>	<b>Yes</b>	<b>45</b>	<b>91.11</b>	<b>n/a</b>	<b>n/a</b>	<b>0.0009347</b>	<b>NP Inter (NDs) 1 of 2</b>
Boron (mg/L)	MW-4A	0.299	n/a	9/18/2020	0.1ND	No	45	91.11	n/a	n/a	0.0009347	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-5B	0.299	n/a	9/18/2020	0.1ND	No	45	91.11	n/a	n/a	0.0009347	NP Inter (NDs) 1 of 2
Boron (mg/L)	MW-6A	0.299	n/a	9/18/2020	0.1ND	No	45	91.11	n/a	n/a	0.0009347	NP Inter (NDs) 1 of 2
<b>Calcium (mg/L)</b>	<b>MW-14A</b>	<b>124.1</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>244</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>None</b>	<b>sqrt(x)</b>	<b>0.001254</b>	<b>Param Inter 1 of 2</b>
<b>Calcium (mg/L)</b>	<b>MW-15A</b>	<b>124.1</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>134</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>None</b>	<b>sqrt(x)</b>	<b>0.001254</b>	<b>Param Inter 1 of 2</b>
Calcium (mg/L)	MW-21	124.1	n/a	9/18/2020	101	No	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Calcium (mg/L)	MW-4A	124.1	n/a	9/18/2020	89	No	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Calcium (mg/L)	MW-5B	124.1	n/a	9/18/2020	108	No	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Calcium (mg/L)	MW-6A	124.1	n/a	9/18/2020	87.9	No	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Chloride (mg/L)	MW-14A	30	n/a	9/18/2020	22.8	No	45	33.33	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-15A	30	n/a	9/18/2020	8.63	No	45	33.33	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-21	30	n/a	9/18/2020	7.21	No	45	33.33	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-4A	30	n/a	9/18/2020	15.1	No	45	33.33	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
<b>Chloride (mg/L)</b>	<b>MW-5B</b>	<b>30</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>41</b>	<b>Yes</b>	<b>45</b>	<b>33.33</b>	<b>n/a</b>	<b>n/a</b>	<b>0.0009347</b>	<b>NP Inter (normality) 1 of 2</b>
Chloride (mg/L)	MW-6A	30	n/a	9/18/2020	15.6	No	45	33.33	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Fluoride (mg/L)	MW-14A	0.864	n/a	9/18/2020	0.5ND	No	44	81.82	n/a	n/a	0.0009736	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-15A	0.864	n/a	9/18/2020	0.5ND	No	44	81.82	n/a	n/a	0.0009736	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-21	0.864	n/a	9/18/2020	0.5ND	No	44	81.82	n/a	n/a	0.0009736	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-4A	0.864	n/a	9/18/2020	0.5ND	No	44	81.82	n/a	n/a	0.0009736	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-5B	0.864	n/a	9/18/2020	0.5ND	No	44	81.82	n/a	n/a	0.0009736	NP Inter (NDs) 1 of 2
Fluoride (mg/L)	MW-6A	0.864	n/a	9/18/2020	0.5ND	No	44	81.82	n/a	n/a	0.0009736	NP Inter (NDs) 1 of 2
pH (SU)	MW-14A	7.753	6.838	9/18/2020	7.21	No	45	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-15A	7.753	6.838	9/18/2020	7.28	No	45	0	None	No	0.0006268	Param Inter 1 of 2
<b>pH (SU)</b>	<b>MW-21</b>	<b>7.753</b>	<b>6.838</b>	<b>9/18/2020</b>	<b>6.8</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.0006268</b>	<b>Param Inter 1 of 2</b>
<b>pH (SU)</b>	<b>MW-4A</b>	<b>7.753</b>	<b>6.838</b>	<b>9/18/2020</b>	<b>7.93</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.0006268</b>	<b>Param Inter 1 of 2</b>
pH (SU)	MW-5B	7.753	6.838	9/18/2020	7.33	No	45	0	None	No	0.0006268	Param Inter 1 of 2
pH (SU)	MW-6A	7.753	6.838	9/18/2020	7.24	No	45	0	None	No	0.0006268	Param Inter 1 of 2
<b>Sulfate (mg/L)</b>	<b>MW-14A</b>	<b>366</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>924</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>	<b>0.0009347</b>	<b>NP Inter (normality) 1 of 2</b>
<b>Sulfate (mg/L)</b>	<b>MW-15A</b>	<b>366</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>403</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>	<b>0.0009347</b>	<b>NP Inter (normality) 1 of 2</b>
Sulfate (mg/L)	MW-21	366	n/a	9/18/2020	356	No	45	0	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-4A	366	n/a	9/18/2020	46.9	No	45	0	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-5B	366	n/a	9/18/2020	61.9	No	45	0	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-6A	366	n/a	9/18/2020	19.1	No	45	0	n/a	n/a	0.0009347	NP Inter (normality) 1 of 2
<b>Total Dissolved Solids (mg/L)</b>	<b>MW-14A</b>	<b>713</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>1620</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>None</b>	<b>sqrt(x)</b>	<b>0.001254</b>	<b>Param Inter 1 of 2</b>
<b>Total Dissolved Solids (mg/L)</b>	<b>MW-15A</b>	<b>713</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>920</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>None</b>	<b>sqrt(x)</b>	<b>0.001254</b>	<b>Param Inter 1 of 2</b>
<b>Total Dissolved Solids (mg/L)</b>	<b>MW-21</b>	<b>713</b>	<b>n/a</b>	<b>9/18/2020</b>	<b>738</b>	<b>Yes</b>	<b>45</b>	<b>0</b>	<b>None</b>	<b>sqrt(x)</b>	<b>0.001254</b>	<b>Param Inter 1 of 2</b>
Total Dissolved Solids (mg/L)	MW-4A	713	n/a	9/18/2020	360	No	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-5B	713	n/a	9/18/2020	436	No	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-6A	713	n/a	9/18/2020	374	No	45	0	None	sqrt(x)	0.001254	Param Inter 1 of 2

Exceeds Limit: MW-14A, MW-15A, MW-21

Prediction Limit  
Interwell Non-parametric

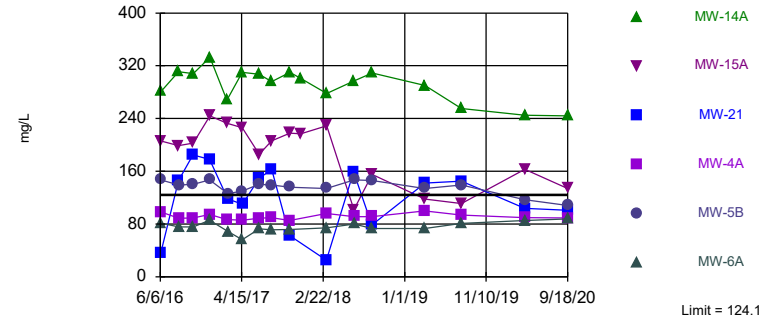


Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 45 background values. 91.11% NDs. Annual per-constituent alpha = 0.01116. Individual comparison alpha = 0.0009347 (1 of 2). Comparing 6 points to limit.

Constituent: Boron Analysis Run 11/12/2020 5:54 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Exceeds Limit: MW-14A, MW-15A

Prediction Limit  
Interwell Parametric

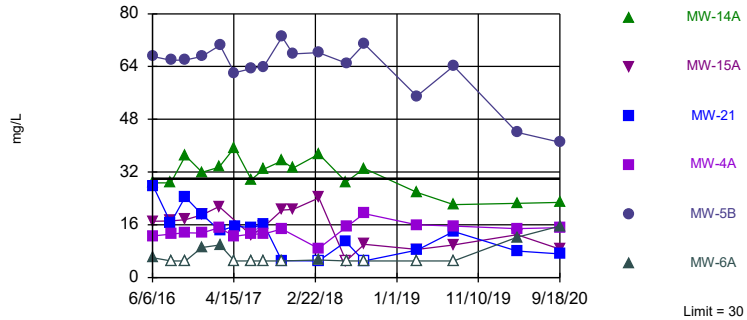


Background Data Summary (based on square root transformation): Mean=9.241, Std. Dev.=0.9907, n=45. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9414, critical = 0.926. Kappa = 1.916 (c=7, w=6, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.001254. Comparing 6 points to limit.

Constituent: Calcium Analysis Run 11/12/2020 5:54 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Exceeds Limit: MW-5B

Prediction Limit  
Interwell Non-parametric

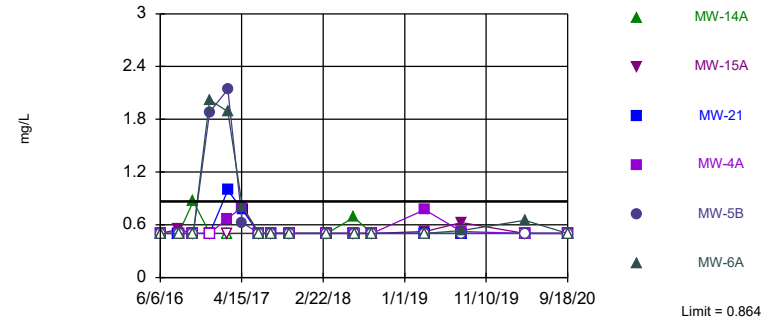


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 45 background values. 33.33% NDs. Annual per-constituent alpha = 0.01116. Individual comparison alpha = 0.0009347 (1 of 2). Comparing 6 points to limit.

Constituent: Chloride Analysis Run 11/12/2020 5:54 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Within Limit

Prediction Limit  
Interwell Non-parametric

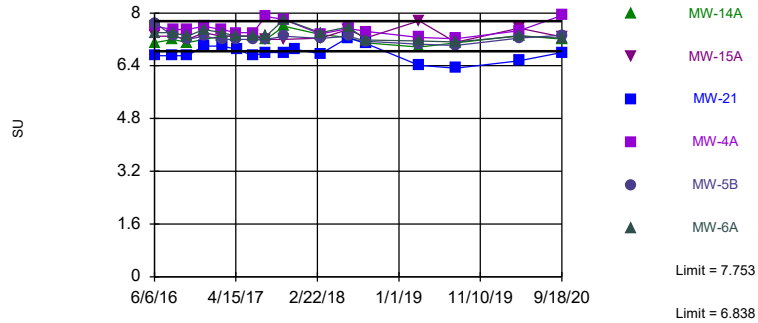


Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 44 background values. 81.82% NDs. Annual per-constituent alpha = 0.01162. Individual comparison alpha = 0.0009736 (1 of 2). Comparing 6 points to limit.

Constituent: Fluoride Analysis Run 11/12/2020 5:54 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Exceeds Limits: MW-21, MW-4A

Prediction Limit  
Interwell Parametric

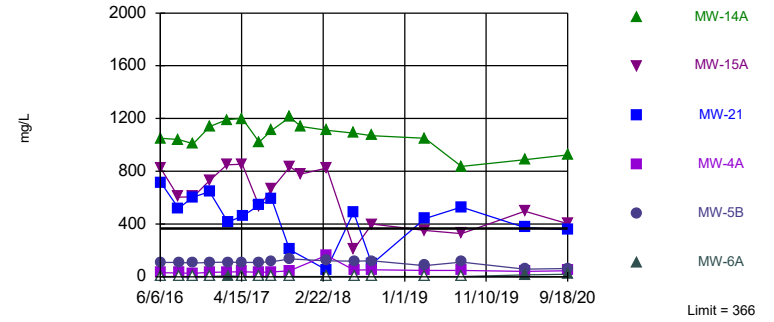


Background Data Summary: Mean=7.295, Std. Dev.=0.2388, n=45. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9349, critical = 0.926. Kappa = 1.916 (c=7, w=6, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.0006268. Comparing 6 points to limit.

Constituent: pH Analysis Run 11/12/2020 5:54 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Hollow symbols indicate censored values.  
Exceeds Limit: MW-14A, MW-15A

Prediction Limit  
Interwell Non-parametric

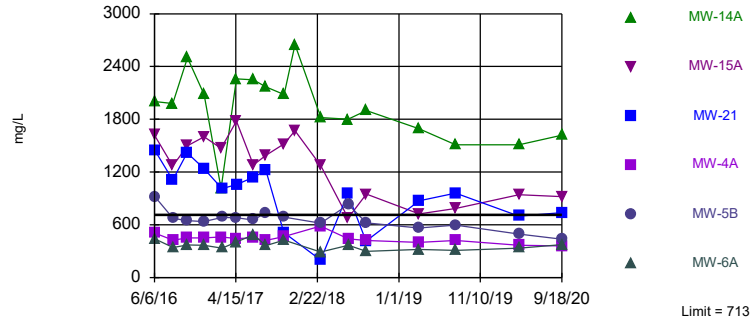


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 45 background values. Annual per-constituent alpha = 0.01116. Individual comparison alpha = 0.0009347 (1 of 2). Comparing 6 points to limit.

