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Our ref: 12575233-LTR-6

January 31, 2025

Mr. Brian Rath
Environmental Engineer Senior
Solid Waste and Contaminated Sites Section
Iowa Department of Natural Resources
6200 Park Avenue, Suite 200
Des Moines, Iowa 50321

2024 IDNR Template Tables
Louisa Generating Station West Monofill
Muscatine, Iowa
Permit 70-SDP-16-04P

Dear Brian,

GHD has prepared Table 7 and Table 9 using the general format provided in the Iowa Department of Natural Resources' (IDNR's) *Annual Water Quality Report Template for Non-Municipal Landfills*. Table 7 and Table 9, provided in Attachment 1, are modified as approved during our January 23, 2025 telephone conversation with Geoffrey Spain (IDNR) and Josh Love of MidAmerican Energy Company. A comparison of the IDNR Action Levels from 567 Iowa Administrative Code (IAC) Chapter 103 to the criteria specified in the federal CCR rule (40 CFR §257) is provided in Attachment 2.

In Attachment 3, the 2024 groundwater monitoring results are compared to the Maximum Contaminant Level (MCL) or Health Advisory Lifetime (HAL) as described in 567 IAC Chapter 103, paragraph 103.1(4)d.

Attachment 4 provides a crosswalk table to reference the items provided in the Annual Groundwater Monitoring and Corrective Action Report prepared under the Federal CCR rule with the IDNR's *Annual Water Quality Report Template for Non-Municipal Landfills*.

If you have any questions regarding these tables, please contact Kevin Amstrong.

Sincerely,

Kevin G. Armstrong
Hydrogeologist

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KA/lgLTR-6

Encl.

Copy to: Jamie Murphy, MidAmerican Energy Company
Josh Love, MidAmerican Energy Company

Attachments

Attachment 1

IDNR Template Table 7 and Table 9

Summary of Ongoing and Newly Identified Control Limit Exceedances
2024 Annual Water Quality Report
Louisa Generating Station - West Monofill
Permit No. 70-SDP-16-04P

Well	Constituent	Units	Most recent result	Background Standard	Groundwater Protection Standard 40 CFR §257.95(h)
MW-17R	None	--	None	None	None
MW-18A	pH, lab	s.u.	7.1 J	7.53 - 8.29	None
MW-20A	None	--	None	None	None
MW-21	None	--	None	None	None
MW-22	Chloride	mg/L	18.9/19.0	9.95	None
	pH, lab	s.u.	7.6 J / 7.5 J	7.53 - 8.29	None
	Molybdenum	mg/L	0.0226 / 0.0227	0.00200 U	0.1

Comments:

Statistics are based on the background concentration (inter-well prediction limit) developed in accordance with the Federal CCR rule.

Table 4.4 of the Annual Groundwater Monitoring and Corrective Action Report compares the MCL, GWPS, and background concentrations for the Appendix IV Parameters. The background concentration is used as the site-specific GWPS when higher than the MCL or GWPS.

Table 4.3 of the Annual Groundwater Monitoring and Corrective Action Report provides the background concentrations established for the Appendix III and IV analytes.

The following Appendix III/IV analyte(s) are compared to the background concentrations, no IDNR Action Level has been established: calcium.

The following Appendix III analyte(s) are compared to the background concentrations, which are higher than the IDNR Action Level: None.

The following Appendix III analyte(s) are compared to the background concentrations, which are higher than the IDNR Action Level: None.

Table 9

Historical Control Limit & GWPS Exceedances
2024 Annual Water Quality Report
Louisa Generating Station - West Monofill
Permit No. 70-SDP-16-04P

Key: gray =CL; black =GWPS		March	June	September	March	September	November	March	September	March	September	March	August
Well	**Constituent**	**2020**	**2020**	**2020**	**2021**	**2021**	**2021**	**2022**	**2022**	**2023**	**2023**	**2024**	**2024**
MW-03 (Background)	pH, lab		*ns*				*ns*						
	Arsenic		*ns*	*na*			*ns*						
	Cadmium		*ns*	*na*			*ns*						
	Cobalt		*ns*	*na*			*ns*						
	Lead		*ns*				*ns*						
	Molybdenum		*ns*				*ns*						
	Radium-226 & 228		*ns*				*ns*						
	Thallium		*ns*	*na*			*ns*						
MW-04 (Background)	Boron		*ns*				*ns*						
	Chloride		*ns*				*ns*						
	Selenium		*ns*				*ns*						
MW-17R	Sulfate		*ns*				*ns*						
	Radium-226 & 228		*ns*				*ns*						
MW-18A	pH, lab		*na*				*ns*						
	Sulfate						*ns*						
	Selenium		*na*				*ns*						
MW-20A	Chloride		*na*				*ns*						
	pH, lab						*ns*						
	Sulfate		*na*				*ns*						
	Total Dissolved Solids (TDS)		*na*				*ns*						
	Arsenic		*na*	*na*			*ns*						
	Barium		*na*				*ns*						
	Beryllium		*na*	*na*			*ns*						
	Cadmium		*na*	*na*			*ns*						
	Cobalt		*na*	*na*			*ns*						
	Lead		*na*				*ns*						
	Molybdenum		*na*				*ns*						
	Radium-226 & 228		*na*				*ns*						
	Selenium		*na*				*ns*						
	Thallium		*na*	*na*			*ns*						
MW-21	Calcium		*ns*				*ns*						
	Chloride		*ns*				*ns*						
	pH, lab		*ns*				*ns*						
	Sulfate		*ns*				*ns*						
	Total Dissolved Solids (TDS)		*ns*										
	Barium		*ns*				*ns*						
	Radium-226 & 228		*ns*				*ns*						
MW-22	Boron												
	Chloride		*na*				*na*						
	pH, lab		*na*				*na*						
	Sulfate						*na*						
	Chromium						*na*						
	Molybdenum						*na*						
	Radium-226 & 228		*na*				*na*						
	Selenium						*na*						

Historical Control Limit & GWPS Exceedances
2024 Annual Water Quality Report
Louisa Generating Station - West Monofill
Permit No. 70-SDP-16-04P

Comments:

ns - No sample collected during this sampling event.

na - Constituent not analyzed.

Statistics are based on the background concentration (inter-well prediction limit) developed in accordance with the Federal CCR rule.

Table 4.4 of the Annual Groundwater Monitoring and Corrective Action Report compares the MCL, GWPS, and background concentrations for the Appendix IV Parameters. The background concentration is used as the site-specific GWPS when higher than the MCL or GWPS.

Table 4.3 of the Annual Groundwater Monitoring and Corrective Action Report provides the background concentrations established for the Appendix III and IV analytes.

The following Appendix III/IV analyte(s) are compared to the background concentrations, no IDNR Action Level has been established: calcium.

The following Appendix III analyte(s) are compared to the background concentrations, which are higher than the IDNR Action Level: None.

The following Appendix III analyte(s) are compared to the background concentrations, which are higher than the IDNR Action Level: None.

Grey shading indicates exceedance of the background concentration; black shading indicates exceedance of the site-specific Groundwater Protection Standard (GWPS).

Attachment 2

Iowa CCR Rule and Federal CCR Rule Criteria Summary

Iowa CCR Rule and Federal CCR Rule Criteria Summary for West Monofill Groundwater
MidAmerican Energy Company
Louisa Generating Station - West CCR Monofill
Permit No. 70-SDP-16-04P

Analytes	Units	IDNR CCR Rule *567 IAC Chapter 103, paragraph 103.1(4)d* MCL [a]	HAL [b]	SDWR [c]	Federal CCR Rule *40 CFR 257.95(h)(1) - 40 CFR 257.95(h)(3)* MCL [a]	CCR Rule GWPS [d]	Site-Specific Background [e]	Site-Specific GWPS	Proposed Basis for Comparison on IDNR Template Tables
Appendix III									
Boron	mg/L	--	6	--	--	--	0.588	none	Use HAL.
Calcium	mg/L	--	--	--	--	--	**73.1**	none	**No MCL or HAL, so use background for comparison.**
Chloride	mg/L	--	--	250	--	--	9.95	none	Use secondary MCL.
pH, lab	s.u.	--	--	6.5-8.5	--	--	7.53-8.29	none	Use secondary MCL.
Sulfate	mg/L	--	--	250	--	--	63.6	none	Use secondry MCL.
TDS	mg/L	--	--	500	--	--	389	none	Use secondry MCL.
Appendix IV									
Antimony	mg/L	0.006	0.006	--	0.006	--	0.00200 U	0.006 [a]	Federal site-specific GWPS equal to the MCL and HAL.
Arsenic	mg/L	0.01	--	--	0.01	--	0.00200 U	0.01 [a]	Federal site-specific GWPS equal to the MCL.
Barium	mg/L	2.0	--	--	2.0	--	0.0688	2.0 [a]	Federal site-specific GWPS equal to the MCL.
Beryllium	mg/L	0.004	--	--	0.004	--	0.00100 U	0.004 [a]	Federal site-specific GWPS equal to the MCL.
Cadmium	mg/L	0.005	0.005	--	0.005	--	0.000500 U	0.005 [a]	Federal site-specific GWPS equal to the MCL and HAL.
Chromium	mg/L	0.1	--	--	0.1	--	0.0153	0.1 [a]	Federal site-specific GWPS equal to the MCL.
Cobalt	mg/L	--	--	--	--	0.006	0.000500 U	**0.006 [d]**	**Federal GWPS (no MCL or HAL).**
Fluoride	mg/L	4.0	--	--	4.0	--	1.74	4.0 [a]	Federal site-specific GWPS equal to the MCL.
Lead	mg/L	0.015 [f]	--	2.0	--	0.015	0.000500 U	0.015 [d]	Federal site-specific GWPS equal to the MCL.
Lithium	mg/L	--	--	--	--	0.040	0.0100 U	**0.040 [d]**	**Federal GWPS (no MCL or HAL).**
Mercury	mg/L	0.002	0.002	--	0.002	--	0.000200 U	0.002 [a]	Federal site-specific GWPS equal to the MCL and HAL.
Molybdenum	mg/L	--	0.04	--	--	0.100	0.000200 U	**0.100 [d]**	**Federal GWPS (higher than the HAL).**
Radium-226 & 228	pCi/L	5	--	--	5	--	0.64	5 [a]	Federal site-specific GWPS equal to the MCL.
Selenium	mg/L	0.05	0.05	--	0.05	--	0.00500 U	0.05 [a]	Federal site-specific GWPS equal to the MCL.
Thallium	mg/L	0.002	--	--	0.002	--	0.00100 U	0.002 [a]	Federal site-specific GWPS equal to the MCL.

Notes:

-- - Not applicable.

U - Not detected at the associated reporting limit.

[a] Maximum contaminant level (MCL) - used in both IDNR and Federal CCR rules.

[b] Drink Water Health Advisory - Lifetime (HAL).

[c] Secondary Drinking Water Regulation (SDWR).

[d] Groundwater protection standard (GWPS) established under 40 CFR 257.95(h)(2).

[e] Background concentration (inter-well prediction limits) developed in accordance with the Federal CCR rule, determined from baseline data set for MW-3, MW-4, and MW-17R (40 CFR 257.95(h)(3)).

[f] Action level for lead (treatment technique).

409 Federal site-specific GWPS varies from state action levels (MCL, HAL, SDWR).

Attachment 3

MCL/HAL Comparison Table

2024 Monitoring Analytical Results Summary
MidAmerican Energy Company
Louisa Generating Station West Monofill - Muscatine, Iowa
Permit No. 70-SDP-16-04P

Sample Location:					MW-03	MW-03	MW-04	MW-04	MW-17R	MW-17R	MW-18A	MW-18A
Sample ID:					MW03-GW-0324	MW03-GW-0824	MW04-GW-0324	MW04-GW-0824	MW17R-GW-0324	MW17R-GW-0824	MW18A-GW-0324	MW18A-GW-0824
Sample Date:		MCL [a]	HAL [b]	SDWR [c]	3/12/2024	8/27/2024	3/12/2024	8/27/2024	3/12/2024	8/27/2024	3/12/2024	8/27/2024
Parameters	**Units**											
Appendix III												
Boron	mg/L	--	6	--	0.100 U	0.100 U	0.383	0.367	0.100 U	0.100 U	0.172	0.240
Calcium	mg/L	--	--	--	22.6	31.0	45.7	46.8	34.2	38.0	33.6	32.0
Chloride	mg/L	--	--	250	5.00 U	5.00 U	13.7	9.29	5.00 U	5.00 U	6.75	9.17
Fluoride	mg/L	4.0	--	2.0	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
pH, lab	s.u.	--	--	6.5 - 8.5	7.9 J	8.3 J	7.9 J	7.7 J	8.0 J	7.9 J	7.3 J	7.1 J
Sulfate	mg/L	--	--	250	5.68	5.46	39.2	23.9	11.7	19.7	44.9	38.8
Total dissolved solids (TDS)	mg/L	--	--	500	94.0	134	224	214	136	162	186	162
Appendix IV												
Antimony	mg/L	0.006	0.006	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	0.01	--	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	2.0	--	--	0.0149	0.0203	0.0464	0.0505	0.0301	0.0299	0.0289	0.0310
Beryllium	mg/L	0.004	--	--	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.005	0.005	--	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Chromium	mg/L	0.1	--	--	0.00500 U	0.00500 U	0.00788	0.00500 U	0.00500 U	0.00500 U	0.00879	0.0114
Cobalt	mg/L	--	--	--	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.015 [d]	--	--	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	--	--	--	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U
Mercury	mg/L	0.002	0.002	--	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	--	0.04	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	5	--	--	0.194 U	0.0975	0.184 U	0.401	-0.0678 U	0.273	-0.190 U	0.564
Selenium	mg/L	0.05	0.05	--	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.002	--	--	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

2024 Monitoring Analytical Results Summary
MidAmerican Energy Company
Louisa Generating Station West Monofill - Muscatine, Iowa
Permit No. 70-SDP-16-04P

Sample Location:		MW-20A	MW-20A	MW-21	MW-21	MW-22	MW-22	MW-22	MW-22
Sample ID:		MW20A-GW-0324	MW20A-GW-0824	MW21-GW-0324	MW21-GW-0824	MW22-GW-0324	DP02-GW-0324	MW22-GW-0824	DP02-GW-0824
Sample Date:		3/13/2024	8/27/2024	3/13/2024	8/27/2024	3/13/2024	3/13/2024 (Duplicate)	8/27/2024	8/27/2024 (Duplicate)
Parameters	**Units**								
Appendix III									
Boron	mg/L	0.214	0.199	0.100 U	0.100 U	0.318	0.331	0.158	0.158
Calcium	mg/L	32.0	24.3	90.6	69.0	32.3	32.3	38.6	38.7
Chloride	mg/L	9.16	5.30	17.5	5.98	11.4	11.4	18.9	19.0
Fluoride	mg/L	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
pH, lab	s.u.	7.6 J	7.0 J	7.8 J	7.5 J	7.5 J	7.5 J	7.6 J	7.5 J
Sulfate	mg/L	65.7	46.7	66.0	24.7	46.0	46.4	33.6	33.7
Total dissolved solids (TDS)	mg/L	246	190	398	246	220	218	182	172
Appendix IV									
Antimony	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	0.0364	0.0290	0.0929	0.0612	0.0256	0.0256	0.0140	0.0141
Beryllium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Chromium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.0246	0.0249	0.00648	0.00665
Cobalt	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U
Mercury	mg/L	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.0382	0.0392	0.0226	0.0227
Radium-226 & 228	pCi/L	-0.109 U	0.516	0.0380 U	0.0668	0.150 U	-0.0904 U	0.245	0.692
Selenium	mg/L	0.00500 U	0.00950	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Notes:
[a] Maximum contaminant level (MCL) establised under 40 CFR 257.95(h)(1).
[b] Drink Water Health Advisories - Life-time established in the 2018 Edition of the Drinking Water Standards and Health Advisories (EPA 822-F-18-001).
[c] Secondary Drinking Water Regulation.
[d] Action level for lead (treatment technique).
1.00 Value exceeds the MCL, or HAL where MCL not established.
J - Estimated concentration.
U - Not detected at the associated reporting limit.
J- - Estimated concentration, result may be biased low
J+ - Estimated concentration, result may be biased high.

Attachment 4

IDNR Template to AGWMCAR Cross Reference Table

IDNR Template to AGWMCAR Cross Reference Table

Louisa Generating Station - West Monofill
Permit No. 70-SDP-16-04P

Annual Water Quality Report Template for Non-Municipal Landfills		Annual Groundwater Monitoring and Corrective Action Report		Notes
Table 1	Monitoring Program Summary	Table 2.1	Groundwater Monitoring Well Network	Lists all wells in monitoring network.
		Table 2.6	Summary of Groundwater Monitoring Events	Lists total number of samples from monitoring programs since December 2015.
		Table 4.3	Inter-Well Comparisons for Monitoring Data vs. Upgradient Background Prediction Limits	Compares current reporting period's groundwater data to the prediction limit value (control limit).
		Section 1	Introduction	States the current monitoring program.
		Section 2.1	Groundwater Monitoring Network	Describes the aquifer characteristics.
		Section 6.3	Recommendations	Provides recommended changes, if any, to the monitoring network.
Table 2	Monitoring Program Implementation Schedule	Table 2.6	Summary of Groundwater Monitoring Events	Provides summary of sampling events since December 2015.
Table 3	Monitoring Well Maintenance and Performance Revaluation Schedule	Section 2.2	Monitoring Well Inspection	States the frequency of total depth measurements (annually).
Table 4	Monitoring Well Maintenance and Performance Summary	Table 2.2	Well Construction Details	Provides well coordinates and elevations for TOC, original total depth, ground surface, top of screen, and bottom of screen.
		Table 2.3	Monitoring Well Screen Occlusion Evaluation	Provides TOC elevation, original total depth below TOC, screen length, annual total depth measurements, and percent of screen occluded.
		Table 3.1	Groundwater Elevation Summary	Provides groundwater elevation data, past elevations through elevations during the current reporting period.
Table 5	Background Summary	Table 4.3	Inter-Well Comparisons for Monitoring Data vs. Upgradient Background Prediction Limits	Provides the prediction limit value (background level).
Table 6	Summary of Well/Detected Constituent Pairs With No Immediately Preceding Control Limit Exceedances	Table 4.3	Inter-Well Comparisons for Monitoring Data vs. Upgradient Background Prediction Limits	Compares current reporting period's groundwater data to the prediction limit value (control limit).
Table 7	Summary of Ongoing and Newly Identified Control Limit Exceedances	--		Table 7 is provided to IDNR.
Table 8	Analytical Data Summary	Table 4.1	Baseline Period Groundwater Monitoring Data	Provides groundwater analytical data from the baseline period at the CCR Monofill.
		Table 4.2	Monitoring Analytical Results Summary	Provides groundwater analytical data for the current reporting period at the CCR Monofill.
Table 9	Historic Control Limit & GWPS Exceedances	--		Table 9 is provided to IDNR.
Table 10	Groundwater Quality Assessment Plan Trend Analysis	Section 4	Groundwater Monitoring	Section 4 discusses trends in groundwater data, during baseline monitoring and current reporting period.
Table 11	Leachate Management Summary	NA		Not applicable since the West Monofill does not have a Leachate Collection System.
Table 12	Gas Monitoring Summary	NA		Not applicable since the West Monofill holds CCR and does not generate gas.

Annual Groundwater Monitoring and Corrective Action Report for the West Monofill

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

MidAmerican Energy Company

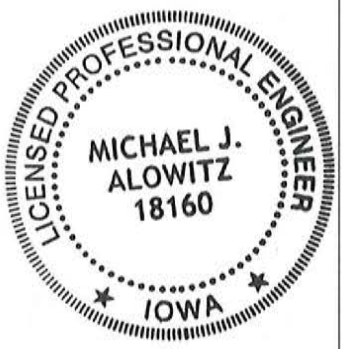
January 31, 2025

The Power of Commitment

Certification

Annual Groundwater Monitoring and Corrective Action Report for the West Monofill
Permit 70-SDP-16-04P
Louisa Generating Station
Muscatine, Iowa
MidAmerican Energy Company

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



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Michael J. Alowitz, P.E.

1/31/2025
Date

License Number: 18160

My license renewal date is: December 31, 2026

Pages or sheets covered by this seal: Entire Document

Executive summary

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

Item	Current Status
(e)(6)(i) At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95;	At the start of this annual reporting period, this CCR unit was operating under the assessment monitoring program (40 CFR §257.95).
(e)(6)(ii) At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95;	At the end of this annual reporting period, this CCR unit continued to operate under the assessment monitoring program (40 CFR §257.95).
(e)(6)(iii) If it was determined that there was a statistically significant increase over background for one or more constituents listed in appendix III to this part pursuant to §257.94(e):	
Identify those constituents listed in appendix III to this part and the names of the monitoring wells associated with such an increase; and	Ongoing, verified statistically significant increases were detected for the following Appendix III constituents during the calendar year 2024 reporting period: – pH SSDs at MW-18A and MW-22 – Chloride SSI at MW-22
Provide the date when the assessment monitoring program was initiated for the CCR unit.	The assessment monitoring program for this CCR unit was initiated in April 2018.
(e)(6)(iv) If it was determined that there was a statistically significant level above the groundwater protection standard for one or more constituents listed in appendix IV to this part pursuant to §257.95(g) include all of the following:	
Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an increase;	No Appendix IV constituent was detected at a statistically significant level above the groundwater protection standard.
Provide the date when the assessment of corrective measures was initiated for the CCR unit;	No corrective measures activities are required for this CCR unit.
Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and	No corrective measures activities are required for this CCR unit.
Provide the date when the assessment of corrective measures was completed for the CCR unit.	No corrective measures activities are required for this CCR unit.
(e)(6)(v) Whether a remedy was selected pursuant to §257.97 during the current annual reporting period, and if so, the date of remedy selection; and	No corrective measures activities are required for this CCR unit.
(e)(6)(vi) Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.	No remedial activities are required for this CCR unit.

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Appendices

1. Introduction

This Annual Groundwater Monitoring and Corrective Action Report was prepared by GHD on behalf of MidAmerican Energy Company (MidAmerican) in compliance with the Federal Coal Combustion Residual (CCR) rule (40 CFR Part 257) for the Louisa Generating Station (LGS) West Monofill located near Muscatine, Iowa. The West Monofill is located approximately 4 miles south of the city of Muscatine, Iowa in the southwest quarter of Section 33, Township 76 North, and Range 2 West and northwest quarter of Section 4, Township 75 North, and Range 2 West in Louisa and Muscatine counties, Iowa. The Site Location Map (Figure 1.1) shows the location of the West Monofill and MidAmerican's LGS facilities. The East Monofill at the LGS facility is in use and its groundwater monitoring is reported separately from the West Monofill. The West Monofill, East Monofill and associated monitoring well locations are shown on Figure 1.2.

MidAmerican initiated baseline groundwater monitoring at the West Monofill in accordance with the Federal CCR rule in December 2015. The initial eight rounds of baseline monitoring, sampling, and analysis were completed prior to the October 17, 2017 deadline established in the Federal CCR rule (40 CFR §257.94). Data for the eight required baseline monitoring events and the first detection monitoring event were presented in the annual report dated January 30, 2018 (Terracon, 2018a). Two semiannual assessment monitoring events were conducted during 2024 (on March 11-13 and August 26-28, 2024).

On May 1, 2018, MidAmerican completed an alternative source determination (GHD, 2018a) for the West Monofill which determined the West Monofill is not the source of statistically significant decreases (SSDs) of pH detected in groundwater. Statistically significant increases (SSIs) were detected in groundwater; therefore, the West Monofill entered into assessment monitoring during 2018 (GHD, 2018b) and remained in assessment monitoring in 2024. The 2024 semiannual assessment monitoring events were completed in accordance with 40 CFR §257.95.

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

2. Groundwater Monitoring Activities

2.1 Groundwater Monitoring Network

The groundwater monitoring network consists of eight monitoring wells (MW-02, MW-03, MW-04, MW-17R, MW-18A, MW-20A, MW-21, and MW-22) (Table 2.1). No changes to the groundwater monitoring network were made during this reporting period. Groundwater elevation data were collected from the eight monitoring wells, and groundwater samples were collected from seven of the monitoring wells (MW-03, MW-04, MW-17R, MW-18A, MW-20A, MW-21, and MW-22). The seven sampled monitoring wells and the one remaining well are screened near the water table (which occurs at a depth of approximately 12 to 50 feet bgs in the area). Horizontal spacing between the downgradient shallow alluvial aquifer monitoring wells range from about 700 feet to 1,300 feet. Groundwater samples are used to assess potential impacts of the West Monofill on surrounding groundwater. Well construction details are provided in Table 2.2. Groundwater elevation data are used to identify upgradient and downgradient monitoring points at the West Monofill.

2.2 Monitoring Well Inspection

During each sampling event, the monitoring wells were visually inspected, and if present, deficient conditions of the monitoring wells were noted on the field forms (Appendix A). Wells are maintained with a well cap and a lockable protective casing. Observations include the condition of the protective casing/vault and surrounding ground surface.

All monitoring wells in the groundwater monitoring system consist of 2-inch nominal inner-diameter polyvinyl chloride (PVC) casing and screen. Monitoring well surface completions consist of a lockable stick-up surface casing set in a concrete pad and placement of protective bollards in locations where traffic may be of concern. The monitoring wells were found to be in generally good condition, with no issues affecting well or sample integrity. Due to the surrounding topography, sediment has accumulated on top of some of the monitoring well pads.

On a periodic basis, the total depth of each well in the monitoring network is measured to evaluate the well condition and potential sediment accumulation in the well. Total well depth measurements and screen occlusion calculations from the total depth measurements are presented in Table 2.3. If screen occlusion greater than 10 percent is determined to be present, the well will be redeveloped prior to the next sampling event. The total depth measurements collected in 2024 indicate no monitoring wells were occluded at or above the 10 percent criterion.

2.3 Sample Collection

Sampling was conducted using dedicated pneumatic bladder pumps to purge water and collect samples using low-flow sampling techniques.

Prior to sample collection, temperature, conductivity, pH, oxidation-reduction potential (ORP), dissolved oxygen, and turbidity of the purge water were measured using a calibrated multiparameter water quality instrument and flow cell. The readings were recorded on electronic well sampling records. Following stabilization, unfiltered samples were collected in laboratory-supplied containers. Copies of the groundwater sampling records for the 2024 monitoring events are included in Appendix A. During each of the monitoring events, a field duplicate sample was collected for quality assurance/quality control (QA/QC) purposes. A duplicate sample was collected from MW-22 during the March 2024 and August 2024 sampling events.

2.4 Analytical Parameters

Groundwater samples were analyzed for the parameters specified in 40 CFR Part 257 Appendix III and IV (Tables 2.4 and 2.5, respectively) for the March and August 2024 monitoring events. The laboratory analyses were conducted by Eurofins Environment Testing North Central, LLC (Eurofins) in Cedar Falls, Iowa except for radium 226 and 228 (combined) analyses which were conducted by Eurofins in St. Louis, Missouri. Analyses were conducted by the laboratory in accordance with the procedures and methods described in the United States Environmental Protection Agency (USEPA) Manual SW-846, “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (September 1986),” as updated and/or in accordance with other approved testing procedures. Eurofins provided prepared sample containers for each monitoring event. Analytical reports from each sampling event report total (i.e., unfiltered) sample results in accordance with the Federal CCR rule.

Table 2.6 summarizes the number of groundwater samples collected for analysis from each monitoring well, the dates the samples were collected, and whether the sample was required by the baseline, detection monitoring, or assessment monitoring programs.

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

3. Groundwater Flow Conditions

3.1 Horizontal Groundwater Flow

Groundwater levels were measured at each of the monitoring wells included in the monitoring network during each monitoring event. Table 3.1 presents groundwater elevations measured in wells during the March and August sampling events at the West Monofill. A groundwater flow map was prepared using water level measurements from each monitoring event for the alluvial aquifer associated with the West Monofill and the East Monofill (Figures 3.1 and 3.2). The inferred groundwater flow direction during the March 2024 monitoring event was northwest across the West Monofill area; inferred groundwater flow direction was westerly across the West Monofill area during the August 2024 event. The variations in groundwater elevation and flow direction observed during the monitoring events are likely a result of variability in the amount and rate of infiltration of precipitation and potentially elevations of the irrigation wells to the west of the site.

3.2 Horizontal Hydraulic Gradient and Groundwater Flow Velocity

Hydraulic conductivity estimates for the alluvial aquifer at the West Monofill were derived from single well-specific capacity tests and ranged from 0.0293 centimeters per second (cm/sec) to 0.162 cm/sec, for an average hydraulic conductivity of 0.1 cm/sec (86.4 meters per day [m/day]) (Terracon, 2018a).

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

$$V = Ki/n$$

Where V equals the average linear velocity; K equals the average hydraulic conductivity (86.4 m/day); i equals the average horizontal hydraulic gradient; and n equals the effective porosity (estimated at 0.3). During the two recent monitoring events at the West Monofill, the average linear groundwater velocity at the water table (shallow alluvial aquifer) was estimated to range between 0.14 m/day (approximately 170 feet per year), calculated for the March 2024 monitoring event, and 0.22 m/day (approximately 270 feet per year), calculated for the August 2024 monitoring event. The estimated horizontal gradients and average linear groundwater flow velocities for each of the monitoring events is summarized in Table 3.2.

3.3 Monitoring Well Network Assessment

Groundwater elevations were within the screened interval in all wells during the March 2024 gauging and sampling event and above the screened interval in all wells except MW-02 during the August 2024 event. Table 2.2 provides the top and bottom of screen elevations and Table 3.1 provides the water table elevations measured in each well during the gauging events.

The West Monofill groundwater monitoring network meets the Federal CCR rule requirements of having at least one upgradient monitoring well and three downgradient monitoring wells, and the groundwater monitoring network meets the design and construction requirements of 40 CFR Part 257, Section 91. Monitoring wells MW-03, MW-04, and MW-17R have been identified as background sampling locations.

4. Groundwater Monitoring

Groundwater sample collection records for the 2024 monitoring events are provided in Appendix A and the associated laboratory analytical reports are provided in Appendix B. Appendix C includes time series plots of concentration versus time for each analyte in the current monitoring program. Analytical results for groundwater samples collected during the eight baseline monitoring events (December 2015 through July 2017) and the 2024 monitoring events are summarized in Tables 4.1 and 4.2, respectively. The cumulative groundwater analytical database for the West Monofill monitoring network from December 2015 through 2024 is provided in Appendix D.

4.1 Statistical Analysis Approach

As required by the Federal CCR rule 40 CFR §257.90(b), prior to October 17, 2017, the owner or operator of the CCR unit must develop the groundwater sampling and analysis program to include selection and certification of the statistical procedures to be used for evaluating groundwater monitoring data as required by section 257.93. The Groundwater Statistical Method Certification (Terracon, 2018b) uses an inter-well prediction interval statistical analysis. The selected statistical methods for the site include trend analysis utilizing the Sen's Slope/Mann-Kendall method and an inter-well prediction interval to analyze the laboratory analytical data for an SSI. The statistical analyses and methods were conducted in general accordance with and conform to the performance standards of the Federal CCR rule.

During the December 2015 through December 2017 baseline monitoring period, trend analysis was conducted on each monitoring well during each monitoring event (background and compliance) for the laboratory measured Detection Monitoring parameters (Appendix III, 40 CFR 257) and each site monitoring well during the background monitoring events for the laboratory measured Assessment Monitoring parameters (Appendix IV, 40 CFR 257).

Inter-well prediction limit intervals were prepared for each Appendix III and Appendix IV parameter using the combined background monitoring data collected from monitoring wells MW-03, MW-04, and MW-17R.

The inter-well prediction limit for lithium was updated in the 2023 AGWMCAR (GHD, 2024) due to a change in the laboratory's method report limit for lithium; beginning with the 2018 monitoring events the lithium reporting limit was reduced from 0.0500 mg/L to 0.0100 mg/L. The inter-well prediction limit for antimony was updated as part of this 2024 AGWMCAR due to a change in the laboratory's method report limit for antimony; beginning with the 2021 monitoring events the antimony reporting limit was increased from 0.00100 mg/L to 0.00200 mg/L. Changes to the laboratory reporting limit for cadmium have also occurred and recalculation of the inter-well prediction limits for cadmium will be considered when eight samples at the new reporting limit have been obtained.

4.2 Assessment of Baseline Data

4.2.1 Stability Assessment/Baseline Period Trend Analysis

The assessment of temporal trends is included as a precursor to inter-well comparisons, as the statistical methods for these comparisons assume that a stable condition is present in the reference data set (i.e., the upgradient background data set for inter-well comparisons). Where a trend is identified, the comparison procedures must be adjusted to take this into account.

The Methods Certification selected the Sen's Slope/Mann-Kendall Trend Test statistical procedures for evaluating trends in the baseline data. The applicability and methodology are discussed in the Methods Certification. The baseline data sets presented in Table 4.1 were subjected to trend testing as described above. Trends were found for the following wells/constituents (Terracon, 2018a):

– Decreasing trend for calcium at MW-22
– Increasing trend for total dissolved solids (TDS) at MW-03 and MW-20A

– Increasing trend for chloride at MW-20A
– Increasing trend for sulfate at MW-04 and MW-20A
– Decreasing trend for barium at MW-22
– Increasing trend for molybdenum at MW-22

4.3 Evaluation of 2024 Assessment Monitoring Data

4.3.1 Inter-well Comparisons (versus Upgradient Background)

Inter-well comparisons of current monitoring data are conducted by comparing monitoring data from the 2024 monitoring events (March and August 2024) to the upgradient background predication limits derived from the baseline period data at the upgradient wells (MW-03, MW-04, and MW-17R). These comparisons are presented in Table 4.3.

The results of the inter-well comparisons indicate observations where one or both 2024 assessment monitoring events have a constituent concentration or measurement outside of baseline conditions in the upgradient wells. These include the following potentially statistically significant increases (SSIs) or decreases (SSDs):

– Calcium SSI at MW-21
– Chloride SSI at MW-04, MW-21, and MW-22
– pH SSI at MW-03
– pH SSDs at MW-18A, MW-20A, MW-21, and MW-22
– Sulfate SSI at MW-20A and MW-21
– TDS SSI at MW-21
– Barium SSI at MW-21
– Chromium SSI at MW-22
– Molybdenum SSI at MW-22
– Radium 226 and 228 (combined) SSI at MW-22
– Selenium SSI at MW-20A

Ongoing, verified SSI or SSD following the September 2024 event include:

– Chloride at MW-22
– pH SSDs at MW-18A and MW-22
– Molybdenum SSI at MW-22

4.4 Comparison to Maximum Contaminant Levels (MCLs)

The 2024 sample results are compared to the USEPA MCL for constituents with an MCL. During the March and August 2024 semiannual assessment monitoring events, all Appendix III and Appendix IV parameters were analyzed. A summary of these sample results compared to groundwater protection standards (GWPSs) is provided in Table 4.4.

4.4.1 Appendix III Analytes

– Boron. No MCL has been established for boron. Four wells had detections of boron during each 2024 sampling event. The maximum boron concentration in the 2024 samples was 0.383 milligrams per liter (mg/L) at MW-04 (upgradient, March 2024). Boron concentrations were below the method reporting limit (0.1 mg/L) during the two assessment events in 2024 for MW-3, MW-17R, and MW-21.

- Calcium. No MCL has been established for calcium. The maximum calcium concentration in the 2024 samples was 90.6 mg/L at downgradient monitoring well MW-21 (March 2024).
- Chloride. No MCL has been established for chloride. The maximum chloride concentration detected in the 2024 samples was 19.0 mg/L at MW-22 (downgradient), in the duplicate sample, during the August sampling event.
- Fluoride. The MCL for fluoride is 4.0 mg/L. Fluoride concentrations were below the method reporting limit (1.0 mg/L) in all samples collected in 2024.
- pH. No MCL has been established for pH. The lowest pH recorded during 2024 was 7.0 at downgradient monitoring well MW-20A in August 2024. The highest pH recorded during the 2024 assessment monitoring events was 8.3 at upgradient monitoring well MW-03 in August 2024.
- Sulfate. No MCL has been established for sulfate. The maximum sulfate concentration detected in the 2024 samples was 66.0 mg/L at downgradient monitoring well MW-21 in March 2024.
- TDS. No MCL has been established for TDS. The maximum TDS concentration detected in the 2024 samples was 398 mg/L at downgradient monitoring well MW-21 in March 2024.

4.4.2 Appendix IV Analytes

- Antimony. Antimony concentrations were below the method reporting limit (0.00200 mg/L) and the established MCL (0.006 mg/L) in all samples from all monitoring wells during the 2024 monitoring events.
- Arsenic. Arsenic concentrations were below the established MCL (0.01 mg/L) and below the method reporting limit (0.00200 mg/L) for arsenic during the 2024 event in all monitoring wells.
- Barium. Barium was detected in all monitored wells during the 2024 monitoring events. However, the detected levels were below the MCL for barium (2.0 mg/L), with a maximum detected concentration in the 2024 samples of 0.0929 mg/L at downgradient monitoring well MW-21 (March 2024).
- Beryllium. Beryllium concentrations were below the method reporting limit (0.00100 mg/L) and the established MCL (0.004 mg/L) in all samples from all monitoring wells during the 2024 monitoring events.
- Cadmium. Cadmium concentrations were below the method reporting limit (0.000200 mg/L) and the established MCL (0.005 mg/L) in all samples from all monitoring wells during the 2024 monitoring events.
- Chromium. Chromium was detected in monitoring wells MW-04, MW-18A, and MW-22, all below the established MCL (0.1 mg/L). All other samples were below the detection limit of 0.00500 mg/L. The maximum concentration of chromium detected in the 2024 samples was 0.0249 mg/L at downgradient monitoring well MW-22 during March 2024 (duplicate sample).
- Cobalt. No MCL has been established for cobalt; the GWPS established under 40 CFR §257.95(h)(2) for cobalt is 0.006 mg/L. Cobalt concentrations were below the method reporting limit (0.000500 mg/L) in all monitoring wells during the 2024 monitoring events.
- Fluoride. The MCL for fluoride is 4.0 mg/L. Fluoride concentrations were below the method reporting limit (1.0 mg/L) in all samples collected in 2024.
- Lead. No MCL has been established for lead; the GWPS established under 40 CFR §257.95(h)(2) for lead is 0.015 mg/L. Lead concentrations were below the method reporting limit (0.000500 mg/L) in all monitoring wells during the 2024 monitoring events.
- Lithium. No MCL has been established for lithium; the GWPS established under 40 CFR §257.95(h)(2) for lithium is 0.040 mg/L. Lithium concentrations were below the method reporting limit (0.0100 mg/L) at all wells during the 2024 monitoring events.
- Mercury. Mercury concentrations were below the method reporting limit (0.000200 mg/L) and the established MCL (0.002 mg/L) in all samples from all monitoring wells during the 2024 monitoring events.
- Molybdenum. No MCL has been established for molybdenum; the GWPS established under 40 CFR §257.95(h)(2) for molybdenum is 0.100 mg/L. Molybdenum was only detected in downgradient monitoring well MW-22 with a maximum concentration of 0.0392 mg/L (duplicate) during the March 2024

sampling event. Molybdenum was not detected at concentrations exceeding the method reporting limit (0.00200 mg/L) at other wells during the 2024 events.

– Radium 226 and 228 (combined). The MCL for radium 226 and 228 (combined) is 5 picocuries per liter (pCi/L). Radium 226 and 228 (combined) was detected in all monitoring wells during the August 2024 monitoring event. The maximum detected concentration was 0.692 pCi/L at downgradient well MW-22 during the August 2024 monitoring event, which is below the MCL.
– Selenium. The MCL for selenium is 0.05 mg/L and method reporting limit is 0.00500 mg/L. Selenium was only detected in downgradient well MW-20A during the August 2024 sampling event with a maximum concentration of 0.00950 mg/L, which is below the MCL. All other wells tested below the method reporting limit during all sampling events in 2024.
– Thallium. Thallium concentrations were below the method reporting limit (0.00100 mg/L) and the established MCL (0.002 mg/L) in all samples from all monitoring wells during the 2024 monitoring events.

5. Alternate Source Determination

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

5.1 Description of Alternate Source Determination

As described in the 2017 Annual Groundwater Monitoring and Corrective Action Report (Terracon, 2018a), based on the inter-well prediction interval lower limit of 7.603 for pH, an SSD (pH below the lower limit) was identified at monitoring wells MW-18A, MW-20A, and MW-22 for the October 2017 compliance monitoring event. This SSD was verified by sampling completed in February 2018. The SSD continued in the March 2019 event at all three monitoring wells and in September 2019 in MW-20A and MW-22. During 2020, the pH SSD was observed in March 2020 in MW-20A and in September 2020 in MW-18A and MW-20A. From 2021 to 2023, the pH SSD was observed in MW-18A, MW-20A, and MW-22. In 2024 the pH SSD was observed in MW-18A and MW-22.

For most characteristics of groundwater evaluated, an SSI is subject to additional evaluation. For pH. However, both an SSI and an SSD indicate potential changes to groundwater quality relative to background concentrations. The Alternate Source Determination Report (GHD, 2018a) addressed an SSD for pH.

MidAmerican developed a new, lined CCR Monofill (East Monofill) at the LGS facility. The East Monofill is located upgradient of the West Monofill. No CCR storage or disposal occurred in the East Monofill prior to October 15, 2018 and no CCR storage or disposal occurred upgradient of the East Monofill. As part of the work associated with the East Monofill, MidAmerican initiated groundwater monitoring of that area in 2017. Groundwater flow is generally to the west-northwest, from the East Monofill, toward the West Monofill.

An impact to groundwater from the West Monofill would be expected as an increase in pH. However, based on available groundwater monitoring data, naturally occurring groundwater conditions demonstrate decreasing pH concentrations from the East Monofill area to the West Monofill background wells to the West Monofill downgradient wells with the SSD.

5.2 Alternate Source Determination Conclusion

As demonstrated in the alternate source determination evaluation, the West Monofill is not the source of the observed pH SSDs in groundwater.

6. Conclusions and Recommendations

6.1 Groundwater Flow and Evaluation of the Monitoring Network

Groundwater flow in the vicinity of the West Monofill was observed to be in northwest or westerly directions during the 2024 monitoring events. The groundwater flow evaluation (see Figures 3.1 and 3.2) indicates the monitoring network is sufficient and has appropriately located upgradient and downgradient well locations.

In an August 4, 2023 comment letter regarding the 2022 AGWMCAR, the Iowa Department of Natural Resources (IDNR) requested a clarification regarding the use of inter-well prediction limits at MW-03 and if MW-03 remains a valid background point monitoring for the West Monofill. The IDNR noted the 2022 results from MW-03 exceeded the inter-well prediction limits for several parameters (arsenic, cadmium, cobalt, lead, molybdenum, radium and thallium during one or both 2022 events).

Hydraulicly, MW-03 remains consistently upgradient of the West Monofill (Figures 3.1 and 3.2), and as such should be a valid upgradient monitoring point. Additionally, none of the constituents observed to be above the inter-well prediction limits during 2022 were above the inter-well prediction limits in the 2023 or 2024 data; this suggests the 2022 SSIs were unrelated to the West Monofill and MW-03 remains a valid background monitoring location. MW-03 and the other upgradient monitoring wells will continue to be evaluated to consider their appropriateness as background monitoring locations.

6.2 Groundwater Quality

The statistical evaluation of groundwater monitoring data collected during the baseline period (December 2015 to July 2017) was conducted in accordance with the Federal CCR rule and Unified Guidance for assessing groundwater data (USEPA, 2009). This evaluation (Terracon, 2018a) was successful in characterizing the baseline data sets, assessing the baseline data for trends, and generating inter-well upgradient background reference values and intra-well baseline values against which future monitoring data may be evaluated.

An assessment of monitoring data from samples collected during the two 2024 assessment monitoring events has been conducted. Key results of the evaluation include:

– Statistically significant concentration trends over time were observed in some baseline data sets at both downgradient wells and upgradient wells.
– Inter-well baseline values (prediction limits) have been calculated from the baseline data for three upgradient background wells (MW-03, MW-04, and MW-17R). The inter-well prediction limit for lithium was updated in 2023 due to a change in the laboratory's reporting limit. The inter-well prediction limit for antimony was updated in this report due to a change the laboratory reporting limit.
– Inter-well comparisons of the 2024 assessment monitoring data indicate the following:

The monitoring results at downgradient wells are mainly consistent with upgradient background conditions during the baseline period. The exceptions include verified SSIs of chloride and molybdenum at MW-22.

The pH SSD observed at MW-18A and MW-22 has been shown to not be related to the West Monofill.

All Appendix IV constituents were detected at concentrations below the corresponding MCL or GWPS established under 40 CFR §257.95(h)(2) during the 2024 monitoring period

6.3 Recommendations

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

7. References

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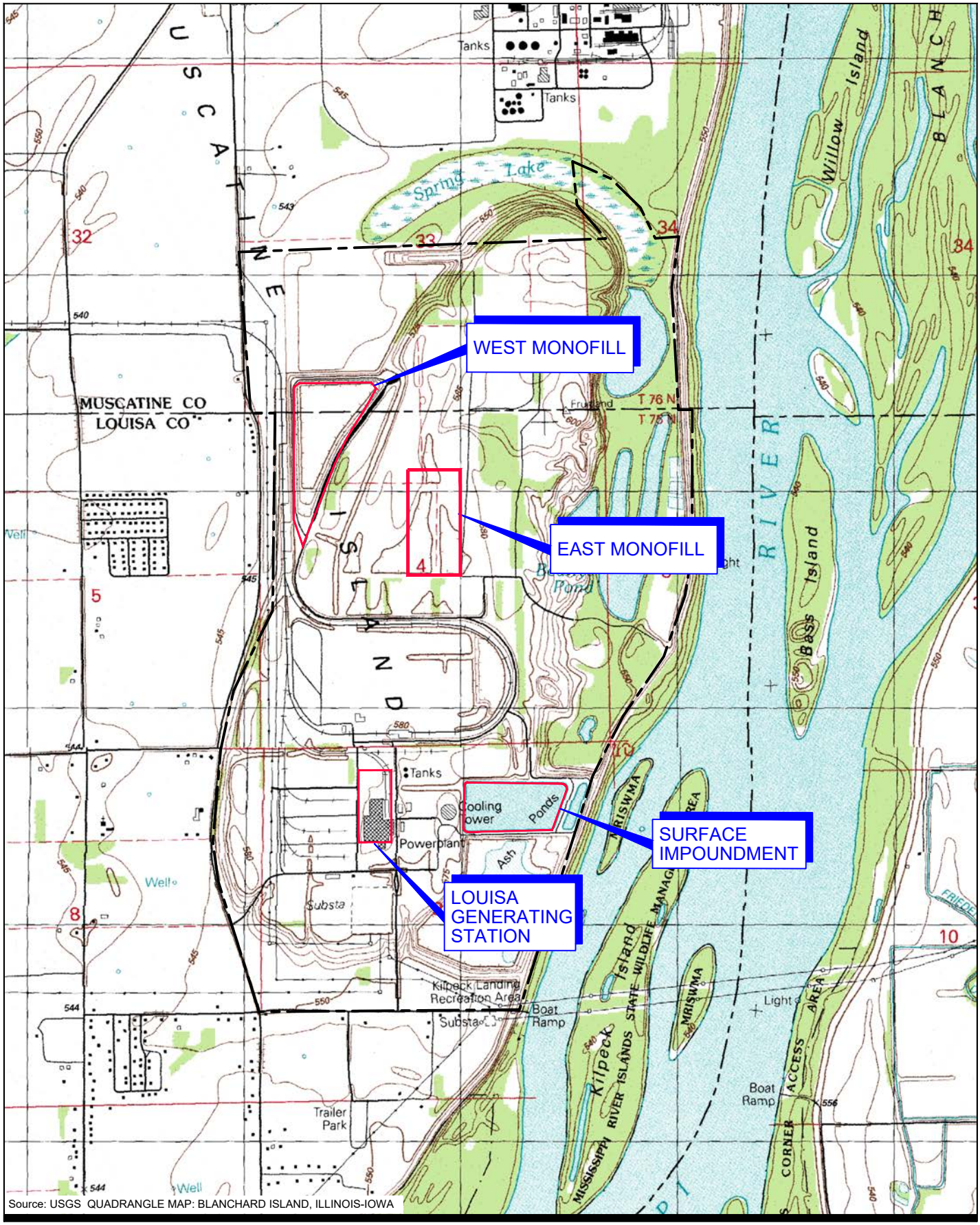
Figures



0 1000 2000 ft

1" = 2000 ft

Coordinate System:
NAD83 State PLane
Iowa South Feet

N

GHD

MIDAMERICAN ENERGY COMPANY
LOUISA GENERATING STATION
WEST MONOFILL
MUSCATINE, IOWA

Project No. **12575233**
Date **April 2024**

SITE LOCATION MAP

FIGURE 1.1

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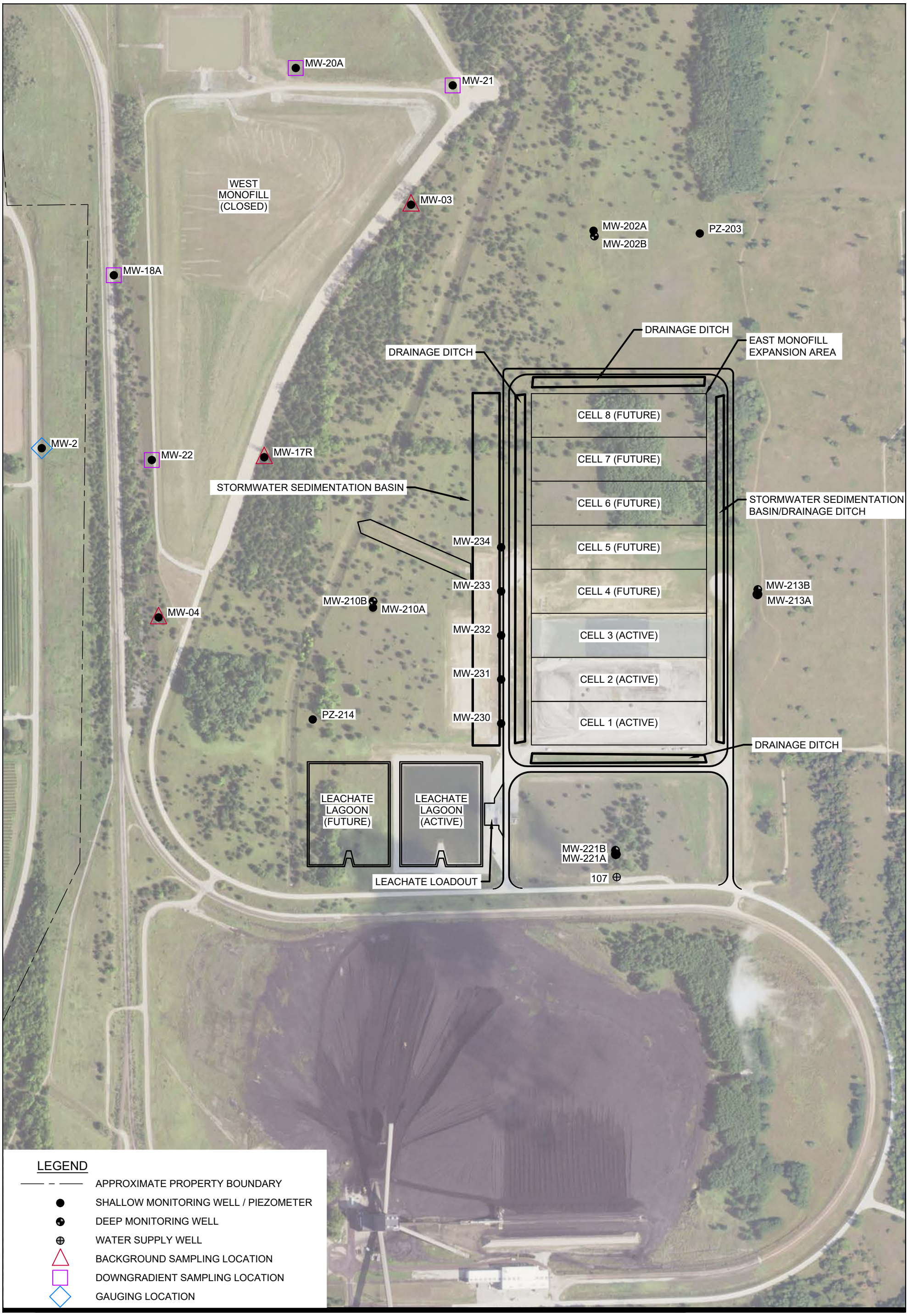

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1" = 400 ft

Coordinate System:
NAD83 State Plane
Iowa South Feet

N

GHD

MIDAMERICAN ENERGY COMPANY
LOUISA GENERATING STATION
WEST MONOFILL
MUSCATINE, IOWA

SITE MAP AND MONITORING NETWORK

Project No. **12575233**
Date **November 2024**

FIGURE 1.2

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Plot Date: 20 November 2024 5:47 PM

MW-20A
531.80

MW-21
531.98

532.0

532.0

WEST
MONOFILL
(CLOSED)

MW-03
532.20

532.5

MW-202A
532.41

MW-202B
532.43*

PZ-203
532.66

MW-18A
532.52

DRAINAGE DITCH

DRAINAGE DITCH

EAST MONOFILL
EXPANSION AREA

CELL 8 (FUTURE)

CELL 7 (FUTURE)

CELL 6 (FUTURE)

CELL 5 (FUTURE)

CELL 4 (FUTURE)

CELL 3 (ACTIVE)

CELL 2 (ACTIVE)

CELL 1 (ACTIVE)

533.0

MW-02
532.09

MW-22
532.19

MW-17R
532.22

STORMWATER SEDIMENTATION BASIN

STORMWATER SEDIMENTATION
BASIN/DRAINAGE DITCH

MW-234
532.68

MW-233
532.64

MW-213B
533.55*

MW-213A
533.41

MW-210B
532.54*

MW-210A
532.59

MW-04
532.28

MW-232
532.72

532.5

MW-231
533.00

533.0

PZ-214
533.11

MW-230
532.85

DRAINAGE DITCH

LEACHATE
LAGOON
(FUTURE)

LEACHATE
LAGOON
(ACTIVE)

MW-221B
533.40*

MW-221A
533.34

107

LEACHATE LOADOUT

LEGEND

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

0 200 400 ft

1" = 400 ft

Coordinate System:
NAD83 State Plane
Iowa South Feet

N

GHD

MIDAMERICAN ENERGY COMPANY
LOUISA GENERATING STATION
WEST MONOFILL
MUSCATINE, IOWA

GROUNDWATER FLOW MAP
MARCH 11, 2024

Project No. **12575233**
Date **November 2024**

FIGURE 3.1

Filename: N:\US\Des Moines\Projects\563\12575233\Digital_Design\ACAD\Figures\RPT013\12575233-GHD-00-00-RPT-EN-D103_DE-013.dwg
Plot Date: 20 November 2024 5:40 PM

MW-20A
537.49

MW-21
538.06

538.0

537.5

WEST
MONOFILL
(CLOSED)

MW-03
537.97

538.5

MW-202A
538.41

MW-202B
538.42*

PZ-203
538.75

MW-18A
537.32

537.0

DRAINAGE DITCH

EAST MONOFILL
EXPANSION AREA

DRAINAGE DITCH

CELL 8 (FUTURE)

CELL 7 (FUTURE)

CELL 6 (FUTURE)

CELL 5 (FUTURE)

CELL 4 (FUTURE)

CELL 3 (ACTIVE)

CELL 2 (ACTIVE)

CELL 1 (ACTIVE)

536.5

MW-02
536.41

536.5

MW-22
536.89

MW-17R
537.24

STORMWATER SEDIMENTATION BASIN

STORMWATER SEDIMENTATION
BASIN/DRAINAGE DITCH

MW-234
538.07

MW-233
537.94

MW-213B
538.78*

MW-213A
538.65

MW-210B
537.62*

MW-210A
537.66

MW-04
536.79

537.0

MW-232
537.99

MW-231
538.14

538.5

537.5

PZ-214
537.95

MW-230
537.9

DRAINAGE DITCH

LEACHATE
LAGOON
(FUTURE)

LEACHATE
LAGOON
(ACTIVE)

538.0

MW-221B
538.30*

MW-221A
538.25

107

LEACHATE LOADOUT

LEGEND

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

0 200 400 ft

1" = 400 ft

Coordinate System:
NAD83 State Plane
Iowa South Feet

N

GHD

MIDAMERICAN ENERGY COMPANY
LOUISA GENERATING STATION
WEST MONOFILL
MUSCATINE, IOWA

GROUNDWATER FLOW MAP
AUGUST 26, 2024

Project No. 12575233
Date November 2024

FIGURE 3.2

Filename: N:\US\Des Moines\Projects\563\12575233\Digital_Design\ACAD\Figures\RPT013\12575233-GHD-00-00-RPT-EN-D104_DE-013.dwg
Plot Date: 22 November 2024 11:28 AM

Tables

Table 2.1

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

Monitoring Well	Use in Monitoring Network	Role in Monitoring Network
MW-02	Gauged Only	Gauging Location
MW-03	Gauged and Sampled	Background Location
MW-04	Gauged and Sampled	Background Location
MW-17R	Gauged and Sampled	Background Location
MW-18A	Gauged and Sampled	Downgradient Location
MW-20A	Gauged and Sampled	Downgradient Location
MW-21	Gauged and Sampled	Downgradient Location
MW-22	Gauged and Sampled	Downgradient Location

Table 2.2

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

			Monitoring Well Construction					
Well Identification	Northing	Easting	Ground Surface Elevation (NAVD88)	Top of Casing (NAVD88)	Total Depth (feet BTOC)	Screen Length (feet)	Top of Screen (NAVD88)	Bottom of Screen (NAVD88)
MW-02	494018.3	2299709.5	544.12	547.03	19.31	10	541.6	531.6
MW-03	495123.7	2301386.2	578.35	580.39	58.20	10	532.2	522.2
MW-04	493249.9	2300239.6	574.49	577.00	50.29	10	536.7	526.7
MW-17R	493977.2	2300719.5	577.11	579.90	52.67	10	537.2	527.2
MW-18A	494803.6	2300036.6	546.52	549.32	22.25	10	537.1	527.1
MW-20A	495744.3	2300862.7	544.47	547.21	22.45	10	534.8	524.8
MW-21	495665.4	2301575.2	574.00	575.55	50.88	10	534.7	524.7
MW-22	493964.6	2300209.2	572.77	574.56	50.34	10	534.2	524.2
MW-202A	494993.0	2302214.5	576.41	579.05	53.00	10	536.1	526.1
MW-202B [a]	494980.9	2302218.6	575.99	578.78	82.60	10	506.2	496.2
MW-210A	493306.4	2301215.7	575.14	578.23	50.88	10	537.4	527.4
MW-210B [a]	493310.9	2301213.7	575.24	578.23	80.78	10	507.5	497.5
MW-213A [b]	493355.0	2302959.0	575.34	578.27	48.49	10	539.8	529.8
MW-213B [a]	493363.4	2302960.6	575.16	578.20	82.59	10	505.6	495.6
MW-221A	492175.1	2302315.8	576.96	579.81	53.37	10	536.4	526.4
MW-221B [a]	492178.2	2302314.3	576.88	579.50	83.52	10	506.0	496.0
MW-230	492769.3	2301796.8	573.88	579.25	54.47	10	534.8	524.8
MW-231	492968.5	2301795.2	574.76	580.10	54.90	10	535.2	525.2
MW-232	493168.6	2301794.4	573.13	578.23	54.34	10	533.9	523.9
MW-233 [b]	493368.1	2301794.6	574.27	577.62	52.67	10	535.0	525.0
MW-234 [b]	493568.2	2301795.1	575.90	579.03	53.40	10	535.6	525.6
PZ-203	494993.3	2302697.1	589.44	592.66	64.19	10	538.5	528.5
PZ-214	492786.8	2300939.7	576.02	579.22	53.26	10	536.0	526.0

Notes

[a] Well is screened in deep portion of the alluvial aquifer.
[b] Top of casing (TOC) at MW-213A, MW-233, and MW-234 was cut down on April 16, 2018 to accommodate dedicated pump installation, resulting in change of TOC reference elevation. MW-213A TOC elevation changed from 578.36 to 578.27; MW-233 from 577.77 to 577.62; MW-234 from 579.25 to 579.03.
There is a discrepancy in past total depth measurements of MW-02, likely due to changes to the protective well casing post-construction. No well log exists for MW-02 (MWH, 2004), so the total depth was calculated from the average of measured values from 2015 to 2021.

Table 2.3

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

Well	Top of Casing Elevation (NAVD88)	Total Well Depth Below Top of Casing (feet BTOC)	Screen Length (feet)	10-Oct-2017		5-Sep-2018		3-Mar-2020		13-Sep-2021		25-Sep-2023		11-Mar-2024	
				Measured Well Depth (feet)	Screen Occlusion (%)	Measured Well Depth (feet)	Screen Occlusion (%)	Measured Well Depth (feet)	Screen Occlusion (%)	Measured Well Depth (feet)	Screen Occlusion (%)	Measured Well Depth (feet)	Screen Occlusion (%)	Measured Well Depth (feet)	Screen Occlusion (%)
MW-02	547.03	19.31[a]	10	NA		NA		19.59	-2.8%	19.63	-3.2%	19.72	-4.1%	19.68	-3.70%
MW-03	580.39	58.20	10	58.17	0.3%	58.20	0.0%	58.21	-0.1%	58.18	0.2%	58.25	-0.5%	58.14	0.60%
MW-04	577.00	50.29	10	50.28	0.1%	50.30	-0.1%	50.27	0.2%	50.27	0.2%	50.29	0.0%	50.28	0.10%
MW-17R	579.90	52.67	10	52.67	0.0%	52.65	0.2%	52.68	-0.1%	52.66	0.1%	52.67	0.0%	52.67	0.00%
MW-18A	549.32	22.25	10	22.16	0.9%	22.18	0.7%	22.11	1.4%	22.16	0.9%	22.19	0.6%	22.19	0.60%
MW-20A	547.21	22.45	10	22.39	0.6%	22.40	0.5%	22.38	0.7%	22.38	0.7%	22.44	0.1%	22.40	0.50%
MW-21	575.55	50.88	10	50.86	0.2%	50.89	-0.1%	50.85	0.3%	50.85	0.3%	50.86	0.2%	50.85	0.30%
MW-22	574.56	50.34	10	50.33	0.1%	50.37	-0.3%	50.33	0.1%	50.30	0.4%	50.34	0.0%	50.32	0.20%

Notes:

NA - No data available.

% - Percent.

[a] There is a discrepancy in past total depth measurements of MW-02, likely due to changes to the protective well casing post-construction. No well log exists for MW-02 (MWH, 2004), so the total depth was calculated from the average of measured values from 2015 to 2021.

Table 2.4

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

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

Table 2.5

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

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

Table 2.6

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

Sampling Dates	MW-03 (Upgradient)	MW-04 (Upgradient)	MW-17R (Upgradient)	MW-18A	MW-20A	MW-21	MW-22
December 14, 2015	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
March 7, 2016	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
June 13, 2016	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
September 13, 2016	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
December 13, 2016	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
February 15, 2017	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
April 18, 2017	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
June 26, 2017	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
October 10-11, 2018	Detection	Detection	Detection	Detection	Detection	Detection	Detection
February 1, 2018	-	-	-	Verification	Verification	-	Verification
April 24, 2018	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
September 4, 2018	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
March 19-20, 2019	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
June 11, 2019	-	Verification	-	Verification	Verification	-	Verification
September 4-5, 2019	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
March 3-4, 2020	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
June 2-3, 2020	-	-	-	Verification	Verification	-	Verification
September 8-10, 2020	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
March 23-24, 2021	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
September 15-16, 2021	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
November 2, 2021	-	-	-	-	-	-	Verification
March 21-22, 2022	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
September 26-28, 2022	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
March 6-9, 2023	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
September 25-28, 2023	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
March 11-14, 2024	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment
August 26-28, 2024	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment

Table 2.6

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

	MW-03 (Upgradient)	MW-04 (Upgradient)	MW-17R (Upgradient)	MW-18A	MW-20A	MW-21	MW-22
Number of Samples							
Appendix III Analytes	23	23	23	23	23	23	23
Apendix IV Analytes	22	22	22	22	22	22	22

Notes:

1. Baseline monitoring events included analysis of both Appendix III (Detection Monitoring) and Appendix IV (Assessment Monitoring) analytes.
2. Detection monitoring events include the analysis of Appendix III analytes only.
3. Assessment monitoring events include analysis of Appendix III and Appendix IV analytes.
4. Verification monitoring events include analysis of select Appendix III (Detection Monitoring) and Appendix IV (Assessment Monitoring) analytes.