Constituent: Sulfate Analysis Run 11/12/2020 5:54 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Exceeds Limit: MW-14A, MW-15A, MW-21

Prediction Limit  
Interwell Parametric



Background Data Summary (based on square root transformation): Mean=21.16, Std. Dev.=2.895, n=45. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9548, critical = 0.926. Kappa = 1.916 (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 11/12/2020 5:54 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

# Prediction Limit

Constituent: Boron (mg/L) Analysis Run 11/12/2020 5:55 PM View: Appendix III  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-4A	MW-6A	MW-5B	MW-08 (bg)	MW-14A	MW-21	MW-22 (bg)
6/6/2016	16.8	<0.1							
6/7/2016			<0.1	<0.1	<0.1	<0.1			
6/8/2016							15.8	<0.1	
8/15/2016	20.6	<0.1					17.9	7.23	
8/16/2016			<0.1	<0.1	<0.1	<0.1			
10/10/2016		<0.1				<0.1		8.45	
10/11/2016	17.9		<0.1	<0.1	<0.1		19.3		
12/12/2016			<0.1	<0.1	<0.1			6.93	
12/14/2016	18.4	<0.1				<0.1	14.7		
2/17/2017	14.9	<0.1	<0.1				13.1		
2/21/2017				<0.1	<0.1	<0.1		4.87	
4/17/2017	14.7	<0.1	<0.1	<0.1	<0.1	<0.1	11.3		
4/18/2017								4.49	
6/19/2017		<0.1				<0.1			
6/20/2017			<0.1		<0.1			7.36	
6/21/2017	16.4			<0.1			16.3		
8/7/2017		<0.1	<0.1			<0.1			
8/8/2017	14.7			<0.1	<0.1		13	7.05	
10/16/2017		<0.1	<0.1			<0.1		3.33	
10/17/2017	19.2			<0.1	<0.1		16		
11/28/2017	12.9 (R)						13.7 (R)	2.24 (R)	
3/5/2018		<0.1							
3/6/2018			0.66	<0.1	<0.1	<0.1		0.885	<0.1
3/7/2018	9.8						11		
6/19/2018		<0.1				<0.1		6.84	<0.1
6/20/2018	10.5						15		
6/21/2018			<0.1	<0.1	<0.1				
8/27/2018		<0.1				<0.1			<0.1
8/28/2018			<0.1					1.36	
8/29/2018	14.6			<0.1	<0.1		14		
3/18/2019						<0.1			
3/19/2019		<0.1	<0.1	<0.1	<0.1				0.299
3/20/2019	8.35						15.5	6.95	
8/6/2019						0.205			<0.1
8/7/2019	7.56	<0.1	<0.1	<0.1	<0.1		17.6	8.46	
4/7/2020	10.6	<0.1	<0.1	<0.1	<0.1	<0.1	17.4	6.76	<0.1
9/18/2020	14.5	<0.1	<0.1	<0.1	<0.1	<0.1	19.5	6.82	0.263

# Prediction Limit

Constituent: Boron (mg/L) Analysis Run 11/12/2020 5:55 PM View: Appendix III  
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

# Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 11/12/2020 5:55 PM View: Appendix III  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-4A	MW-6A	MW-5B	MW-08 (bg)	MW-14A	MW-21	MW-22 (bg)
6/6/2016	206	89.3							
6/7/2016			98.2	81.4	147	152			
6/8/2016							281	37.2	
8/15/2016	199	80.7					311	146	
8/16/2016			88.8	75.4	139	117			
10/10/2016		83.3				118		185	
10/11/2016	203		89.3	75.7	140		308		
12/12/2016			94.5	85.6	147			178	
12/14/2016	244	86.5				109	333		
2/17/2017	233	81.2	86.8				268		
2/21/2017				68.8	126	89.9		118	
4/17/2017	226	79.2	85.9	56.3	130	96.5	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	89.7			91.3			
8/8/2017	206			71.2	139		296	163	
10/16/2017		83.3	85.3			77		62.3	
10/17/2017	218			71.9	136		310		
11/28/2017	217 (R)						301 (R)		
3/5/2018		77.3							
3/6/2018			95.8	74.1	134	74.7		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	80.1	147				
8/27/2018		85.4				83.6			80.7
8/28/2018			91.3					78.7	
8/29/2018	155			73.3	146		309		
3/18/2019						97.6			
3/19/2019		76.3	99.7	73.2	134				91.6
3/20/2019	118						290	142	
8/6/2019						132			83.8
8/7/2019	111	78.9	93.8	80.9	139		255	145	
4/7/2020	163	75.4	89.6	85.1	117	92.4	245	104	80.9
9/18/2020	134	74.2	89	87.9	108	77.7	244	101	75.5

# Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 11/12/2020 5:55 PM View: Appendix III  
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



# Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 11/12/2020 5:55 PM View: Appendix III  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-4A	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

# Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 11/12/2020 5:55 PM View: Appendix III  
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



# Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 11/12/2020 5:55 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

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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

# Prediction Limit

Constituent: pH (SU) Analysis Run 11/12/2020 5:55 PM View: Appendix III  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-08 (bg)	MW-4A	MW-5B	MW-6A	MW-21	MW-14A	MW-22 (bg)
6/6/2016	7.3	7.4							
6/7/2016			7.2	7.6	7.7	7.4			
6/8/2016							6.7	7.1	
8/15/2016	7.3	7.3					6.7	7.2	
8/16/2016			7.3	7.5	7.3	7.4			
10/10/2016		7.2	7.1				6.7		
10/11/2016	7.2			7.5	7.2	7.3		7.1	
12/12/2016				7.6	7.3	7.5	7		
12/14/2016	7.4	7.3	7.3					7.2	
2/17/2017	7.3	7.2		7.5				7.3	
2/21/2017			7.3		7.2	7.4	7		
4/17/2017	7.3	7.3	7.1	7.4	7.2	7.3		7.3	
4/18/2017							6.9		
6/19/2017		7.2	7.1						
6/20/2017				7.4	7.2		6.7		
6/21/2017	7.3					7.3		7.3	
8/7/2017		7.9	7.3	7.9					
8/8/2017	7.2				7.2	7.3	6.8	7.2	
10/16/2017		7.3	7.4	7.8			6.8		
10/17/2017	7.2				7.3	7.8		7.6	
11/28/2017							6.9 (R)		
3/5/2018		7.04							
3/6/2018			7.3	7.36	7.23	7.4	6.76		7.36
3/7/2018	7.24							7.35	
6/19/2018		7.72	7.56				7.25		7.9
6/20/2018	7.5							7.26	
6/21/2018				7.53	7.3	7.58			
8/27/2018		7.23	7.2						7.42
8/28/2018				7.44			7.07		
8/29/2018	7.25				7.14	7.18		7.09	
3/19/2019		7.1	7.08	7.26	7.05	7.15			7.21
3/20/2019	7.76						6.41	6.97	
8/6/2019			6.64						7.12
8/7/2019	7.11	7.07		7.22	7.02	7.12	6.33	7.09	
4/7/2020	7.54	7.26	7.21	7.46	7.24	7.3	6.55	7.32	7.32
9/18/2020	7.28	7.33	7.4	7.93	7.33	7.24	6.8	7.21	7.53

# Prediction Limit

Constituent: pH (SU) Analysis Run 11/12/2020 5:55 PM View: Appendix III  
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

# Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 11/12/2020 5:55 PM View: Appendix III  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-4A	MW-6A	MW-5B	MW-08 (bg)	MW-14A	MW-21	MW-22 (bg)
6/6/2016	827	42.1							
6/7/2016			32.2	<5	109	366			
6/8/2016							1050	713	
8/15/2016	605	33.8					1040	520	
8/16/2016			28.4	<5	109	187			
10/10/2016		36.4				187		603	
10/11/2016	607		27.2	<5	105		1010		
12/12/2016			32.7	<5	109			645	
12/14/2016	732	38.4				149	1140		
2/17/2017	849	47.3	36				1190		
2/21/2017				5.94	111	145		415	
4/17/2017	853	38.3	39.5	<5	108	145	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	35.3			119			
8/8/2017	664			<5	114		1110	590	
10/16/2017		46.9	45.4			106		206	
10/17/2017	835			<5	135		1210		
11/28/2017	779 (R)						1140 (R)		
3/5/2018		51.4							
3/6/2018			162	<5	122	87.3		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	<5	119				
8/27/2018		34.3				94.7			125
8/28/2018			52.2					96.6	
8/29/2018	400			<5	120		1070		
3/18/2019						223			
3/19/2019		42.8	48	<5	85				134
3/20/2019	351						1050	442	
8/6/2019						276			139
8/7/2019	327	28.8	47	<5	112		837	529	
4/7/2020	496	18.6	41.5	13.6	58.9	123	888	373	143
9/18/2020	403	36.5	46.9	19.1	61.9	100	924	356	151

# Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 11/12/2020 5:55 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

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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



# Prediction Limit

Constituent: Total Dissolved Solids (mg/L) Analysis Run 11/12/2020 5:55 PM View: Appendix III

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

	MW-15A	MW-10 (bg)	MW-4A	MW-6A	MW-5B	MW-08 (bg)	MW-14A	MW-21	MW-22 (bg)
6/6/2016	1620	468							
6/7/2016			507	440	920	836			
6/8/2016							2000	1440	
8/15/2016	1270	412					1980	1110	
8/16/2016			426	340	672	664			
10/10/2016		444				708		1420	
10/11/2016	1500		450	370	646		2500		
12/12/2016			450	368	636			1240	
12/14/2016	1600	428				634	2080		
2/17/2017	1470	498	460				1010		
2/21/2017				336	684	578		1010	
4/17/2017	1780	538	442	402	680	624	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	420			488			
8/8/2017	1390			364	734		2170	1220	
10/16/2017		414	466			470		514	
10/17/2017	1520			424	688		2080		
11/28/2017	1670 (R)						2650 (R)		
3/5/2018		314							
3/6/2018			586	292	620	376		200	424
3/7/2018	1270						1820		
6/19/2018		396				502		952	434
6/20/2018	676						1800		
6/21/2018			440	368	828				
8/27/2018		392				414			420
8/28/2018			420					416	
8/29/2018	948			298	622		1900		
3/18/2019						612			
3/19/2019		326	398	320	562				456
3/20/2019	724						1690	872	
8/6/2019						702			428
8/7/2019	786	320	422	308	596		1510	960	
4/7/2020	942	316	366	336	494	418	1510	698	422
9/18/2020	920	344	360	374	436	350	1620	738	398

# Prediction Limit

Constituent: Total Dissolved Solids (mg/L) Analysis Run 11/12/2020 5:55 PM View: Appendix III

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

FIGURE E.

# Trend Test - Significant Results

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/12/2020, 5:58 PM

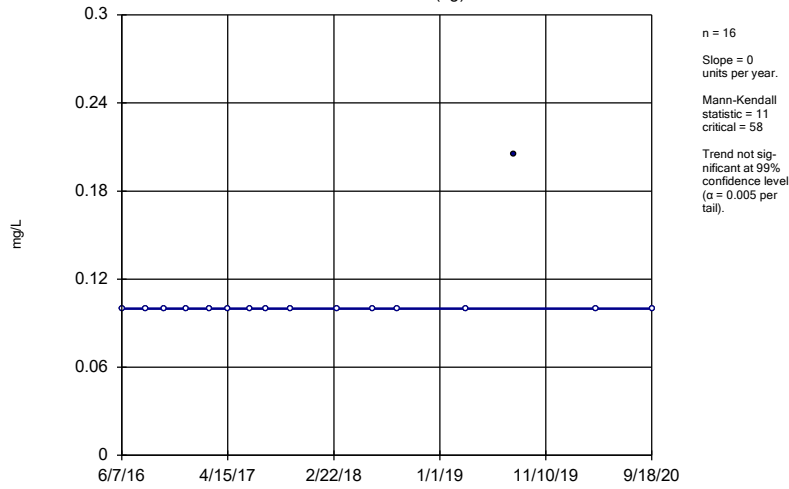
<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Boron (mg/L)	MW-15A	-2.726	-81	-63	Yes	17	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-08 (bg)	-83.97	-64	-58	Yes	16	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-10 (bg)	-39.58	-62	-58	Yes	16	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-15A	-197.3	-65	-63	Yes	17	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-21	-160	-64	-58	Yes	16	0	n/a	n/a	0.01	NP

# Trend Test - All Results

Muscatine Power & Water    Client: HR Green, Inc.    Data: Muscatine Power & Water    Printed 11/12/2020, 5:58 PM