Table 3.1

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

Well	Top of Casing Elevation (NAVD88)	Total Well Depth Below Top of Casing (feet BTOC)	15-Feb-2017 (NAVD88)	18-Apr-2017 (NAVD88)	26-Jun-2017 (NAVD88)	11-Oct-2017 (NAVD88)	1-Feb-2018 (NAVD88)	13-Mar-2018 (NAVD88)	24-Apr-2018 (NAVD88)	8-May-2018 (NAVD88)	10-Jul-2018 (NAVD88)	4-Sep-2018 (NAVD88)	19-Mar-2019 (NAVD88)	21-May-2019 (NAVD88)	11-Jun-2019 (NAVD88)	3-Sep-2019 (NAVD88)
MW-02	547.03	15.48	534.40	534.66		534.08	533.46	533.92	533.88	533.86	534.54	534.39	537.66	542.73	542.54	539.46
MW-03	580.39	58.20	534.77	535.08	536.53	534.35	533.58	534.02	534.10	534.19	535.81	534.92	537.96	543.46	544.03	540.41
MW-04	577.00	50.29	534.72	534.98	535.79	534.36	533.71	534.04	534.10	534.10	535.06	534.56	537.76	542.39	543.06	539.86
MW-17R	579.90	52.67	535.01	535.26	536.33	534.63	533.64	533.96	534.07	534.13	535.32	534.65	537.79	542.81	543.49	540.10
MW-18A	549.32	22.25	534.37	534.62	535.58	534.01	533.89	534.37	534.39			534.96	538.15	543.76	543.61	540.24
MW-20A	547.21	22.45	534.69	535.01	536.43	534.31	533.14	532.35	533.65	533.73	535.17	534.51	534.91	534.21	534.70	539.99
MW-21	575.55	50.88	534.79	535.14	536.79	534.36	533.36	533.84	532.93	534.06	535.78	534.79	537.82	543.43	543.87	540.27
MW-22	574.56	50.34	534.71	535.00	535.86	534.33	533.61	533.96	534.03	534.05	535.02	534.52	537.76	542.74	543.07	539.87
MW-202A	579.05	53.00	-	-	-	-	-	534.51	-	534.57	536.34	535.21	538.12	543.50	544.45	540.53
MW-202B [a]	578.78	82.60	-	-	-	-	-	533.96	-	534.57	536.36	535.23	538.14	543.52	544.49	540.54
MW-210A	578.23	50.88	-	-	-	-	-	534.28	-	534.48	535.80	535.02	537.95	542.75	544.00	540.39
MW-210B [a]	578.23	80.78	-	-	-	-	-	534.24	-	534.43	535.73	534.96	538.00	542.72	543.98	540.39
MW-213A [b]	578.27	48.49	-	-	-	-	-	535.16	-	535.86	537.73	536.06	538.59	543.38	544.94	540.36
MW-213B [a]	578.20	82.59	-	-	-	-	-	535.30	-	536.03	537.82	536.16	538.74	543.55	545.06	540.48
MW-221A	579.81	53.37	-	-	-	-	-	534.95	-	535.40	537.04	535.56	538.18	542.92	544.51	540.18
MW-221B [a]	579.50	83.52	-	-	-	-	-	534.02	-	535.44	537.07	535.61	538.31	543.04	544.59	540.26
MW-230	579.25	54.47	-	-	-	-	-	534.47	-	534.80	536.29	535.28	538.04	542.66	544.19	540.40
MW-231	580.10	54.90	-	-	-	-	-	534.65	-	534.96	536.47	535.48	538.21	542.89	545.39	540.60
MW-232	578.23	54.34	-	-	-	-	-	534.45	-	534.73	536.25	535.30	538.06	542.79	544.25	540.46
MW-233 [b]	577.62	52.67	-	-	-	-	-	534.41	-	534.69	536.22	535.26	538.06	542.86	544.34	540.47
MW-234 [b]	579.03	53.40	-	-	-	-	-	534.39	-	534.69	536.24	535.27	538.09	542.97	544.36	540.45
PZ-203	592.66	64.19	-	-	-	-	-	534.47	-	534.98	536.88	535.52	538.31	543.61	544.77	540.59
PZ-214	579.22	53.26	-	-	-	-	-	534.76	-	534.93	536.11	535.40	538.46	542.97	544.32	540.77

Table 3.1

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

Well	Top of Casing Elevation (NAVD88)	Total Well Depth Below Top of Casing (feet BTOC)	3-Mar-2020 (NAVD88)	2-Jun-2020 (NAVD88)	8-Sep-2020 (NAVD88)	22-Mar-2021 (NAVD88)	13-Sep-2021 (NAVD88)	2-Nov-2021 (NAVD88)	21-Mar-2022 (NAVD88)	26-Sep-2022 (NAVD88)	6-Mar-2023 (NAVD88)	25-Sep-2023 (NAVD88)	11-Mar-2024 (NAVD88)	26-Aug-2024 (NAVD88)
MW-02	547.03	15.48	537.77	538.64	536.66	534.91	533.43	532.89	532.09	531.71	534.67	531.99	532.09	536.41
MW-03	580.39	58.20	538.20	539.60	537.34	535.09	533.75	532.98	532.22	532.13	532.18	532.38	532.20	537.97
MW-04	577.00	50.29	537.96	539.04	536.98	537.01	533.59	532.91	532.25	531.95	532.21	532.74	532.28	536.79
MW-17R	579.90	52.67	538.02	539.20	537.10	534.97	533.67	532.91	532.26	531.92	532.14	532.31	532.22	537.24
MW-18A	549.32	22.25	538.32	539.30	537.26	535.41	533.96	533.34	532.54	532.20	532.53	532.55	532.52	537.32
MW-20A	547.21	22.45	537.89	539.18	535.01	534.78	533.34	532.64	531.90	531.61	531.83	531.94	531.80	537.49
MW-21	575.55	50.88	538.08	539.58	537.20	534.87	533.53	532.77	532.11	531.93	531.96	532.18	531.98	538.06
MW-22	574.56	50.34	537.91	538.99	536.92	534.97	533.56	532.90	532.20	531.90	532.13	532.19	532.19	536.89
MW-202A	579.05	53.00	538.33	539.91	537.50	535.22	533.98	533.15	532.53	532.45	532.41	532.68	532.41	538.41
MW-202B [a]	578.78	82.60	538.33	539.94	537.50	535.14	533.97	533.13	532.53	532.45	532.42	532.69	532.43	538.42
MW-210A	578.23	50.88	538.35	539.65	536.23	535.22	533.94	533.13	532.57	532.42	532.49	532.65	532.59	537.66
MW-210B [a]	578.23	80.78	538.32	539.60	537.43	535.15	533.91	533.10	532.53	532.39	532.43	532.61	532.54	537.62
MW-213A [b]	578.27	48.49	538.53	540.41	537.72	535.96	534.57	533.79	533.44	533.42	533.65	533.35	533.41	538.65
MW-213B [a]	578.20	82.59	538.63	540.50	537.82	536.07	534.68	533.88	533.55	533.52	533.75	533.50	533.55	538.78
MW-221A	579.81	53.37	538.50	540.38	537.53	535.56	534.03	533.38	533.10	532.96	533.24	532.92	533.34	538.25
MW-221B [a]	579.50	83.52	538.56	540.46	537.60	535.62	534.09	533.44	533.14	533.01	533.37	533.00	533.40	538.30
MW-230	579.25	54.47	538.44	539.95	537.59	535.31	534.01	533.22	532.75	532.67	532.79	532.77	532.85	537.90
MW-231	580.10	54.90	538.60	540.09	537.76	535.47	534.20	533.38	532.92	532.84	532.92	532.90	533.00	538.14
MW-232	578.23	54.34	538.42	539.91	537.60	535.29	534.06	533.58	NA	NA	532.64	532.75	532.72	537.99
MW-233 [b]	577.62	52.67	538.41	540.46	537.59	535.27	534.06	533.22	532.70	532.62	532.63	533.39	532.64	537.94
MW-234 [b]	579.03	53.40	538.42	539.86	537.62	535.31	534.12	533.26	532.72	532.63	532.64	532.80	532.68	538.07
PZ-203	592.66	64.19	538.41	540.13	537.61	535.40	534.18	533.36	532.80	532.76	532.73	532.93	532.66	538.75
PZ-214	579.22	53.26	538.82	540.13	537.90	535.65	534.32	533.56	533.02	532.84	532.99	533.06	533.11	537.95

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

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

Table 3.2

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

Date	Horizontal Hydraulic Gradient (unitless)	Average Linear Groundwater Flow Velocity (meters/day)	Average Linear Groundwater Flow Velocity (feet/year)
1-Feb-2018	0.0003	0.08	98
24-Apr-2018	0.0002	0.05	65
4-Sep-2018	0.0003	0.07	88
19-Mar-2019	0.0001	0.04	44
21-May-2019	0.0005	0.15	176
11-Jun-2019	0.0009	0.27	324
3-Sep-2019	0.0006	0.18	218
3-Mar-2020	0.0002	0.07	85
2-Jun-2020	0.0006	0.16	191
8-Sep-2020	0.0004	0.13	150
22-Mar-2021	0.0001	0.03	31
13-Sep-2021	0.0005	0.14	163
2-Nov-2021	0.0004	0.11	135
21-Mar-2022	0.0004	0.11	136
26-Sep-2022	0.0006	0.18	221
6-Mar-2023	0.0004	0.12	149
25-Sep-2023	0.0005	0.16	187
11-Mar-2024	0.0005	0.14	170
26-Aug-2024	0.0008	0.22	270

Table 4.1

Baseline Period Groundwater Monitoring Data
MidAmerican Energy Company
Louisa Generating Station West Monofill - Muscatine, Iowa

Sample Location:			MW-03	MW-03	MW-03	MW-03	MW-03	MW-03	MW-03	MW-03
Sample ID:			MW-03	MW-03	MW-03	MW-03	MW-03	MW-03	MW-03	MW-03
Sample Date:			12/15/2015	3/8/2016	6/13/2016	9/14/2016	12/14/2016	2/16/2017	4/19/2017	6/27/2017
Parameters	**Units**	**MCL**								
Appendix III										
Boron	mg/L	None	0.0500 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
Calcium	mg/L	None	30.0	23.7	29.2	27.8	26.4	27.4	22.7	26.2
Chloride	mg/L	None	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Fluoride	mg/L	4.0 [a]	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.07	0.500 U
pH, lab	s.u.	None	7.99	8.08	8.22	8.2	8.0	8.3	8.1	8.0
Sulfate	mg/L	None	8.78	8.97	7.50	6.16	7.39	8.63	9.67	8.16
Total dissolved solids (TDS)	mg/L	None	112	158	136	160	252	182	168	214
Appendix IV										
Antimony	mg/L	0.006 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Arsenic	mg/L	0.01 [a]	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	2.0 [a]	0.0191	0.0140	0.0178	0.0165	0.0160	0.0167	0.0155	0.0166
Beryllium	mg/L	0.004 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.005 [a]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Chromium	mg/L	0.1 [a]	0.00500 U	0.00500 U	0.00508	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Cobalt	mg/L	0.006 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.015 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.040 [b]	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U
Mercury	mg/L	0.002 [a]	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.100 [b]	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	5 [a]	0.194	0.439	-0.110	0.572	0.174	-0.0899	0.0316	0.120
Selenium	mg/L	0.05 [a]	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.002 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Table 4.1

Baseline Period Groundwater Monitoring Data
MidAmerican Energy Company
Louisa Generating Station West Monofill - Muscatine, Iowa

Sample Location:			MW-04	MW-04	MW-04	MW-04	MW-04	MW-04	MW-04	MW-04
Sample ID:			MW-04	MW-04	MW-04	MW-04	MW-04	MW-04	MW-04	MW-04
Sample Date:			12/16/2015	3/7/2016	6/13/2016	9/14/2016	12/14/2016	2/16/2017	4/19/2017	6/27/2017
Parameters	**Units**	**MCL**								
Appendix III										
Boron	mg/L	None	0.584	0.276	0.201	0.225	0.369	0.417	0.341	0.454
Calcium	mg/L	None	53.9	60.2	59.6	56.5	66.2	70.4	59.2	57.9
Chloride	mg/L	None	5.00 U	5.00 U	5.00 U	5.33	5.00 U	5.00 U	5.94	5.15
Fluoride	mg/L	4.0 [a]	0.500 U	0.500 U	0.500 U	0.825	0.500 U	0.500 U	1.09	0.500 U
pH, lab	s.u.	None	7.84	7.79	7.71	7.8	7.6	7.6	7.8	7.5
Sulfate	mg/L	None	33.2	20.5	28.5	24.5	41.6	50.8	67.7	61.0
Total dissolved solids (TDS)	mg/L	None	280	250	260	262	392	296	282	336
Appendix IV										
Antimony	mg/L	0.006 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Arsenic	mg/L	0.01 [a]	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	2.0 [a]	0.0571	0.0525	0.0508	0.0495	0.0552	0.0634	0.0539	0.0575
Beryllium	mg/L	0.004 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.005 [a]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Chromium	mg/L	0.1 [a]	0.00500 U	0.00500 U	0.0153	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Cobalt	mg/L	0.006 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.015 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.040 [b]	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U
Mercury	mg/L	0.002 [a]	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.100 [b]	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	5 [a]	0.148	0.183	0.129	0.292	0.173	0.441	0.0626	0.224
Selenium	mg/L	0.05 [a]	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.002 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Table 4.1

Baseline Period Groundwater Monitoring Data
MidAmerican Energy Company
Louisa Generating Station West Monofill - Muscatine, Iowa

Sample Location:			MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R
Sample ID:			MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R
Sample Date:			12/16/2015	3/8/2016	6/13/2016	9/14/2016	12/14/2016	2/16/2017	4/19/2017	6/27/2017
Parameters	**Units**	**MCL**								
Appendix III										
Boron	mg/L	None	0.0500 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
Calcium	mg/L	None	45.8	47.5	56.3	47.4	51.1	52.7	39.9	41.8
Chloride	mg/L	None	5.00 U	5.00 U	5.00 U	6.60	9.17	5.00 U	9.95	5.00 U
Fluoride	mg/L	4.0 [a]	0.500 U	0.500 U	0.500 U	0.793	1.74	0.500 U	1.58	0.500 U
pH, lab	s.u.	None	7.90	7.88	7.93	8.0	7.8	7.9	8.0	7.8
Sulfate	mg/L	None	30.0	33.1	43.2	29.0	31.5	31.3	26.4	21.2
Total dissolved solids (TDS)	mg/L	None	216	208	238	234	236	212	198	312
Appendix IV										
Antimony	mg/L	0.006 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Arsenic	mg/L	0.01 [a]	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	2.0 [a]	0.0364	0.0311	0.0357	0.0310	0.0305	0.0402	0.0328	0.0346
Beryllium	mg/L	0.004 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.005 [a]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Chromium	mg/L	0.1 [a]	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Cobalt	mg/L	0.006 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.015 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.040 [b]	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U
Mercury	mg/L	0.002 [a]	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.100 [b]	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	5 [a]	0.611	-0.00637	0.150	0.188	0.631	0.235	0.381	0.275
Selenium	mg/L	0.05 [a]	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.002 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Table 4.1

Baseline Period Groundwater Monitoring Data
MidAmerican Energy Company
Louisa Generating Station West Monofill - Muscatine, Iowa

Sample Location:			MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A
Sample ID:			MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A
Sample Date:			12/16/2015	3/7/2016	6/13/2016	9/14/2016	12/14/2016	2/16/2017	4/19/2017	6/27/2017
Parameters	**Units**	**MCL**								
Appendix III										
Boron	mg/L	None	0.350	0.200 U	0.200 U	0.200 U	0.210	0.263	0.268	0.310
Calcium	mg/L	None	41.2	30.7	37.1	32.3	51.7	60.4	47.5	44.4
Chloride	mg/L	None	7.29	5.00 U	5.00 U	5.00 U	7.06	5.00 U	7.58	5.53
Fluoride	mg/L	4.0 [a]	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.37	0.500 U
pH, lab	s.u.	None	7.84	7.11	7.11	6.9	6.9	6.9	7.0	6.7
Sulfate	mg/L	None	59.5	25.1	25.8	29.2	80.4	107	105	86.5
Total dissolved solids (TDS)	mg/L	None	214	160	194	206	314	338	336	314
Appendix IV										
Antimony	mg/L	0.006 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Arsenic	mg/L	0.01 [a]	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	2.0 [a]	0.0502	0.0260	0.0287	0.0296	0.0398	0.0473	0.0343	0.0368
Beryllium	mg/L	0.004 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.005 [a]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Chromium	mg/L	0.1 [a]	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00680	0.00648	0.00574
Cobalt	mg/L	0.006 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.015 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.040 [b]	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U
Mercury	mg/L	0.002 [a]	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.100 [b]	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	5 [a]	0.311	0.108	0.231	0.228	0.260	0.235	0.183	0.639
Selenium	mg/L	0.05 [a]	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00559	0.00500 U	0.00500 U
Thallium	mg/L	0.002 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Table 4.1

Baseline Period Groundwater Monitoring Data
MidAmerican Energy Company
Louisa Generating Station West Monofill - Muscatine, Iowa

Sample Location:			MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A
Sample ID:			MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A
Sample Date:			12/15/2015	3/7/2016	6/13/2016	9/14/2016	12/14/2016	2/16/2017	4/19/2017	6/27/2017
Parameters	**Units**	**MCL**								
Appendix III										
Boron	mg/L	None	0.0862	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
Calcium	mg/L	None	45.5	46.4	57.9	47.7	51.4	57.3	61.1	62.8
Chloride	mg/L	None	15.7	17.0	16.4	17.2	23.0	33.8	34.1	36.4
Fluoride	mg/L	4.0 [a]	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	3.17	0.708	0.500 U
pH, lab	s.u.	None	7.91	6.76	8.08	7.2	6.7	6.7	6.8	6.6
Sulfate	mg/L	None	56.8	69.8	115	85.6	103	117	165	211
Total dissolved solids (TDS)	mg/L	None	286	308	400	372	368	380	462	580
Appendix IV										
Antimony	mg/L	0.006 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Arsenic	mg/L	0.01 [a]	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	2.0 [a]	0.0488	0.0432	0.0595	0.0476	0.0521	0.0570	0.0694	0.0772
Beryllium	mg/L	0.004 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.005 [a]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Chromium	mg/L	0.1 [a]	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00521	0.00500 U
Cobalt	mg/L	0.006 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.015 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.040 [b]	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U
Mercury	mg/L	0.002 [a]	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.100 [b]	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	5 [a]	0.159	0.236	0.525	0.435	0.401	0.276	0.0869	-0.0348
Selenium	mg/L	0.05 [a]	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.002 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Table 4.1

Baseline Period Groundwater Monitoring Data
MidAmerican Energy Company
Louisa Generating Station West Monofill - Muscatine, Iowa

Sample Location:			MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21
Sample ID:			MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21
Sample Date:			12/15/2015	3/8/2016	6/13/2016	9/14/2016	12/14/2016	2/16/2017	4/19/2017	6/27/2017
Parameters	**Units**	**MCL**								
Appendix III										
Boron	mg/L	None	0.184	0.311	0.224	0.346	0.200 U	0.200 U	0.200 U	0.200 U
Calcium	mg/L	None	70.5	71.9	64.9	69.9	49.2	51.0	63.7	54.1
Chloride	mg/L	None	5.51	14.0	16.8	21.6	9.04	7.63	14.8	9.41
Fluoride	mg/L	4.0 [a]	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.650	0.500 U
pH, lab	s.u.	None	7.90	7.66	7.94	7.7	7.7	7.7	7.7	7.6
Sulfate	mg/L	None	15.5	19.2	12.1	27.2	5.01	8.91	22.4	21.2
Total dissolved solids (TDS)	mg/L	None	268	272	260	284	232	262	286	282
Appendix IV										
Antimony	mg/L	0.006 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Arsenic	mg/L	0.01 [a]	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	2.0 [a]	0.0616	0.0565	0.0489	0.0569	0.0388	0.0442	0.0550	0.0543
Beryllium	mg/L	0.004 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.005 [a]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Chromium	mg/L	0.1 [a]	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Cobalt	mg/L	0.006 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.015 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.040 [b]	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U
Mercury	mg/L	0.002 [a]	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.100 [b]	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	5 [a]	0.378	0.140	-0.162	0.259	0.0625	-0.0622	0.0439	0.0259
Selenium	mg/L	0.05 [a]	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.002 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Table 4.1

Baseline Period Groundwater Monitoring Data
MidAmerican Energy Company
Louisa Generating Station West Monofill - Muscatine, Iowa

Sample Location:			MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22
Sample ID:			MW-22	DP-02	MW-22	DP-02	MW-22	DP-02	MW-22	DP-02
Sample Date:			12/16/2015	12/16/2015	3/7/2016	3/7/2016	6/13/2016	6/13/2016	9/14/2016	9/14/2016
Parameters	**Units**	**MCL**		(Duplicate)		(Duplicate)		(Duplicate)		(Duplicate)
Appendix III										
Boron	mg/L	None	0.477	0.457	0.708	0.697	0.588	0.551	0.535	0.570
Calcium	mg/L	None	66.4	70.6	64.2	63.5	55.4	56.5	58.8	65.1
Chloride	mg/L	None	9.72	10.4	10.1	10.1	10.3	10.7	10.8	10.7
Fluoride	mg/L	4.0 [a]	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
pH, lab	s.u.	None	8.10	6.65	6.78	6.70	6.72	6.74	6.8	6.8
Sulfate	mg/L	None	162	161	215	195	194	194	196	196
Total dissolved solids (TDS)	mg/L	None	438	406	484	458	440	482	456	482
Appendix IV										
Antimony	mg/L	0.006 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Arsenic	mg/L	0.01 [a]	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	2.0 [a]	0.0885	0.0943	0.0713	0.0707	0.0640	0.0652	0.0556	0.0606
Beryllium	mg/L	0.004 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.005 [a]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Chromium	mg/L	0.1 [a]	0.0109	0.0117	0.0281	0.0280	0.0277	0.0291	0.0558	0.0600
Cobalt	mg/L	0.006 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.015 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.040 [b]	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U
Mercury	mg/L	0.002 [a]	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.100 [b]	0.00274	0.00292	0.00644	0.00644	0.00758	0.00765	0.00988	0.0103
Radium-226 & 228	pCi/L	5 [a]	0.255	0.335	0.459	0.692	0.161	0.366	0.249	0.449
Selenium	mg/L	0.05 [a]	0.00807	0.00889	0.0142	0.0145	0.0195	0.0204	0.0178	0.0206
Thallium	mg/L	0.002 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Table 4.1

Baseline Period Groundwater Monitoring Data
MidAmerican Energy Company
Louisa Generating Station West Monofill - Muscatine, Iowa

Sample Location:			MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22
Sample ID:			MW-22	DP-02	MW-22	DP-02	MW-22	DP-02	MW-22	DP-02
Sample Date:			12/14/2016	12/14/2016	2/16/2017	2/16/2017	4/19/2017	4/19/2017	6/27/2017	6/27/2017
Parameters	Units	MCL		(Duplicate)		(Duplicate)		(Duplicate)		(Duplicate)
Appendix III										
Boron	mg/L	None	0.542	0.533	0.511	0.508	0.384	0.384	0.380	0.375
Calcium	mg/L	None	44.6	46.2	47.8	43.8	34.1	32.0	32.3	32.3
Chloride	mg/L	None	9.08	9.27	7.34	8.89	5.00 U	5.00 U	5.00 U	5.00 U
Fluoride	mg/L	4.0 [a]	0.500 U	0.810	0.610	0.733	0.541	0.500 U	0.500 U	0.500 U
pH, lab	s.u.	None	7.1	7.0	7.0	7.0	7.2	7.2	7.1	7.1
Sulfate	mg/L	None	118	119	133	136	108	108	71.5	78.0
Total dissolved solids (TDS)	mg/L	None	394	372	344	388	280	272	306	318
Appendix IV										
Antimony	mg/L	0.006 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Arsenic	mg/L	0.01 [a]	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	2.0 [a]	0.0344	0.0336	0.0405	0.0387	0.0290	0.0266	0.0251	0.0252
Beryllium	mg/L	0.004 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.005 [a]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Chromium	mg/L	0.1 [a]	0.0461	0.0475	0.0457	0.0437	0.0461	0.0435	0.0466	0.0469
Cobalt	mg/L	0.006 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.015 [b]	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.040 [b]	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U
Mercury	mg/L	0.002 [a]	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.100 [b]	0.0141	0.0143	0.0202	0.0195	0.0321	0.0289	0.0333	0.0340
Radium-226 & 228	pCi/L	5 [a]	0.0733	0.498	-0.0754	0.114	0.130	0.407	0.209	0.0320
Selenium	mg/L	0.05 [a]	0.0176	0.0175	0.0206	0.0205	0.0154	0.0148	0.00861	0.00848
Thallium	mg/L	0.002 [a]	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Notes:
U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
[a] Maximum contaminant level (MCL).
[b] Groundwater protection standard (GWPS) established under 40 CFR 257.95(h)(2).
None - No MCL established.

Table 4.2

2024 Monitoring Analytical Results Summary
MidAmerican Energy Company
Louisa Generating Station West Monofill - Muscatine, Iowa

Sample Location:			MW-03	MW-03	MW-04	MW-04	MW-17R	MW-17R
Sample ID:			MW03-GW-0324	MW03-GW-0824	MW04-GW-0324	MW04-GW-0824	MW17R-GW-0324	MW17R-GW-0824
Sample Date:			3/12/2024	8/27/2024	3/12/2024	8/27/2024	3/12/2024	8/27/2024
Parameters	**Units**	**Site-Specific GWPS**						
Appendix III								
Boron	mg/L	None	0.100 U	0.100 U	0.383	0.367	0.100 U	0.100 U
Calcium	mg/L	None	22.6	31.0	45.7	46.8	34.2	38.0
Chloride	mg/L	None	5.00 U	5.00 U	13.7	9.29	5.00 U	5.00 U
Fluoride	mg/L	4	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
pH, lab	s.u.	None	7.9 J	8.3 J	7.9 J	7.7 J	8.0 J	7.9 J
Sulfate	mg/L	None	5.68	5.46	39.2	23.9	11.7	19.7
Total dissolved solids (TDS)	mg/L	None	94.0	134	224	214	136	162
Appendix IV								
Antimony	mg/L	0.006	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	0.01	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	2	0.0149	0.0203	0.0464	0.0505	0.0301	0.0299
Beryllium	mg/L	0.004	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.005	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Chromium	mg/L	0.1	0.00500 U	0.00500 U	0.00788	0.00500 U	0.00500 U	0.00500 U
Cobalt	mg/L	0.006	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.015	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.04	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U
Mercury	mg/L	0.002	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.1	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	5	0.194 U	0.0975	0.184 U	0.401	-0.0678 U	0.273
Selenium	mg/L	0.05	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.002	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Table 4.2

2024 Monitoring Analytical Results Summary
MidAmerican Energy Company
Louisa Generating Station West Monofill - Muscatine, Iowa

Sample Location:		**MW-18A**	**MW-18A**	**MW-20A**	**MW-20A**	**MW-21**	**MW-21**	**MW-22**
Sample ID:		**MW18A-GW-0324**	**MW18A-GW-0824**	**MW20A-GW-0324**	**MW20A-GW-0824**	**MW21-GW-0324**	**MW21-GW-0824**	**MW22-GW-0324**
Sample Date:		**3/12/2024**	**8/27/2024**	**3/13/2024**	**8/27/2024**	**3/13/2024**	**8/27/2024**	**3/13/2024**
Parameters	**Units**							
Appendix III								
Boron	mg/L	0.172	0.240	0.214	0.199	0.100 U	0.100 U	0.318
Calcium	mg/L	33.6	32.0	32.0	24.3	90.6	69.0	32.3
Chloride	mg/L	6.75	9.17	9.16	5.30	17.5	5.98	11.4
Fluoride	mg/L	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
pH, lab	s.u.	7.3 J	7.1 J	7.6 J	7.0 J	7.8 J	7.5 J	7.5 J
Sulfate	mg/L	44.9	38.8	65.7	46.7	66.0	24.7	46.0
Total dissolved solids (TDS)	mg/L	186	162	246	190	398	246	220
Appendix IV								
Antimony	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	0.0289	0.0310	0.0364	0.0290	0.0929	0.0612	0.0256
Beryllium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Chromium	mg/L	0.00879	0.0114	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.0246
Cobalt	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U
Mercury	mg/L	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.0382
Radium-226 & 228	pCi/L	-0.190 U	0.564	-0.109 U	0.516	0.0380 U	0.0668	0.150 U
Selenium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00950	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Table 4.2

2024 Monitoring Analytical Results Summary
MidAmerican Energy Company
Louisa Generating Station West Monofill - Muscatine, Iowa

Sample Location:		**MW-22**	**MW-22**	**MW-22**
Sample ID:		**DP02-GW-0324**	**MW22-GW-0824**	**DP02-GW-0824**
Sample Date:		**3/13/2024 (Duplicate)**	**8/27/2024**	**8/27/2024 (Duplicate)**
Parameters	**Units**			
Appendix III				
Boron	mg/L	0.331	0.158	0.158
Calcium	mg/L	32.3	38.6	38.7
Chloride	mg/L	11.4	18.9	19.0
Fluoride	mg/L	1.00 U	1.00 U	1.00 U
pH, lab	s.u.	7.5 J	7.6 J	7.5 J
Sulfate	mg/L	46.4	33.6	33.7
Total dissolved solids (TDS)	mg/L	218	182	172
Appendix IV				
Antimony	mg/L	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	0.0256	0.0140	0.0141
Beryllium	mg/L	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.000200 U	0.000200 U	0.000200 U
Chromium	mg/L	0.0249	0.00648	0.00665
Cobalt	mg/L	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.0100 U	0.0100 U	0.0100 U
Mercury	mg/L	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.0392	0.0226	0.0227
Radium-226 & 228	pCi/L	-0.0904 U	0.245	0.692
Selenium	mg/L	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.00100 U	0.00100 U	0.00100 U

Footnotes:
U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
GWPS - Groundwater Protection Standard.

Table 4.3

Inter-Well Comparisons for 2024 Monitoring Data vs. Upgradient Background Prediction Limits
MidAmerican Energy Company
Louisa Generating Station - West Monofill
Muscatine, Iowa

		Appendix III Analytes						
Well	**Observation**	**Boron mg/L**	**Calcium mg/L**	**Chloride mg/L**	**Fluoride mg/L**	**pH, lab s.u.**	**Sulfate mg/L**	**Total dissolved solids (TDS) mg/L**
Combined Upgradient	***Prediction Limit***	**0.588**	**73.1**	**9.95**	**1.74**	**7.53-8.29**	**63.6**	**389**
	MCL/GWPS	**None**	**None**	**None**	**4.0** [a]	**None**	**None**	**None**
MW-03 (Upgradient)	3/12/2024	0.100 U	22.6	5.00 U	1.00 U	7.9 J	5.68	94
	8/27/2024	0.100 U	31.0	5.00 U	1.00 U	8.3 J	5.46	134
MW-04 (Upgradient)	3/12/2024	0.383	45..7	13.7	1.00 U	7.9 J	39.2	224
	8/27/2024	0.367	46.8	9.29	1.00 U	7.7 J	23.9	214
MW-17R (Upgradient)	3/12/2024	0.100 U	34.2	5.00 U	1.00 U	8.0 J	11.7	136
	8/27/2024	0.100 U	38.0	5.00 U	1.00 U	7.9 J	19.7	162
MW-18A	3/12/2024	0.172	33.6	6.75	1.00 U	7.3 J [c]	44.9	186
	8/27/2024	0.240	32.0	9.17	1.00 U	7.1 J	38.8	162
MW-20A	3/13/2024	0.214	32.0	9.16	1.00 U	7.6 J	65.7	246
	8/27/2024	0.199	24.3	5.30	1.00 U	7.0 J [c]	46.7	190
MW-21	3/13/2024	0.100 U	90.6	17.5	1.00 U	7.8 J	66.0	398
	8/27/2024	0.100 U	69.0	5.98	1.00 U	7.5 J	24.7	246
MW-22	3/13/2024	0.318/0.331	32.3/32.3	11.4/11.4	1.00 U/1.00 U	7.5 J/7.5 J [c]	46.0/46.4	220/218
	8/27/2024	0.158/0.158	38.6/38.7	18.9/19.0	1.00 U/1.00 U	7.6 J/**7.5 J** [c]	33.6/33.7	182/172

Table 4.3

Inter-Well Comparisons for 2024 Monitoring Data vs. Upgradient Background Prediction Limits
MidAmerican Energy Company
Louisa Generating Station - West Monofill
Muscatine, Iowa

		Appendix IV Analytes						
Well	**Observation**	**Antimony mg/L**	**Arsenic mg/L**	**Barium mg/L**	**Beryllium mg/L**	**Cadmium mg/L**	**Chromium mg/L**	**Cobalt mg/L**
Combined Upgradient	***Prediction Limit***	**0.00200 U**	**0.00200 U**	**0.0688**	**0.00100 U**	**0.000500 U**	**0.0153**	**0.000500 U**
	MCL/GWPS	**0.006** [a]	**0.01** [a]	**2.0** [a]	**0.004** [a]	**0.005** [a]	**0.1** [a]	**0.006** [b]
MW-03 (Upgradient)	3/12/2024	0.00200 U	0.00200 U	0.0149	0.00100 U	0.000200 U	0.00500 U	0.000500 U
	8/27/2024	0.00200 U	0.00200 U	0.0203	0.00100 U	0.000200 U	0.00500 U	0.000500 U
MW-04 (Upgradient)	3/12/2024	0.00200 U	0.00200 U	0.0464	0.00100 U	0.000200 U	0.00788	0.000500 U
	8/27/2024	0.00200 U	0.00200 U	0.0505	0.00100 U	0.000200 U	0.00500 U	0.000500 U
MW-17R (Upgradient)	3/12/2024	0.00200 U	0.00200 U	0.0301	0.00100 U	0.000200 U	0.00500 U	0.000500 U
	8/27/2024	0.00200 U	0.00200 U	0.0299	0.00100 U	0.000200 U	0.00500 U	0.000500 U
MW-18A	3/12/2024	0.00200 U	0.00200 U	0.0289	0.00100 U	0.000200 U	0.00879	0.000500 U
	8/27/2024	0.00200 U	0.00200 U	0.0310	0.00100 U	0.000200 U	0.01140	0.000500 U
MW-20A	3/13/2024	0.00200 U	0.00200 U	0.0364	0.00100 U	0.000200 U	0.00500 U	0.000500 U
	8/27/2024	0.00200 U	0.00200 U	0.0290	0.00100 U	0.000200 U	0.00500 U	0.000500 U
MW-21	3/13/2024	0.00200 U	0.00200 U	0.0929	0.00100 U	0.000200 U	0.00500 U	0.000500 U
	8/27/2024	0.00200 U	0.00200 U	0.0612	0.00100 U	0.000200 U	0.00500 U	0.000500 U
MW-22	3/13/2024	0.00200 U/0.00200 U	0.00200 U/0.00200 U	0.0256/0.0259	0.00100 U/0.00100 U	0.000200 U/0.000200 U	0.0246/0.0249	0.000500 U/0.000500 U
	8/27/2024	0.00200 U/0.00200 U	0.00200 U/0.00200 U	0.0140/0.0141	0.00100 U/0.00100 U	0.000200 U/0.000200 U	0.00648/0.00665	0.000500 U/0.000500 U

Table 4.3

Inter-Well Comparisons for 2024 Monitoring Data vs. Upgradient Background Prediction Limits
MidAmerican Energy Company
Louisa Generating Station - West Monofill
Muscatine, Iowa

		Appendix IV Analytes						
Well	**Observation**	**Lead mg/L**	**Lithium mg/L**	**Mercury mg/L**	**Molybdenum mg/L**	**Radium-226 & 228 pCi/L**	**Selenium mg/L**	**Thallium mg/L**
Combined Upgradient	***Prediction Limit***	**0.000500 U**	**0.0100 U**	**0.000200 U**	**0.00200 U**	**0.640**	**0.00500 U**	**0.00100 U**
	MCL/GWPS	**0.015** [b]	**0.040** [b]	**0.002** [a]	**0.100** [b]	**5** [a]	**0.05** [a]	**0.002** [a]
MW-03 (Upgradient)	3/12/2024	0.000500 U	0.0100 U	0.000200 U	0.00200 U	0.194 U	0.00500 U	0.00100 U
	8/27/2024	0.000500 U	0.0100 U	0.000200 U	0.00200 U	0.0975	0.00500 U	0.00100 U
MW-04 (Upgradient)	3/12/2024	0.000500 U	0.0100 U	0.000200 U	0.00200 U	0.184 U	0.00500 U	0.00100 U
	8/27/2024	0.000500 U	0.0100 U	0.000200 U	0.00200 U	0.401	0.00500 U	0.00100 U
MW-17R (Upgradient)	3/12/2024	0.000500 U	0.0100 U	0.000200 U	0.00200 U	-0.0678 U	0.00500 U	0.00100 U
	8/27/2024	0.000500 U	0.0100 U	0.000200 U	0.00200 U	0.273	0.00500 U	0.00100 U
MW-18A	3/12/2024	0.000500 U	0.0100 U	0.000200 U	0.00200 U	-0.190 U	0.00500 U	0.00100 U
	8/27/2024	0.000500 U	0.0100 U	0.000200 U	0.00200 U	0.564	0.00500 U	0.00100 U
MW-20A	3/13/2024	0.000500 U	0.0100 U	0.000200 U	0.00200 U	-0.109 U	0.00500 U	0.00100 U
	8/27/2024	0.000500 U	0.0100 U	0.000200 U	0.00200 U	0.516	0.00950	0.00100 U
MW-21	3/13/2024	0.000500 U	0.0100 U	0.000200 U	0.00200 U	0.0380 U	0.00500 U	0.00100 U
	8/27/2024	0.000500 U	0.0100 U	0.000200 U	0.00200 U	0.0668	0.00500 U	0.00100 U
MW-22	3/13/2024	0.000500 U/0.000500 U	0.0100 U/0.0100 U	0.000200 U/0.000200 U	0.0382/0.0392	0.150 U/-0.0904 U	0.00500 U/0.00500 U	0.00100 U/0.00100 U
	8/27/2024	0.000500 U/0.000500 U	0.0100 U/0.0100 U	0.000200 U/0.000200 U	0.0226/0.0227	0.245/**0.692**	0.00500 U/0.00500 U	0.00100 U/0.00100 U

Notes:
0.931/0.928 - Field duplicate results.
U - Not detected at the associated reporting limit.
J - Estimated concentration.
NS - Not sampled
1.68 Value exceeds inter-well prediction limit.
† - Trend present during baseline period, no UTL values calculated (baseline range listed for comparison).
None - No MCL established.
[a] Maximum contaminant level (MCL).
[b] Groundwater protection standard (GWPS) established under 40 CFR 257.95(h)(2).
[c] An alternate source determiniation other than the CCR unit has been identified for statistically significant decreases of pH (GHD, 2019).

Table 4.4

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

Parameters	Units	MCL [a] 40 CFR 257.95(h)(1)	GWPS [b] 40 CFR 257.95(h)(2)	Background [c] 40 CFR 257.95(h)(3)	Site-Specific GWPS	Maximum 2024 Concentration Downgradient [d]	2024 Conclusion
Appendix IV							
Antimony	mg/L	0.006 [a]	NA	0.00200 U	0.006 [a]	0.00200 U	Below GWPS
Arsenic	mg/L	0.01 [a]	NA	0.00200 U	0.01 [a]	0.00200 U	Below GWPS
Barium	mg/L	2.0 [a]	NA	0.0688	2.0 [a]	0.0929	Below GWPS
Beryllium	mg/L	0.004 [a]	NA	0.00100 U	0.004 [a]	0.00100 U	Below GWPS
Cadmium	mg/L	0.005 [a]	NA	0.000500 U	0.005 [a]	0.000200 U	Below GWPS
Chromium	mg/L	0.1 [a]	NA	0.0153	0.1 [a]	0.0249	Below GWPS
Cobalt	mg/L	NA	0.006 [b]	0.000500 U	0.006 [b]	0.000500 U	Below GWPS
Fluoride	mg/L	4.0 [a]	NA	1.74	4.0 [a]	1.00 U	Below GWPS
Lead	mg/L	NA	0.015 [b]	0.000500 U	0.015 [b]	0.000500 U	Below GWPS
Lithium	mg/L	NA	0.040 [b]	0.0100 U	0.040 [b]	0.0100 U	Below GWPS
Mercury	mg/L	0.002 [a]	NA	0.000200 U	0.002 [a]	0.000200 U	Below GWPS
Molybdenum	mg/L	NA	0.100 [b]	0.00200 U	0.100 [b]	0.0392	Below GWPS
Radium-226 & 228	pCi/L	5 [a]	NA	0.640	5 [a]	0.692	Below GWPS
Selenium	mg/L	0.05 [a]	NA	0.00500 U	0.05 [a]	0.0095	Below GWPS
Thallium	mg/L	0.002 [a]	NA	0.00100 U	0.002 [a]	0.00100 U	Below GWPS

Notes:

MCL - Maximum Contaminant Level.

NA - Not applicable.

U - Not detected at the associated reporting limit.

[a] Maximum contaminant level (MCL).

[b] Groundwater protection standard (GWPS) established under 40 CFR 257.95(h)(2).

[c] Determined from baseline data set for MW-3, MW-4, and MW-17R.

[d] Determined from downgradient wells data set for MW-18A, MW-20A, MW-21, and MW-22.

Appendices

Appendix A

Groundwater Sample Collection Records

Low-Flow Test Report:

Test Date / Time: 3/12/2024 3:12:00 PM
Project: LGS West Monofill MW-03
Operator Name: Brooke Wasson

Location Name: MW-03 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 48.2 ft** **Total Depth: 58.2 ft** **Initial Depth to Water: 48.18 ft**	**Pump Type: Solinst Model 407 Bladder Pump** **Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing** **Tubing Inner Diameter: 0.125 in** **Tubing Length: 55 ft** **Pump Intake From TOC: 57 ft** **Estimated Total Volume Pumped: 1695 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 150 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 876572**

Test Notes:
Sampled 1525

Weather Conditions:
69 degrees F mostly sunny breezy

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
3/12/2024 3:12 PM	00:00	7.77 pH	15.87 °C	0.00 mS/cm	10.00 mg/L	2.06 NTU	117.3 mV	48.18 ft	150.00 ml/min
3/12/2024 3:13 PM	01:53	8.03 pH	14.36 °C	0.18 mS/cm	10.51 mg/L	0.00 NTU	103.2 mV	48.18 ft	150.00 ml/min
3/12/2024 3:15 PM	03:46	8.05 pH	14.09 °C	0.18 mS/cm	10.59 mg/L	0.00 NTU	114.8 mV	48.18 ft	150.00 ml/min
3/12/2024 3:17 PM	05:39	8.03 pH	13.80 °C	0.17 mS/cm	10.69 mg/L	0.00 NTU	109.5 mV	48.18 ft	150.00 ml/min
3/12/2024 3:19 PM	07:32	8.02 pH	13.68 °C	0.17 mS/cm	10.70 mg/L	0.00 NTU	105.0 mV	48.18 ft	150.00 ml/min
3/12/2024 3:21 PM	09:25	8.02 pH	13.65 °C	0.17 mS/cm	10.72 mg/L	0.00 NTU	114.2 mV	48.18 ft	150.00 ml/min
3/12/2024 3:23 PM	11:18	8.02 pH	13.56 °C	0.17 mS/cm	10.69 mg/L	0.00 NTU	109.4 mV	48.18 ft	150.00 ml/min

Samples

Sample ID:	Description:

MW03-GW-0324	2 plastic 1 liter nitric acid 1 plastic 1 liter unpreserved 1 plastic 250mL nitric acid 1 plastic 250mL unpreserved

Low-Flow Test Report:

Test Date / Time: 3/12/2024 2:28:00 PM
Project: LGS West Monofill MW-04 (4)
Operator Name: Brooke Wasson

Location Name: MW-04 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 40.3 ft** **Total Depth: 50.3 ft** **Initial Depth to Water: 44.74 ft**	**Pump Type: Solinst Model 407 Bladder Pump** **Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing** **Tubing Inner Diameter: 0.125 in** **Tubing Length: 47 ft** **Pump Intake From TOC: 49 ft** **Estimated Total Volume Pumped: 2266.667 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 876572**

Test Notes:
Sampled 1440

Weather Conditions:
68 degrees F mostly sunny windy

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
3/12/2024 2:28 PM	00:00	7.60 pH	15.66 °C	0.41 mS/cm	9.88 mg/L	4.77 NTU	129.9 mV	44.74 ft	200.00 ml/min
3/12/2024 2:30 PM	02:16	7.68 pH	14.28 °C	0.39 mS/cm	10.50 mg/L	0.00 NTU	83.4 mV	44.74 ft	200.00 ml/min
3/12/2024 2:32 PM	04:32	7.64 pH	14.21 °C	0.38 mS/cm	10.48 mg/L	7.42 NTU	77.6 mV	44.74 ft	200.00 ml/min
3/12/2024 2:34 PM	06:48	7.63 pH	14.12 °C	0.37 mS/cm	10.51 mg/L	0.00 NTU	75.7 mV	44.74 ft	200.00 ml/min
3/12/2024 2:37 PM	09:04	7.63 pH	14.04 °C	0.38 mS/cm	10.48 mg/L	0.00 NTU	73.7 mV	44.74 ft	200.00 ml/min
3/12/2024 2:39 PM	11:20	7.64 pH	14.01 °C	0.37 mS/cm	10.51 mg/L	0.00 NTU	71.3 mV	44.74 ft	200.00 ml/min

Samples

Sample ID:	Description:

MW04-GW-0324	2 plastic 1 liter nitric acid 1 plastic 1 liter unpreserved 1 plastic 250mL nitric acid 1 plastic 250mL unpreserved

Low-Flow Test Report:

Test Date / Time: 3/12/2024 3:56:58 PM
Project: LGS West Monofill MW-17R
Operator Name: Brooke Wasson

Location Name: MW-17R **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 42.7 ft** **Total Depth: 52.7 ft** **Initial Depth to Water: 47.69 ft**	**Pump Type: Solinst Model 407 Bladder Pump** **Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing** **Tubing Inner Diameter: 0.125 in** **Tubing Length: 49.4 ft** **Pump Intake From TOC: 51.4 ft** **Estimated Total Volume Pumped: 2283.333 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 876572**

Test Notes:
Sampled 1605

Weather Conditions:
69 degrees F mostly cloudy breezy

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
3/12/2024 3:56 PM	00:00	7.85 pH	17.50 °C	0.24 mS/cm	9.05 mg/L	0.00 NTU	137.9 mV	47.69 ft	200.00 ml/min
3/12/2024 3:59 PM	02:17	7.92 pH	14.80 °C	0.25 mS/cm	10.36 mg/L	0.23 NTU	107.9 mV	47.69 ft	200.00 ml/min
3/12/2024 4:01 PM	04:34	7.90 pH	14.36 °C	0.25 mS/cm	10.53 mg/L	0.00 NTU	106.9 mV	47.69 ft	200.00 ml/min
3/12/2024 4:03 PM	06:51	7.88 pH	14.15 °C	0.25 mS/cm	10.59 mg/L	0.18 NTU	107.4 mV	47.69 ft	200.00 ml/min
3/12/2024 4:06 PM	09:08	7.86 pH	14.05 °C	0.25 mS/cm	10.56 mg/L	0.75 NTU	103.9 mV	47.69 ft	200.00 ml/min
3/12/2024 4:08 PM	11:25	7.84 pH	13.99 °C	0.25 mS/cm	10.51 mg/L	2.03 NTU	104.2 mV	47.69 ft	200.00 ml/min

Samples

Sample ID:	Description:

MW-17R-GW-0324	2 plastic 1 liter nitric acid 1 plastic 1 liter unpreserved 1 plastic 250mL nitric acid 1 plastic 250mL unpreserved

Low-Flow Test Report:

Test Date / Time: 3/12/2024 4:51:23 PM
Project: LGS West Monofill MW-18A (4)
Operator Name: Brooke Wasson

Location Name: MW-18A **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 12.2 ft** **Total Depth: 22.3 ft** **Initial Depth to Water: 16.79 ft**	**Pump Type: Solinst Model 407 Bladder Pump** **Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing** **Tubing Inner Diameter: 0.125 in** **Tubing Length: 19 ft** **Pump Intake From TOC: 21 ft** **Estimated Total Volume Pumped: 958.333 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 100 ml/min** **Final Draw Down: 0.01 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 876572**

Test Notes:
Sampled 1705
MS/MSD collected

Weather Conditions:
69 degrees F cloudy breezy

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
3/12/2024 4:51 PM	00:00	7.47 pH	16.59 °C	0.30 mS/cm	8.81 mg/L	0.00 NTU	137.7 mV	16.79 ft	100.00 ml/min
3/12/2024 4:53 PM	01:55	6.90 pH	14.10 °C	0.32 mS/cm	9.74 mg/L	1.45 NTU	136.3 mV	16.80 ft	100.00 ml/min
3/12/2024 4:55 PM	03:50	6.70 pH	13.35 °C	0.32 mS/cm	9.58 mg/L	0.31 NTU	135.6 mV	16.80 ft	100.00 ml/min
3/12/2024 4:57 PM	05:45	6.63 pH	13.13 °C	0.32 mS/cm	9.64 mg/L	0.80 NTU	134.5 mV	16.80 ft	100.00 ml/min
3/12/2024 4:59 PM	07:40	6.59 pH	12.99 °C	0.32 mS/cm	9.60 mg/L	0.87 NTU	133.2 mV	16.80 ft	100.00 ml/min
3/12/2024 5:00 PM	09:35	6.57 pH	13.12 °C	0.32 mS/cm	9.55 mg/L	1.43 NTU	132.6 mV	16.80 ft	100.00 ml/min

Samples

Sample ID:	Description:

MW-18A-0324	2 plastic 1 liter nitric acid 1 plastic 1 liter unpreserved 1 plastic 250mL nitric acid 1 plastic 250mL unpreserved

Low-Flow Test Report:

Test Date / Time: 3/13/2024 8:16:44 AM
Project: LGS West Monofill MW-20A (4)
Operator Name: Brooke Wasson

Location Name: MW-20A **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 12.4 ft** **Total Depth: 22.5 ft** **Initial Depth to Water: 15.42 ft**	**Pump Type: Solinst Model 407 Bladder Pump** **Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing** **Tubing Inner Diameter: 0.125 in** **Tubing Length: 19.2 ft** **Pump Intake From TOC: 21.2 ft** **Estimated Total Volume Pumped: 15640 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.02 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 876572**

Test Notes:
Sampled 0910

Weather Conditions:
48 degrees F sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
3/13/2024 8:16 AM	00:00	6.95 pH	11.68 °C	0.47 mS/cm	2.37 mg/L	5.38 NTU	185.3 mV	15.42 ft	300.00 ml/min
3/13/2024 8:18 AM	01:32	6.96 pH	11.61 °C	0.47 mS/cm	2.00 mg/L	5.03 NTU	182.7 mV	15.44 ft	300.00 ml/min
3/13/2024 8:19 AM	03:04	6.98 pH	11.61 °C	0.37 mS/cm	1.91 mg/L	4.40 NTU	169.7 mV	15.44 ft	300.00 ml/min
3/13/2024 8:21 AM	04:36	6.99 pH	11.64 °C	0.47 mS/cm	1.95 mg/L	6.38 NTU	174.7 mV	15.44 ft	300.00 ml/min
3/13/2024 8:22 AM	06:08	7.01 pH	11.63 °C	0.47 mS/cm	1.96 mg/L	14.66 NTU	164.7 mV	15.44 ft	300.00 ml/min
3/13/2024 8:24 AM	07:40	7.01 pH	11.61 °C	0.47 mS/cm	1.93 mg/L	19.62 NTU	162.6 mV	15.44 ft	300.00 ml/min
3/13/2024 8:25 AM	09:12	7.02 pH	11.61 °C	0.47 mS/cm	1.87 mg/L	20.15 NTU	163.8 mV	15.44 ft	300.00 ml/min
3/13/2024 8:27 AM	10:44	7.03 pH	11.63 °C	0.47 mS/cm	1.86 mg/L	26.77 NTU	160.4 mV	15.44 ft	300.00 ml/min
3/13/2024 8:29 AM	12:16	7.03 pH	11.65 °C	0.47 mS/cm	1.87 mg/L	21.98 NTU	163.9 mV	15.44 ft	300.00 ml/min
3/13/2024 8:30 AM	13:48	7.03 pH	11.65 °C	0.47 mS/cm	1.83 mg/L	29.14 NTU	158.1 mV	15.44 ft	300.00 ml/min
3/13/2024 8:32 AM	15:20	7.03 pH	11.64 °C	0.47 mS/cm	1.80 mg/L	35.09 NTU	159.2 mV	15.44 ft	300.00 ml/min

3/13/2024 8:33 AM	16:52	7.03 pH	11.65 °C	0.47 mS/cm	1.84 mg/L	37.09 NTU	159.1 mV	15.44 ft	300.00 ml/min
3/13/2024 8:35 AM	18:24	7.04 pH	11.66 °C	0.46 mS/cm	1.88 mg/L	38.53 NTU	158.4 mV	15.44 ft	300.00 ml/min
3/13/2024 8:36 AM	19:56	7.03 pH	11.67 °C	0.46 mS/cm	2.02 mg/L	40.23 NTU	151.2 mV	15.44 ft	300.00 ml/min
3/13/2024 8:38 AM	21:28	7.02 pH	11.69 °C	0.46 mS/cm	2.04 mg/L	42.71 NTU	147.9 mV	15.44 ft	300.00 ml/min
3/13/2024 8:39 AM	23:00	7.02 pH	11.69 °C	0.41 mS/cm	2.15 mg/L	47.57 NTU	154.2 mV	15.44 ft	300.00 ml/min
3/13/2024 8:41 AM	24:32	7.01 pH	11.71 °C	0.44 mS/cm	2.24 mg/L	81.03 NTU	153.0 mV	15.44 ft	300.00 ml/min
3/13/2024 8:42 AM	26:04	7.01 pH	11.74 °C	0.45 mS/cm	2.30 mg/L	103.00 NTU	151.8 mV	15.44 ft	300.00 ml/min
3/13/2024 8:44 AM	27:36	7.01 pH	11.78 °C	0.45 mS/cm	2.40 mg/L	84.75 NTU	142.0 mV	15.44 ft	300.00 ml/min
3/13/2024 8:45 AM	29:08	7.00 pH	11.79 °C	0.45 mS/cm	2.48 mg/L	90.88 NTU	141.7 mV	15.44 ft	300.00 ml/min
3/13/2024 8:47 AM	30:40	7.00 pH	11.79 °C	0.37 mS/cm	2.63 mg/L	92.47 NTU	139.8 mV	15.44 ft	300.00 ml/min
3/13/2024 8:48 AM	32:12	7.02 pH	11.77 °C	0.36 mS/cm	2.68 mg/L	109.45 NTU	135.0 mV	15.44 ft	300.00 ml/min
3/13/2024 8:50 AM	33:44	7.02 pH	11.73 °C	0.35 mS/cm	2.79 mg/L	110.45 NTU	137.9 mV	15.44 ft	300.00 ml/min
3/13/2024 8:52 AM	35:16	7.02 pH	11.68 °C	0.41 mS/cm	2.96 mg/L	144.25 NTU	136.8 mV	15.44 ft	300.00 ml/min
3/13/2024 8:53 AM	36:48	7.02 pH	11.66 °C	0.39 mS/cm	2.93 mg/L	70.97 NTU	137.1 mV	15.44 ft	300.00 ml/min
3/13/2024 8:55 AM	38:20	7.02 pH	11.67 °C	0.34 mS/cm	2.95 mg/L	77.44 NTU	145.0 mV	15.44 ft	300.00 ml/min
3/13/2024 8:56 AM	39:52	7.02 pH	11.66 °C	0.41 mS/cm	3.05 mg/L	72.91 NTU	136.2 mV	15.44 ft	300.00 ml/min
3/13/2024 8:58 AM	41:24	7.02 pH	11.67 °C	0.41 mS/cm	3.00 mg/L	90.64 NTU	138.9 mV	15.44 ft	300.00 ml/min
3/13/2024 8:59 AM	42:56	7.02 pH	11.67 °C	0.36 mS/cm	3.06 mg/L	88.34 NTU	136.7 mV	15.44 ft	300.00 ml/min
3/13/2024 9:01 AM	44:28	7.02 pH	11.68 °C	0.36 mS/cm	3.03 mg/L	94.67 NTU	132.4 mV	15.44 ft	300.00 ml/min
3/13/2024 9:02 AM	46:00	7.02 pH	11.68 °C	0.38 mS/cm	3.12 mg/L	91.25 NTU	131.7 mV	15.44 ft	300.00 ml/min
3/13/2024 9:04 AM	47:32	7.01 pH	11.74 °C	0.41 mS/cm	3.07 mg/L	0.00 NTU	127.6 mV	15.44 ft	300.00 ml/min
3/13/2024 9:05 AM	49:04	7.00 pH	11.73 °C	0.43 mS/cm	3.04 mg/L	0.00 NTU	131.9 mV	15.44 ft	300.00 ml/min
3/13/2024 9:07 AM	50:36	7.01 pH	11.74 °C	0.43 mS/cm	3.02 mg/L	5.10 NTU	132.7 mV	15.44 ft	300.00 ml/min
3/13/2024 9:08 AM	52:08	7.00 pH	11.74 °C	0.43 mS/cm	3.17 mg/L	1.37 NTU	132.8 mV	15.44 ft	300.00 ml/min

Samples

Sample ID:	Description:

MW-20A-GW-0324	2 Plastic 1 liter nitric acid 1 plastic 1 liter unpreserved 1 plastic 250mL nitric acid 1 plastic 250mL unpreserved

Low-Flow Test Report:

Test Date / Time: 3/13/2024 9:40:01 AM
Project: LGS West Monofill MW-21
Operator Name: Brooke Wasson

Location Name: MW-21 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 40.9 ft** **Total Depth: 50.9 ft** **Initial Depth to Water: 43.6 ft**	**Pump Type: Solinst Model 407 Bladder Pump** **Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing** **Tubing Inner Diameter: 0.125 in** **Tubing Length: 47.6 ft** **Pump Intake From TOC: 49.6 ft** **Estimated Total Volume Pumped: 2725 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 876572**

Test Notes:
Sampled 0950

Weather Conditions:
51 degrees F sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
3/13/2024 9:40 AM	00:00	7.05 pH	12.17 °C	0.47 mS/cm	10.10 mg/L	0.18 NTU	150.9 mV	43.60 ft	300.00 ml/min
3/13/2024 9:41 AM	01:49	7.34 pH	12.82 °C	0.66 mS/cm	9.69 mg/L	0.27 NTU	114.5 mV	43.60 ft	300.00 ml/min
3/13/2024 9:43 AM	03:38	7.37 pH	12.98 °C	0.66 mS/cm	9.65 mg/L	0.00 NTU	114.4 mV	43.60 ft	300.00 ml/min
3/13/2024 9:45 AM	05:27	7.39 pH	13.06 °C	0.66 mS/cm	9.66 mg/L	0.00 NTU	107.5 mV	43.60 ft	300.00 ml/min
3/13/2024 9:47 AM	07:16	7.39 pH	13.07 °C	0.66 mS/cm	9.68 mg/L	0.00 NTU	109.9 mV	43.60 ft	300.00 ml/min
3/13/2024 9:49 AM	09:05	7.40 pH	13.13 °C	0.65 mS/cm	9.70 mg/L	0.00 NTU	102.2 mV	43.60 ft	300.00 ml/min

Samples

Sample ID:	Description:

MW-21-0324	2 Plastic 1 liter nitric acid 1 plastic 1 liter unpreserved 1 plastic 250mL nitric acid 1 plastic 250mL unpreserved

Low-Flow Test Report:

Test Date / Time: 3/13/2024 10:16:09 AM
Project: LGS West Monofill MW-22 (4)
Operator Name: Brooke Wasson

Location Name: MW-22 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 40.4 ft** **Total Depth: 50.3 ft** **Initial Depth to Water: 42.38 ft**	**Pump Type: Solinst Model 407 Bladder Pump** **Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing** **Tubing Inner Diameter: 0.125 in** **Tubing Length: 47.1 ft** **Pump Intake From TOC: 49.1 ft** **Estimated Total Volume Pumped: 3400 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 876572**

Test Notes:
Sampled 1025

Weather Conditions:
56 degrees F mostly sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
3/13/2024 10:16 AM	00:00	6.99 pH	14.25 °C	0.38 mS/cm	7.18 mg/L	0.00 NTU	119.4 mV	42.38 ft	300.00 ml/min
3/13/2024 10:18 AM	02:16	6.75 pH	13.45 °C	0.40 mS/cm	6.79 mg/L	3.20 NTU	109.9 mV	42.38 ft	300.00 ml/min
3/13/2024 10:20 AM	04:32	6.75 pH	13.45 °C	0.40 mS/cm	6.90 mg/L	0.89 NTU	104.5 mV	42.38 ft	300.00 ml/min
3/13/2024 10:22 AM	06:48	6.78 pH	13.40 °C	0.40 mS/cm	7.06 mg/L	0.00 NTU	101.6 mV	42.38 ft	300.00 ml/min
3/13/2024 10:25 AM	09:04	6.81 pH	13.35 °C	0.40 mS/cm	7.18 mg/L	0.00 NTU	99.9 mV	42.38 ft	300.00 ml/min
3/13/2024 10:27 AM	11:20	6.82 pH	13.38 °C	0.40 mS/cm	7.25 mg/L	0.00 NTU	97.3 mV	42.38 ft	300.00 ml/min

Samples

Sample ID:	Description:

MW22-GW-0324	2 Plastic 1 liter nitric acid 1 plastic 1 liter unpreserved 1 plastic 250mL nitric acid 1 plastic 250mL unpreserved

Low-Flow Test Report:

Test Date / Time: 8/27/2024 6:25:51 PM
Project: LGS West Monofill MW-03
Operator Name: Brooke Wasson

Location Name: MW-03 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 48.2 ft** **Total Depth: 58.2 ft** **Initial Depth to Water: 42.7 ft**	**Pump Type: Solinst Model 407 Bladder Pump** **Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing** **Tubing Inner Diameter: 0.125 in** **Tubing Length: 55 ft** **Pump Intake From TOC: 57 ft** **Estimated Total Volume Pumped: 1883.333 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 955645**

Test Notes:
Sampled 1535

Weather Conditions:
95 degrees F mostly sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
8/27/2024 6:25 PM	00:00	7.22 pH	18.91 °C	0.28 mS/cm	9.57 mg/L	0.97 NTU	85.1 mV	42.70 ft	200.00 ml/min
8/27/2024 6:27 PM	01:53	7.46 pH	16.92 °C	0.31 mS/cm	10.34 mg/L	0.58 NTU	97.6 mV	42.70 ft	200.00 ml/min
8/27/2024 6:29 PM	03:46	7.49 pH	16.05 °C	0.31 mS/cm	10.67 mg/L	0.48 NTU	101.3 mV	42.70 ft	200.00 ml/min
8/27/2024 6:31 PM	05:39	7.50 pH	15.80 °C	0.31 mS/cm	10.66 mg/L	0.69 NTU	102.6 mV	42.70 ft	200.00 ml/min
8/27/2024 6:33 PM	07:32	7.48 pH	15.70 °C	0.31 mS/cm	10.72 mg/L	0.33 NTU	104.8 mV	42.70 ft	200.00 ml/min
8/27/2024 6:35 PM	09:25	7.50 pH	15.58 °C	0.30 mS/cm	10.69 mg/L	0.31 NTU	104.8 mV	42.70 ft	200.00 ml/min

Samples

Sample ID:	Description:
MW03-GW-0824	

Low-Flow Test Report:

Test Date / Time: 8/27/2024 3:15:32 PM
Project: LGS West Monofill MW-04
Operator Name: Brooke 3

Location Name: MW-04 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 40.3 ft** **Total Depth: 50.3 ft** **Initial Depth to Water: 40.25 ft**	**Pump Type: Solinst Model 407 Bladder Pump** **Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing** **Tubing Inner Diameter: 0.125 in** **Tubing Length: 47 ft** **Pump Intake From TOC: 49 ft** **Estimated Total Volume Pumped: 2266.667 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 955645**

Test Notes:
Sampled 1425

Weather Conditions:
96 degrees F sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
8/27/2024 3:15 PM	00:00	7.48 pH	20.34 °C	0.40 mS/cm	9.19 mg/L	1.57 NTU	132.7 mV	40.25 ft	200.00 ml/min
8/27/2024 3:17 PM	02:16	7.31 pH	15.73 °C	0.43 mS/cm	10.58 mg/L	0.97 NTU	143.1 mV	40.25 ft	200.00 ml/min
8/27/2024 3:20 PM	04:32	7.36 pH	15.32 °C	0.43 mS/cm	10.59 mg/L	0.47 NTU	141.5 mV	40.25 ft	200.00 ml/min
8/27/2024 3:22 PM	06:48	7.34 pH	15.15 °C	0.42 mS/cm	10.60 mg/L	0.37 NTU	141.9 mV	40.25 ft	200.00 ml/min
8/27/2024 3:24 PM	09:04	7.35 pH	15.21 °C	0.42 mS/cm	10.53 mg/L	0.26 NTU	140.8 mV	40.25 ft	200.00 ml/min
8/27/2024 3:26 PM	11:20	7.34 pH	15.26 °C	0.41 mS/cm	10.51 mg/L	0.09 NTU	140.7 mV	40.25 ft	200.00 ml/min

Samples

Sample ID:	Description:
MW-04_24_08	

Low-Flow Test Report:

Test Date / Time: 8/27/2024 7:02:41 PM
Project: LGS West Monofill MW-17R
Operator Name: Brooke Wasson

Location Name: MW-17R **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 42.7 ft** **Total Depth: 52.7 ft** **Initial Depth to Water: 42.46 ft**	**Pump Type: Solinst Model 407 Bladder Pump** **Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing** **Tubing Inner Diameter: 0.125 in** **Tubing Length: 49.4 ft** **Pump Intake From TOC: 51.4 ft** **Estimated Total Volume Pumped: 1826.667 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0.04 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 955645**

Test Notes:
Sampled 1815

Weather Conditions:
95 degrees F mostly sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
8/27/2024 7:02 PM	00:00	7.55 pH	19.15 °C	0.20 mS/cm	9.30 mg/L	1.00 NTU	95.0 mV	42.46 ft	200.00 ml/min
8/27/2024 7:04 PM	02:17	7.86 pH	16.56 °C	0.24 mS/cm	10.35 mg/L	0.56 NTU	98.2 mV	42.50 ft	200.00 ml/min
8/27/2024 7:07 PM	04:34	7.93 pH	16.06 °C	0.24 mS/cm	10.35 mg/L	0.37 NTU	96.0 mV	42.50 ft	200.00 ml/min
8/27/2024 7:09 PM	06:51	7.92 pH	15.78 °C	0.23 mS/cm	10.24 mg/L	0.39 NTU	96.4 mV	42.50 ft	200.00 ml/min
8/27/2024 7:11 PM	09:08	7.91 pH	15.62 °C	0.23 mS/cm	10.21 mg/L	0.39 NTU	96.3 mV	42.50 ft	200.00 ml/min

Samples

Sample ID:	Description:
MW03-GW-0824	

Low-Flow Test Report:

Test Date / Time: 8/27/2024 5:18:32 PM
Project: LGS West Monofill MW-18A
Operator Name: Brooke Wasson

Location Name: MW-18A **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 12.2 ft** **Total Depth: 22.3 ft** **Initial Depth to Water: 12.05 ft**	**Pump Type: Solinst Model 407 Bladder Pump** **Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing** **Tubing Inner Diameter: 0.125 in** **Tubing Length: 19 ft** **Pump Intake From TOC: 21 ft** **Estimated Total Volume Pumped: 1533.333 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 955645**

Test Notes:
Sampled 1630
Collected ms/msd

Weather Conditions:
97 degrees F sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
8/27/2024 5:18 PM	00:00	7.21 pH	19.61 °C	0.32 mS/cm	8.80 mg/L	1.17 NTU	129.2 mV	12.05 ft	200.00 ml/min
8/27/2024 5:20 PM	01:55	6.58 pH	17.59 °C	0.32 mS/cm	8.95 mg/L	0.48 NTU	150.6 mV	12.05 ft	200.00 ml/min
8/27/2024 5:22 PM	03:50	6.44 pH	17.98 °C	0.32 mS/cm	8.86 mg/L	0.52 NTU	154.1 mV	12.05 ft	200.00 ml/min
8/27/2024 5:24 PM	05:45	6.40 pH	17.91 °C	0.31 mS/cm	8.86 mg/L	0.36 NTU	155.0 mV	12.05 ft	200.00 ml/min
8/27/2024 5:26 PM	07:40	6.39 pH	17.91 °C	0.31 mS/cm	8.75 mg/L	0.31 NTU	154.9 mV	12.05 ft	200.00 ml/min

Samples

Sample ID:	Description:
MW-18-GW-0824	
MW-18-GW-0824MS2	

MW-18-GW-0824MSD2	

Low-Flow Test Report:

Test Date / Time: 8/27/2024 7:55:45 PM
Project: LGS West Monofill MW-20A
Operator Name: Brooke Wasson

Location Name: MW-20A **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 12.4 ft** **Total Depth: 22.5 ft** **Initial Depth to Water: 9.77 ft**	**Pump Type: Solinst Model 407 Bladder Pump** **Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing** **Tubing Inner Diameter: 0.125 in** **Tubing Length: 19.2 ft** **Pump Intake From TOC: 21.2 ft** **Estimated Total Volume Pumped: 2760 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 955645**

Test Notes:
Sampled 1905
Last 2 readings incorrect, aquatroll disconnected

Weather Conditions:
90 degrees F mostly sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
8/27/2024 7:55 PM	00:00	7.43 pH	19.03 °C	0.44 mS/cm	6.93 mg/L	0.71 NTU	106.6 mV	9.77 ft	300.00 ml/min
8/27/2024 7:57 PM	01:32	7.04 pH	15.90 °C	0.42 mS/cm	1.83 mg/L	0.67 NTU	121.1 mV	9.77 ft	300.00 ml/min
8/27/2024 7:58 PM	03:04	6.81 pH	15.55 °C	0.41 mS/cm	1.99 mg/L	0.75 NTU	129.5 mV	9.77 ft	300.00 ml/min
8/27/2024 8:00 PM	04:36	6.69 pH	15.48 °C	0.41 mS/cm	2.13 mg/L	0.72 NTU	133.3 mV	9.77 ft	300.00 ml/min
8/27/2024 8:01 PM	06:08	6.64 pH	15.51 °C	0.41 mS/cm	2.18 mg/L	0.31 NTU	135.1 mV	9.77 ft	300.00 ml/min
8/27/2024 8:03 PM	07:40	6.60 pH	15.69 °C	0.40 mS/cm	2.38 mg/L	0.20 NTU	136.9 mV	9.77 ft	300.00 ml/min
8/27/2024 8:04 PM	09:12	6.57 pH	16.26 °C	0.40 mS/cm	2.43 mg/L	0.19 NTU	137.9 mV	9.77 ft	300.00 ml/min

Samples

Sample ID:	Description:

MW20A-GW-0824	

Low-Flow Test Report:

Test Date / Time: 8/27/2024 4:44:32 PM
Project: LGS West Monofill MW-21
Operator Name: Brooke Wasson

Location Name: MW-21 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 40.9 ft** **Total Depth: 50.9 ft** **Initial Depth to Water: 37.57 ft**	**Pump Type: Solinst Model 407 Bladder Pump** **Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing** **Tubing Inner Diameter: 0.125 in** **Tubing Length: 47.6 ft** **Pump Intake From TOC: 49.6 ft** **Estimated Total Volume Pumped: 1816.667 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 955645**

Test Notes:
Sampled 1555

Weather Conditions:
97 degrees F sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
8/27/2024 4:44 PM	00:00	7.24 pH	20.78 °C	0.63 mS/cm	8.88 mg/L	0.77 NTU	112.1 mV	37.57 ft	200.00 ml/min
8/27/2024 4:46 PM	01:49	7.24 pH	16.40 °C	0.50 mS/cm	9.80 mg/L	0.37 NTU	123.7 mV	37.57 ft	200.00 ml/min
8/27/2024 4:48 PM	03:38	7.13 pH	15.36 °C	0.49 mS/cm	10.09 mg/L	0.21 NTU	130.5 mV	37.57 ft	200.00 ml/min
8/27/2024 4:49 PM	05:27	7.11 pH	15.09 °C	0.49 mS/cm	10.16 mg/L	0.17 NTU	132.0 mV	37.57 ft	200.00 ml/min
8/27/2024 4:51 PM	07:16	7.09 pH	15.18 °C	0.48 mS/cm	10.15 mg/L	0.14 NTU	132.7 mV	37.57 ft	200.00 ml/min
8/27/2024 4:53 PM	09:05	7.09 pH	15.16 °C	0.48 mS/cm	10.15 mg/L	0.13 NTU	132.8 mV	37.57 ft	200.00 ml/min

Samples

Sample ID:	Description:
MW21-GW-0824	

Low-Flow Test Report:

Test Date / Time: 8/27/2024 3:58:08 PM
Project: LGS West Monofill MW-22 (2)
Operator Name: Conner Adams

Location Name: MW-22 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 40.4 ft** **Total Depth: 50.3 ft** **Initial Depth to Water: 37.75 ft**	**Pump Type: Solinst Model 407 Bladder Pump** **Tubing Type: Teflon-lined 1/4" x 1/4" twin-bonded tubing** **Tubing Inner Diameter: 0.125 in** **Tubing Length: 47.1 ft** **Pump Intake From TOC: 49.1 ft** **Estimated Total Volume Pumped: 1813.333 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 955645**

Test Notes:
Sampled 1510
Collected DP02

Weather Conditions:
97 degrees F sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth to Water	Flow
		+/- 0.2	+/- 0.2	+/- 3 %	+/- 0.2	+/- 10	+/- 20	+/- 5	
8/27/2024 3:58 PM	00:00	7.13 pH	17.43 °C	0.37 mS/cm	9.46 mg/L	1.76 NTU	129.3 mV	37.75 ft	200.00 ml/min
8/27/2024 4:00 PM	02:16	7.18 pH	15.90 °C	0.36 mS/cm	10.18 mg/L	4.09 NTU	134.6 mV	37.75 ft	200.00 ml/min
8/27/2024 4:02 PM	04:32	7.23 pH	15.64 °C	0.36 mS/cm	10.24 mg/L	4.22 NTU	133.8 mV	37.75 ft	200.00 ml/min
8/27/2024 4:04 PM	06:48	7.24 pH	15.38 °C	0.36 mS/cm	10.27 mg/L	2.41 NTU	133.5 mV	37.75 ft	200.00 ml/min
8/27/2024 4:07 PM	09:04	7.25 pH	15.22 °C	0.36 mS/cm	10.31 mg/L	0.96 NTU	132.9 mV	37.75 ft	200.00 ml/min

Samples

Sample ID:	Description:
MW22-GW-0824	
DP02-GW-0824	

Appendix B

Laboratory Analytical Reports

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

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

Generated 4/10/2024 10:41:31 AM

JOB DESCRIPTION

MEC Louisa West CCR Monofill

JOB NUMBER

310-276742-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

Job Notes

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

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

Authorization

Generated
4/10/2024 10:41:31 AM

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

Table of Contents

Job ID: 310-276742-1 Eurofins Cedar Falls

Job Narrative
310-276742-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 3/14/2024 9:20 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 1.5°C, 1.6°C and 3.9°C.