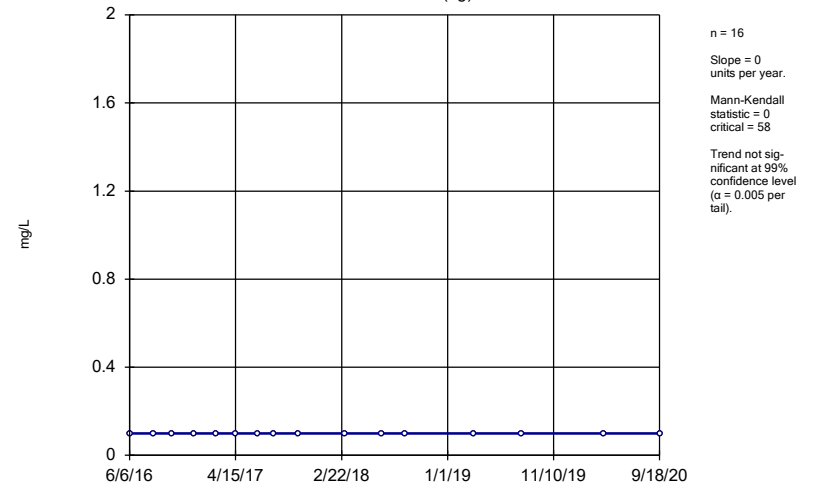
Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron (mg/L)	MW-08 (bg)	0	11	58	No	16	93.75	n/a	n/a	0.01	NP
Boron (mg/L)	MW-10 (bg)	0	0	58	No	16	100	n/a	n/a	0.01	NP
Boron (mg/L)	MW-14A	0.4085	14	63	No	17	0	n/a	n/a	0.01	NP
<b>Boron (mg/L)</b>	<b>MW-15A</b>	<b>-2.726</b>	<b>-81</b>	<b>-63</b>	<b>Yes</b>	<b>17</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
Boron (mg/L)	MW-21	-0.0679	-12	-63	No	17	5.882	n/a	n/a	0.01	NP
Boron (mg/L)	MW-22 (bg)	0	5	18	No	7	71.43	n/a	n/a	0.01	NP
Boron (mg/L)	MW-23 (bg)	0	-5	-14	No	6	83.33	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-08 (bg)	-7.908	-40	-58	No	16	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-10 (bg)	-2.195	-51	-58	No	16	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-14A	-13.54	-63	-63	No	17	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-15A	-22.88	-53	-63	No	17	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-22 (bg)	-2.521	-1	-18	No	7	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-23 (bg)	-5.72	-11	-14	No	6	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-08 (bg)	-0.3792	-20	-58	No	16	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-10 (bg)	0	-15	-58	No	16	93.75	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-22 (bg)	-2.655	-17	-18	No	7	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-23 (bg)	-0.1111	-1	-14	No	6	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-5B	-2.724	-33	-63	No	17	0	n/a	n/a	0.01	NP
pH (SU)	MW-08 (bg)	0	3	58	No	16	0	n/a	n/a	0.01	NP
pH (SU)	MW-10 (bg)	-0.01624	-17	-58	No	16	0	n/a	n/a	0.01	NP
pH (SU)	MW-21	0	-7	-63	No	17	0	n/a	n/a	0.01	NP
pH (SU)	MW-22 (bg)	-0.06197	-3	-18	No	7	0	n/a	n/a	0.01	NP
pH (SU)	MW-23 (bg)	-0.1363	-5	-14	No	6	0	n/a	n/a	0.01	NP
pH (SU)	MW-4A	-0.04074	-23	-58	No	16	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-08 (bg)	-22.55	-42	-58	No	16	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-10 (bg)	-1.212	-20	-58	No	16	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-14A	-44.23	-37	-63	No	17	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-15A	-98.27	-50	-63	No	17	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-22 (bg)	10.71	18	18	No	7	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-23 (bg)	-3.842	-11	-14	No	6	0	n/a	n/a	0.01	NP
<b>Total Dissolved Solids (mg/L)</b>	<b>MW-08 (bg)</b>	<b>-83.97</b>	<b>-64</b>	<b>-58</b>	<b>Yes</b>	<b>16</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
<b>Total Dissolved Solids (mg/L)</b>	<b>MW-10 (bg)</b>	<b>-39.58</b>	<b>-62</b>	<b>-58</b>	<b>Yes</b>	<b>16</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
Total Dissolved Solids (mg/L)	MW-14A	-159.5	-56	-63	No	17	0	n/a	n/a	0.01	NP
<b>Total Dissolved Solids (mg/L)</b>	<b>MW-15A</b>	<b>-197.3</b>	<b>-65</b>	<b>-63</b>	<b>Yes</b>	<b>17</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
<b>Total Dissolved Solids (mg/L)</b>	<b>MW-21</b>	<b>-160</b>	<b>-64</b>	<b>-58</b>	<b>Yes</b>	<b>16</b>	<b>0</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
Total Dissolved Solids (mg/L)	MW-22 (bg)	-8.391	-7	-18	No	7	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	MW-23 (bg)	-47.78	-11	-14	No	6	0	n/a	n/a	0.01	NP

### Sen's Slope Estimator MW-08 (bg)



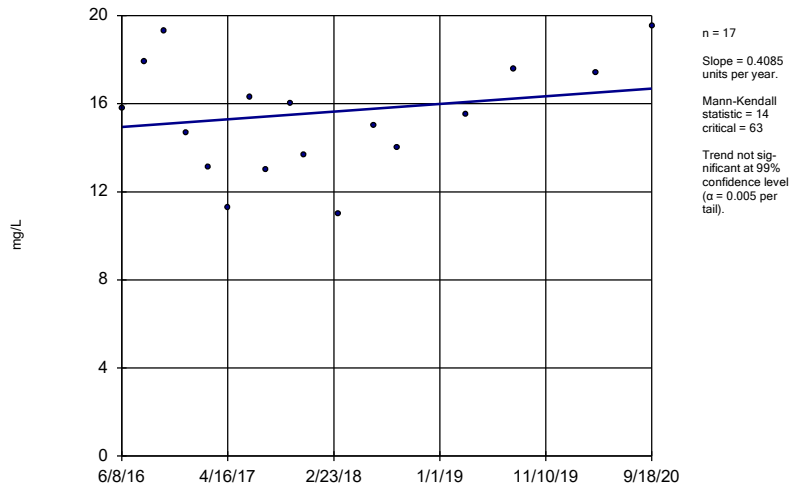
Constituent: Boron Analysis Run 11/12/2020 5:56 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Sen's Slope Estimator MW-10 (bg)



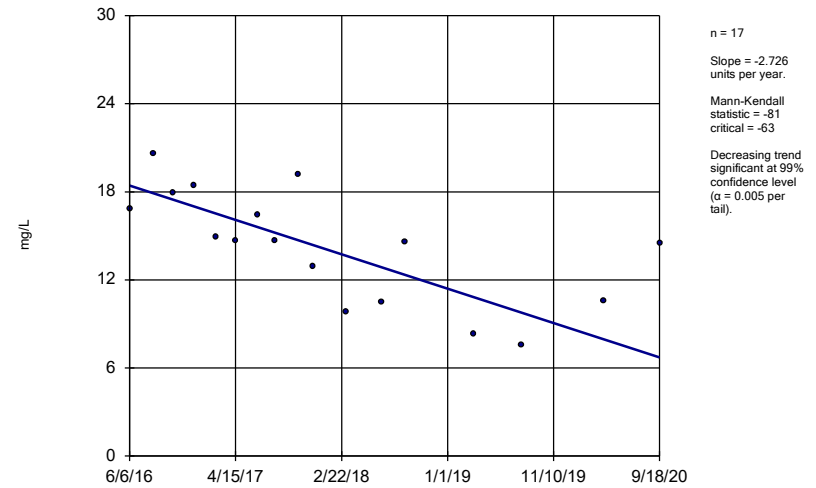
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Sen's Slope Estimator MW-14A



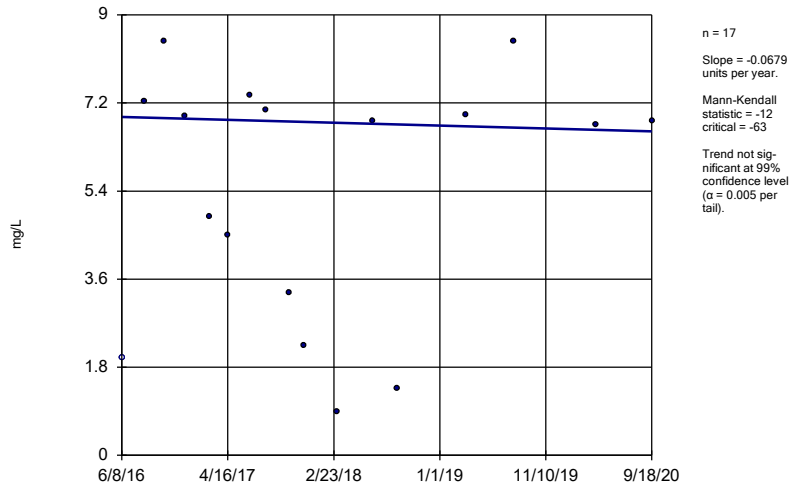
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Sen's Slope Estimator MW-15A



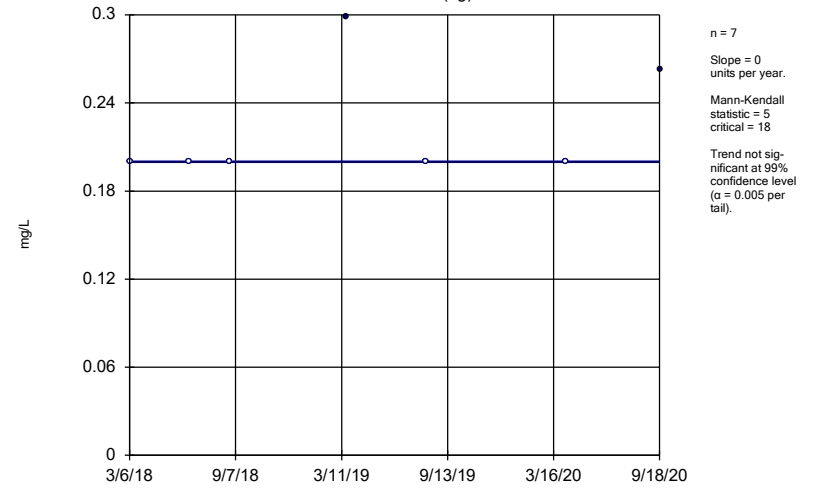
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Sen's Slope Estimator MW-21



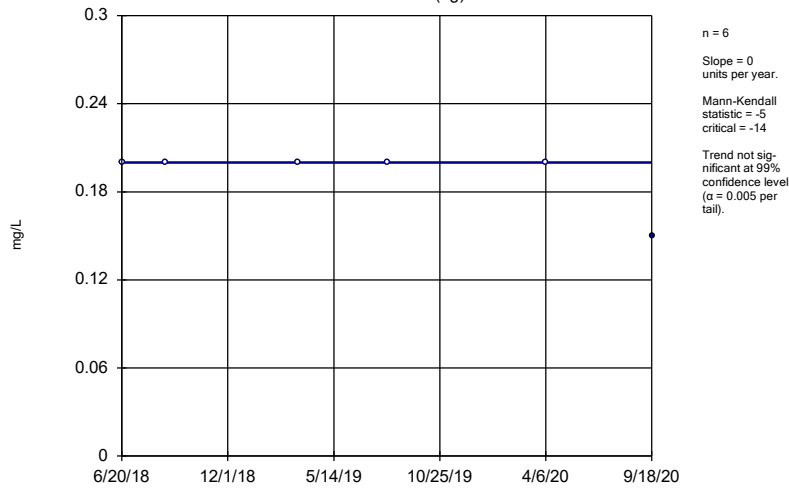
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Sen's Slope Estimator MW-22 (bg)



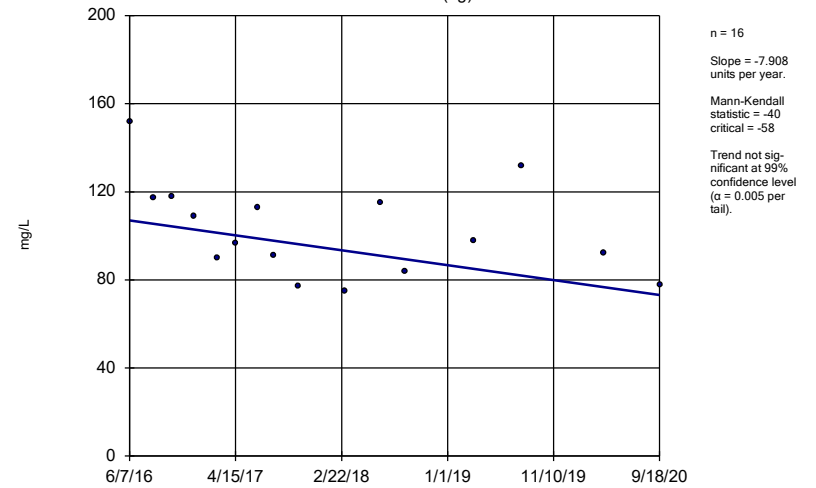
Constituent: Boron Analysis Run 11/12/2020 5:56 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Sen's Slope Estimator MW-23 (bg)

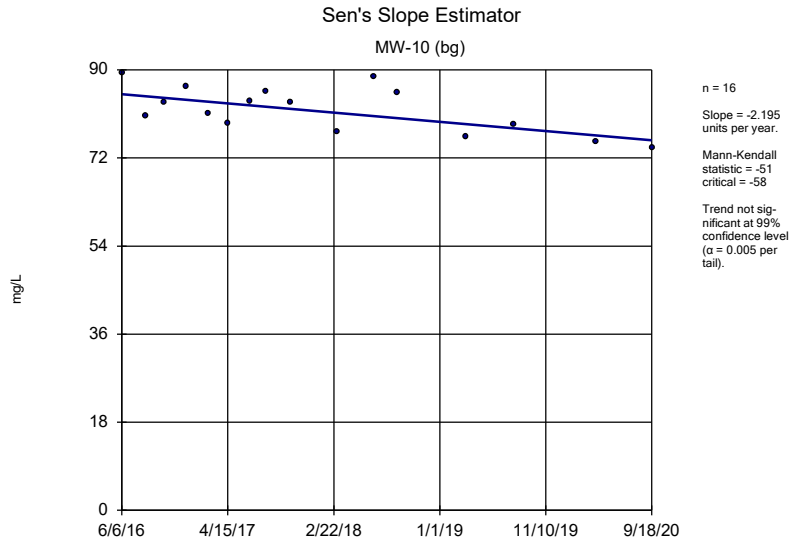


Constituent: Boron Analysis Run 11/12/2020 5:56 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

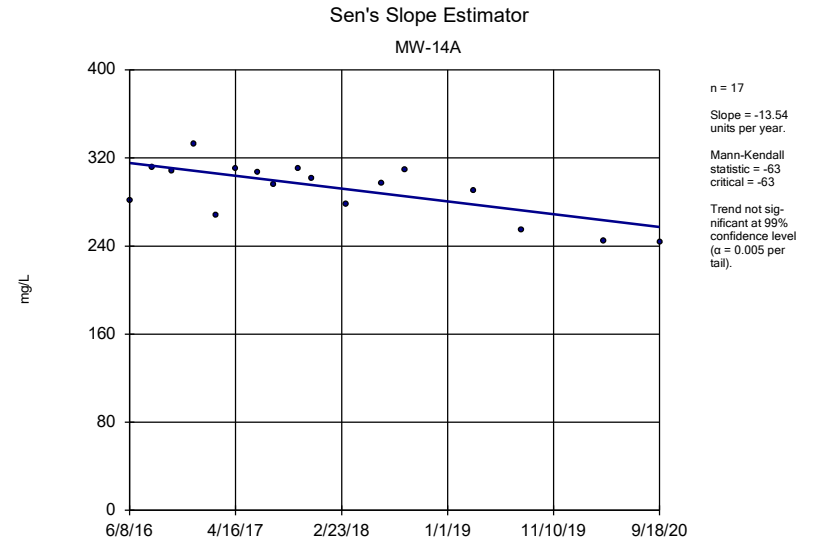
### Sen's Slope Estimator MW-08 (bg)



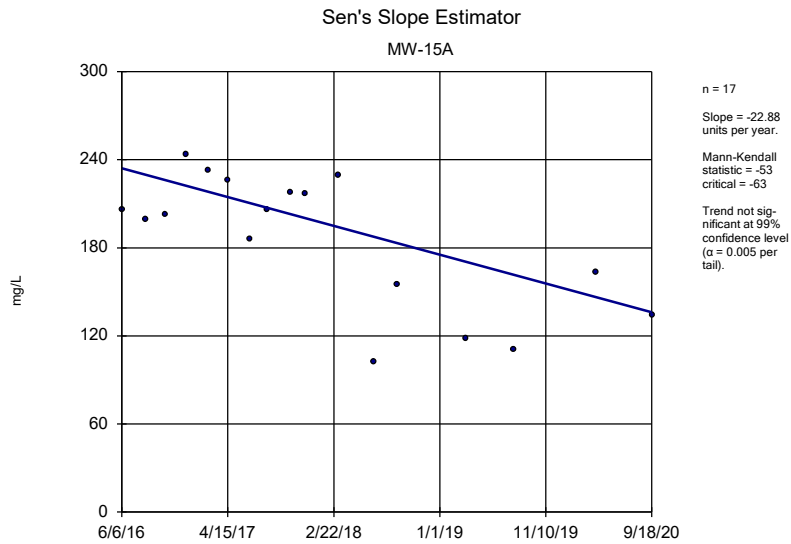
Constituent: Calcium Analysis Run 11/12/2020 5:56 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water



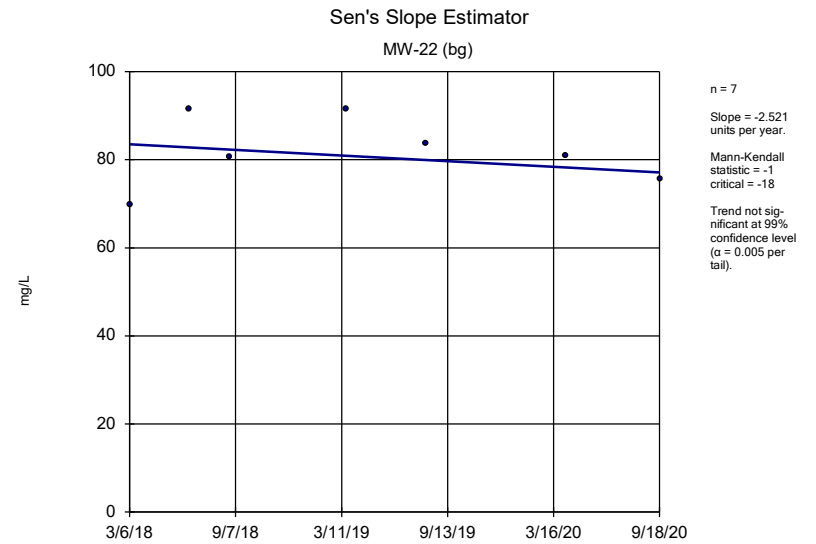
Constituent: Calcium Analysis Run 11/12/2020 5:56 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water



Constituent: Calcium Analysis Run 11/12/2020 5:56 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water



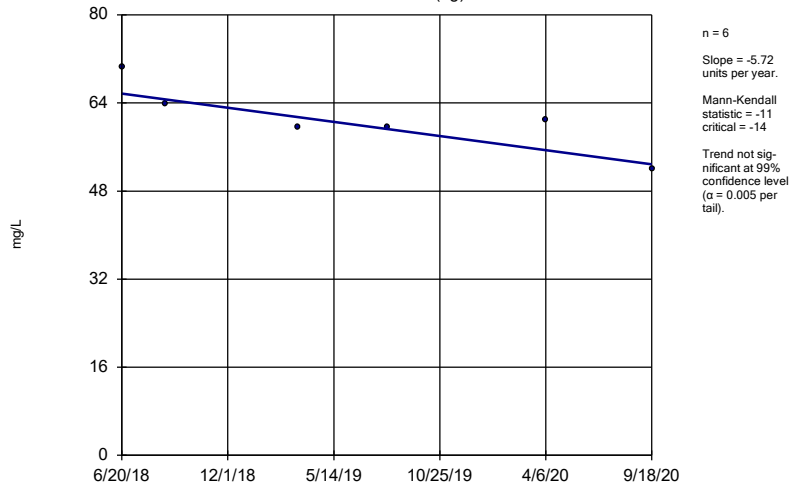
Constituent: Calcium Analysis Run 11/12/2020 5:56 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water



Constituent: Calcium Analysis Run 11/12/2020 5:56 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

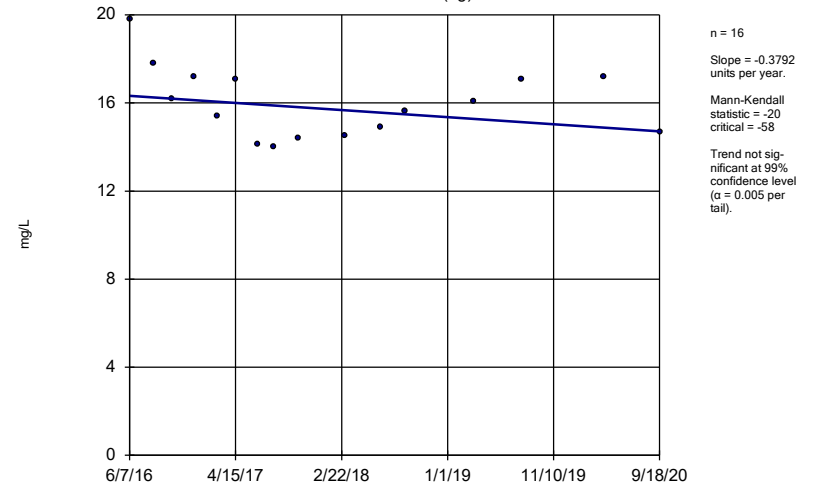


Sen's Slope Estimator  
MW-23 (bg)



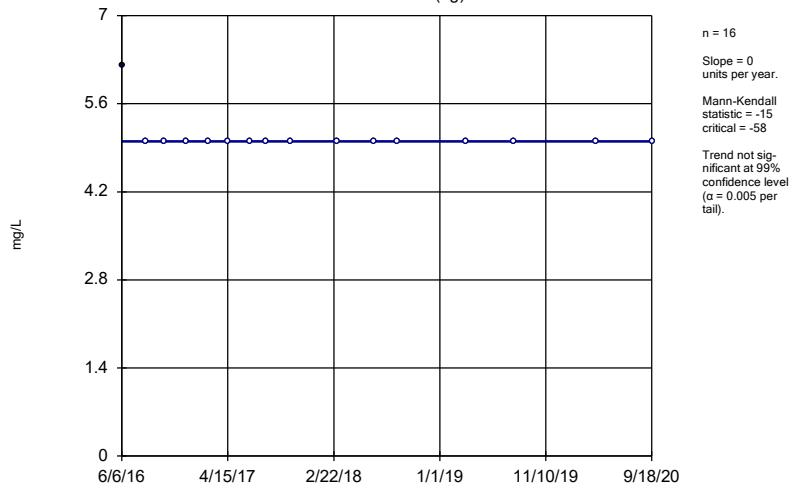
Constituent: Calcium Analysis Run 11/12/2020 5:56 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-08 (bg)



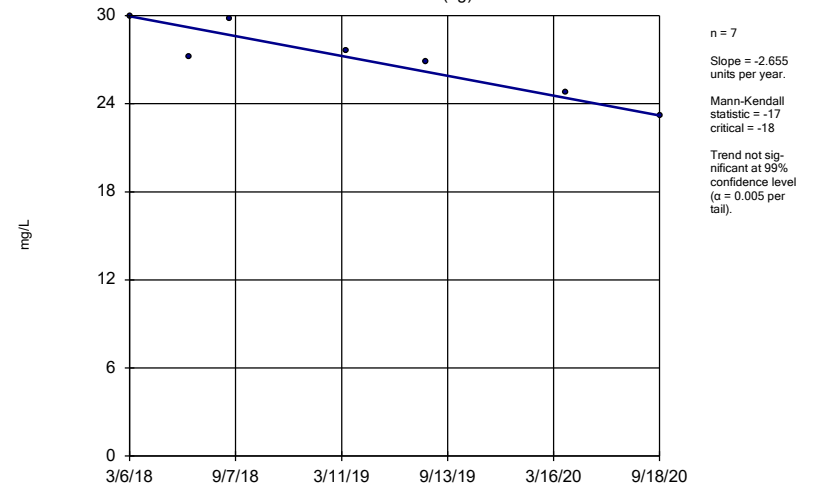
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-10 (bg)



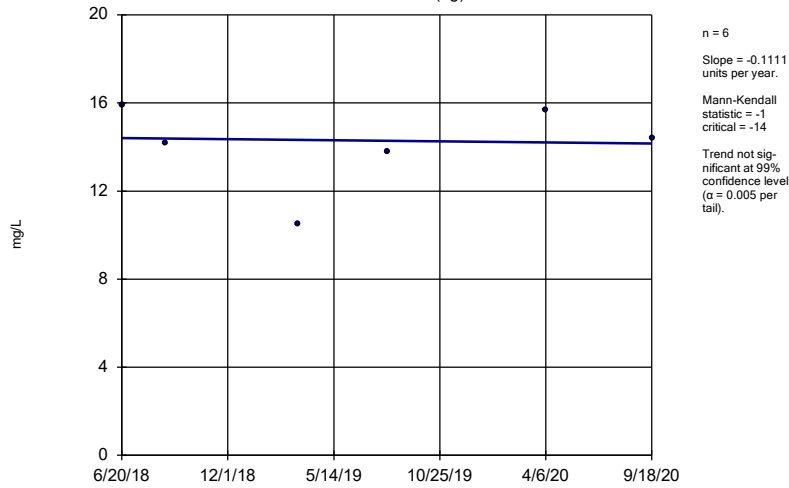
Constituent: Chloride Analysis Run 11/12/2020 5:57 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-22 (bg)



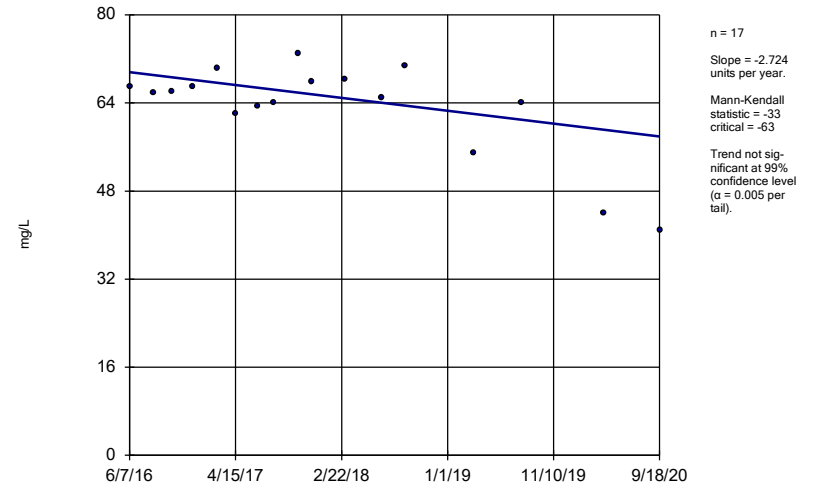
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-23 (bg)



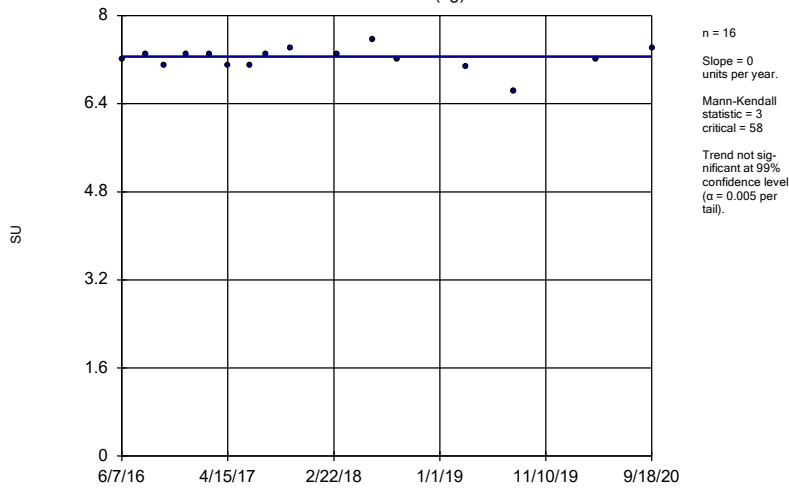
Constituent: Chloride Analysis Run 11/12/2020 5:57 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-5B



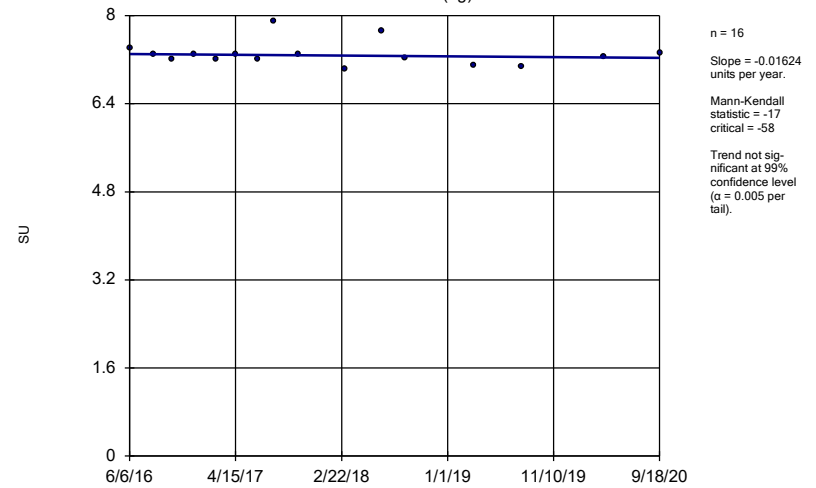
Constituent: Chloride Analysis Run 11/12/2020 5:57 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-08 (bg)