HPLC/IC
Method 9056A_ORGFM_28D: The following samples were diluted due to the nature of the sample matrix: MW03-GW-0324 (310-276742-1), MW04-GW-0324 (310-276742-2), MW17R-GW-0324 (310-276742-3), MW18A-GW-0324 (310-276742-4), MW20A-GW-0324 (310-276742-5), MW21-GW-0324 (310-276742-6), MW22-GW-0324 (310-276742-7) and DP02-GW-0324 (310-276742-8). Elevated reporting limits (RLs) are provided.

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

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

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

Job ID: 310-276742-2 Eurofins Cedar Falls

Job Narrative
310-276742-2

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 3/14/2024 9:20 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 1.5°C, 1.6°C and 3.9°C.

Gas Flow Proportional Counter
Method 9320_Ra228: Radium-228 prep batch 160-652927:

The matrix spike duplicate (MSD) recoveries for preparation batch 160-652927 and analytical batch 160-655125 were outside control limits for one or more analytes. See QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits. MW18A-GW-0324 (310-276742-4[MSD])

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

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

Sample Summary

Client: GHD Services Inc.
Job ID: 310-276742-1
Project/Site: MEC Louisa West CCR Monofill

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-276742-1	MW03-GW-0324	Water	03/12/24 15:25	03/14/24 09:20
310-276742-2	MW04-GW-0324	Water	03/12/24 14:40	03/14/24 09:20
310-276742-3	MW17R-GW-0324	Water	03/12/24 16:05	03/14/24 09:20
310-276742-4	MW18A-GW-0324	Water	03/12/24 17:05	03/14/24 09:20
310-276742-5	MW20A-GW-0324	Water	03/13/24 09:10	03/14/24 09:20
310-276742-6	MW21-GW-0324	Water	03/13/24 09:50	03/14/24 09:20
310-276742-7	MW22-GW-0324	Water	03/13/24 10:25	03/14/24 09:20
310-276742-8	DP02-GW-0324	Water	03/13/24 00:00	03/14/24 09:20

Detection Summary

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

Job ID: 310-276742-1

Client Sample ID: MW03-GW-0324 — Lab Sample ID: 310-276742-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	5.68		5.00		mg/L	5		9056A	Total/NA
Barium	0.0149		0.00200		mg/L	1		6020B	Total/NA
Calcium	22.6		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	94.0		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.9	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW04-GW-0324 — Lab Sample ID: 310-276742-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	13.7		5.00		mg/L	5		9056A	Total/NA
Sulfate	39.2		5.00		mg/L	5		9056A	Total/NA
Barium	0.0464		0.00200		mg/L	1		6020B	Total/NA
Boron	0.383		0.100		mg/L	1		6020B	Total/NA
Calcium	45.7		0.500		mg/L	1		6020B	Total/NA
Chromium	0.00788		0.00500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	224		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.9	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW17R-GW-0324 — Lab Sample ID: 310-276742-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	11.7		5.00		mg/L	5		9056A	Total/NA
Barium	0.0301		0.00200		mg/L	1		6020B	Total/NA
Calcium	34.2		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	136		50.0		mg/L	1		SM 2540C	Total/NA
pH	8.0	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW18A-GW-0324 — Lab Sample ID: 310-276742-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	6.75		5.00		mg/L	5		9056A	Total/NA
Sulfate	44.9		5.00		mg/L	5		9056A	Total/NA
Barium	0.0289		0.00200		mg/L	1		6020B	Total/NA
Boron	0.172		0.100		mg/L	1		6020B	Total/NA
Calcium	33.6		0.500		mg/L	1		6020B	Total/NA
Chromium	0.00879		0.00500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	186		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW20A-GW-0324 — Lab Sample ID: 310-276742-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	9.16		5.00		mg/L	5		9056A	Total/NA
Sulfate	65.7		5.00		mg/L	5		9056A	Total/NA
Barium	0.0364		0.00200		mg/L	1		6020B	Total/NA
Boron	0.214		0.100		mg/L	1		6020B	Total/NA
Calcium	32.0		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	246		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.6	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

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

Job ID: 310-276742-1

Client Sample ID: MW21-GW-0324 — Lab Sample ID: 310-276742-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	17.5		5.00		mg/L	5		9056A	Total/NA
Sulfate	66.0		5.00		mg/L	5		9056A	Total/NA
Barium	0.0929		0.00200		mg/L	1		6020B	Total/NA
Calcium	90.6		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	398		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.8	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW22-GW-0324 — Lab Sample ID: 310-276742-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	11.4		5.00		mg/L	5		9056A	Total/NA
Sulfate	46.0		5.00		mg/L	5		9056A	Total/NA
Barium	0.0256		0.00200		mg/L	1		6020B	Total/NA
Boron	0.318		0.100		mg/L	1		6020B	Total/NA
Calcium	32.3		0.500		mg/L	1		6020B	Total/NA
Chromium	0.0246		0.00500		mg/L	1		6020B	Total/NA
Molybdenum	0.0382		0.00200		mg/L	1		6020B	Total/NA
Total Dissolved Solids	220		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: DP02-GW-0324 — Lab Sample ID: 310-276742-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	11.4		5.00		mg/L	5		9056A	Total/NA
Sulfate	46.4		5.00		mg/L	5		9056A	Total/NA
Barium	0.0256		0.00200		mg/L	1		6020B	Total/NA
Boron	0.331		0.100		mg/L	1		6020B	Total/NA
Calcium	32.3		0.500		mg/L	1		6020B	Total/NA
Chromium	0.0249		0.00500		mg/L	1		6020B	Total/NA
Molybdenum	0.0392		0.00200		mg/L	1		6020B	Total/NA
Total Dissolved Solids	218		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW03-GW-0324
Lab Sample ID: 310-276742-1

Date Collected: 03/12/24 15:25
Matrix: Water

Date Received: 03/14/24 09:20

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			03/18/24 13:36	5
Fluoride	<1.00		1.00		mg/L			03/18/24 13:36	5
Sulfate	**5.68**		5.00		mg/L			03/18/24 13:36	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:09	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:09	1
Barium	**0.0149**		0.00200		mg/L		03/15/24 09:00	03/15/24 18:09	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:09	1
Boron	<0.100		0.100		mg/L		03/15/24 09:00	03/15/24 18:09	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 18:09	1
Calcium	**22.6**		0.500		mg/L		03/15/24 09:00	03/15/24 18:09	1
Chromium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:09	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:09	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:09	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 18:09	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:09	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:09	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:09	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		03/15/24 10:52	03/18/24 10:13	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**94.0**		50.0		mg/L			03/14/24 17:08	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.9**	**HF**	1.0		SU			03/14/24 17:02	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.107	U	0.0601	0.0602	1.00	0.107	pCi/L	03/18/24 10:23	04/09/24 09:30	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*98.2*		*30 - 110*	*03/18/24 10:23*	*04/09/24 09:30*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.557	U	0.321	0.322	1.00	0.557	pCi/L	03/18/24 10:26	04/03/24 11:38	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*98.2*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:38*	*1*
Y Carrier	*81.5*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:38*	*1*

Client Sample Results

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

Job ID: 310-276742-1

Client Sample ID: MW03-GW-0324

Date Collected: 03/12/24 15:25
Date Received: 03/14/24 09:20

Lab Sample ID: 310-276742-1

Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	<0.557	U	0.327	0.328	5.00	0.557	pCi/L		04/09/24 14:43	1

Client Sample ID: MW04-GW-0324
Lab Sample ID: 310-276742-2

Date Collected: 03/12/24 14:40
Matrix: Water

Date Received: 03/14/24 09:20

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**13.7**		5.00		mg/L			03/18/24 14:16	5
Fluoride	<1.00		1.00		mg/L			03/18/24 14:16	5
Sulfate	**39.2**		5.00		mg/L			03/18/24 14:16	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:11	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:11	1
Barium	**0.0464**		0.00200		mg/L		03/15/24 09:00	03/15/24 18:11	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:11	1
Boron	**0.383**		0.100		mg/L		03/15/24 09:00	03/15/24 18:11	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 18:11	1
Calcium	**45.7**		0.500		mg/L		03/15/24 09:00	03/15/24 18:11	1
Chromium	**0.00788**		0.00500		mg/L		03/15/24 09:00	03/15/24 18:11	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:11	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:11	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 18:11	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:11	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:11	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:11	1

Method: SW846 7470A - Mercury (CVAA)

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

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**224**		50.0		mg/L			03/14/24 17:08	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.9**	**HF**	1.0		SU			03/14/24 16:55	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.0915	U	0.0640	0.0643	1.00	0.0915	pCi/L	03/18/24 10:23	04/09/24 09:31	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*100*		*30 - 110*	*03/18/24 10:23*	*04/09/24 09:31*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.444	U	0.250	0.250	1.00	0.444	pCi/L	03/18/24 10:26	04/03/24 11:38	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*100*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:38*	*1*
Y Carrier	*82.2*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:38*	*1*

Client Sample Results

Client: GHD Services Inc.
Job ID: 310-276742-1
Project/Site: MEC Louisa West CCR Monofill

Client Sample ID: MW04-GW-0324
Lab Sample ID: 310-276742-2
Date Collected: 03/12/24 14:40
Matrix: Water
Date Received: 03/14/24 09:20

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	<0.444	U	0.258	0.258	5.00	0.444	pCi/L		04/09/24 14:43	1

Client Sample ID: MW17R-GW-0324
Lab Sample ID: 310-276742-3

Date Collected: 03/12/24 16:05
Matrix: Water
Date Received: 03/14/24 09:20

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			03/18/24 14:29	5
Fluoride	<1.00		1.00		mg/L			03/18/24 14:29	5
Sulfate	**11.7**		5.00		mg/L			03/18/24 14:29	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:13	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:13	1
Barium	**0.0301**		0.00200		mg/L		03/15/24 09:00	03/15/24 18:13	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:13	1
Boron	<0.100		0.100		mg/L		03/15/24 09:00	03/15/24 18:13	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 18:13	1
Calcium	**34.2**		0.500		mg/L		03/15/24 09:00	03/15/24 18:13	1
Chromium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:13	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:13	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:13	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 18:13	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:13	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:13	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:13	1

Method: SW846 7470A - Mercury (CVAA)

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

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**136**		50.0		mg/L			03/14/24 17:08	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**8.0**	**HF**	1.0		SU			03/14/24 16:59	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.0991	U	0.0514	0.0514	1.00	0.0991	pCi/L	03/18/24 10:23	04/09/24 09:31	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*94.1*		*30 - 110*	*03/18/24 10:23*	*04/09/24 09:31*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.489	U	0.242	0.242	1.00	0.489	pCi/L	03/18/24 10:26	04/03/24 11:39	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*94.1*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:39*	*1*
Y Carrier	*84.5*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:39*	*1*

Client Sample Results

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

Job ID: 310-276742-1

Client Sample ID: MW17R-GW-0324

Date Collected: 03/12/24 16:05
Date Received: 03/14/24 09:20

Lab Sample ID: 310-276742-3

Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	<0.489	U	0.247	0.247	5.00	0.489	pCi/L		04/09/24 14:43	1

Client Sample ID: MW18A-GW-0324

Date Collected: 03/12/24 17:05
Date Received: 03/14/24 09:20

Lab Sample ID: 310-276742-4

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**6.75**		5.00		mg/L			03/18/24 14:42	5
Fluoride	<1.00		1.00		mg/L			03/18/24 14:42	5
Sulfate	**44.9**		5.00		mg/L			03/18/24 14:42	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:16	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:16	1
Barium	**0.0289**		0.00200		mg/L		03/15/24 09:00	03/15/24 18:16	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:16	1
Boron	**0.172**		0.100		mg/L		03/15/24 09:00	03/15/24 18:16	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 18:16	1
Calcium	**33.6**		0.500		mg/L		03/15/24 09:00	03/15/24 18:16	1
Chromium	**0.00879**		0.00500		mg/L		03/15/24 09:00	03/15/24 18:16	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:16	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:16	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 18:16	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:16	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:16	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:16	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		03/15/24 10:52	03/18/24 10:20	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**186**		50.0		mg/L			03/14/24 17:08	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.3**	**HF**	1.0		SU			03/14/24 16:47	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.158	U	0.0835	0.0835	1.00	0.158	pCi/L	03/18/24 10:23	04/09/24 09:31	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*92.8*		*30 - 110*	*03/18/24 10:23*	*04/09/24 09:31*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.672	U	0.335	0.336	1.00	0.672	pCi/L	03/18/24 10:26	04/03/24 11:39	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*92.8*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:39*	*1*
Y Carrier	*76.6*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:39*	*1*

Client Sample Results

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

Job ID: 310-276742-1

Client Sample ID: MW18A-GW-0324

Date Collected: 03/12/24 17:05
Date Received: 03/14/24 09:20

Lab Sample ID: 310-276742-4

Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	<0.672	U	0.345	0.346	5.00	0.672	pCi/L		04/09/24 14:43	1

Client Sample ID: MW20A-GW-0324

Date Collected: 03/13/24 09:10
Date Received: 03/14/24 09:20

Lab Sample ID: 310-276742-5

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**9.16**		5.00		mg/L			03/18/24 15:21	5
Fluoride	<1.00		1.00		mg/L			03/18/24 15:21	5
Sulfate	**65.7**		5.00		mg/L			03/18/24 15:21	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:36	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:36	1
Barium	**0.0364**		0.00200		mg/L		03/15/24 09:00	03/15/24 18:36	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:36	1
Boron	**0.214**		0.100		mg/L		03/15/24 09:00	03/15/24 18:36	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 18:36	1
Calcium	**32.0**		0.500		mg/L		03/15/24 09:00	03/15/24 18:36	1
Chromium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:36	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:36	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:36	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 18:36	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:36	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:36	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:36	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		03/15/24 10:52	03/18/24 10:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**246**		50.0		mg/L			03/14/24 17:08	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.6**	**HF**	1.0		SU			03/14/24 17:06	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.123	U	0.0671	0.0672	1.00	0.123	pCi/L	03/18/24 10:23	04/09/24 09:43	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*103*		*30 - 110*	*03/18/24 10:23*	*04/09/24 09:43*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.532	U	0.264	0.264	1.00	0.532	pCi/L	03/18/24 10:26	04/03/24 11:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*103*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:40*	*1*
Y Carrier	*80.0*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:40*	*1*

Client Sample Results

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

Job ID: 310-276742-1

Client Sample ID: MW20A-GW-0324

Date Collected: 03/13/24 09:10
Date Received: 03/14/24 09:20

Lab Sample ID: 310-276742-5

Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	<0.532	U	0.272	0.272	5.00	0.532	pCi/L		04/09/24 14:43	1

Client Sample ID: MW21-GW-0324
Lab Sample ID: 310-276742-6

Date Collected: 03/13/24 09:50
Matrix: Water

Date Received: 03/14/24 09:20

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**17.5**		5.00		mg/L			03/18/24 15:34	5
Fluoride	<1.00		1.00		mg/L			03/18/24 15:34	5
Sulfate	**66.0**		5.00		mg/L			03/18/24 15:34	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:38	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:38	1
Barium	**0.0929**		0.00200		mg/L		03/15/24 09:00	03/15/24 18:38	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:38	1
Boron	<0.100		0.100		mg/L		03/15/24 09:00	03/15/24 18:38	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 18:38	1
Calcium	**90.6**		0.500		mg/L		03/15/24 09:00	03/15/24 18:38	1
Chromium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:38	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:38	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:38	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 18:38	1
Molybdenum	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:38	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:38	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:38	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		03/15/24 10:52	03/18/24 10:33	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**398**		50.0		mg/L			03/14/24 17:08	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.8**	**HF**	1.0		SU			03/14/24 17:10	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.128	U	0.0736	0.0737	1.00	0.128	pCi/L	03/18/24 10:23	04/09/24 09:43	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*95.9*		*30 - 110*	*03/18/24 10:23*	*04/09/24 09:43*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.469	U	0.244	0.244	1.00	0.469	pCi/L	03/18/24 10:26	04/03/24 11:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*95.9*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:40*	*1*
Y Carrier	*83.0*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:40*	*1*

Client Sample Results

Client: GHD Services Inc.
Job ID: 310-276742-1
Project/Site: MEC Louisa West CCR Monofill

Client Sample ID: MW21-GW-0324
Lab Sample ID: 310-276742-6

Date Collected: 03/13/24 09:50
Matrix: Water
Date Received: 03/14/24 09:20

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	<0.469	U	0.255	0.255	5.00	0.469	pCi/L		04/09/24 14:43	1

Client Sample ID: MW22-GW-0324

Date Collected: 03/13/24 10:25
Date Received: 03/14/24 09:20

Lab Sample ID: 310-276742-7

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**11.4**		5.00		mg/L			03/18/24 15:47	5
Fluoride	<1.00		1.00		mg/L			03/18/24 15:47	5
Sulfate	**46.0**		5.00		mg/L			03/18/24 15:47	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:40	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:40	1
Barium	**0.0256**		0.00200		mg/L		03/15/24 09:00	03/15/24 18:40	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:40	1
Boron	**0.318**		0.100		mg/L		03/15/24 09:00	03/15/24 18:40	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 18:40	1
Calcium	**32.3**		0.500		mg/L		03/15/24 09:00	03/15/24 18:40	1
Chromium	**0.0246**		0.00500		mg/L		03/15/24 09:00	03/15/24 18:40	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:40	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:40	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 18:40	1
Molybdenum	**0.0382**		0.00200		mg/L		03/15/24 09:00	03/15/24 18:40	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:40	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:40	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		03/15/24 10:52	03/18/24 10:35	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**220**		50.0		mg/L			03/14/24 17:08	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.5**	**HF**	1.0		SU			03/14/24 17:14	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.139	U	0.0771	0.0772	1.00	0.139	pCi/L	03/18/24 10:23	04/09/24 09:43	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*94.6*		*30 - 110*	*03/18/24 10:23*	*04/09/24 09:43*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.540	U	0.305	0.305	1.00	0.540	pCi/L	03/18/24 10:26	04/03/24 11:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*94.6*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:40*	*1*
Y Carrier	*80.0*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:40*	*1*

Client Sample Results

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

Job ID: 310-276742-1

Client Sample ID: MW22-GW-0324

Date Collected: 03/13/24 10:25
Date Received: 03/14/24 09:20

Lab Sample ID: 310-276742-7

Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	<0.540	U	0.315	0.315	5.00	0.540	pCi/L		04/09/24 14:43	1

Client Sample ID: DP02-GW-0324

Date Collected: 03/13/24 00:00
Date Received: 03/14/24 09:20

Lab Sample ID: 310-276742-8

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**11.4**		5.00		mg/L			03/18/24 16:00	5
Fluoride	<1.00		1.00		mg/L			03/18/24 16:00	5
Sulfate	**46.4**		5.00		mg/L			03/18/24 16:00	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:42	1
Arsenic	<0.00200		0.00200		mg/L		03/15/24 09:00	03/15/24 18:42	1
Barium	**0.0256**		0.00200		mg/L		03/15/24 09:00	03/15/24 18:42	1
Beryllium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:42	1
Boron	**0.331**		0.100		mg/L		03/15/24 09:00	03/15/24 18:42	1
Cadmium	<0.000200		0.000200		mg/L		03/15/24 09:00	03/15/24 18:42	1
Calcium	**32.3**		0.500		mg/L		03/15/24 09:00	03/15/24 18:42	1
Chromium	**0.0249**		0.00500		mg/L		03/15/24 09:00	03/15/24 18:42	1
Cobalt	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:42	1
Lead	<0.000500		0.000500		mg/L		03/15/24 09:00	03/15/24 18:42	1
Lithium	<0.0100		0.0100		mg/L		03/15/24 09:00	03/15/24 18:42	1
Molybdenum	**0.0392**		0.00200		mg/L		03/15/24 09:00	03/15/24 18:42	1
Selenium	<0.00500		0.00500		mg/L		03/15/24 09:00	03/15/24 18:42	1
Thallium	<0.00100		0.00100		mg/L		03/15/24 09:00	03/15/24 18:42	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		03/15/24 10:52	03/18/24 10:37	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**218**		50.0		mg/L			03/14/24 17:08	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.5**	**HF**	1.0		SU			03/14/24 17:19	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.140	U	0.0842	0.0844	1.00	0.140	pCi/L	03/18/24 10:23	04/09/24 09:44	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*91.8*		*30 - 110*	*03/18/24 10:23*	*04/09/24 09:44*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.572	U	0.282	0.282	1.00	0.572	pCi/L	03/18/24 10:26	04/03/24 11:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*91.8*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:40*	*1*
Y Carrier	*81.5*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:40*	*1*

Client Sample Results

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

Job ID: 310-276742-1

Client Sample ID: DP02-GW-0324

Date Collected: 03/13/24 00:00
Date Received: 03/14/24 09:20

Lab Sample ID: 310-276742-8

Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	<0.572	U	0.294	0.294	5.00	0.572	pCi/L		04/09/24 16:39	1

Definitions/Glossary

Client: GHD Services Inc. Job ID: 310-276742-1
Project/Site: MEC Louisa West CCR Monofill

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.

General Chemistry

Qualifier	Qualifier Description
HF	Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.

Rad

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

Glossary

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

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-416369/3
Matrix: Water
Analysis Batch: 416369

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			03/18/24 13:10	1
Fluoride	<0.200		0.200		mg/L			03/18/24 13:10	1
Sulfate	<1.00		1.00		mg/L			03/18/24 13:10	1

Lab Sample ID: LCS 310-416369/4
Matrix: Water
Analysis Batch: 416369

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	9.839		mg/L		98	90 - 110
Fluoride	2.00	2.061		mg/L		103	90 - 110
Sulfate	10.0	10.54		mg/L		105	90 - 110

Lab Sample ID: 310-276742-4 MS
Matrix: Water
Analysis Batch: 416369

Client Sample ID: MW18A-GW-0324
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	6.75		25.0	30.42		mg/L		95	80 - 120
Fluoride	<1.00		5.00	5.135		mg/L		103	80 - 120
Sulfate	44.9		25.0	70.68		mg/L		103	80 - 120

Lab Sample ID: 310-276742-4 MSD
Matrix: Water
Analysis Batch: 416369

Client Sample ID: MW18A-GW-0324
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	6.75		25.0	30.19		mg/L		94	80 - 120	1	15
Fluoride	<1.00		5.00	5.079		mg/L		102	80 - 120	1	15
Sulfate	44.9		25.0	69.43		mg/L		98	80 - 120	2	15

Method: 6020B - Metals (ICP/MS)

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

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

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

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

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

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

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

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

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

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

Lab Sample ID: 310-276742-4 MS
Matrix: Water
Analysis Batch: 416229

Client Sample ID: MW18A-GW-0324
Prep Type: Total/NA
Prep Batch: 416034

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	<0.00200		0.200	0.2254		mg/L		113	75 - 125
Arsenic	<0.00200		0.200	0.2141		mg/L		107	75 - 125
Barium	0.0289		0.100	0.1341		mg/L		105	75 - 125
Beryllium	<0.00100		0.100	0.1075		mg/L		108	75 - 125
Boron	0.172		0.200	0.3740		mg/L		101	75 - 125
Cadmium	<0.000200		0.100	0.1018		mg/L		102	75 - 125
Calcium	33.6		2.00	35.17	4	mg/L		76	75 - 125
Chromium	0.00879		0.100	0.1088		mg/L		100	75 - 125
Cobalt	<0.000500		0.100	0.09998		mg/L		100	75 - 125
Lead	<0.000500		0.200	0.2099		mg/L		105	75 - 125
Lithium	<0.0100		0.200	0.2213		mg/L		111	75 - 125
Molybdenum	<0.00200		0.200	0.2042		mg/L		102	75 - 125
Selenium	<0.00500		0.400	0.4103		mg/L		102	75 - 125
Thallium	<0.00100		0.100	0.1095		mg/L		110	75 - 125

Lab Sample ID: 310-276742-4 MSD
Matrix: Water
Analysis Batch: 416229

Client Sample ID: MW18A-GW-0324
Prep Type: Total/NA
Prep Batch: 416034

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Antimony	<0.00200		0.200	0.2381		mg/L		119	75 - 125	6	20

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

Lab Sample ID: 310-276742-4 MSD
Matrix: Water
Analysis Batch: 416229

Client Sample ID: MW18A-GW-0324
Prep Type: Total/NA
Prep Batch: 416034

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	<0.00200		0.200	0.2177		mg/L		109	75 - 125	2	20
Barium	0.0289		0.100	0.1364		mg/L		107	75 - 125	2	20
Beryllium	<0.00100		0.100	0.1096		mg/L		110	75 - 125	2	20
Boron	0.172		0.200	0.3852		mg/L		107	75 - 125	3	20
Cadmium	<0.000200		0.100	0.1053		mg/L		105	75 - 125	3	20
Calcium	33.6		2.00	36.05	4	mg/L		120	75 - 125	2	20
Chromium	0.00879		0.100	0.1103		mg/L		102	75 - 125	1	20
Cobalt	<0.000500		0.100	0.1010		mg/L		101	75 - 125	1	20
Lead	<0.000500		0.200	0.2135		mg/L		107	75 - 125	2	20
Lithium	<0.0100		0.200	0.2252		mg/L		113	75 - 125	2	20
Molybdenum	<0.00200		0.200	0.2100		mg/L		105	75 - 125	3	20
Selenium	<0.00500		0.400	0.4158		mg/L		103	75 - 125	1	20
Thallium	<0.00100		0.100	0.1148		mg/L		115	75 - 125	5	20

Method: 7470A - Mercury (CVAA)

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

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

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

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

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

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

Lab Sample ID: 310-276742-4 MS
Matrix: Water
Analysis Batch: 416244

Client Sample ID: MW18A-GW-0324
Prep Type: Total/NA
Prep Batch: 416093

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Mercury	<0.000200		0.00167	0.001530		mg/L		92	80 - 120		

Lab Sample ID: 310-276742-4 MSD
Matrix: Water
Analysis Batch: 416244

Client Sample ID: MW18A-GW-0324
Prep Type: Total/NA
Prep Batch: 416093

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	<0.000200		0.00167	0.001639		mg/L		98	80 - 120	7	20

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

Lab Sample ID: MB 310-416040/1
Matrix: Water
Analysis Batch: 416040

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			03/14/24 17:08	1

Lab Sample ID: LCS 310-416040/2
Matrix: Water
Analysis Batch: 416040

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	942.0		mg/L		94	90 - 110		

Lab Sample ID: 310-276742-4 DU
Matrix: Water
Analysis Batch: 416040

Client Sample ID: MW18A-GW-0324
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Dissolved Solids	186			168.0		mg/L				10	20

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-416066/1
Matrix: Water
Analysis Batch: 416066

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: 310-276742-4 DU
Matrix: Water
Analysis Batch: 416066

Client Sample ID: MW18A-GW-0324
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH	7.3	HF		7.3		SU				1	20

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-652926/1-A
Matrix: Water
Analysis Batch: 656032

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 652926

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.122	U	0.0697	0.0698	1.00	0.122	pCi/L	03/18/24 10:23	04/09/24 09:28	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*97.2*		*30 - 110*	*03/18/24 10:23*	*04/09/24 09:28*	*1*

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

Lab Sample ID: LCS 160-652926/2-A
Matrix: Water
Analysis Batch: 656032

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 652926

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-226			11.3	10.43		1.10	1.00	0.0936	pCi/L	92	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*101*		*30 - 110*

Lab Sample ID: 310-276742-4 MS
Matrix: Water
Analysis Batch: 656032

Client Sample ID: MW18A-GW-0324
Prep Type: Total/NA
Prep Batch: 652926

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-226	<0.158	U	11.4	10.99		1.16	1.00	0.121	pCi/L	96	60 - 140		

Carrier	*MS %Yield*	*MS Qualifier*	*Limits*
Barium	*93.0*		*30 - 110*

Lab Sample ID: 310-276742-4 MSD
Matrix: Water
Analysis Batch: 656032

Client Sample ID: MW18A-GW-0324
Prep Type: Total/NA
Prep Batch: 652926

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium-226	<0.158	U	11.4	10.88		1.16	1.00	0.103	pCi/L	95	60 - 140	0.05	1

Carrier	*MSD %Yield*	*MSD Qualifier*	*Limits*
Barium	*89.9*		*30 - 110*

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-652927/1-A
Matrix: Water
Analysis Batch: 655125

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 652927

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.536	U	0.287	0.287	1.00	0.536	pCi/L	03/18/24 10:26	04/03/24 11:38	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*97.2*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:38*	*1*
Y Carrier	*81.9*		*30 - 110*	*03/18/24 10:26*	*04/03/24 11:38*	*1*

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

Lab Sample ID: LCS 160-652927/2-A
Matrix: Water
Analysis Batch: 655125

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 652927

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-228			9.06	9.615		1.26	1.00	0.425	pCi/L	106	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*101*		*30 - 110*
Y Carrier	*87.5*		*30 - 110*

Lab Sample ID: 310-276742-4 MS
Matrix: Water
Analysis Batch: 655125

Client Sample ID: MW18A-GW-0324
Prep Type: Total/NA
Prep Batch: 652927

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-228	<0.672	U	9.11	11.58		1.51	1.00	0.542	pCi/L	127	60 - 140		

Carrier	*MS %Yield*	*MS Qualifier*	*Limits*
Barium	*93.0*		*30 - 110*
Y Carrier	*81.1*		*30 - 110*

Lab Sample ID: 310-276742-4 MSD
Matrix: Water
Analysis Batch: 655125

Client Sample ID: MW18A-GW-0324
Prep Type: Total/NA
Prep Batch: 652927

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium-228	<0.672	U	9.14	11.93		1.58	1.00	0.545	pCi/L	131	60 - 140	0.11	1

Carrier	*MSD %Yield*	*MSD Qualifier*	*Limits*
Barium	*89.9*		*30 - 110*
Y Carrier	*75.9*		*30 - 110*

HPLC/IC

Analysis Batch: 416369

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276742-1	MW03-GW-0324	Total/NA	Water	9056A	
310-276742-2	MW04-GW-0324	Total/NA	Water	9056A	
310-276742-3	MW17R-GW-0324	Total/NA	Water	9056A	
310-276742-4	MW18A-GW-0324	Total/NA	Water	9056A	
310-276742-5	MW20A-GW-0324	Total/NA	Water	9056A	
310-276742-6	MW21-GW-0324	Total/NA	Water	9056A	
310-276742-7	MW22-GW-0324	Total/NA	Water	9056A	
310-276742-8	DP02-GW-0324	Total/NA	Water	9056A	
MB 310-416369/3	Method Blank	Total/NA	Water	9056A	
LCS 310-416369/4	Lab Control Sample	Total/NA	Water	9056A	
310-276742-4 MS	MW18A-GW-0324	Total/NA	Water	9056A	
310-276742-4 MSD	MW18A-GW-0324	Total/NA	Water	9056A	

Metals

Prep Batch: 416034

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276742-1	MW03-GW-0324	Total/NA	Water	3005A	
310-276742-2	MW04-GW-0324	Total/NA	Water	3005A	
310-276742-3	MW17R-GW-0324	Total/NA	Water	3005A	
310-276742-4	MW18A-GW-0324	Total/NA	Water	3005A	
310-276742-5	MW20A-GW-0324	Total/NA	Water	3005A	
310-276742-6	MW21-GW-0324	Total/NA	Water	3005A	
310-276742-7	MW22-GW-0324	Total/NA	Water	3005A	
310-276742-8	DP02-GW-0324	Total/NA	Water	3005A	
MB 310-416034/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-416034/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-276742-4 MS	MW18A-GW-0324	Total/NA	Water	3005A	
310-276742-4 MSD	MW18A-GW-0324	Total/NA	Water	3005A	