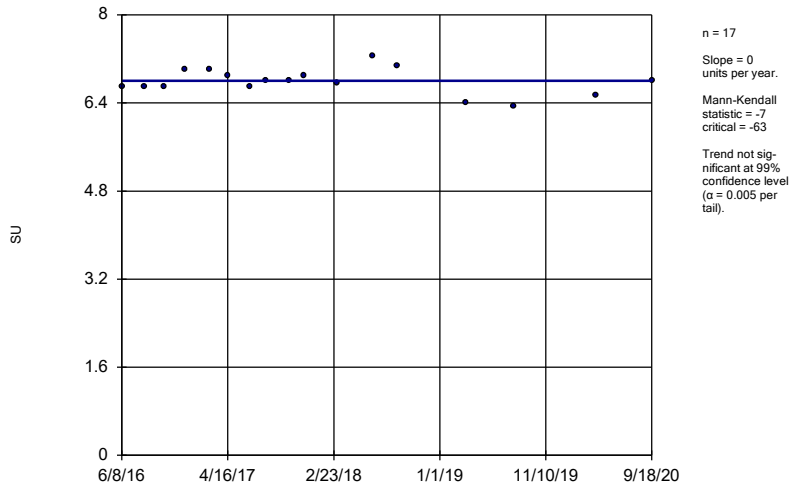
Constituent: pH Analysis Run 11/12/2020 5:57 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-10 (bg)



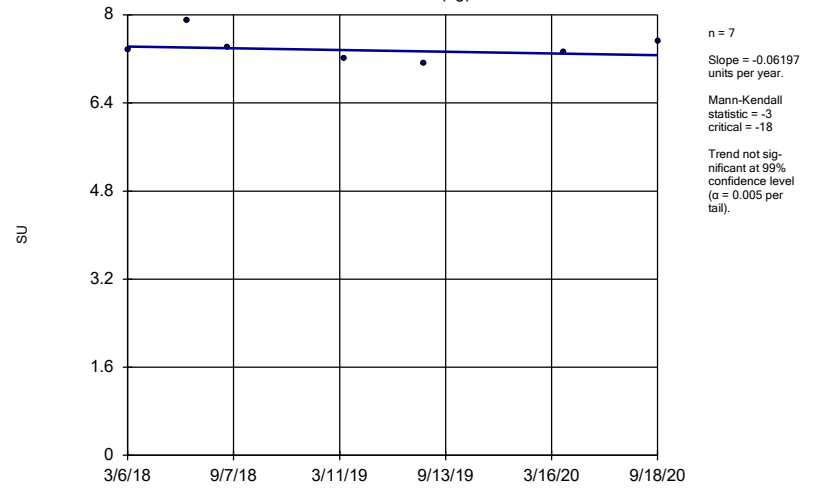
Constituent: pH Analysis Run 11/12/2020 5:57 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-21



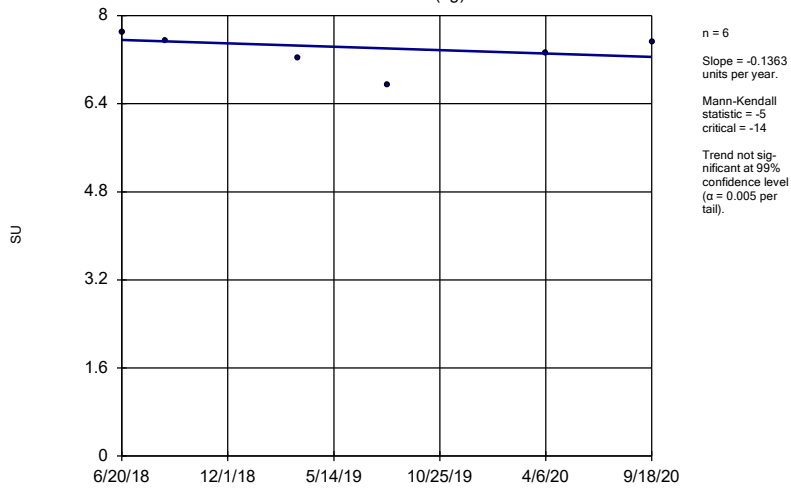
Constituent: pH Analysis Run 11/12/2020 5:57 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-22 (bg)



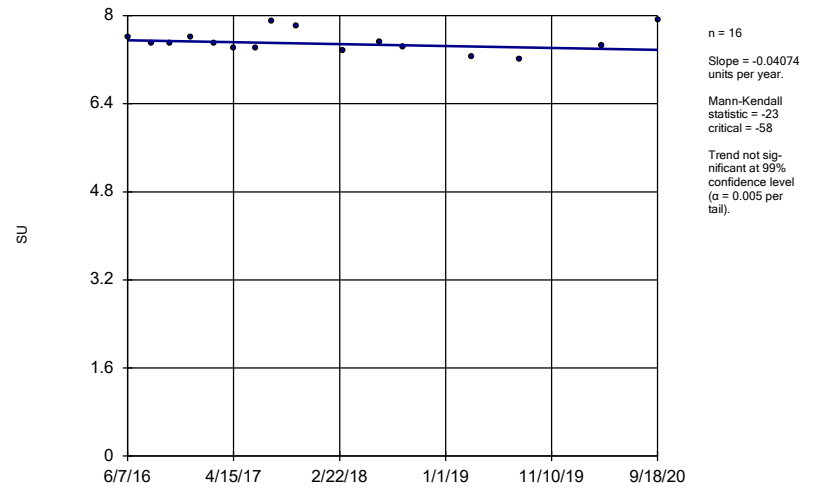
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-23 (bg)



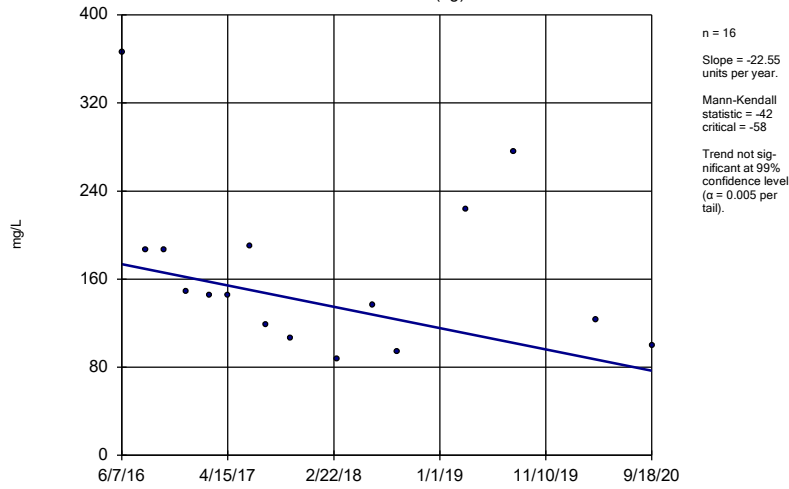
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-4A



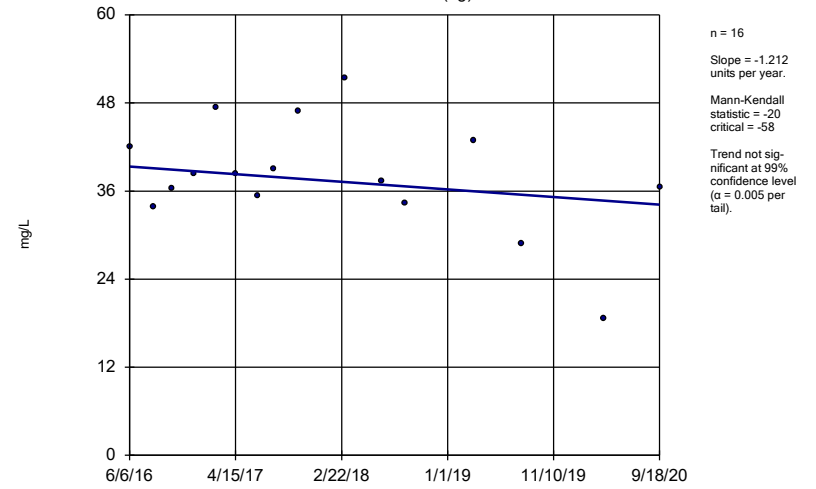
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-08 (bg)



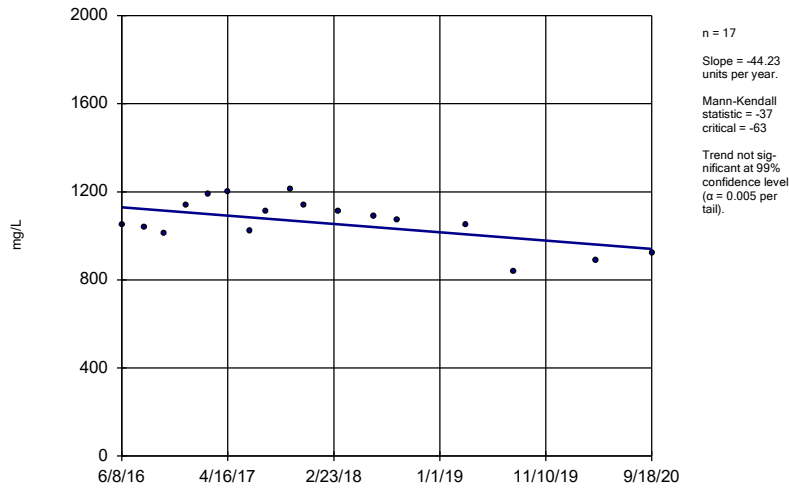
Constituent: Sulfate Analysis Run 11/12/2020 5:57 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-10 (bg)



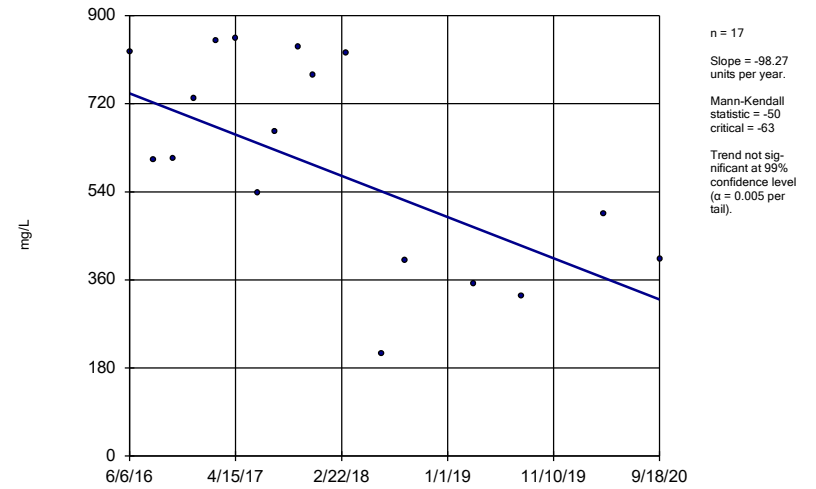
Constituent: Sulfate Analysis Run 11/12/2020 5:57 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-14A



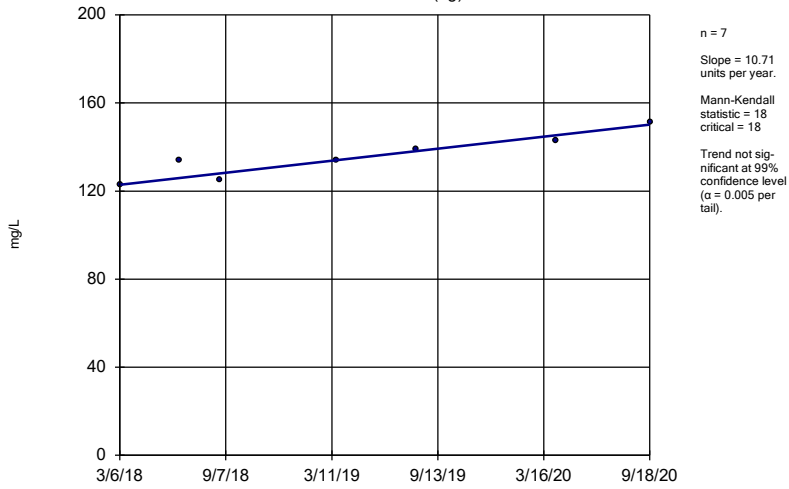
Constituent: Sulfate Analysis Run 11/12/2020 5:57 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-15A



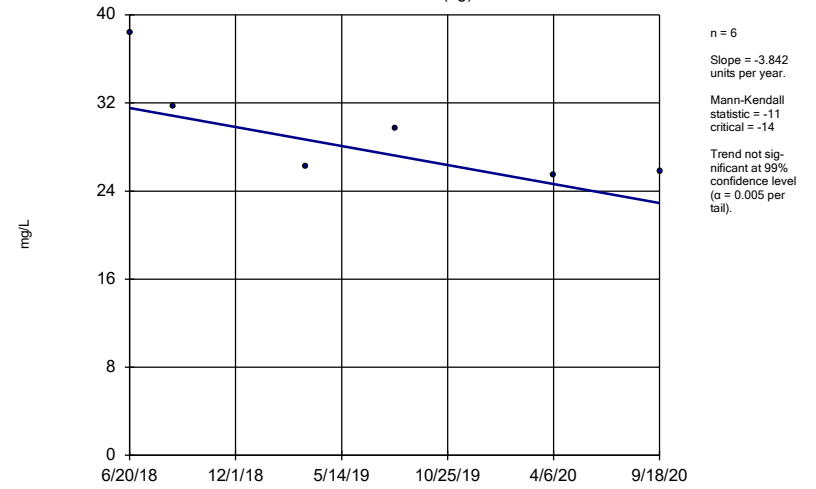
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-22 (bg)