Prep Batch: 416093

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276742-1	MW03-GW-0324	Total/NA	Water	7470A	
310-276742-2	MW04-GW-0324	Total/NA	Water	7470A	
310-276742-3	MW17R-GW-0324	Total/NA	Water	7470A	
310-276742-4	MW18A-GW-0324	Total/NA	Water	7470A	
310-276742-5	MW20A-GW-0324	Total/NA	Water	7470A	
310-276742-6	MW21-GW-0324	Total/NA	Water	7470A	
310-276742-7	MW22-GW-0324	Total/NA	Water	7470A	
310-276742-8	DP02-GW-0324	Total/NA	Water	7470A	
MB 310-416093/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-416093/2-A	Lab Control Sample	Total/NA	Water	7470A	
310-276742-4 MS	MW18A-GW-0324	Total/NA	Water	7470A	
310-276742-4 MSD	MW18A-GW-0324	Total/NA	Water	7470A	

Analysis Batch: 416229

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276742-1	MW03-GW-0324	Total/NA	Water	6020B	416034
310-276742-2	MW04-GW-0324	Total/NA	Water	6020B	416034
310-276742-3	MW17R-GW-0324	Total/NA	Water	6020B	416034
310-276742-4	MW18A-GW-0324	Total/NA	Water	6020B	416034

Metals (Continued)

Analysis Batch: 416229 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276742-5	MW20A-GW-0324	Total/NA	Water	6020B	416034
310-276742-6	MW21-GW-0324	Total/NA	Water	6020B	416034
310-276742-7	MW22-GW-0324	Total/NA	Water	6020B	416034
310-276742-8	DP02-GW-0324	Total/NA	Water	6020B	416034
MB 310-416034/1-A	Method Blank	Total/NA	Water	6020B	416034
LCS 310-416034/2-A	Lab Control Sample	Total/NA	Water	6020B	416034
310-276742-4 MS	MW18A-GW-0324	Total/NA	Water	6020B	416034
310-276742-4 MSD	MW18A-GW-0324	Total/NA	Water	6020B	416034

Analysis Batch: 416244

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276742-1	MW03-GW-0324	Total/NA	Water	7470A	416093
310-276742-2	MW04-GW-0324	Total/NA	Water	7470A	416093
310-276742-3	MW17R-GW-0324	Total/NA	Water	7470A	416093
310-276742-4	MW18A-GW-0324	Total/NA	Water	7470A	416093
310-276742-5	MW20A-GW-0324	Total/NA	Water	7470A	416093
310-276742-6	MW21-GW-0324	Total/NA	Water	7470A	416093
310-276742-7	MW22-GW-0324	Total/NA	Water	7470A	416093
310-276742-8	DP02-GW-0324	Total/NA	Water	7470A	416093
MB 310-416093/1-A	Method Blank	Total/NA	Water	7470A	416093
LCS 310-416093/2-A	Lab Control Sample	Total/NA	Water	7470A	416093
310-276742-4 MS	MW18A-GW-0324	Total/NA	Water	7470A	416093
310-276742-4 MSD	MW18A-GW-0324	Total/NA	Water	7470A	416093

General Chemistry

Analysis Batch: 416040

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276742-1	MW03-GW-0324	Total/NA	Water	SM 2540C	
310-276742-2	MW04-GW-0324	Total/NA	Water	SM 2540C	
310-276742-3	MW17R-GW-0324	Total/NA	Water	SM 2540C	
310-276742-4	MW18A-GW-0324	Total/NA	Water	SM 2540C	
310-276742-5	MW20A-GW-0324	Total/NA	Water	SM 2540C	
310-276742-6	MW21-GW-0324	Total/NA	Water	SM 2540C	
310-276742-7	MW22-GW-0324	Total/NA	Water	SM 2540C	
310-276742-8	DP02-GW-0324	Total/NA	Water	SM 2540C	
MB 310-416040/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-416040/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-276742-4 DU	MW18A-GW-0324	Total/NA	Water	SM 2540C	

Analysis Batch: 416066

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276742-1	MW03-GW-0324	Total/NA	Water	SM 4500 H+ B	
310-276742-2	MW04-GW-0324	Total/NA	Water	SM 4500 H+ B	
310-276742-3	MW17R-GW-0324	Total/NA	Water	SM 4500 H+ B	
310-276742-4	MW18A-GW-0324	Total/NA	Water	SM 4500 H+ B	
310-276742-5	MW20A-GW-0324	Total/NA	Water	SM 4500 H+ B	
310-276742-6	MW21-GW-0324	Total/NA	Water	SM 4500 H+ B	
310-276742-7	MW22-GW-0324	Total/NA	Water	SM 4500 H+ B	
310-276742-8	DP02-GW-0324	Total/NA	Water	SM 4500 H+ B	
LCS 310-416066/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

General Chemistry (Continued)

Analysis Batch: 416066 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276742-4 DU	MW18A-GW-0324	Total/NA	Water	SM 4500 H+ B	

Rad

Prep Batch: 652926

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276742-1	MW03-GW-0324	Total/NA	Water	PrecSep-21	
310-276742-2	MW04-GW-0324	Total/NA	Water	PrecSep-21	
310-276742-3	MW17R-GW-0324	Total/NA	Water	PrecSep-21	
310-276742-4	MW18A-GW-0324	Total/NA	Water	PrecSep-21	
310-276742-5	MW20A-GW-0324	Total/NA	Water	PrecSep-21	
310-276742-6	MW21-GW-0324	Total/NA	Water	PrecSep-21	
310-276742-7	MW22-GW-0324	Total/NA	Water	PrecSep-21	
310-276742-8	DP02-GW-0324	Total/NA	Water	PrecSep-21	
MB 160-652926/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-652926/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
310-276742-4 MS	MW18A-GW-0324	Total/NA	Water	PrecSep-21	
310-276742-4 MSD	MW18A-GW-0324	Total/NA	Water	PrecSep-21	

Prep Batch: 652927

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-276742-1	MW03-GW-0324	Total/NA	Water	PrecSep_0	
310-276742-2	MW04-GW-0324	Total/NA	Water	PrecSep_0	
310-276742-3	MW17R-GW-0324	Total/NA	Water	PrecSep_0	
310-276742-4	MW18A-GW-0324	Total/NA	Water	PrecSep_0	
310-276742-5	MW20A-GW-0324	Total/NA	Water	PrecSep_0	
310-276742-6	MW21-GW-0324	Total/NA	Water	PrecSep_0	
310-276742-7	MW22-GW-0324	Total/NA	Water	PrecSep_0	
310-276742-8	DP02-GW-0324	Total/NA	Water	PrecSep_0	
MB 160-652927/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-652927/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
310-276742-4 MS	MW18A-GW-0324	Total/NA	Water	PrecSep_0	
310-276742-4 MSD	MW18A-GW-0324	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-276742-1
Project/Site: MEC Louisa West CCR Monofill

Client Sample ID: MW03-GW-0324
Lab Sample ID: 310-276742-1
Date Collected: 03/12/24 15:25
Matrix: Water
Date Received: 03/14/24 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416369	QTZ5	EET CF	03/18/24 13:36
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 18:09
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 10:13
Total/NA	Analysis	SM 2540C		1	416040	D7CP	EET CF	03/14/24 17:08
Total/NA	Analysis	SM 4500 H+ B		1	416066	WZC8	EET CF	03/14/24 17:02
Total/NA	Prep	PrecSep-21			652926	KAK	EET SL	03/18/24 10:23
Total/NA	Analysis	9315		1	656032	SWS	EET SL	04/09/24 09:30
Total/NA	Prep	PrecSep_0			652927	KAK	EET SL	03/18/24 10:26
Total/NA	Analysis	9320		1	655125	SCB	EET SL	04/03/24 11:38
Total/NA	Analysis	Ra226_Ra228		1	656101	FLC	EET SL	04/09/24 14:43

Client Sample ID: MW04-GW-0324
Lab Sample ID: 310-276742-2
Date Collected: 03/12/24 14:40
Matrix: Water
Date Received: 03/14/24 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416369	QTZ5	EET CF	03/18/24 14:16
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 18:11
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 10:15
Total/NA	Analysis	SM 2540C		1	416040	D7CP	EET CF	03/14/24 17:08
Total/NA	Analysis	SM 4500 H+ B		1	416066	WZC8	EET CF	03/14/24 16:55
Total/NA	Prep	PrecSep-21			652926	KAK	EET SL	03/18/24 10:23
Total/NA	Analysis	9315		1	656032	SWS	EET SL	04/09/24 09:31
Total/NA	Prep	PrecSep_0			652927	KAK	EET SL	03/18/24 10:26
Total/NA	Analysis	9320		1	655125	SCB	EET SL	04/03/24 11:38
Total/NA	Analysis	Ra226_Ra228		1	656101	FLC	EET SL	04/09/24 14:43

Client Sample ID: MW17R-GW-0324
Lab Sample ID: 310-276742-3
Date Collected: 03/12/24 16:05
Matrix: Water
Date Received: 03/14/24 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416369	QTZ5	EET CF	03/18/24 14:29
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 18:13
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 10:18
Total/NA	Analysis	SM 2540C		1	416040	D7CP	EET CF	03/14/24 17:08
Total/NA	Analysis	SM 4500 H+ B		1	416066	WZC8	EET CF	03/14/24 16:59

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-276742-1
Project/Site: MEC Louisa West CCR Monofill

Client Sample ID: MW17R-GW-0324
Lab Sample ID: 310-276742-3
Date Collected: 03/12/24 16:05
Matrix: Water
Date Received: 03/14/24 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			652926	KAK	EET SL	03/18/24 10:23
Total/NA	Analysis	9315		1	656032	SWS	EET SL	04/09/24 09:31
Total/NA	Prep	PrecSep_0			652927	KAK	EET SL	03/18/24 10:26
Total/NA	Analysis	9320		1	655125	SCB	EET SL	04/03/24 11:39
Total/NA	Analysis	Ra226_Ra228		1	656101	FLC	EET SL	04/09/24 14:43

Client Sample ID: MW18A-GW-0324
Lab Sample ID: 310-276742-4
Date Collected: 03/12/24 17:05
Matrix: Water
Date Received: 03/14/24 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416369	QTZ5	EET CF	03/18/24 14:42
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 18:16
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 10:20
Total/NA	Analysis	SM 2540C		1	416040	D7CP	EET CF	03/14/24 17:08
Total/NA	Analysis	SM 4500 H+ B		1	416066	WZC8	EET CF	03/14/24 16:47
Total/NA	Prep	PrecSep-21			652926	KAK	EET SL	03/18/24 10:23
Total/NA	Analysis	9315		1	656032	SWS	EET SL	04/09/24 09:31
Total/NA	Prep	PrecSep_0			652927	KAK	EET SL	03/18/24 10:26
Total/NA	Analysis	9320		1	655125	SCB	EET SL	04/03/24 11:39
Total/NA	Analysis	Ra226_Ra228		1	656101	FLC	EET SL	04/09/24 14:43

Client Sample ID: MW20A-GW-0324
Lab Sample ID: 310-276742-5
Date Collected: 03/13/24 09:10
Matrix: Water
Date Received: 03/14/24 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416369	QTZ5	EET CF	03/18/24 15:21
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 18:36
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 10:30
Total/NA	Analysis	SM 2540C		1	416040	D7CP	EET CF	03/14/24 17:08
Total/NA	Analysis	SM 4500 H+ B		1	416066	WZC8	EET CF	03/14/24 17:06
Total/NA	Prep	PrecSep-21			652926	KAK	EET SL	03/18/24 10:23
Total/NA	Analysis	9315		1	656033	SWS	EET SL	04/09/24 09:43
Total/NA	Prep	PrecSep_0			652927	KAK	EET SL	03/18/24 10:26
Total/NA	Analysis	9320		1	655125	SCB	EET SL	04/03/24 11:40
Total/NA	Analysis	Ra226_Ra228		1	656101	FLC	EET SL	04/09/24 14:43

Client Sample ID: MW21-GW-0324
Lab Sample ID: 310-276742-6

Date Collected: 03/13/24 09:50
Matrix: Water
Date Received: 03/14/24 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416369	QTZ5	EET CF	03/18/24 15:34
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 18:38
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 10:33
Total/NA	Analysis	SM 2540C		1	416040	D7CP	EET CF	03/14/24 17:08
Total/NA	Analysis	SM 4500 H+ B		1	416066	WZC8	EET CF	03/14/24 17:10
Total/NA	Prep	PrecSep-21			652926	KAK	EET SL	03/18/24 10:23
Total/NA	Analysis	9315		1	656033	SWS	EET SL	04/09/24 09:43
Total/NA	Prep	PrecSep_0			652927	KAK	EET SL	03/18/24 10:26
Total/NA	Analysis	9320		1	655125	SCB	EET SL	04/03/24 11:40
Total/NA	Analysis	Ra226_Ra228		1	656101	FLC	EET SL	04/09/24 14:43

Client Sample ID: MW22-GW-0324
Lab Sample ID: 310-276742-7

Date Collected: 03/13/24 10:25
Matrix: Water
Date Received: 03/14/24 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416369	QTZ5	EET CF	03/18/24 15:47
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 18:40
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 10:35
Total/NA	Analysis	SM 2540C		1	416040	D7CP	EET CF	03/14/24 17:08
Total/NA	Analysis	SM 4500 H+ B		1	416066	WZC8	EET CF	03/14/24 17:14
Total/NA	Prep	PrecSep-21			652926	KAK	EET SL	03/18/24 10:23
Total/NA	Analysis	9315		1	656033	SWS	EET SL	04/09/24 09:43
Total/NA	Prep	PrecSep_0			652927	KAK	EET SL	03/18/24 10:26
Total/NA	Analysis	9320		1	655125	SCB	EET SL	04/03/24 11:40
Total/NA	Analysis	Ra226_Ra228		1	656101	FLC	EET SL	04/09/24 14:43

Client Sample ID: DP02-GW-0324
Lab Sample ID: 310-276742-8

Date Collected: 03/13/24 00:00
Matrix: Water
Date Received: 03/14/24 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	416369	QTZ5	EET CF	03/18/24 16:00
Total/NA	Prep	3005A			416034	QTZ5	EET CF	03/15/24 09:00
Total/NA	Analysis	6020B		1	416229	DHM5	EET CF	03/15/24 18:42
Total/NA	Prep	7470A			416093	NFT2	EET CF	03/15/24 10:52
Total/NA	Analysis	7470A		1	416244	A6US	EET CF	03/18/24 10:37
Total/NA	Analysis	SM 2540C		1	416040	D7CP	EET CF	03/14/24 17:08
Total/NA	Analysis	SM 4500 H+ B		1	416066	WZC8	EET CF	03/14/24 17:19

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-276742-1
Project/Site: MEC Louisa West CCR Monofill

Client Sample ID: DP02-GW-0324
Lab Sample ID: 310-276742-8

Date Collected: 03/13/24 00:00
Matrix: Water

Date Received: 03/14/24 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			652926	KAK	EET SL	03/18/24 10:23
Total/NA	Analysis	9315		1	656033	SWS	EET SL	04/09/24 09:44
Total/NA	Prep	PrecSep_0			652927	KAK	EET SL	03/18/24 10:26
Total/NA	Analysis	9320		1	655125	SCB	EET SL	04/03/24 11:40
Total/NA	Analysis	Ra226_Ra228		1	656101	FLC	EET SL	04/09/24 16:39

Laboratory References:

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

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

Accreditation/Certification Summary

Client: GHD Services Inc. Job ID: 310-276742-1
Project/Site: MEC Louisa West CCR Monofill

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-25

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

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

Laboratory: Eurofins St. Louis

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	373	12-01-24

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

Analysis Method	Prep Method	Matrix	Analyte
9315	PrecSep-21	Water	Radium-226
9320	PrecSep_0	Water	Radium-228
Ra226_Ra228		Water	Combined Radium 226 + 228

Method Summary

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

Job ID: 310-276742-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
7470A	Mercury (CVAA)	SW846	EET CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET CF
SM 4500 H+ B	pH	SM	EET CF
9315	Radium-226 (GFPC)	SW846	EET SL
9320	Radium-228 (GFPC)	SW846	EET SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	EET SL
3005A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF
PrecSep_0	Preparation, Precipitate Separation	None	EET SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	EET SL

Protocol References:

None = None

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

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

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

Laboratory References:

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

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

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310-276742 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: GHD

City/State: CITY | STATE | Project:

Receipt Information

Date/Time Received: DATE 3/14/24 | TIME 0920 | Received By: AM

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

Condition of Cooler/Containers

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

Temperature Record

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

Thermometer ID: X | Correction Factor (°C): 0

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

Uncorrected Temp (°C): 1.6 | Corrected Temp (°C): 1.6

• **Sample Container Temperature**

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

Exceptions Noted

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

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

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

Additional Comments

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Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: GHD

City/State: CITY | STATE | Project:

Receipt Information

Date/Time Received: DATE 3/14/24 | TIME 0920 | Received By: AM

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

Condition of Cooler/Containers

Sample(s) received in Cooler?	☒ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☒ Yes	☐ No	*If yes:* Cooler # 2 of 3
Cooler Custody Seals Present? No	☐ Yes	☒ No	*If yes:* Cooler custody seals intact? ☐ Yes ☐
Sample Custody Seals Present? No	☐ Yes	☒ No	*If yes:* Sample custody seals intact? ☐ Yes ☐
Trip Blank Present?	☐ Yes	☒ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record

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

Thermometer ID: X | Correction Factor (°C): 0

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

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

• Sample Container Temperature

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

Exceptions Noted

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

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

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

Additional Comments

eurofins | Environment Testing America

Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: GHD

City/State: CITY | STATE | Project:

Receipt Information

Date/Time Received: DATE 3/14/24 | TIME 0920 | Received By: AM

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

Condition of Cooler/Containers

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

Temperature Record

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

Thermometer ID: X | Correction Factor (°C): 0

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

Uncorrected Temp (°C): 3.9 | Corrected Temp (°C): 3.9

• **Sample Container Temperature**

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

Exceptions Noted

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

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

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

Additional Comments

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

Chain of Custody Record

DSM 214

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

Analysis Requested

Preservation Codes

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

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9315_Ra226 Standard Target List	9320_Ra228 - Standard Target List	9056A_ORGFM_28D - Chloride, Fluoride, Sulfate	6020B, 7470A CCR Metals List	2540C_Calcd, SM4500_H+	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D	N	D	N		
MW03-GW-0324	3/12	1525	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW04-GW-0324	3/12	1440	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW17R-GW-0324	3/12	1605	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW18A-GW-0324	3/12	1705	G	W	N	Y	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW20A-GW-0324	3/13	0910	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW21-GW-0324	3/13	0950	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW22-GW-0324	3/13	1025	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
DP02-GW-0324	3/13	—	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents

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

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

Deliverable Requested I II III IV Other (specify)

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

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

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Brooke Wasson	3/13 1200	GHD			
2						
3					3/14/24 0920	

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

Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-276742-1
SDG Number:

Login Number: 276742
List Number: 1
Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

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

Tracer/Carrier Summary

Client: GHD Services Inc.
Job ID: 310-276742-1
Project/Site: MEC Louisa West CCR Monofill

Method: 9315 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(30-110)
310-276742-1	MW03-GW-0324	98.2
310-276742-2	MW04-GW-0324	100
310-276742-3	MW17R-GW-0324	94.1
310-276742-4	MW18A-GW-0324	92.8
310-276742-4 MS	MW18A-GW-0324	93.0
310-276742-4 MSD	MW18A-GW-0324	89.9
310-276742-5	MW20A-GW-0324	103
310-276742-6	MW21-GW-0324	95.9
310-276742-7	MW22-GW-0324	94.6
310-276742-8	DP02-GW-0324	91.8
LCS 160-652926/2-A	Lab Control Sample	101
MB 160-652926/1-A	Method Blank	97.2

Tracer/Carrier Legend

Ba = Barium

Method: 9320 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
		Ba	Y
Lab Sample ID	Client Sample ID	(30-110)	(30-110)
310-276742-1	MW03-GW-0324	98.2	81.5
310-276742-2	MW04-GW-0324	100	82.2
310-276742-3	MW17R-GW-0324	94.1	84.5
310-276742-4	MW18A-GW-0324	92.8	76.6
310-276742-4 MS	MW18A-GW-0324	93.0	81.1
310-276742-4 MSD	MW18A-GW-0324	89.9	75.9
310-276742-5	MW20A-GW-0324	103	80.0
310-276742-6	MW21-GW-0324	95.9	83.0
310-276742-7	MW22-GW-0324	94.6	80.0
310-276742-8	DP02-GW-0324	91.8	81.5
LCS 160-652927/2-A	Lab Control Sample	101	87.5
MB 160-652927/1-A	Method Blank	97.2	81.9

Tracer/Carrier Legend

Ba = Barium
Y = Y Carrier

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ANALYTICAL REPORT

PREPARED FOR

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

Generated 10/4/2024 1:23:31 PM Revision 1

JOB DESCRIPTION

MEC Louisa West CCR Monofill

JOB NUMBER

310-289236-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

Job Notes

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

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

Authorization

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Revision 1

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

Table of Contents

Job ID: 310-289236-1 Eurofins Cedar Falls

Job Narrative
310-289236-1

REVISION

The report being provided is a revision of the original report sent on 9/27/2024. The report (revision 1) is being revised due to issues with Barium QC.

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 8/29/2024 8:50 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 1.6°C, 3.1°C and 3.8°C.

HPLC/IC
Method 9056A_ORGFM_28D: The following samples were diluted due to the nature of the sample matrix: MW03-GW-0824 (310-289236-1), MW04-GW-0824 (310-289236-2), MW17R-GW-0824 (310-289236-3), MW18A-GW-0824 (310-289236-4), MW20A-GW-0824 (310-289236-5), MW21-GW-0824 (310-289236-6), MW22-GW-0824 (310-289236-7) and DP02-GW-0824 (310-289236-8). Elevated reporting limits (RLs) are provided.

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

Metals
Method 6020B: The method blank for preparation batch 310-431824 and analytical batch 310-433162 contained Barium above the method detection limit (MDL). Associated sample(s) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

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

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

Job ID: 310-289236-2 Eurofins Cedar Falls

Job Narrative
310-289236-2

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 8/29/2024 8:50 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 1.6°C, 3.1°C and 3.8°C.

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

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

Sample Summary

Client: GHD Services Inc.
Job ID: 310-289236-1
Project/Site: MEC Louisa West CCR Monofill

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-289236-1	MW03-GW-0824	Water	08/27/24 18:15	08/29/24 08:50
310-289236-2	MW04-GW-0824	Water	08/27/24 14:25	08/29/24 08:50
310-289236-3	MW17R-GW-0824	Water	08/27/24 17:35	08/29/24 08:50
310-289236-4	MW18A-GW-0824	Water	08/27/24 16:30	08/29/24 08:50
310-289236-5	MW20A-GW-0824	Water	08/27/24 19:03	08/29/24 08:50
310-289236-6	MW21-GW-0824	Water	08/27/24 15:55	08/29/24 08:50
310-289236-7	MW22-GW-0824	Water	08/27/24 15:10	08/29/24 08:50
310-289236-8	DP02-GW-0824	Water	08/27/24 00:00	08/29/24 08:50

Detection Summary

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

Job ID: 310-289236-1

Client Sample ID: MW03-GW-0824 — Lab Sample ID: 310-289236-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	5.46		5.00		mg/L	5		9056A	Total/NA
Barium	0.0203		0.00200		mg/L	1		6020B	Total/NA
Calcium	31.0		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	134		50.0		mg/L	1		SM 2540C	Total/NA
pH	8.3	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW04-GW-0824 — Lab Sample ID: 310-289236-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	9.29		5.00		mg/L	5		9056A	Total/NA
Sulfate	23.9		5.00		mg/L	5		9056A	Total/NA
Barium	0.0505		0.00200		mg/L	1		6020B	Total/NA
Boron	0.367		0.100		mg/L	1		6020B	Total/NA
Calcium	46.8		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	214		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.7	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW17R-GW-0824 — Lab Sample ID: 310-289236-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	19.7		5.00		mg/L	5		9056A	Total/NA
Barium	0.0299		0.00200		mg/L	1		6020B	Total/NA
Calcium	38.0		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	162		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.9	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW18A-GW-0824 — Lab Sample ID: 310-289236-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	9.17		5.00		mg/L	5		9056A	Total/NA
Sulfate	38.8		5.00		mg/L	5		9056A	Total/NA
Barium	0.0310		0.00200		mg/L	1		6020B	Total/NA
Boron	0.240		0.100		mg/L	1		6020B	Total/NA
Calcium	32.0		0.500		mg/L	1		6020B	Total/NA
Chromium	0.0114		0.00500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	162		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.1	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW20A-GW-0824 — Lab Sample ID: 310-289236-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	5.30		5.00		mg/L	5		9056A	Total/NA
Sulfate	46.7		5.00		mg/L	5		9056A	Total/NA
Barium	0.0290		0.00200		mg/L	1		6020B	Total/NA
Boron	0.199		0.100		mg/L	1		6020B	Total/NA
Calcium	24.3		0.500		mg/L	1		6020B	Total/NA
Selenium	0.00950		0.00500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	190		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.0	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

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

Job ID: 310-289236-1

Client Sample ID: MW21-GW-0824 — Lab Sample ID: 310-289236-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	5.98		5.00		mg/L	5		9056A	Total/NA
Sulfate	24.7		5.00		mg/L	5		9056A	Total/NA
Barium	0.0612		0.00200		mg/L	1		6020B	Total/NA
Calcium	69.0		0.500		mg/L	1		6020B	Total/NA
Total Dissolved Solids	246		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW22-GW-0824 — Lab Sample ID: 310-289236-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	18.9		5.00		mg/L	5		9056A	Total/NA
Sulfate	33.6		5.00		mg/L	5		9056A	Total/NA
Barium	0.0140		0.00200		mg/L	1		6020B	Total/NA
Boron	0.158		0.100		mg/L	1		6020B	Total/NA
Calcium	38.6		0.500		mg/L	1		6020B	Total/NA
Chromium	0.00648		0.00500		mg/L	1		6020B	Total/NA
Molybdenum	0.0226		0.00200		mg/L	1		6020B	Total/NA
Total Dissolved Solids	182		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.6	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: DP02-GW-0824 — Lab Sample ID: 310-289236-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	19.0		5.00		mg/L	5		9056A	Total/NA
Sulfate	33.7		5.00		mg/L	5		9056A	Total/NA
Barium	0.0141		0.00200		mg/L	1		6020B	Total/NA
Boron	0.158		0.100		mg/L	1		6020B	Total/NA
Calcium	38.7		0.500		mg/L	1		6020B	Total/NA
Chromium	0.00665		0.00500		mg/L	1		6020B	Total/NA
Molybdenum	0.0227		0.00200		mg/L	1		6020B	Total/NA
Total Dissolved Solids	172		50.0		mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	1.0		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

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

Job ID: 310-289236-1

Client Sample ID: MW03-GW-0824

Date Collected: 08/27/24 18:15
Date Received: 08/29/24 08:50

Lab Sample ID: 310-289236-1

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			09/05/24 17:44	5
Fluoride	<1.00		1.00		mg/L			09/05/24 17:44	5
Sulfate	**5.46**		5.00		mg/L			09/05/24 17:44	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 16:35	1
Arsenic	<0.00200		0.00200		mg/L		08/30/24 09:00	09/03/24 16:51	1
Barium	**0.0203**		0.00200		mg/L		09/18/24 09:00	09/18/24 20:00	1
Beryllium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/10/24 16:35	1
Boron	<0.100		0.100		mg/L		08/30/24 09:00	09/10/24 16:35	1
Cadmium	<0.000200		0.000200		mg/L		08/30/24 09:00	09/12/24 16:04	1
Calcium	**31.0**		0.500		mg/L		08/30/24 09:00	09/10/24 16:35	1
Chromium	<0.00500		0.00500		mg/L		08/30/24 09:00	09/03/24 16:51	1
Cobalt	<0.000500		0.000500		mg/L		08/30/24 09:00	09/10/24 16:35	1
Lead	<0.000500		0.000500		mg/L		08/30/24 09:00	09/03/24 16:51	1
Lithium	<0.0100		0.0100		mg/L		08/30/24 09:00	09/03/24 16:51	1
Molybdenum	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 16:35	1
Selenium	<0.00500		0.00500		mg/L		08/30/24 09:00	09/03/24 16:51	1
Thallium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/03/24 16:51	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/04/24 15:45	09/05/24 12:21	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**134**		50.0		mg/L			08/29/24 14:11	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**8.3**	**HF**	1.0		SU			08/29/24 11:38	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.247	U	0.139	0.139	1.00	0.247	pCi/L	09/03/24 08:35	09/26/24 08:15	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*91.9*		*30 - 110*	*09/03/24 08:35*	*09/26/24 08:15*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.537	U	0.286	0.286	1.00	0.537	pCi/L	09/03/24 08:42	09/25/24 11:57	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*91.9*		*30 - 110*	*09/03/24 08:42*	*09/25/24 11:57*	*1*
Y Carrier	*76.3*		*30 - 110*	*09/03/24 08:42*	*09/25/24 11:57*	*1*

Client Sample Results

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

Job ID: 310-289236-1

Client Sample ID: MW03-GW-0824

Date Collected: 08/27/24 18:15
Date Received: 08/29/24 08:50

Lab Sample ID: 310-289236-1

Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	<0.537	U	0.318	0.318	5.00	0.537	pCi/L		09/27/24 12:38	1

Client Sample ID: MW04-GW-0824
Lab Sample ID: 310-289236-2

Date Collected: 08/27/24 14:25
Matrix: Water
Date Received: 08/29/24 08:50

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**9.29**		5.00		mg/L			09/05/24 17:56	5
Fluoride	<1.00		1.00		mg/L			09/05/24 17:56	5
Sulfate	**23.9**		5.00		mg/L			09/05/24 17:56	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 16:39	1
Arsenic	<0.00200		0.00200		mg/L		08/30/24 09:00	09/03/24 17:05	1
Barium	**0.0505**		0.00200		mg/L		09/18/24 09:00	09/18/24 20:05	1
Beryllium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/10/24 16:39	1
Boron	**0.367**		0.100		mg/L		08/30/24 09:00	09/10/24 16:39	1
Cadmium	<0.000200		0.000200		mg/L		08/30/24 09:00	09/13/24 13:13	1
Calcium	**46.8**		0.500		mg/L		08/30/24 09:00	09/10/24 16:39	1
Chromium	<0.00500		0.00500		mg/L		08/30/24 09:00	09/03/24 17:05	1
Cobalt	<0.000500		0.000500		mg/L		08/30/24 09:00	09/10/24 16:39	1
Lead	<0.000500		0.000500		mg/L		08/30/24 09:00	09/03/24 17:05	1
Lithium	<0.0100		0.0100		mg/L		08/30/24 09:00	09/03/24 17:05	1
Molybdenum	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 16:39	1
Selenium	<0.00500		0.00500		mg/L		08/30/24 09:00	09/03/24 17:05	1
Thallium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/03/24 17:05	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/04/24 15:45	09/05/24 12:23	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**214**		50.0		mg/L			08/29/24 14:11	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.7**	**HF**	1.0		SU			08/29/24 11:37	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.285	U	0.153	0.153	1.00	0.285	pCi/L	09/03/24 08:35	09/26/24 11:49	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*85.7*		*30 - 110*	*09/03/24 08:35*	*09/26/24 11:49*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.584	U	0.362	0.364	1.00	0.584	pCi/L	09/03/24 08:42	09/25/24 11:57	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*85.7*		*30 - 110*	*09/03/24 08:42*	*09/25/24 11:57*	*1*
Y Carrier	*78.9*		*30 - 110*	*09/03/24 08:42*	*09/25/24 11:57*	*1*

Client Sample Results

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

Job ID: 310-289236-1

Client Sample ID: MW04-GW-0824

Date Collected: 08/27/24 14:25
Date Received: 08/29/24 08:50

Lab Sample ID: 310-289236-2

Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	<0.584	U	0.393	0.395	5.00	0.584	pCi/L		09/27/24 12:38	1

Client Sample ID: MW17R-GW-0824
Lab Sample ID: 310-289236-3

Date Collected: 08/27/24 17:35
Matrix: Water
Date Received: 08/29/24 08:50

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<5.00		5.00		mg/L			09/05/24 18:08	5
Fluoride	<1.00		1.00		mg/L			09/05/24 18:08	5
Sulfate	**19.7**		5.00		mg/L			09/05/24 18:08	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 16:42	1
Arsenic	<0.00200		0.00200		mg/L		08/30/24 09:00	09/03/24 17:07	1
Barium	**0.0299**		0.00200		mg/L		09/18/24 09:00	09/18/24 20:07	1
Beryllium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/10/24 16:42	1
Boron	<0.100		0.100		mg/L		08/30/24 09:00	09/10/24 16:42	1
Cadmium	<0.000200		0.000200		mg/L		08/30/24 09:00	09/13/24 13:15	1
Calcium	**38.0**		0.500		mg/L		08/30/24 09:00	09/10/24 16:42	1
Chromium	<0.00500		0.00500		mg/L		08/30/24 09:00	09/03/24 17:07	1
Cobalt	<0.000500		0.000500		mg/L		08/30/24 09:00	09/10/24 16:42	1
Lead	<0.000500		0.000500		mg/L		08/30/24 09:00	09/03/24 17:07	1
Lithium	<0.0100		0.0100		mg/L		08/30/24 09:00	09/03/24 17:07	1
Molybdenum	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 16:42	1
Selenium	<0.00500		0.00500		mg/L		08/30/24 09:00	09/03/24 17:07	1
Thallium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/03/24 17:07	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/04/24 15:45	09/05/24 12:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**162**		50.0		mg/L			08/29/24 14:11	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.9**	**HF**	1.0		SU			08/29/24 11:39	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.239	U	0.145	0.145	1.00	0.239	pCi/L	09/03/24 08:35	09/26/24 11:49	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*95.1*		*30 - 110*	*09/03/24 08:35*	*09/26/24 11:49*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.567	U	0.325	0.325	1.00	0.567	pCi/L	09/03/24 08:42	09/25/24 11:57	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*95.1*		*30 - 110*	*09/03/24 08:42*	*09/25/24 11:57*	*1*
Y Carrier	*74.8*		*30 - 110*	*09/03/24 08:42*	*09/25/24 11:57*	*1*

Client Sample Results

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

Job ID: 310-289236-1

Client Sample ID: MW17R-GW-0824

Date Collected: 08/27/24 17:35
Date Received: 08/29/24 08:50

Lab Sample ID: 310-289236-3

Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	<0.567	U	0.356	0.356	5.00	0.567	pCi/L		09/27/24 12:38	1