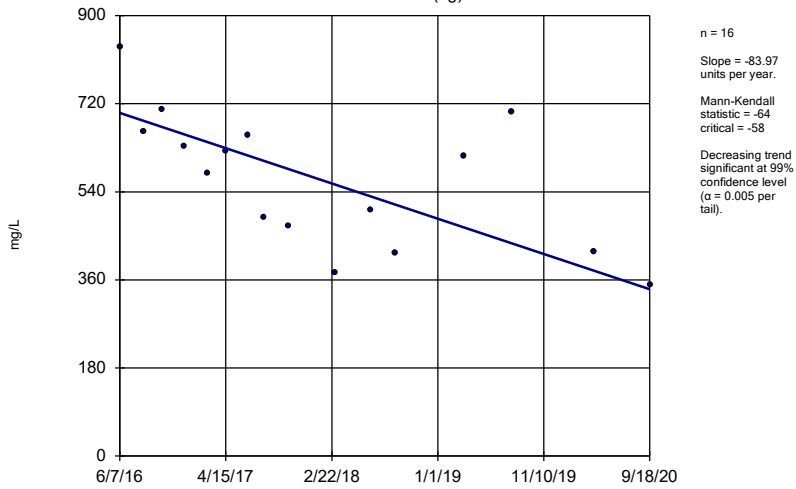
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Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-23 (bg)



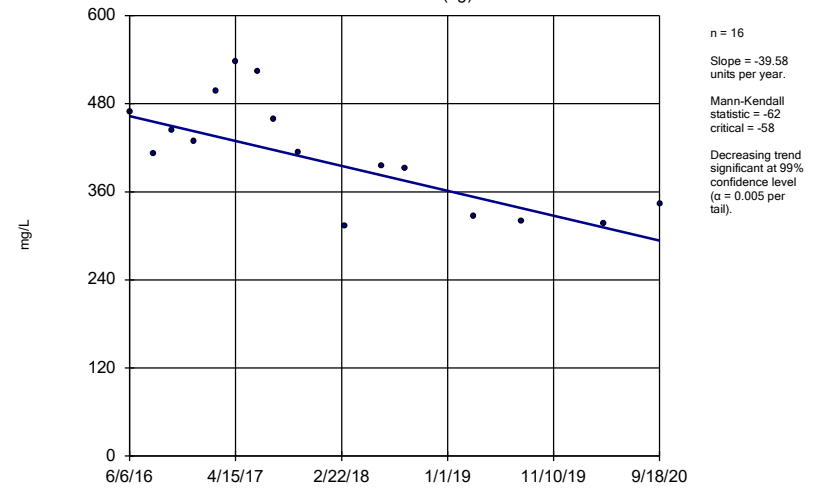
Constituent: Sulfate Analysis Run 11/12/2020 5:57 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

Sen's Slope Estimator  
MW-08 (bg)



Constituent: Total Dissolved Solids Analysis Run 11/12/2020 5:57 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

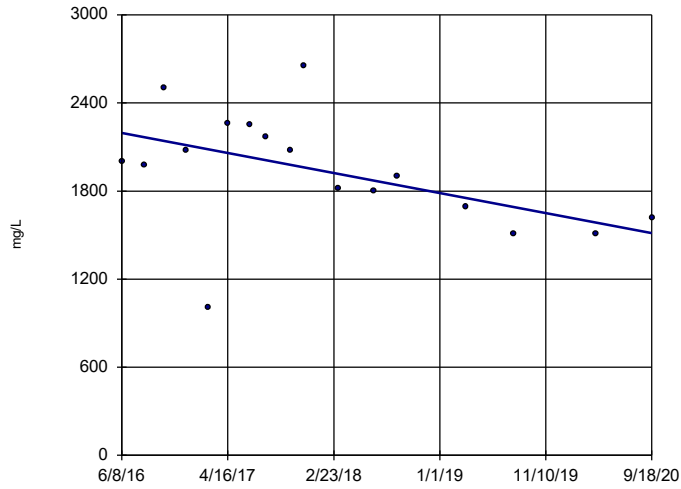
Sen's Slope Estimator  
MW-10 (bg)



Constituent: Total Dissolved Solids Analysis Run 11/12/2020 5:57 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Sen's Slope Estimator

MW-14A

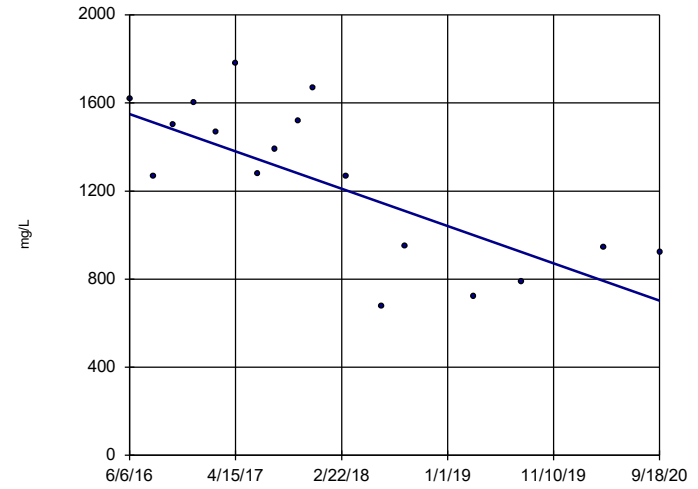


n = 17  
 Slope = -159.5  
 units per year.  
 Mann-Kendall  
 statistic = -56  
 critical = -63  
 Trend not sig-  
 nificant at 99%  
 confidence level  
 ( $\alpha = 0.005$  per  
 tail).

Constituent: Total Dissolved Solids Analysis Run 11/12/2020 5:57 PM View: Appendix III  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Sen's Slope Estimator

MW-15A

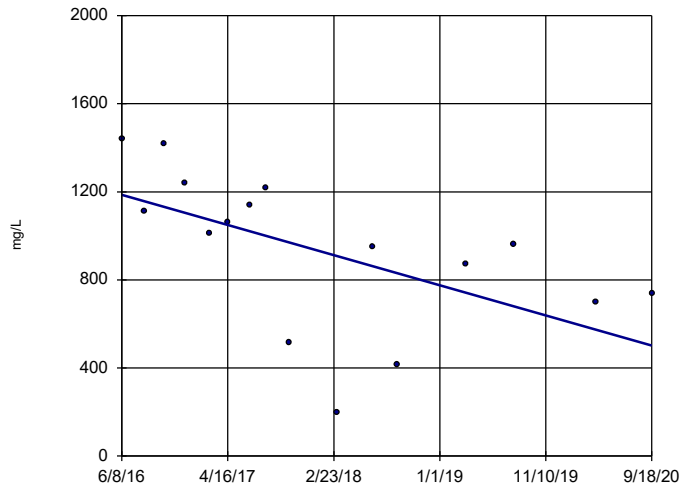


n = 17  
 Slope = -197.3  
 units per year.  
 Mann-Kendall  
 statistic = -65  
 critical = -63  
 Decreasing trend  
 significant at 99%  
 confidence level  
 ( $\alpha = 0.005$  per  
 tail).

Constituent: Total Dissolved Solids Analysis Run 11/12/2020 5:57 PM View: Appendix III  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Sen's Slope Estimator

MW-21

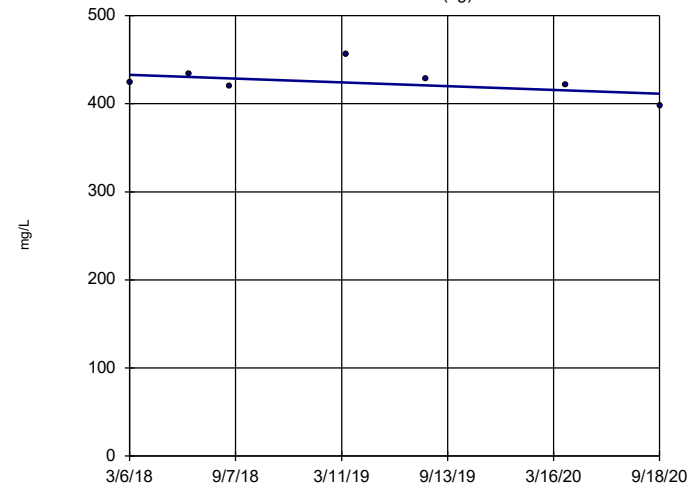


n = 16  
 Slope = -160  
 units per year.  
 Mann-Kendall  
 statistic = -64  
 critical = -58  
 Decreasing trend  
 significant at 99%  
 confidence level  
 ( $\alpha = 0.005$  per  
 tail).

Constituent: Total Dissolved Solids Analysis Run 11/12/2020 5:57 PM View: Appendix III  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Sen's Slope Estimator

MW-22 (bg)

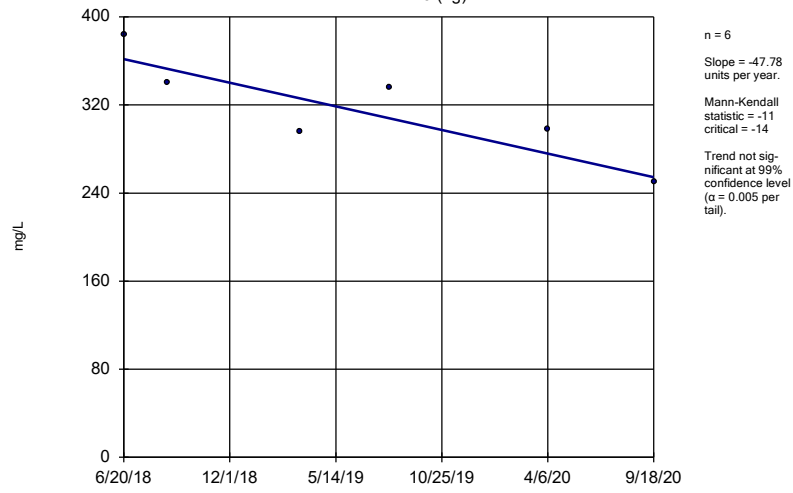


n = 7  
 Slope = -8.391  
 units per year.  
 Mann-Kendall  
 statistic = -7  
 critical = -18  
 Trend not sig-  
 nificant at 99%  
 confidence level  
 ( $\alpha = 0.005$  per  
 tail).

Constituent: Total Dissolved Solids Analysis Run 11/12/2020 5:57 PM View: Appendix III  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Sen's Slope Estimator

MW-23 (bg)



Constituent: Total Dissolved Solids Analysis Run 11/12/2020 5:57 PM View: Appendix III  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

FIGURE F.



# Upper Tolerance Limits

Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water Printed 11/12/2020, 4:45 PM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Antimony (mg/L)	n/a	0.001	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)
Arsenic (mg/L)	n/a	0.00784	n/a	n/a	n/a	43	65.12	n/a	0.1102	NP Inter(NDs)
Barium (mg/L)	n/a	0.227	n/a	n/a	n/a	43	0	n/a	0.1102	NP Inter(normal...
Beryllium (mg/L)	n/a	0.001	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)
Cadmium (mg/L)	n/a	0.0001	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)
Chromium (mg/L)	n/a	0.005	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)
Cobalt (mg/L)	n/a	0.00558	n/a	n/a	n/a	44	36.36	n/a	0.1047	NP Inter(normal...
Combined Radium 226 + 228 (pCi/L)	n/a	1.007	n/a	n/a	n/a	29	0	No	0.05	Inter
Fluoride (mg/L)	n/a	0.864	n/a	n/a	n/a	44	81.82	n/a	0.1047	NP Inter(NDs)
Lead (mg/L)	n/a	0.00204	n/a	n/a	n/a	43	88.37	n/a	0.1102	NP Inter(NDs)
Lithium (mg/L)	n/a	0.01	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)
Mercury (mg/L)	n/a	0.0002	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)
Molybdenum (mg/L)	n/a	0.00822	n/a	n/a	n/a	45	64.44	n/a	0.09944	NP Inter(NDs)
Selenium (mg/L)	n/a	0.005	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)
Thallium (mg/L)	n/a	0.001	n/a	n/a	n/a	43	100	n/a	0.1102	NP Inter(NDs)

FIGURE G.

<b>MUSCATINE POWER &amp; WATER GWPS</b>				
<b>Constituent Name</b>	<b>MCL</b>	<b>CCR Rule-Specified</b>	<b>Background Limit</b>	<b>GWPS</b>
Antimony, Total (mg/L)	0.006		0.001	0.006
Arsenic, Total (mg/L)	0.01		0.0078	0.01
Barium, Total (mg/L)	2		0.23	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		1.0	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.