Client Sample ID: MW18A-GW-0824
Lab Sample ID: 310-289236-4

Date Collected: 08/27/24 16:30
Matrix: Water
Date Received: 08/29/24 08:50

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**9.17**		5.00		mg/L			09/05/24 18:20	5
Fluoride	<1.00		1.00		mg/L			09/05/24 18:20	5
Sulfate	**38.8**		5.00		mg/L			09/05/24 18:20	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 16:53	1
Arsenic	<0.00200		0.00200		mg/L		08/30/24 09:00	09/03/24 17:09	1
Barium	**0.0310**		0.00200		mg/L		09/18/24 09:00	09/18/24 20:09	1
Beryllium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/10/24 16:53	1
Boron	**0.240**		0.100		mg/L		08/30/24 09:00	09/10/24 16:53	1
Cadmium	<0.000200		0.000200		mg/L		08/30/24 09:00	09/13/24 13:17	1
Calcium	**32.0**		0.500		mg/L		08/30/24 09:00	09/10/24 16:53	1
Chromium	**0.0114**		0.00500		mg/L		08/30/24 09:00	09/03/24 17:09	1
Cobalt	<0.000500		0.000500		mg/L		08/30/24 09:00	09/10/24 16:53	1
Lead	<0.000500		0.000500		mg/L		08/30/24 09:00	09/03/24 17:09	1
Lithium	<0.0100		0.0100		mg/L		08/30/24 09:00	09/03/24 17:09	1
Molybdenum	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 16:53	1
Selenium	<0.00500		0.00500		mg/L		08/30/24 09:00	09/03/24 17:09	1
Thallium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/03/24 17:09	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/04/24 15:45	09/05/24 12:27	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**162**		50.0		mg/L			08/29/24 14:11	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.1**	**HF**	1.0		SU			08/29/24 11:35	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.264	U	0.139	0.139	1.00	0.264	pCi/L	09/03/24 08:35	09/26/24 11:49	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*96.1*		*30 - 110*	*09/03/24 08:35*	*09/26/24 11:49*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.675	U	0.433	0.436	1.00	0.675	pCi/L	09/03/24 08:42	09/25/24 13:39	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*96.1*		*30 - 110*	*09/03/24 08:42*	*09/25/24 13:39*	*1*
Y Carrier	*78.9*		*30 - 110*	*09/03/24 08:42*	*09/25/24 13:39*	*1*

Client: GHD Services Inc.
Job ID: 310-289236-1
Project/Site: MEC Louisa West CCR Monofill

Client Sample ID: MW18A-GW-0824
Lab Sample ID: 310-289236-4
Date Collected: 08/27/24 16:30
Matrix: Water
Date Received: 08/29/24 08:50

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	<0.675	U	0.455	0.458	5.00	0.675	pCi/L		09/27/24 12:38	1

Client Sample ID: MW20A-GW-0824
Lab Sample ID: 310-289236-5

Date Collected: 08/27/24 19:03
Matrix: Water
Date Received: 08/29/24 08:50

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**5.30**		5.00		mg/L			09/05/24 19:21	5
Fluoride	<1.00		1.00		mg/L			09/05/24 19:21	5
Sulfate	**46.7**		5.00		mg/L			09/05/24 19:21	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 16:59	1
Arsenic	<0.00200		0.00200		mg/L		08/30/24 09:00	09/03/24 17:21	1
Barium	**0.0290**		0.00200		mg/L		09/18/24 09:00	09/18/24 20:29	1
Beryllium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/10/24 16:59	1
Boron	**0.199**		0.100		mg/L		08/30/24 09:00	09/10/24 16:59	1
Cadmium	<0.000200		0.000200		mg/L		08/30/24 09:00	09/13/24 13:33	1
Calcium	**24.3**		0.500		mg/L		08/30/24 09:00	09/10/24 16:59	1
Chromium	<0.00500		0.00500		mg/L		08/30/24 09:00	09/03/24 17:21	1
Cobalt	<0.000500		0.000500		mg/L		08/30/24 09:00	09/10/24 16:59	1
Lead	<0.000500		0.000500		mg/L		08/30/24 09:00	09/03/24 17:21	1
Lithium	<0.0100		0.0100		mg/L		08/30/24 09:00	09/03/24 17:21	1
Molybdenum	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 16:59	1
Selenium	**0.00950**		0.00500		mg/L		08/30/24 09:00	09/03/24 17:21	1
Thallium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/03/24 17:21	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/04/24 15:45	09/05/24 12:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**190**		50.0		mg/L			08/30/24 12:12	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.0**	**HF**	1.0		SU			08/29/24 11:43	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.270	U	0.173	0.174	1.00	0.270	pCi/L	09/03/24 08:35	09/26/24 13:53	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*90.4*		*30 - 110*	*09/03/24 08:35*	*09/26/24 13:53*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.863	U	0.510	0.511	1.00	0.863	pCi/L	09/03/24 08:42	09/25/24 13:39	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*90.4*		*30 - 110*	*09/03/24 08:42*	*09/25/24 13:39*	*1*
Y Carrier	*74.0*		*30 - 110*	*09/03/24 08:42*	*09/25/24 13:39*	*1*

Client Sample Results

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

Job ID: 310-289236-1

Client Sample ID: MW20A-GW-0824

Date Collected: 08/27/24 19:03
Date Received: 08/29/24 08:50

Lab Sample ID: 310-289236-5

Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	<0.863	U	0.539	0.540	5.00	0.863	pCi/L		09/27/24 12:38	1

Client Sample ID: MW21-GW-0824

Date Collected: 08/27/24 15:55
Date Received: 08/29/24 08:50

Lab Sample ID: 310-289236-6

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**5.98**		5.00		mg/L			09/05/24 19:33	5
Fluoride	<1.00		1.00		mg/L			09/05/24 19:33	5
Sulfate	**24.7**		5.00		mg/L			09/05/24 19:33	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 17:02	1
Arsenic	<0.00200		0.00200		mg/L		08/30/24 09:00	09/03/24 17:23	1
Barium	**0.0612**		0.00200		mg/L		09/18/24 09:00	09/18/24 20:31	1
Beryllium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/10/24 17:02	1
Boron	<0.100		0.100		mg/L		08/30/24 09:00	09/10/24 17:02	1
Cadmium	<0.000200		0.000200		mg/L		08/30/24 09:00	09/13/24 13:35	1
Calcium	**69.0**		0.500		mg/L		08/30/24 09:00	09/10/24 17:02	1
Chromium	<0.00500		0.00500		mg/L		08/30/24 09:00	09/03/24 17:23	1
Cobalt	<0.000500		0.000500		mg/L		08/30/24 09:00	09/10/24 17:02	1
Lead	<0.000500		0.000500		mg/L		08/30/24 09:00	09/03/24 17:23	1
Lithium	<0.0100		0.0100		mg/L		08/30/24 09:00	09/03/24 17:23	1
Molybdenum	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 17:02	1
Selenium	<0.00500		0.00500		mg/L		08/30/24 09:00	09/03/24 17:23	1
Thallium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/03/24 17:23	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/04/24 15:45	09/05/24 12:40	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**246**		50.0		mg/L			08/30/24 12:12	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.5**	**HF**	1.0		SU			08/29/24 11:41	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.211	U	0.107	0.107	1.00	0.211	pCi/L	09/03/24 08:35	09/26/24 15:43	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*91.9*		*30 - 110*	*09/03/24 08:35*	*09/26/24 15:43*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.710	U	0.385	0.385	1.00	0.710	pCi/L	09/03/24 08:42	09/25/24 13:39	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*91.9*		*30 - 110*	*09/03/24 08:42*	*09/25/24 13:39*	*1*
Y Carrier	*77.8*		*30 - 110*	*09/03/24 08:42*	*09/25/24 13:39*	*1*

Client Sample Results

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

Job ID: 310-289236-1

Client Sample ID: MW21-GW-0824

Date Collected: 08/27/24 15:55
Date Received: 08/29/24 08:50

Lab Sample ID: 310-289236-6

Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	<0.710	U	0.400	0.400	5.00	0.710	pCi/L		09/27/24 12:38	1

Client Sample ID: MW22-GW-0824
Lab Sample ID: 310-289236-7

Date Collected: 08/27/24 15:10
Matrix: Water
Date Received: 08/29/24 08:50

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**18.9**		5.00		mg/L			09/05/24 19:45	5
Fluoride	<1.00		1.00		mg/L			09/05/24 19:45	5
Sulfate	**33.6**		5.00		mg/L			09/05/24 19:45	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 17:04	1
Arsenic	<0.00200		0.00200		mg/L		08/30/24 09:00	09/03/24 17:34	1
Barium	**0.0140**		0.00200		mg/L		09/18/24 09:00	09/18/24 20:34	1
Beryllium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/10/24 17:04	1
Boron	**0.158**		0.100		mg/L		08/30/24 09:00	09/10/24 17:04	1
Cadmium	<0.000200		0.000200		mg/L		08/30/24 09:00	09/13/24 13:37	1
Calcium	**38.6**		0.500		mg/L		08/30/24 09:00	09/10/24 17:04	1
Chromium	**0.00648**		0.00500		mg/L		08/30/24 09:00	09/03/24 17:34	1
Cobalt	<0.000500		0.000500		mg/L		08/30/24 09:00	09/10/24 17:04	1
Lead	<0.000500		0.000500		mg/L		08/30/24 09:00	09/03/24 17:34	1
Lithium	<0.0100		0.0100		mg/L		08/30/24 09:00	09/03/24 17:34	1
Molybdenum	**0.0226**		0.00200		mg/L		08/30/24 09:00	09/10/24 17:04	1
Selenium	<0.00500		0.00500		mg/L		08/30/24 09:00	09/03/24 17:34	1
Thallium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/03/24 17:34	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/04/24 15:45	09/05/24 12:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**182**		50.0		mg/L			08/30/24 12:12	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.6**	**HF**	1.0		SU			08/29/24 11:40	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.208	U	0.123	0.123	1.00	0.208	pCi/L	09/03/24 08:35	09/26/24 15:44	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*92.6*		*30 - 110*	*09/03/24 08:35*	*09/26/24 15:44*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.609	U	0.347	0.348	1.00	0.609	pCi/L	09/03/24 08:42	09/25/24 13:39	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*92.6*		*30 - 110*	*09/03/24 08:42*	*09/25/24 13:39*	*1*
Y Carrier	*87.1*		*30 - 110*	*09/03/24 08:42*	*09/25/24 13:39*	*1*

Client Sample Results

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

Job ID: 310-289236-1

Client Sample ID: MW22-GW-0824

Date Collected: 08/27/24 15:10
Date Received: 08/29/24 08:50

Lab Sample ID: 310-289236-7

Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	<0.609	U	0.368	0.369	5.00	0.609	pCi/L		09/27/24 13:52	1

Client Sample ID: DP02-GW-0824

Date Collected: 08/27/24 00:00
Date Received: 08/29/24 08:50

Lab Sample ID: 310-289236-8

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**19.0**		5.00		mg/L			09/05/24 19:57	5
Fluoride	<1.00		1.00		mg/L			09/05/24 19:57	5
Sulfate	**33.7**		5.00		mg/L			09/05/24 19:57	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 17:06	1
Arsenic	<0.00200		0.00200		mg/L		08/30/24 09:00	09/03/24 17:36	1
Barium	**0.0141**		0.00200		mg/L		09/18/24 09:00	09/18/24 20:36	1
Beryllium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/10/24 17:06	1
Boron	**0.158**		0.100		mg/L		08/30/24 09:00	09/10/24 17:06	1
Cadmium	<0.000200		0.000200		mg/L		08/30/24 09:00	09/13/24 13:40	1
Calcium	**38.7**		0.500		mg/L		08/30/24 09:00	09/10/24 17:06	1
Chromium	**0.00665**		0.00500		mg/L		08/30/24 09:00	09/03/24 17:36	1
Cobalt	<0.000500		0.000500		mg/L		08/30/24 09:00	09/10/24 17:06	1
Lead	<0.000500		0.000500		mg/L		08/30/24 09:00	09/03/24 17:36	1
Lithium	<0.0100		0.0100		mg/L		08/30/24 09:00	09/03/24 17:36	1
Molybdenum	**0.0227**		0.00200		mg/L		08/30/24 09:00	09/10/24 17:06	1
Selenium	<0.00500		0.00500		mg/L		08/30/24 09:00	09/03/24 17:36	1
Thallium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/03/24 17:36	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/04/24 15:45	09/05/24 12:45	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**172**		50.0		mg/L			08/30/24 12:12	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH (SM 4500 H+ B)	**7.5**	**HF**	1.0		SU			08/29/24 11:42	1

Method: SW846 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	<0.221	U	0.155	0.156	1.00	0.221	pCi/L	09/03/24 08:35	09/26/24 15:44	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*96.3*		*30 - 110*	*09/03/24 08:35*	*09/26/24 15:44*	*1*

Method: SW846 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.622	U	0.399	0.402	1.00	0.622	pCi/L	09/03/24 08:42	09/25/24 13:38	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*96.3*		*30 - 110*	*09/03/24 08:42*	*09/25/24 13:38*	*1*
Y Carrier	*83.0*		*30 - 110*	*09/03/24 08:42*	*09/25/24 13:38*	*1*

Client Sample Results

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

Job ID: 310-289236-1

Client Sample ID: DP02-GW-0824

Date Collected: 08/27/24 00:00
Date Received: 08/29/24 08:50

Lab Sample ID: 310-289236-8

Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Combined Radium 226 + 228	0.692		0.428	0.431	5.00	0.622	pCi/L		09/27/24 13:52	1

Definitions/Glossary

Client: GHD Services Inc. Job ID: 310-289236-1
Project/Site: MEC Louisa West CCR Monofill

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.

General Chemistry

Qualifier	Qualifier Description
HF	Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.

Rad

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

Glossary

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

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-432477/3
Matrix: Water
Analysis Batch: 432477

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<1.00		1.00		mg/L			09/05/24 14:55	1
Fluoride	<0.200		0.200		mg/L			09/05/24 14:55	1
Sulfate	<1.00		1.00		mg/L			09/05/24 14:55	1

Lab Sample ID: LCS 310-432477/4
Matrix: Water
Analysis Batch: 432477

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	9.707		mg/L		97	90 - 110
Fluoride	2.00	2.029		mg/L		101	90 - 110
Sulfate	10.0	10.19		mg/L		102	90 - 110

Lab Sample ID: 310-289236-4 MS
Matrix: Water
Analysis Batch: 432477

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	9.17		25.0	31.78		mg/L		90	80 - 120
Fluoride	<1.00		5.00	5.071		mg/L		101	80 - 120
Sulfate	38.8		25.0	63.24		mg/L		98	80 - 120

Lab Sample ID: 310-289236-4 MSD
Matrix: Water
Analysis Batch: 432477

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	9.17		25.0	31.90		mg/L		91	80 - 120	0	15
Fluoride	<1.00		5.00	5.095		mg/L		102	80 - 120	0	15
Sulfate	38.8		25.0	63.54		mg/L		99	80 - 120	0	15

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-431824/1-A
Matrix: Water
Analysis Batch: 432145

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 431824

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00200		0.00200		mg/L		08/30/24 09:00	09/03/24 16:47	1
Chromium	<0.00500		0.00500		mg/L		08/30/24 09:00	09/03/24 16:47	1
Lead	<0.000500		0.000500		mg/L		08/30/24 09:00	09/03/24 16:47	1
Lithium	<0.0100		0.0100		mg/L		08/30/24 09:00	09/03/24 16:47	1
Selenium	<0.00500		0.00500		mg/L		08/30/24 09:00	09/03/24 16:47	1
Thallium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/03/24 16:47	1

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

Lab Sample ID: MB 310-431824/1-A
Matrix: Water
Analysis Batch: 432787

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 431824

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 16:30	1
Beryllium	<0.00100		0.00100		mg/L		08/30/24 09:00	09/10/24 16:30	1
Boron	<0.100		0.100		mg/L		08/30/24 09:00	09/10/24 16:30	1
Calcium	<0.500		0.500		mg/L		08/30/24 09:00	09/10/24 16:30	1
Cobalt	<0.000500		0.000500		mg/L		08/30/24 09:00	09/10/24 16:30	1
Molybdenum	<0.00200		0.00200		mg/L		08/30/24 09:00	09/10/24 16:30	1

Lab Sample ID: MB 310-431824/1-A
Matrix: Water
Analysis Batch: 433063

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 431824

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	<0.000200		0.000200		mg/L		08/30/24 09:00	09/12/24 15:59	1

Lab Sample ID: LCS 310-431824/2-A
Matrix: Water
Analysis Batch: 432145

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 431824

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	0.200	0.2031		mg/L		102	80 - 120
Chromium	0.100	0.1003		mg/L		100	80 - 120
Lead	0.200	0.2156		mg/L		108	80 - 120
Lithium	0.200	0.2106		mg/L		105	80 - 120
Selenium	0.400	0.3750		mg/L		94	80 - 120
Thallium	0.100	0.1002		mg/L		100	80 - 120

Lab Sample ID: LCS 310-431824/2-A
Matrix: Water
Analysis Batch: 432787

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 431824

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	0.200	0.2081		mg/L		104	80 - 120
Beryllium	0.100	0.09779		mg/L		98	80 - 120
Boron	0.200	0.1966		mg/L		98	80 - 120
Calcium	2.00	1.828		mg/L		91	80 - 120
Cobalt	0.100	0.09681		mg/L		97	80 - 120
Molybdenum	0.200	0.1923		mg/L		96	80 - 120

Lab Sample ID: LCS 310-431824/2-A
Matrix: Water
Analysis Batch: 433063

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 431824

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Barium	0.100	0.1054		mg/L		105	80 - 120
Cadmium	0.100	0.1010		mg/L		101	80 - 120

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

Lab Sample ID: 310-289236-4 MS
Matrix: Water
Analysis Batch: 432145

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA
Prep Batch: 431824

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	<0.00200		0.200	0.2137		mg/L		107	75 - 125
Chromium	0.0114		0.100	0.1134		mg/L		102	75 - 125
Lead	<0.000500		0.200	0.2249		mg/L		112	75 - 125
Lithium	<0.0100		0.200	0.2245		mg/L		112	75 - 125
Selenium	<0.00500		0.400	0.4020		mg/L		100	75 - 125
Thallium	<0.00100		0.100	0.09768		mg/L		98	75 - 125

Lab Sample ID: 310-289236-4 MS
Matrix: Water
Analysis Batch: 432787

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA
Prep Batch: 431824

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	<0.00200		0.200	0.2196		mg/L		110	75 - 125
Beryllium	<0.00100		0.100	0.1039		mg/L		104	75 - 125
Boron	0.240		0.200	0.4408		mg/L		100	75 - 125
Calcium	32.0		2.00	34.07	4	mg/L		106	75 - 125
Cobalt	<0.000500		0.100	0.09875		mg/L		99	75 - 125
Molybdenum	<0.00200		0.200	0.1996		mg/L		100	75 - 125

Lab Sample ID: 310-289236-4 MS
Matrix: Water
Analysis Batch: 433162

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA
Prep Batch: 431824

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Cadmium	<0.000200		0.100	0.1075		mg/L		107	75 - 125

Lab Sample ID: 310-289236-4 MSD
Matrix: Water
Analysis Batch: 432145

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA
Prep Batch: 431824

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	<0.00200		0.200	0.2050		mg/L		102	75 - 125	4	20
Chromium	0.0114		0.100	0.1099		mg/L		99	75 - 125	3	20
Lead	<0.000500		0.200	0.2171		mg/L		109	75 - 125	4	20
Lithium	<0.0100		0.200	0.2172		mg/L		109	75 - 125	3	20
Selenium	<0.00500		0.400	0.3826		mg/L		95	75 - 125	5	20
Thallium	<0.00100		0.100	0.09782		mg/L		98	75 - 125	0	20

Lab Sample ID: 310-289236-4 MSD
Matrix: Water
Analysis Batch: 432787

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA
Prep Batch: 431824

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Antimony	<0.00200		0.200	0.2137		mg/L		107	75 - 125	3	20
Beryllium	<0.00100		0.100	0.1005		mg/L		100	75 - 125	3	20
Boron	0.240		0.200	0.4278		mg/L		94	75 - 125	3	20
Calcium	32.0		2.00	32.81	4	mg/L		43	75 - 125	4	20
Cobalt	<0.000500		0.100	0.09530		mg/L		95	75 - 125	4	20
Molybdenum	<0.00200		0.200	0.1920		mg/L		96	75 - 125	4	20

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

Lab Sample ID: 310-289236-4 MSD
Matrix: Water
Analysis Batch: 433162

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA
Prep Batch: 431824

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cadmium	<0.000200		0.100	0.1031		mg/L		103	75 - 125	4	20

Lab Sample ID: 310-289236-1 DU
Matrix: Water
Analysis Batch: 432145

Client Sample ID: MW03-GW-0824
Prep Type: Total/NA
Prep Batch: 431824

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Arsenic	<0.00200		<0.00200		mg/L		NC	20
Chromium	<0.00500		<0.00500		mg/L		NC	20
Lead	<0.000500		<0.000500		mg/L		NC	20
Lithium	<0.0100		<0.0100		mg/L		NC	20
Selenium	<0.00500		<0.00500		mg/L		NC	20
Thallium	<0.00100		<0.00100		mg/L		NC	20

Lab Sample ID: 310-289236-1 DU
Matrix: Water
Analysis Batch: 432787

Client Sample ID: MW03-GW-0824
Prep Type: Total/NA
Prep Batch: 431824

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	<0.00200		<0.00200		mg/L		NC	20
Beryllium	<0.00100		<0.00100		mg/L		NC	20
Boron	<0.100		<0.100		mg/L		NC	20
Calcium	31.0		31.35		mg/L		1	20
Cobalt	<0.000500		<0.000500		mg/L		NC	20
Molybdenum	<0.00200		<0.00200		mg/L		NC	20

Lab Sample ID: 310-289236-1 DU
Matrix: Water
Analysis Batch: 433063

Client Sample ID: MW03-GW-0824
Prep Type: Total/NA
Prep Batch: 431824

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Cadmium	<0.000200		<0.000200		mg/L		NC	20

Lab Sample ID: MB 310-433444/1-A
Matrix: Water
Analysis Batch: 433630

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 433444

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	<0.00200		0.00200		mg/L		09/18/24 09:00	09/18/24 19:56	1

Lab Sample ID: MB 310-433444/1-A
Matrix: Water
Analysis Batch: 434059

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 433444

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	<0.000200		0.000200		mg/L		09/18/24 09:00	09/23/24 18:39	1
Calcium	<0.500		0.500		mg/L		09/18/24 09:00	09/23/24 18:39	1

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

Lab Sample ID: MB 310-433444/1-A
Matrix: Water
Analysis Batch: 434205

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 433444

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	<0.00200		0.00200		mg/L		09/18/24 09:00	09/24/24 18:22	1

Lab Sample ID: LCS 310-433444/2-A
Matrix: Water
Analysis Batch: 433630

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 433444

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Barium	0.100	0.1055		mg/L		106	80 - 120

Lab Sample ID: LCS 310-433444/2-A
Matrix: Water
Analysis Batch: 434059

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 433444

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cadmium	0.100	0.09284		mg/L		93	80 - 120
Calcium	2.00	2.033		mg/L		102	80 - 120
Molybdenum	0.200	0.1950		mg/L		98	80 - 120

Lab Sample ID: LCS 310-433444/2-A
Matrix: Water
Analysis Batch: 434205

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 433444

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Molybdenum	0.200	0.2125		mg/L		106	80 - 120

Lab Sample ID: 310-289236-4 MS
Matrix: Water
Analysis Batch: 433630

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA
Prep Batch: 433444

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Barium	0.0310		0.100	0.1345		mg/L		104	75 - 125

Lab Sample ID: 310-289236-4 MSD
Matrix: Water
Analysis Batch: 433630

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA
Prep Batch: 433444

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Barium	0.0310		0.100	0.1370		mg/L		106	75 - 125	2	20

Lab Sample ID: 310-289236-1 DU
Matrix: Water
Analysis Batch: 433630

Client Sample ID: MW03-GW-0824
Prep Type: Total/NA
Prep Batch: 433444

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	<0.00200		<0.00200		mg/L		NC	20
Arsenic	<0.00200		<0.00200		mg/L		NC	20
Barium	0.0203		0.02026		mg/L		0.3	20
Beryllium	<0.00100		<0.00100		mg/L		NC	20
Boron	<0.100		<0.100		mg/L		NC	20
Chromium	<0.00500		<0.00500		mg/L		NC	20

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

Lab Sample ID: 310-289236-1 DU
Matrix: Water
Analysis Batch: 433630

Client Sample ID: MW03-GW-0824
Prep Type: Total/NA
Prep Batch: 433444

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Cobalt	<0.000500		<0.000500		mg/L		NC	20
Lead	<0.000500		<0.000500		mg/L		NC	20
Lithium	<0.0100		<0.0100		mg/L		NC	20
Selenium	<0.00500		<0.00500		mg/L		NC	20
Thallium	<0.00100		<0.00100		mg/L		NC	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-432203/1-A
Matrix: Water
Analysis Batch: 432364

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 432203

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000200		0.000200		mg/L		09/04/24 15:45	09/05/24 12:17	1

Lab Sample ID: LCS 310-432203/2-A
Matrix: Water
Analysis Batch: 432364

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 432203

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001799		mg/L		108	80 - 120

Lab Sample ID: 310-289236-4 MS
Matrix: Water
Analysis Batch: 432364

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA
Prep Batch: 432203

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	<0.000200		0.00167	0.001859		mg/L		112	80 - 120

Lab Sample ID: 310-289236-4 MSD
Matrix: Water
Analysis Batch: 432364

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA
Prep Batch: 432203

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	<0.000200		0.00167	0.001865		mg/L		112	80 - 120	0	20

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

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

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

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

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

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	960.0		mg/L		96	88 - 110

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

Lab Sample ID: MB 310-431930/1
Matrix: Water
Analysis Batch: 431930

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<50.0		50.0		mg/L			08/30/24 12:12	1

Lab Sample ID: LCS 310-431930/2
Matrix: Water
Analysis Batch: 431930

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	976.0		mg/L		98	88 - 110		

Lab Sample ID: 310-289236-5 DU
Matrix: Water
Analysis Batch: 431930

Client Sample ID: MW20A-GW-0824
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Dissolved Solids	190			184.0		mg/L				3	16

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-431718/12
Matrix: Water
Analysis Batch: 431718

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

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

Lab Sample ID: 310-289236-4 DU
Matrix: Water
Analysis Batch: 431718

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH	7.1	HF		7.1		SU				0.1	20

Method: 9315 - Radium-226 (GFPC)

Lab Sample ID: MB 160-677856/1-A
Matrix: Water
Analysis Batch: 681031

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 677856

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.3316		0.195	0.197	1.00	0.241	pCi/L	09/03/24 08:35	09/26/24 08:13	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*82.3*		*30 - 110*	*09/03/24 08:35*	*09/26/24 08:13*	*1*

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

Lab Sample ID: LCS 160-677856/2-A
Matrix: Water
Analysis Batch: 681031

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 677856

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-226			9.58	9.137		1.25	1.00	0.409	pCi/L	95	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*72.9*		*30 - 110*

Lab Sample ID: 310-289236-4 MS
Matrix: Water
Analysis Batch: 681033

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA
Prep Batch: 677856

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-226	<0.264	U	9.55	9.567		1.16	1.00	0.255	pCi/L	100	60 - 140		

Carrier	*MS %Yield*	*MS Qualifier*	*Limits*
Barium	*95.3*		*30 - 110*

Lab Sample ID: 310-289236-4 MSD
Matrix: Water
Analysis Batch: 681033

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA
Prep Batch: 677856

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium-226	<0.264	U	9.56	8.962		1.11	1.00	0.241	pCi/L	93	60 - 140	0.27	1

Carrier	*MSD %Yield*	*MSD Qualifier*	*Limits*
Barium	*91.1*		*30 - 110*

Method: 9320 - Radium-228 (GFPC)

Lab Sample ID: MB 160-677857/1-A
Matrix: Water
Analysis Batch: 680956

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 677857

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	<0.580	U	0.353	0.354	1.00	0.580	pCi/L	09/03/24 08:42	09/25/24 11:50	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*82.3*		*30 - 110*	*09/03/24 08:42*	*09/25/24 11:50*	*1*
Y Carrier	*84.1*		*30 - 110*	*09/03/24 08:42*	*09/25/24 11:50*	*1*

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

Lab Sample ID: LCS 160-677857/2-A
Matrix: Water
Analysis Batch: 680956

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 677857

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-228			8.48	8.555		1.33	1.00	0.740	pCi/L	101	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*72.9*		*30 - 110*
Y Carrier	*79.6*		*30 - 110*

Lab Sample ID: 310-289236-4 MS
Matrix: Water
Analysis Batch: 680835

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA
Prep Batch: 677857

Analyte	Sample Result	Sample Qual	Spike Added	MS Result	MS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium-228	<0.675	U	8.46	8.579		1.33	1.00	0.684	pCi/L	95	60 - 140		

Carrier	*MS %Yield*	*MS Qualifier*	*Limits*
Barium	*95.3*		*30 - 110*
Y Carrier	*73.3*		*30 - 110*

Lab Sample ID: 310-289236-4 MSD
Matrix: Water
Analysis Batch: 680835

Client Sample ID: MW18A-GW-0824
Prep Type: Total/NA
Prep Batch: 677857

Analyte	Sample Result	Sample Qual	Spike Added	MSD Result	MSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium-228	<0.675	U	8.46	8.712		1.35	1.00	0.751	pCi/L	97	60 - 140	0.05	1

Carrier	*MSD %Yield*	*MSD Qualifier*	*Limits*
Barium	*91.1*		*30 - 110*
Y Carrier	*77.4*		*30 - 110*

QC Association Summary

Client: GHD Services Inc.
Job ID: 310-289236-1
Project/Site: MEC Louisa West CCR Monofill

HPLC/IC

Analysis Batch: 432477

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-1	MW03-GW-0824	Total/NA	Water	9056A	
310-289236-2	MW04-GW-0824	Total/NA	Water	9056A	
310-289236-3	MW17R-GW-0824	Total/NA	Water	9056A	
310-289236-4	MW18A-GW-0824	Total/NA	Water	9056A	
310-289236-5	MW20A-GW-0824	Total/NA	Water	9056A	
310-289236-6	MW21-GW-0824	Total/NA	Water	9056A	
310-289236-7	MW22-GW-0824	Total/NA	Water	9056A	
310-289236-8	DP02-GW-0824	Total/NA	Water	9056A	
MB 310-432477/3	Method Blank	Total/NA	Water	9056A	
LCS 310-432477/4	Lab Control Sample	Total/NA	Water	9056A	
310-289236-4 MS	MW18A-GW-0824	Total/NA	Water	9056A	
310-289236-4 MSD	MW18A-GW-0824	Total/NA	Water	9056A	

Metals

Prep Batch: 431824

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-1	MW03-GW-0824	Total/NA	Water	3005A	
310-289236-2	MW04-GW-0824	Total/NA	Water	3005A	
310-289236-3	MW17R-GW-0824	Total/NA	Water	3005A	
310-289236-4	MW18A-GW-0824	Total/NA	Water	3005A	
310-289236-5	MW20A-GW-0824	Total/NA	Water	3005A	
310-289236-6	MW21-GW-0824	Total/NA	Water	3005A	
310-289236-7	MW22-GW-0824	Total/NA	Water	3005A	
310-289236-8	DP02-GW-0824	Total/NA	Water	3005A	
MB 310-431824/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-431824/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-289236-4 MS	MW18A-GW-0824	Total/NA	Water	3005A	
310-289236-4 MSD	MW18A-GW-0824	Total/NA	Water	3005A	
310-289236-1 DU	MW03-GW-0824	Total/NA	Water	3005A	

Analysis Batch: 432145

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-1	MW03-GW-0824	Total/NA	Water	6020B	431824
310-289236-2	MW04-GW-0824	Total/NA	Water	6020B	431824
310-289236-3	MW17R-GW-0824	Total/NA	Water	6020B	431824
310-289236-4	MW18A-GW-0824	Total/NA	Water	6020B	431824
310-289236-5	MW20A-GW-0824	Total/NA	Water	6020B	431824
310-289236-6	MW21-GW-0824	Total/NA	Water	6020B	431824
310-289236-7	MW22-GW-0824	Total/NA	Water	6020B	431824
310-289236-8	DP02-GW-0824	Total/NA	Water	6020B	431824
MB 310-431824/1-A	Method Blank	Total/NA	Water	6020B	431824
LCS 310-431824/2-A	Lab Control Sample	Total/NA	Water	6020B	431824
310-289236-4 MS	MW18A-GW-0824	Total/NA	Water	6020B	431824
310-289236-4 MSD	MW18A-GW-0824	Total/NA	Water	6020B	431824
310-289236-1 DU	MW03-GW-0824	Total/NA	Water	6020B	431824

Prep Batch: 432203

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-1	MW03-GW-0824	Total/NA	Water	7470A	
310-289236-2	MW04-GW-0824	Total/NA	Water	7470A	

Metals (Continued)

Prep Batch: 432203 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-3	MW17R-GW-0824	Total/NA	Water	7470A	
310-289236-4	MW18A-GW-0824	Total/NA	Water	7470A	
310-289236-5	MW20A-GW-0824	Total/NA	Water	7470A	
310-289236-6	MW21-GW-0824	Total/NA	Water	7470A	
310-289236-7	MW22-GW-0824	Total/NA	Water	7470A	
310-289236-8	DP02-GW-0824	Total/NA	Water	7470A	
MB 310-432203/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-432203/2-A	Lab Control Sample	Total/NA	Water	7470A	
310-289236-4 MS	MW18A-GW-0824	Total/NA	Water	7470A	
310-289236-4 MSD	MW18A-GW-0824	Total/NA	Water	7470A	

Analysis Batch: 432364

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-1	MW03-GW-0824	Total/NA	Water	7470A	432203
310-289236-2	MW04-GW-0824	Total/NA	Water	7470A	432203
310-289236-3	MW17R-GW-0824	Total/NA	Water	7470A	432203
310-289236-4	MW18A-GW-0824	Total/NA	Water	7470A	432203
310-289236-5	MW20A-GW-0824	Total/NA	Water	7470A	432203
310-289236-6	MW21-GW-0824	Total/NA	Water	7470A	432203
310-289236-7	MW22-GW-0824	Total/NA	Water	7470A	432203
310-289236-8	DP02-GW-0824	Total/NA	Water	7470A	432203
MB 310-432203/1-A	Method Blank	Total/NA	Water	7470A	432203
LCS 310-432203/2-A	Lab Control Sample	Total/NA	Water	7470A	432203
310-289236-4 MS	MW18A-GW-0824	Total/NA	Water	7470A	432203
310-289236-4 MSD	MW18A-GW-0824	Total/NA	Water	7470A	432203