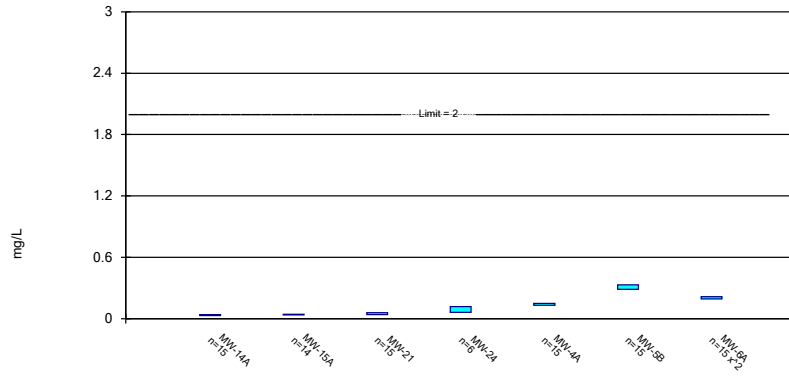
# Confidence Intervals - All Results (No Significant)

Muscatine Power & Water    Client: HR Green, Inc.    Data: Muscatine Power & Water    Printed 11/13/2020, 1:01 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Barium (mg/L)	MW-14A	0.03782	0.0312	2	No	15	0.03451	0.004885	0	None	No	0.01	Param.
Barium (mg/L)	MW-15A	0.04153	0.03523	2	No	14	0.03838	0.004442	0	None	No	0.01	Param.
Barium (mg/L)	MW-21	0.05931	0.04004	2	No	15	0.04967	0.01421	0	None	No	0.01	Param.
Barium (mg/L)	MW-24	0.119	0.06267	2	No	6	0.09082	0.02049	0	None	No	0.01	Param.
Barium (mg/L)	MW-4A	0.1487	0.1299	2	No	15	0.1393	0.01385	0	None	No	0.01	Param.
Barium (mg/L)	MW-5B	0.3291	0.2865	2	No	15	0.3078	0.03141	0	None	No	0.01	Param.
Barium (mg/L)	MW-6A	0.2151	0.1921	2	No	15	0.2032	0.01796	0	None	x^2	0.01	Param.
Chromium (mg/L)	MW-21	0.006326	0.005376	0.1	No	15	0.005851	0.0007254	26.67	Kaplan-Meier	No	0.01	Param.
Cobalt (mg/L)	MW-4A	0.000681	0.0005	0.006	No	15	0.0005767	0.0002515	86.67	None	No	0.01	NP (NDs)
Combined Radium 226 + 228 (pCi/L)	MW-14A	0.4231	0.1313	5	No	11	0.2772	0.1751	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-15A	0.3948	0.1364	5	No	11	0.2656	0.155	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-21	0.5805	0.1357	5	No	11	0.3581	0.2669	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-4A	0.6948	0.3748	5	No	11	0.5348	0.192	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-5B	1.033	0.6173	5	No	11	0.8249	0.2492	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	MW-6A	0.7261	0.3571	5	No	11	0.5416	0.2214	0	None	No	0.01	Param.
Fluoride (mg/L)	MW-14A	0.684	0.5	4	No	15	0.5367	0.1029	86.67	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-15A	0.523	0.5	4	No	15	0.5131	0.03377	80	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-21	0.768	0.5	4	No	16	0.5476	0.1363	87.5	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-24	0.653	0.5	4	No	6	0.5255	0.06246	83.33	None	No	0.0155	NP (NDs)
Fluoride (mg/L)	MW-4A	0.664	0.5	4	No	16	0.5476	0.1018	75	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-5B	0.627	0.5	4	No	16	0.6967	0.5158	81.25	None	No	0.01	NP (NDs)
Fluoride (mg/L)	MW-6A	0.814	0.5	4	No	16	0.7132	0.4925	68.75	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-21	0.000633	0.0005	0.015	No	15	0.0005089	0.00003434	93.33	None	No	0.01	NP (NDs)
Lead (mg/L)	MW-4A	0.000532	0.0005	0.015	No	14	0.0005023	0.000008552	92.86	None	No	0.01	NP (NDs)
Lithium (mg/L)	MW-21	0.0225	0.01	0.04	No	15	0.01455	0.006999	66.67	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-21	0.00383	0.002	0.1	No	15	0.002122	0.0004725	93.33	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-24	0.00447	0.002	0.1	No	6	0.002412	0.001008	83.33	None	No	0.0155	NP (NDs)
Molybdenum (mg/L)	MW-4A	0.00296	0.002	0.1	No	15	0.002064	0.0002479	93.33	None	No	0.01	NP (NDs)
Molybdenum (mg/L)	MW-5B	0.00212	0.002	0.1	No	15	0.002008	0.00003098	93.33	None	No	0.01	NP (NDs)
Selenium (mg/L)	MW-14A	0.00827	0.005	0.05	No	15	0.006983	0.001408	26.67	None	No	0.01	NP (normality)
Selenium (mg/L)	MW-15A	0.00502	0.005	0.05	No	15	0.005001	0.000005164	93.33	None	No	0.01	NP (NDs)
Selenium (mg/L)	MW-21	0.01167	0.007314	0.05	No	15	0.009491	0.003214	13.33	None	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 11/13/2020 12:56 PM View: Appendix IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Parametric Confidence Interval

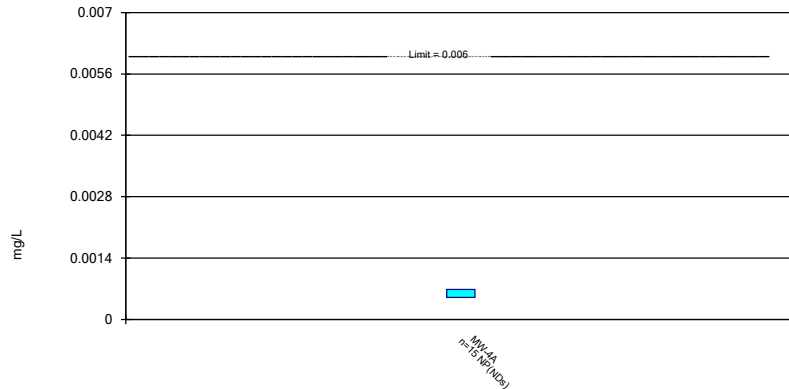
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium Analysis Run 11/13/2020 12:56 PM View: Appendix IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Non-Parametric Confidence Interval

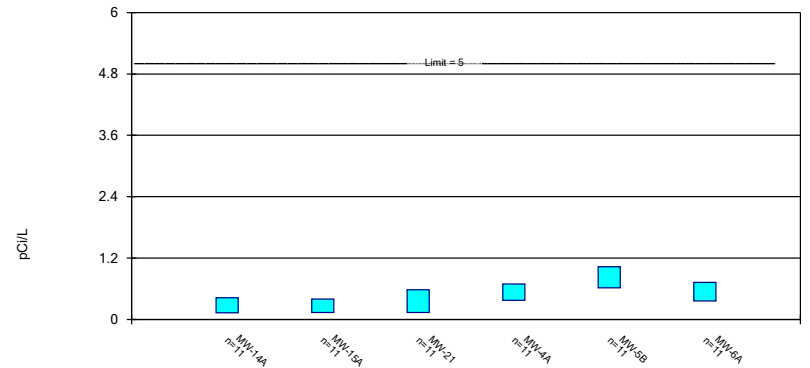
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Constituent: Cobalt Analysis Run 11/13/2020 12:56 PM View: Appendix IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Parametric Confidence Interval

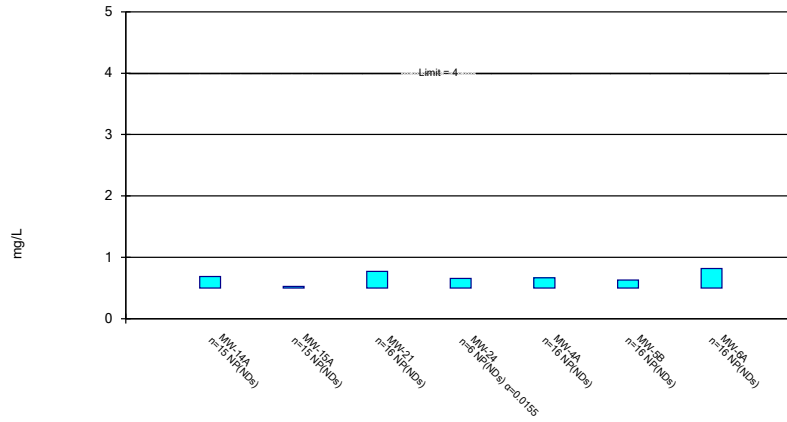
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 11/13/2020 12:56 PM View: Appendix IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Non-Parametric Confidence Interval

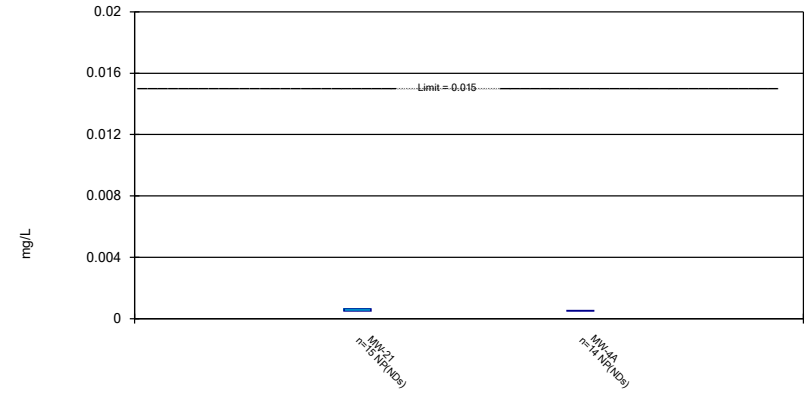
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.



Constituent: Fluoride Analysis Run 11/13/2020 12:56 PM View: Appendix IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Non-Parametric Confidence Interval

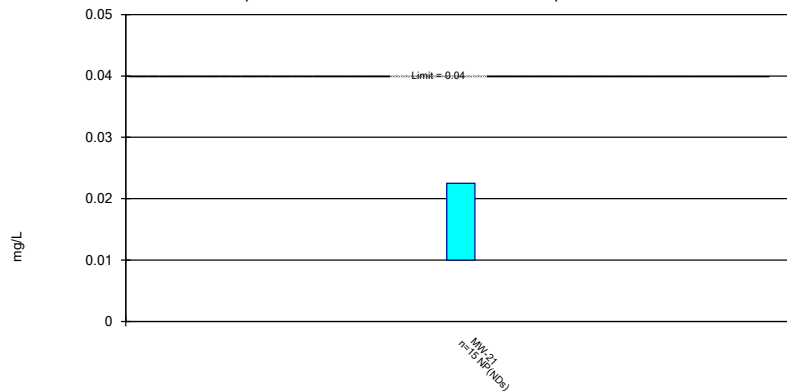
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead Analysis Run 11/13/2020 12:56 PM View: Appendix IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Non-Parametric Confidence Interval

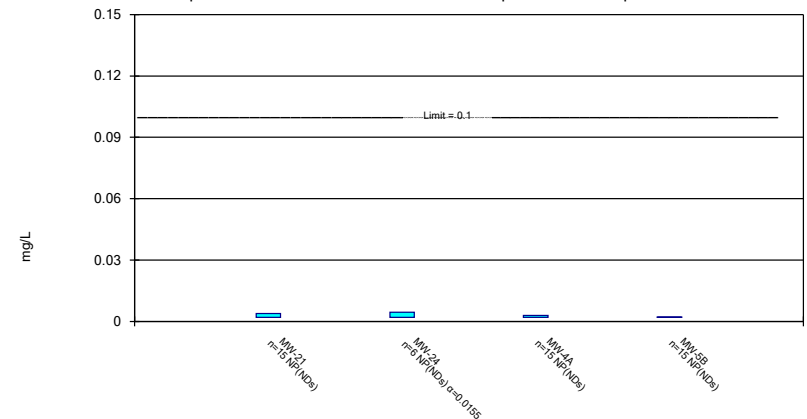
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lithium Analysis Run 11/13/2020 12:56 PM View: Appendix IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

### Non-Parametric Confidence Interval

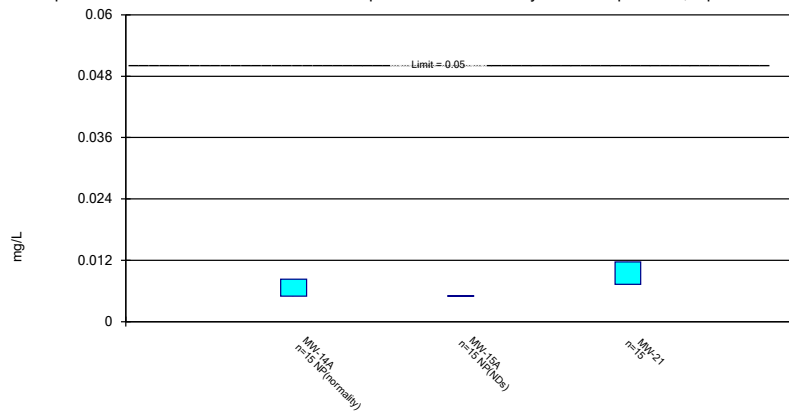
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.



Constituent: Molybdenum Analysis Run 11/13/2020 12:56 PM View: Appendix IV  
 Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water

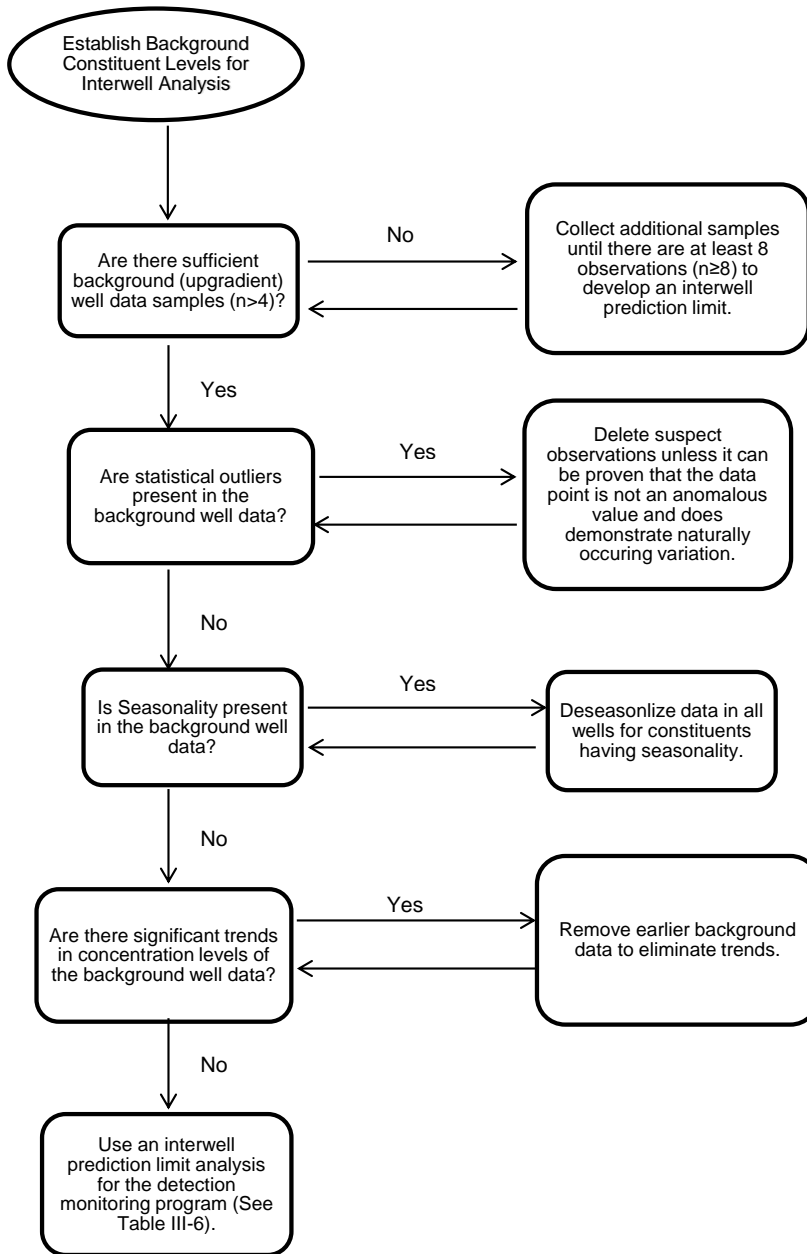
### Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



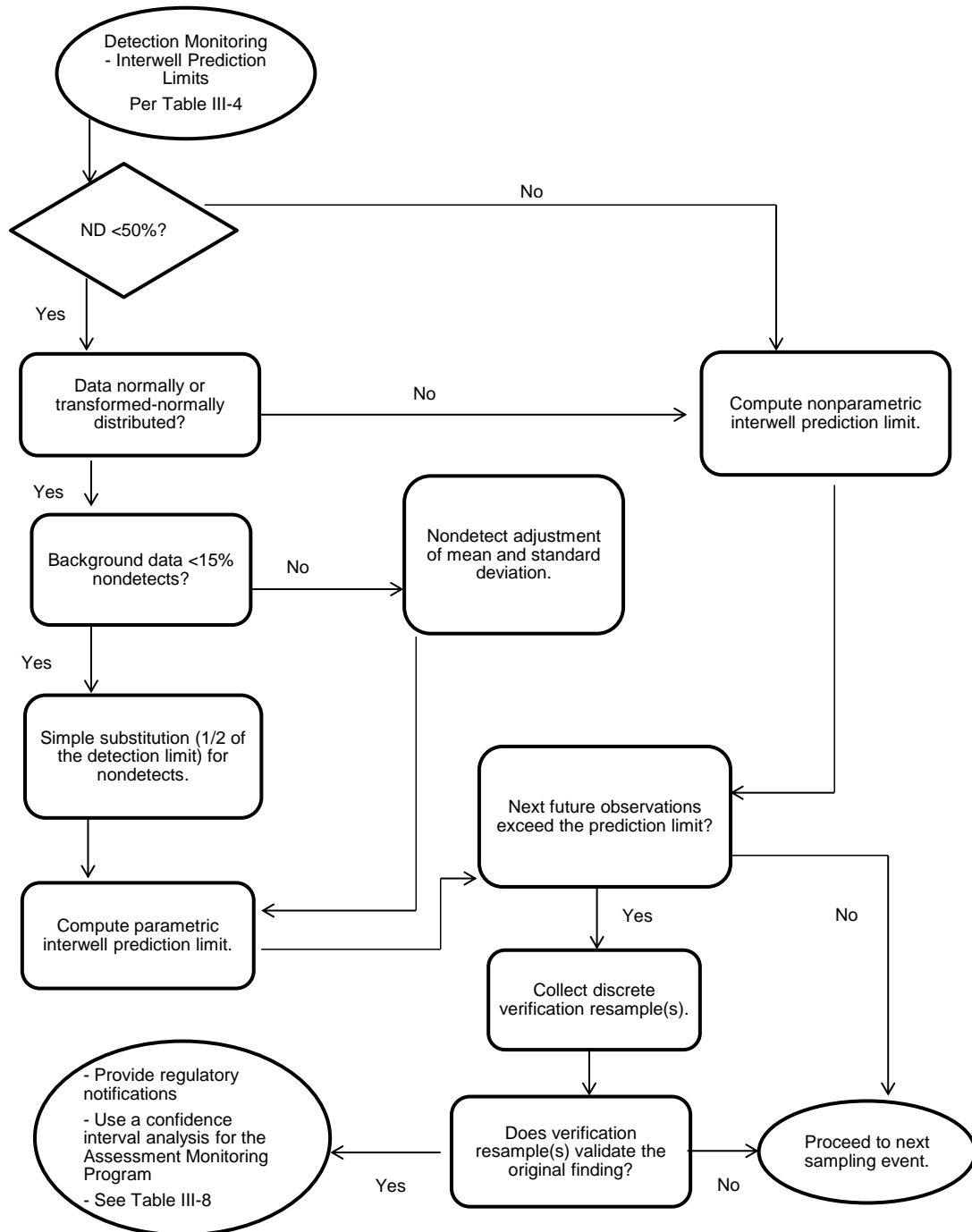
Constituent: Selenium Analysis Run 11/13/2020 12:57 PM View: Appendix IV  
Muscatine Power & Water Client: HR Green, Inc. Data: Muscatine Power & Water





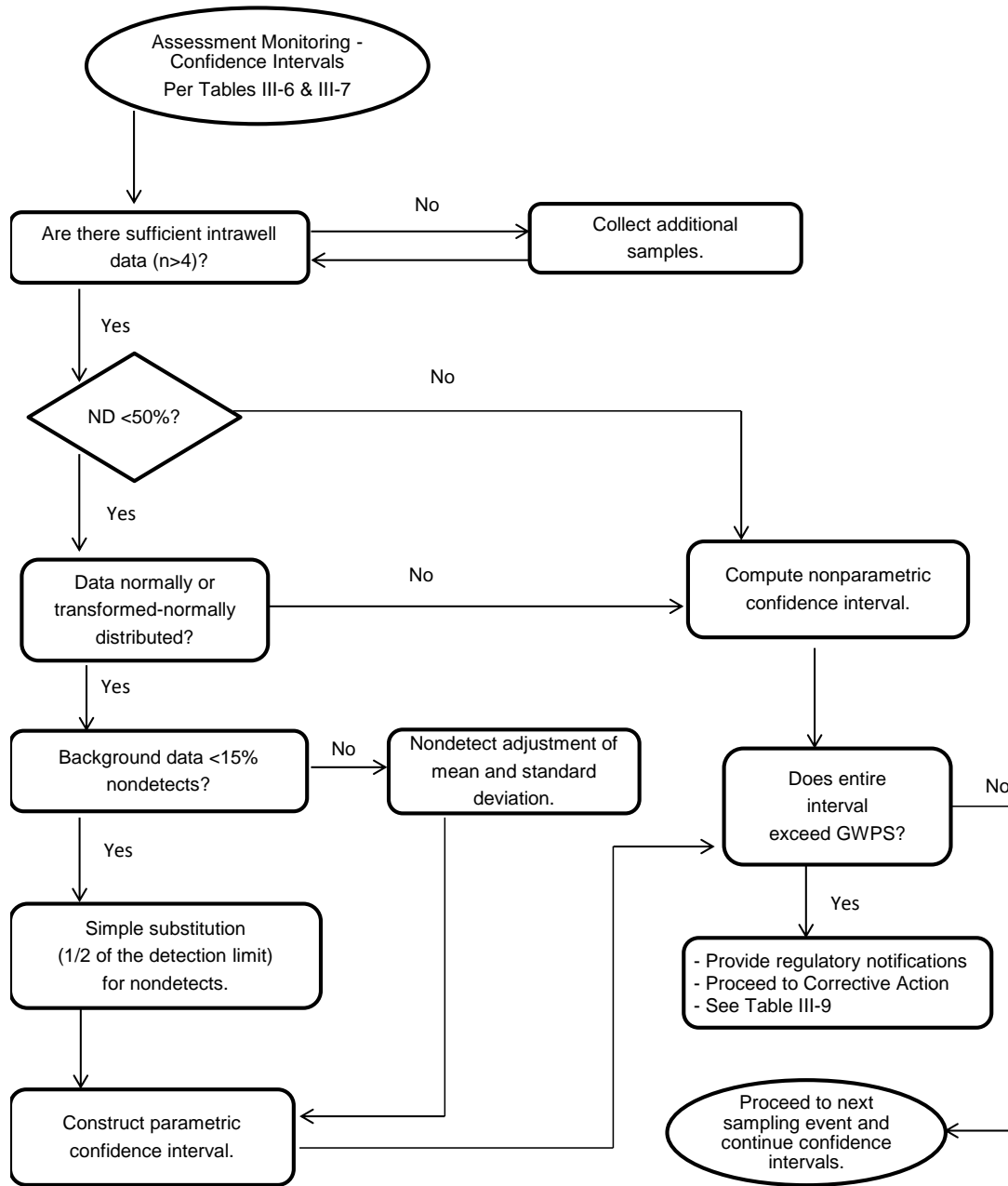
**Table III-4: Methodology to Screen Background Data for Interwell Limits and Establish Background Constituent Levels**

From: *Groundwater Monitoring System and Sampling and Analysis Program, CCR Landfill* (HR Green, May 2017).



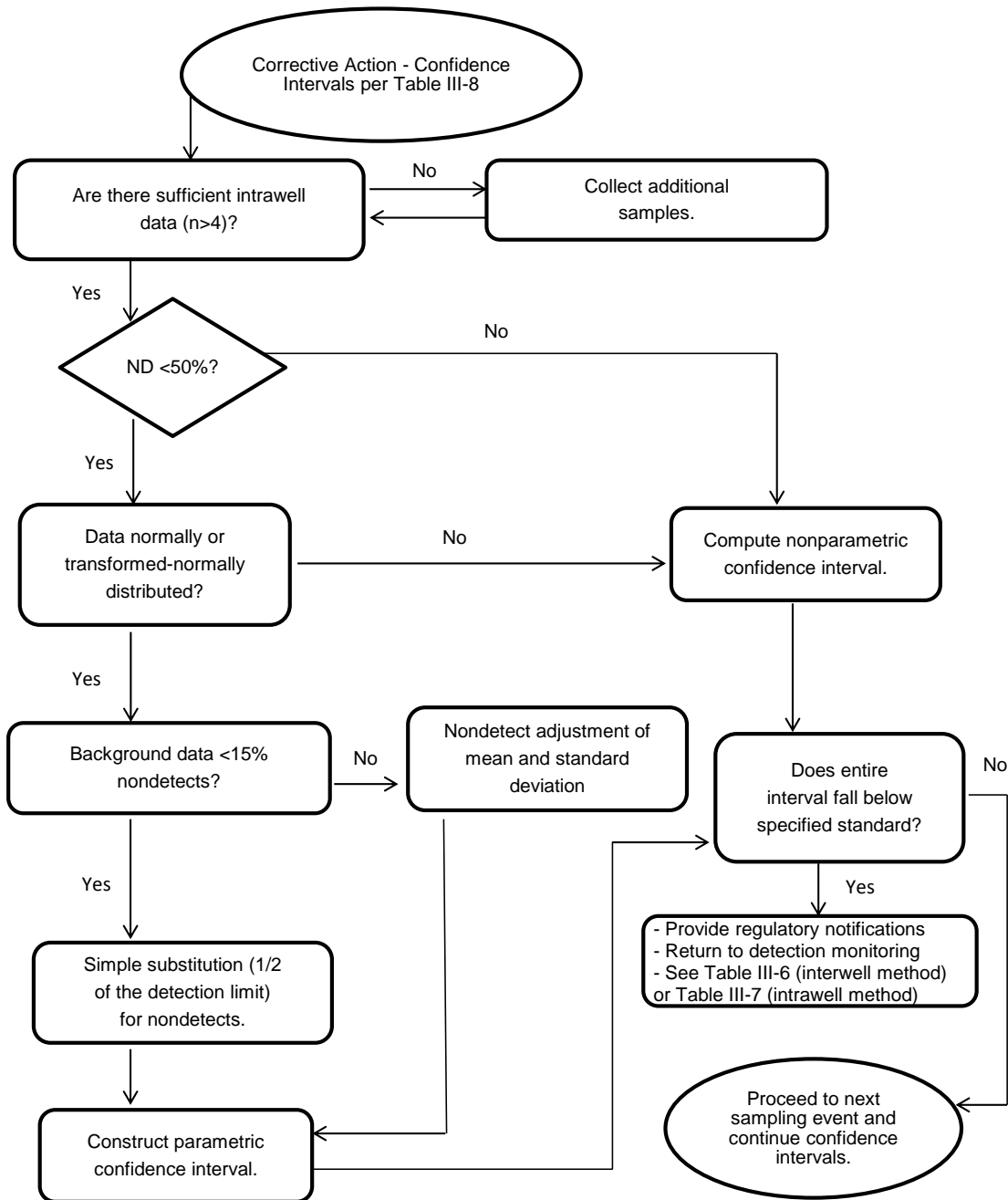
**Table III-6: Methodology for Detection Monitoring - Computing Interwell Prediction Limits**

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).