Analysis Batch: 432787

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-1	MW03-GW-0824	Total/NA	Water	6020B	431824
310-289236-2	MW04-GW-0824	Total/NA	Water	6020B	431824
310-289236-3	MW17R-GW-0824	Total/NA	Water	6020B	431824
310-289236-4	MW18A-GW-0824	Total/NA	Water	6020B	431824
310-289236-5	MW20A-GW-0824	Total/NA	Water	6020B	431824
310-289236-6	MW21-GW-0824	Total/NA	Water	6020B	431824
310-289236-7	MW22-GW-0824	Total/NA	Water	6020B	431824
310-289236-8	DP02-GW-0824	Total/NA	Water	6020B	431824
MB 310-431824/1-A	Method Blank	Total/NA	Water	6020B	431824
LCS 310-431824/2-A	Lab Control Sample	Total/NA	Water	6020B	431824
310-289236-4 MS	MW18A-GW-0824	Total/NA	Water	6020B	431824
310-289236-4 MSD	MW18A-GW-0824	Total/NA	Water	6020B	431824
310-289236-1 DU	MW03-GW-0824	Total/NA	Water	6020B	431824

Analysis Batch: 433063

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-1	MW03-GW-0824	Total/NA	Water	6020B	431824
MB 310-431824/1-A	Method Blank	Total/NA	Water	6020B	431824
LCS 310-431824/2-A	Lab Control Sample	Total/NA	Water	6020B	431824
310-289236-1 DU	MW03-GW-0824	Total/NA	Water	6020B	431824

Metals

Analysis Batch: 433162

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-2	MW04-GW-0824	Total/NA	Water	6020B	431824
310-289236-3	MW17R-GW-0824	Total/NA	Water	6020B	431824
310-289236-4	MW18A-GW-0824	Total/NA	Water	6020B	431824
310-289236-5	MW20A-GW-0824	Total/NA	Water	6020B	431824
310-289236-6	MW21-GW-0824	Total/NA	Water	6020B	431824
310-289236-7	MW22-GW-0824	Total/NA	Water	6020B	431824
310-289236-8	DP02-GW-0824	Total/NA	Water	6020B	431824
310-289236-4 MS	MW18A-GW-0824	Total/NA	Water	6020B	431824
310-289236-4 MSD	MW18A-GW-0824	Total/NA	Water	6020B	431824

Prep Batch: 433444

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-1	MW03-GW-0824	Total/NA	Water	3005A	
310-289236-2	MW04-GW-0824	Total/NA	Water	3005A	
310-289236-3	MW17R-GW-0824	Total/NA	Water	3005A	
310-289236-4	MW18A-GW-0824	Total/NA	Water	3005A	
310-289236-5	MW20A-GW-0824	Total/NA	Water	3005A	
310-289236-6	MW21-GW-0824	Total/NA	Water	3005A	
310-289236-7	MW22-GW-0824	Total/NA	Water	3005A	
310-289236-8	DP02-GW-0824	Total/NA	Water	3005A	
MB 310-433444/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-433444/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-289236-4 MS	MW18A-GW-0824	Total/NA	Water	3005A	
310-289236-4 MSD	MW18A-GW-0824	Total/NA	Water	3005A	
310-289236-1 DU	MW03-GW-0824	Total/NA	Water	3005A	

Analysis Batch: 433630

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-1	MW03-GW-0824	Total/NA	Water	6020B	433444
310-289236-2	MW04-GW-0824	Total/NA	Water	6020B	433444
310-289236-3	MW17R-GW-0824	Total/NA	Water	6020B	433444
310-289236-4	MW18A-GW-0824	Total/NA	Water	6020B	433444
310-289236-5	MW20A-GW-0824	Total/NA	Water	6020B	433444
310-289236-6	MW21-GW-0824	Total/NA	Water	6020B	433444
310-289236-7	MW22-GW-0824	Total/NA	Water	6020B	433444
310-289236-8	DP02-GW-0824	Total/NA	Water	6020B	433444
MB 310-433444/1-A	Method Blank	Total/NA	Water	6020B	433444
LCS 310-433444/2-A	Lab Control Sample	Total/NA	Water	6020B	433444
310-289236-4 MS	MW18A-GW-0824	Total/NA	Water	6020B	433444
310-289236-4 MSD	MW18A-GW-0824	Total/NA	Water	6020B	433444
310-289236-1 DU	MW03-GW-0824	Total/NA	Water	6020B	433444

Analysis Batch: 434059

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-433444/1-A	Method Blank	Total/NA	Water	6020B	433444
LCS 310-433444/2-A	Lab Control Sample	Total/NA	Water	6020B	433444

Analysis Batch: 434205

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-433444/1-A	Method Blank	Total/NA	Water	6020B	433444
LCS 310-433444/2-A	Lab Control Sample	Total/NA	Water	6020B	433444

QC Association Summary

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

Job ID: 310-289236-1

General Chemistry

Analysis Batch: 431718

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-1	MW03-GW-0824	Total/NA	Water	SM 4500 H+ B	
310-289236-2	MW04-GW-0824	Total/NA	Water	SM 4500 H+ B	
310-289236-3	MW17R-GW-0824	Total/NA	Water	SM 4500 H+ B	
310-289236-4	MW18A-GW-0824	Total/NA	Water	SM 4500 H+ B	
310-289236-5	MW20A-GW-0824	Total/NA	Water	SM 4500 H+ B	
310-289236-6	MW21-GW-0824	Total/NA	Water	SM 4500 H+ B	
310-289236-7	MW22-GW-0824	Total/NA	Water	SM 4500 H+ B	
310-289236-8	DP02-GW-0824	Total/NA	Water	SM 4500 H+ B	
LCS 310-431718/12	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-289236-4 DU	MW18A-GW-0824	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 431806

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-1	MW03-GW-0824	Total/NA	Water	SM 2540C	
310-289236-2	MW04-GW-0824	Total/NA	Water	SM 2540C	
310-289236-3	MW17R-GW-0824	Total/NA	Water	SM 2540C	
310-289236-4	MW18A-GW-0824	Total/NA	Water	SM 2540C	
MB 310-431806/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-431806/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Analysis Batch: 431930

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-5	MW20A-GW-0824	Total/NA	Water	SM 2540C	
310-289236-6	MW21-GW-0824	Total/NA	Water	SM 2540C	
310-289236-7	MW22-GW-0824	Total/NA	Water	SM 2540C	
310-289236-8	DP02-GW-0824	Total/NA	Water	SM 2540C	
MB 310-431930/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-431930/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-289236-5 DU	MW20A-GW-0824	Total/NA	Water	SM 2540C	

Rad

Prep Batch: 677856

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-1	MW03-GW-0824	Total/NA	Water	PrecSep-21	
310-289236-2	MW04-GW-0824	Total/NA	Water	PrecSep-21	
310-289236-3	MW17R-GW-0824	Total/NA	Water	PrecSep-21	
310-289236-4	MW18A-GW-0824	Total/NA	Water	PrecSep-21	
310-289236-5	MW20A-GW-0824	Total/NA	Water	PrecSep-21	
310-289236-6	MW21-GW-0824	Total/NA	Water	PrecSep-21	
310-289236-7	MW22-GW-0824	Total/NA	Water	PrecSep-21	
310-289236-8	DP02-GW-0824	Total/NA	Water	PrecSep-21	
MB 160-677856/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-677856/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
310-289236-4 MS	MW18A-GW-0824	Total/NA	Water	PrecSep-21	
310-289236-4 MSD	MW18A-GW-0824	Total/NA	Water	PrecSep-21	

Prep Batch: 677857

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-1	MW03-GW-0824	Total/NA	Water	PrecSep_0	
310-289236-2	MW04-GW-0824	Total/NA	Water	PrecSep_0	

QC Association Summary

Client: GHD Services Inc.
Job ID: 310-289236-1
Project/Site: MEC Louisa West CCR Monofill

Rad (Continued)

Prep Batch: 677857 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289236-3	MW17R-GW-0824	Total/NA	Water	PrecSep_0	
310-289236-4	MW18A-GW-0824	Total/NA	Water	PrecSep_0	
310-289236-5	MW20A-GW-0824	Total/NA	Water	PrecSep_0	
310-289236-6	MW21-GW-0824	Total/NA	Water	PrecSep_0	
310-289236-7	MW22-GW-0824	Total/NA	Water	PrecSep_0	
310-289236-8	DP02-GW-0824	Total/NA	Water	PrecSep_0	
MB 160-677857/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-677857/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
310-289236-4 MS	MW18A-GW-0824	Total/NA	Water	PrecSep_0	
310-289236-4 MSD	MW18A-GW-0824	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-289236-1
Project/Site: MEC Louisa West CCR Monofill

Client Sample ID: MW03-GW-0824
Lab Sample ID: 310-289236-1
Date Collected: 08/27/24 18:15
Matrix: Water
Date Received: 08/29/24 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	432477	QTZ5	EET CF	09/05/24 17:44
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 16:51
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432787	NFT2	EET CF	09/10/24 16:35
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	433063	ZRI4	EET CF	09/12/24 16:04
Total/NA	Prep	3005A			433444	F5MW	EET CF	09/18/24 09:00
Total/NA	Analysis	6020B		1	433630	NFT2	EET CF	09/18/24 20:00
Total/NA	Prep	7470A			432203	DHM5	EET CF	09/04/24 15:45
Total/NA	Analysis	7470A		1	432364	DHM5	EET CF	09/05/24 12:21
Total/NA	Analysis	SM 2540C		1	431806	MDU9	EET CF	08/29/24 14:11
Total/NA	Analysis	SM 4500 H+ B		1	431718	W9YR	EET CF	08/29/24 11:38
Total/NA	Prep	PrecSep-21			677856	BCE	EET SL	09/03/24 08:35
Total/NA	Analysis	9315		1	681033	FLC	EET SL	09/26/24 08:15
Total/NA	Prep	PrecSep_0			677857	BCE	EET SL	09/03/24 08:42
Total/NA	Analysis	9320		1	680955	SWS	EET SL	09/25/24 11:57
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 12:38

Client Sample ID: MW04-GW-0824
Lab Sample ID: 310-289236-2
Date Collected: 08/27/24 14:25
Matrix: Water
Date Received: 08/29/24 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	432477	QTZ5	EET CF	09/05/24 17:56
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 17:05
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432787	NFT2	EET CF	09/10/24 16:39
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	433162	ZRI4	EET CF	09/13/24 13:13
Total/NA	Prep	3005A			433444	F5MW	EET CF	09/18/24 09:00
Total/NA	Analysis	6020B		1	433630	NFT2	EET CF	09/18/24 20:05
Total/NA	Prep	7470A			432203	DHM5	EET CF	09/04/24 15:45
Total/NA	Analysis	7470A		1	432364	DHM5	EET CF	09/05/24 12:23
Total/NA	Analysis	SM 2540C		1	431806	MDU9	EET CF	08/29/24 14:11
Total/NA	Analysis	SM 4500 H+ B		1	431718	W9YR	EET CF	08/29/24 11:37
Total/NA	Prep	PrecSep-21			677856	BCE	EET SL	09/03/24 08:35
Total/NA	Analysis	9315		1	681033	FLC	EET SL	09/26/24 11:49
Total/NA	Prep	PrecSep_0			677857	BCE	EET SL	09/03/24 08:42
Total/NA	Analysis	9320		1	680955	SWS	EET SL	09/25/24 11:57
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 12:38

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-289236-1
Project/Site: MEC Louisa West CCR Monofill

Client Sample ID: MW17R-GW-0824
Lab Sample ID: 310-289236-3
Date Collected: 08/27/24 17:35
Matrix: Water
Date Received: 08/29/24 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	432477	QTZ5	EET CF	09/05/24 18:08
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 17:07
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432787	NFT2	EET CF	09/10/24 16:42
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	433162	ZRI4	EET CF	09/13/24 13:15
Total/NA	Prep	3005A			433444	F5MW	EET CF	09/18/24 09:00
Total/NA	Analysis	6020B		1	433630	NFT2	EET CF	09/18/24 20:07
Total/NA	Prep	7470A			432203	DHM5	EET CF	09/04/24 15:45
Total/NA	Analysis	7470A		1	432364	DHM5	EET CF	09/05/24 12:25
Total/NA	Analysis	SM 2540C		1	431806	MDU9	EET CF	08/29/24 14:11
Total/NA	Analysis	SM 4500 H+ B		1	431718	W9YR	EET CF	08/29/24 11:39
Total/NA	Prep	PrecSep-21			677856	BCE	EET SL	09/03/24 08:35
Total/NA	Analysis	9315		1	681033	FLC	EET SL	09/26/24 11:49
Total/NA	Prep	PrecSep_0			677857	BCE	EET SL	09/03/24 08:42
Total/NA	Analysis	9320		1	680955	SWS	EET SL	09/25/24 11:57
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 12:38

Client Sample ID: MW18A-GW-0824
Lab Sample ID: 310-289236-4
Date Collected: 08/27/24 16:30
Matrix: Water
Date Received: 08/29/24 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	432477	QTZ5	EET CF	09/05/24 18:20
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 17:09
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432787	NFT2	EET CF	09/10/24 16:53
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	433162	ZRI4	EET CF	09/13/24 13:17
Total/NA	Prep	3005A			433444	F5MW	EET CF	09/18/24 09:00
Total/NA	Analysis	6020B		1	433630	NFT2	EET CF	09/18/24 20:09
Total/NA	Prep	7470A			432203	DHM5	EET CF	09/04/24 15:45
Total/NA	Analysis	7470A		1	432364	DHM5	EET CF	09/05/24 12:27
Total/NA	Analysis	SM 2540C		1	431806	MDU9	EET CF	08/29/24 14:11
Total/NA	Analysis	SM 4500 H+ B		1	431718	W9YR	EET CF	08/29/24 11:35
Total/NA	Prep	PrecSep-21			677856	BCE	EET SL	09/03/24 08:35
Total/NA	Analysis	9315		1	681033	FLC	EET SL	09/26/24 11:49
Total/NA	Prep	PrecSep_0			677857	BCE	EET SL	09/03/24 08:42
Total/NA	Analysis	9320		1	680835	FLC	EET SL	09/25/24 13:39
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 12:38

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-289236-1
Project/Site: MEC Louisa West CCR Monofill

Client Sample ID: MW20A-GW-0824
Lab Sample ID: 310-289236-5
Date Collected: 08/27/24 19:03
Matrix: Water
Date Received: 08/29/24 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	432477	QTZ5	EET CF	09/05/24 19:21
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 17:21
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432787	NFT2	EET CF	09/10/24 16:59
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	433162	ZRI4	EET CF	09/13/24 13:33
Total/NA	Prep	3005A			433444	F5MW	EET CF	09/18/24 09:00
Total/NA	Analysis	6020B		1	433630	NFT2	EET CF	09/18/24 20:29
Total/NA	Prep	7470A			432203	DHM5	EET CF	09/04/24 15:45
Total/NA	Analysis	7470A		1	432364	DHM5	EET CF	09/05/24 12:34
Total/NA	Analysis	SM 2540C		1	431930	MDU9	EET CF	08/30/24 12:12
Total/NA	Analysis	SM 4500 H+ B		1	431718	W9YR	EET CF	08/29/24 11:43
Total/NA	Prep	PrecSep-21			677856	BCE	EET SL	09/03/24 08:35
Total/NA	Analysis	9315		1	681033	FLC	EET SL	09/26/24 13:53
Total/NA	Prep	PrecSep_0			677857	BCE	EET SL	09/03/24 08:42
Total/NA	Analysis	9320		1	680835	FLC	EET SL	09/25/24 13:39
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 12:38

Client Sample ID: MW21-GW-0824
Lab Sample ID: 310-289236-6
Date Collected: 08/27/24 15:55
Matrix: Water
Date Received: 08/29/24 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	432477	QTZ5	EET CF	09/05/24 19:33
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 17:23
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432787	NFT2	EET CF	09/10/24 17:02
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	433162	ZRI4	EET CF	09/13/24 13:35
Total/NA	Prep	3005A			433444	F5MW	EET CF	09/18/24 09:00
Total/NA	Analysis	6020B		1	433630	NFT2	EET CF	09/18/24 20:31
Total/NA	Prep	7470A			432203	DHM5	EET CF	09/04/24 15:45
Total/NA	Analysis	7470A		1	432364	DHM5	EET CF	09/05/24 12:40
Total/NA	Analysis	SM 2540C		1	431930	MDU9	EET CF	08/30/24 12:12
Total/NA	Analysis	SM 4500 H+ B		1	431718	W9YR	EET CF	08/29/24 11:41
Total/NA	Prep	PrecSep-21			677856	BCE	EET SL	09/03/24 08:35
Total/NA	Analysis	9315		1	681021	FLC	EET SL	09/26/24 15:43
Total/NA	Prep	PrecSep_0			677857	BCE	EET SL	09/03/24 08:42
Total/NA	Analysis	9320		1	680835	FLC	EET SL	09/25/24 13:39
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 12:38

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-289236-1
Project/Site: MEC Louisa West CCR Monofill

Client Sample ID: MW22-GW-0824
Lab Sample ID: 310-289236-7
Date Collected: 08/27/24 15:10
Matrix: Water
Date Received: 08/29/24 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	432477	QTZ5	EET CF	09/05/24 19:45
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 17:34
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432787	NFT2	EET CF	09/10/24 17:04
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	433162	ZRI4	EET CF	09/13/24 13:37
Total/NA	Prep	3005A			433444	F5MW	EET CF	09/18/24 09:00
Total/NA	Analysis	6020B		1	433630	NFT2	EET CF	09/18/24 20:34
Total/NA	Prep	7470A			432203	DHM5	EET CF	09/04/24 15:45
Total/NA	Analysis	7470A		1	432364	DHM5	EET CF	09/05/24 12:42
Total/NA	Analysis	SM 2540C		1	431930	MDU9	EET CF	08/30/24 12:12
Total/NA	Analysis	SM 4500 H+ B		1	431718	W9YR	EET CF	08/29/24 11:40
Total/NA	Prep	PrecSep-21			677856	BCE	EET SL	09/03/24 08:35
Total/NA	Analysis	9315		1	681021	FLC	EET SL	09/26/24 15:44
Total/NA	Prep	PrecSep_0			677857	BCE	EET SL	09/03/24 08:42
Total/NA	Analysis	9320		1	680835	FLC	EET SL	09/25/24 13:39
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 13:52

Client Sample ID: DP02-GW-0824
Lab Sample ID: 310-289236-8
Date Collected: 08/27/24 00:00
Matrix: Water
Date Received: 08/29/24 08:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	432477	QTZ5	EET CF	09/05/24 19:57
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432145	NFT2	EET CF	09/03/24 17:36
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	432787	NFT2	EET CF	09/10/24 17:06
Total/NA	Prep	3005A			431824	QTZ5	EET CF	08/30/24 09:00
Total/NA	Analysis	6020B		1	433162	ZRI4	EET CF	09/13/24 13:40
Total/NA	Prep	3005A			433444	F5MW	EET CF	09/18/24 09:00
Total/NA	Analysis	6020B		1	433630	NFT2	EET CF	09/18/24 20:36
Total/NA	Prep	7470A			432203	DHM5	EET CF	09/04/24 15:45
Total/NA	Analysis	7470A		1	432364	DHM5	EET CF	09/05/24 12:45
Total/NA	Analysis	SM 2540C		1	431930	MDU9	EET CF	08/30/24 12:12
Total/NA	Analysis	SM 4500 H+ B		1	431718	W9YR	EET CF	08/29/24 11:42
Total/NA	Prep	PrecSep-21			677856	BCE	EET SL	09/03/24 08:35
Total/NA	Analysis	9315		1	681021	FLC	EET SL	09/26/24 15:44
Total/NA	Prep	PrecSep_0			677857	BCE	EET SL	09/03/24 08:42
Total/NA	Analysis	9320		1	680835	FLC	EET SL	09/25/24 13:38
Total/NA	Analysis	Ra226_Ra228		1	681332	FLC	EET SL	09/27/24 13:52

Lab Chronicle

Client: GHD Services Inc.
Job ID: 310-289236-1
Project/Site: MEC Louisa West CCR Monofill

Laboratory References:

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

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

Accreditation/Certification Summary

Client: GHD Services Inc. Job ID: 310-289236-1
Project/Site: MEC Louisa West CCR Monofill

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-25

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

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

Laboratory: Eurofins St. Louis

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	373	12-01-24

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

Analysis Method	Prep Method	Matrix	Analyte
9315	PrecSep-21	Water	Radium-226
9320	PrecSep_0	Water	Radium-228
Ra226_Ra228		Water	Combined Radium 226 + 228

Method Summary

Client: GHD Services Inc.
Job ID: 310-289236-1
Project/Site: MEC Louisa West CCR Monofill

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
7470A	Mercury (CVAA)	SW846	EET CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET CF
SM 4500 H+ B	pH	SM	EET CF
9315	Radium-226 (GFPC)	SW846	EET SL
9320	Radium-228 (GFPC)	SW846	EET SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	EET SL
3005A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF
PrecSep_0	Preparation, Precipitate Separation	None	EET SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	EET SL

Protocol References:

None = None

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

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

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

Laboratory References:

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

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

eurofins | Environment Testing America

310-289236 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: CHD Services			
City/State. CITY: Des Moines		STATE: IA	Project:
Receipt Information			
Date/Time Received:	DATE: 8/24 14	TIME: 700	Received By: PH

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

Condition of Cooler/Containers

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

Temperature Record

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

Thermometer ID: R	Correction Factor (°C): 0

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

Uncorrected Temp (°C): 3.8	Corrected Temp (°C): 3.8

• **Sample Container Temperature**

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

Exceptions Noted

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

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

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

Additional Comments

eurofins | Environment Testing America

Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: GHD Services

City/State: CITY Des Moines | STATE IA | Project:

Receipt Information

Date/Time Received: DATE 8/29/24 | TIME 1510 | Received By: PH

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

Condition of Cooler/Containers

Sample(s) received in Cooler?	☒ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☒ Yes	☐ No	*If yes:* Cooler # 2 of 3
Cooler Custody Seals Present?	☐ Yes	☒ No	*If yes:* Cooler custody seals intact? ☐ Yes ☐ No
Sample Custody Seals Present?	☐ Yes	☒ No	*If yes:* Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?	☐ Yes	☒ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record

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

Thermometer ID: R | Correction Factor (°C): 0

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

Uncorrected Temp (°C): 3.1 | Corrected Temp (°C): 3.1

Sample Container Temperature

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

Exceptions Noted

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

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

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

Additional Comments

eurofins | Environment Testing America

Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: GHD Services

City/State: CITY Des Moines | STATE IA | Project:

Receipt Information

Date/Time Received: DATE 8/29/24 | TIME 1510 | Received By: PH

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

Condition of Cooler/Containers

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

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

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

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

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

Temperature Record

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

Thermometer ID: R | Correction Factor (°C): 0

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

Uncorrected Temp (°C): 1.6 | Corrected Temp (°C): 1.6

Sample Container Temperature

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

Exceptions Noted

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

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

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

Additional Comments

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

Chain of Custody Record

TestAmerica Des Moines SC
214

eurofins

Client Information	Sampler: Brooke Wasson	Lab PM: Zach T Bindert	Carrier Tracking No(s):	COC No:
Client Contact: Kevin Armstrong	Phone: 563-568-7524	E-Mail: Zach.Bindert@e_eurofinsus.com	State of Origin: Iowa	Page: Page 1 of 1
Company: GHD Services Inc.	PWSID:			Job #:

Address: 11228 Aurora Avenue	Due Date Requested:
City: Des Moines	TAT Requested (days): Standard
State, Zip: IA, 50322-7905	Compliance Project: Δ Yes Δ No
Phone: 515-414-3935	PO #: 340-017016
Email: Kevin.Armstrong@ghd.com	WO #: 12575233-003
Project Name: MEC Louisa West CCR Monofill	Project #: 31007299
Site: MEC Louisa West CCR Monofill	SSOW#: 12575233-003

Analysis Requested

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

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9315_Ra226 - Standard Target List	9320_Ra228 - Standard Target List	9056A_ORGFM_28D - Chloride, Fluoride, Sulfate	6020B, 7470A - CCR Metals List	2540C_Calcd, SM4500_H+	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D	N	D	N		
MW03-GW-0824	8/27/24	1815	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW04-GW-0824	8/27/24	1425	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW17R-GW-0824	8/27/24	1735	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW18A-GW-0824	8/27/24	1630	G	W	N	Y	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW20A-GW-0824	8/27/24	1905	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW21-GW-0824	8/27/24	1555	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
MW22-GW-0824	8/27/24	1510	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents
DP02-GW-0824	8/27/24	—	G	W	N	N	X	X	X	X	X		All Appendix III and Appendix IV constituents

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

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

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

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

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

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
			PH	8/29/24 930	EF
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

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

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 310-289236-1

Login Number: 289236
List Number: 1
Creator: Hirsch, Preston

List Source: Eurofins Cedar Falls

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

Tracer/Carrier Summary

Client: GHD Services Inc.
Job ID: 310-289236-1
Project/Site: MEC Louisa West CCR Monofill

Method: 9315 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(30-110)
310-289236-1	MW03-GW-0824	91.9
310-289236-2	MW04-GW-0824	85.7
310-289236-3	MW17R-GW-0824	95.1
310-289236-4	MW18A-GW-0824	96.1
310-289236-4 MS	MW18A-GW-0824	95.3
310-289236-4 MSD	MW18A-GW-0824	91.1
310-289236-5	MW20A-GW-0824	90.4
310-289236-6	MW21-GW-0824	91.9
310-289236-7	MW22-GW-0824	92.6
310-289236-8	DP02-GW-0824	96.3
LCS 160-677856/2-A	Lab Control Sample	72.9
MB 160-677856/1-A	Method Blank	82.3

Tracer/Carrier Legend

Ba = Barium

Method: 9320 - Radium-228 (GFPC)

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

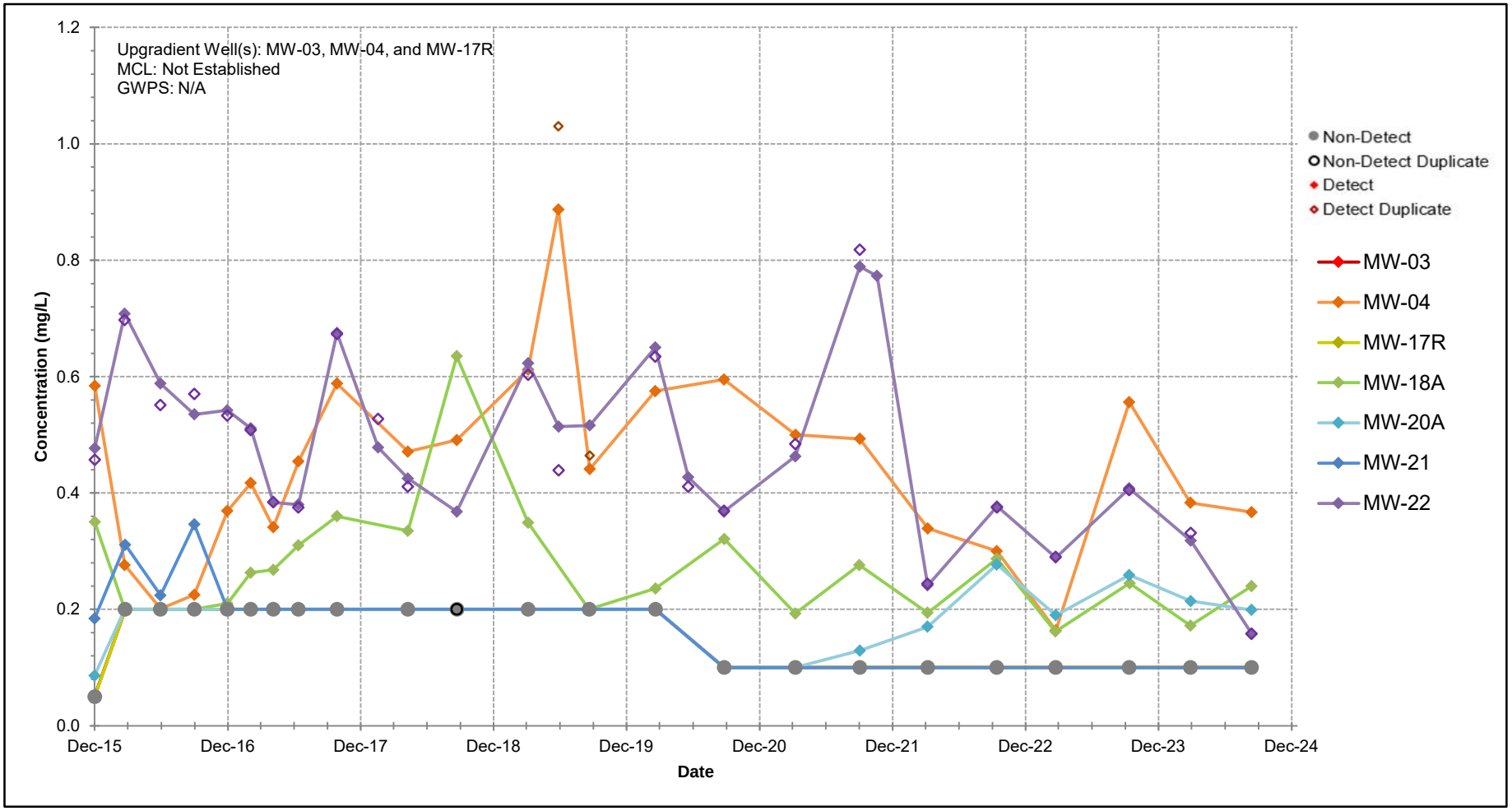
		Percent Yield (Acceptance Limits)	
		Ba	Y
Lab Sample ID	Client Sample ID	(30-110)	(30-110)
310-289236-1	MW03-GW-0824	91.9	76.3
310-289236-2	MW04-GW-0824	85.7	78.9
310-289236-3	MW17R-GW-0824	95.1	74.8
310-289236-4	MW18A-GW-0824	96.1	78.9
310-289236-4 MS	MW18A-GW-0824	95.3	73.3
310-289236-4 MSD	MW18A-GW-0824	91.1	77.4
310-289236-5	MW20A-GW-0824	90.4	74.0
310-289236-6	MW21-GW-0824	91.9	77.8
310-289236-7	MW22-GW-0824	92.6	87.1
310-289236-8	DP02-GW-0824	96.3	83.0
LCS 160-677857/2-A	Lab Control Sample	72.9	79.6
MB 160-677857/1-A	Method Blank	82.3	84.1

Tracer/Carrier Legend

Ba = Barium
Y = Y Carrier

Appendix C

Time Series Plots



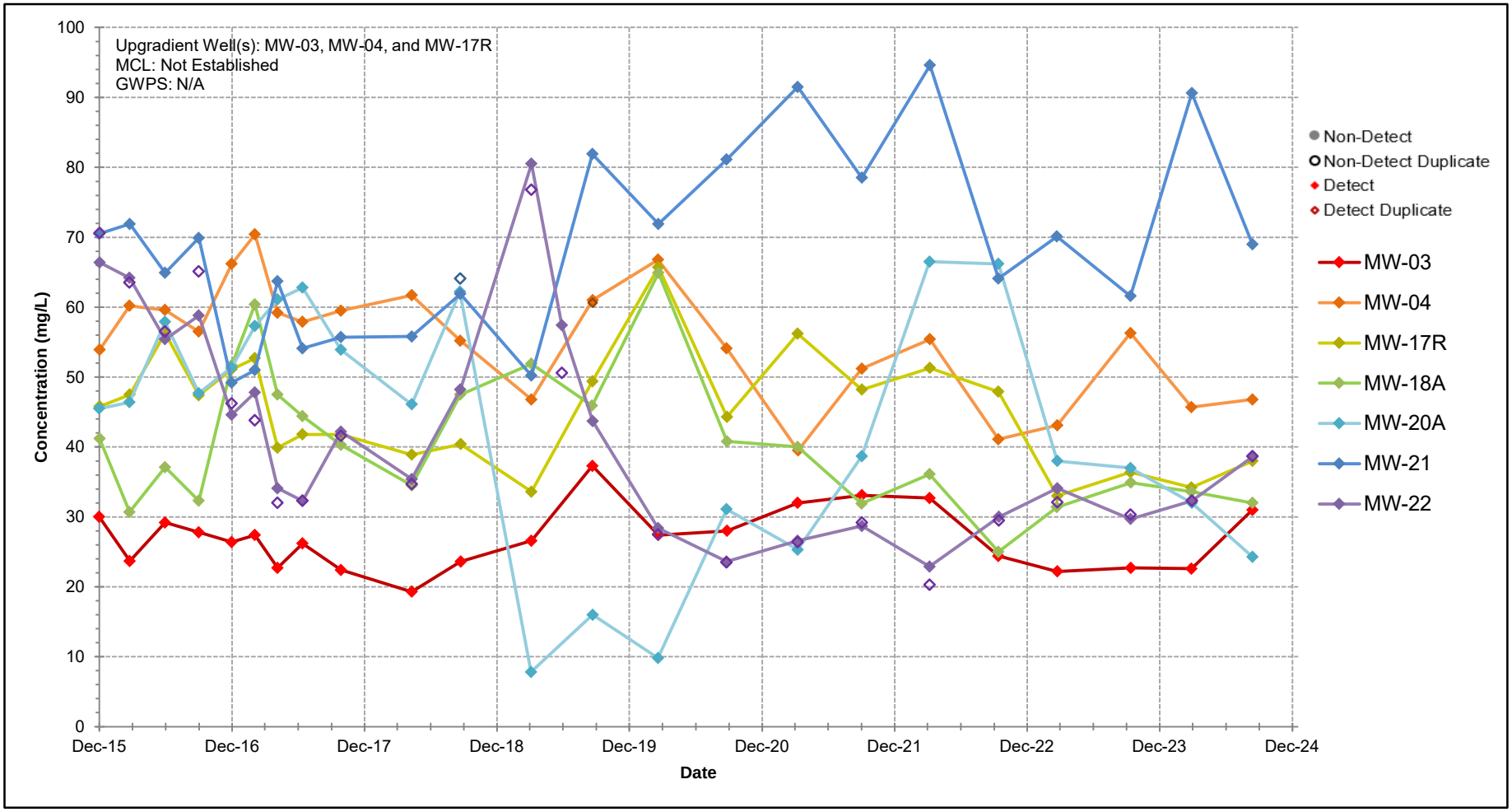
MIDAMERICAN ENERGY COMPANY
LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

11114676

OCT. 30, 2024

BORON CONCENTRATION VS. TIME

FIGURE 1



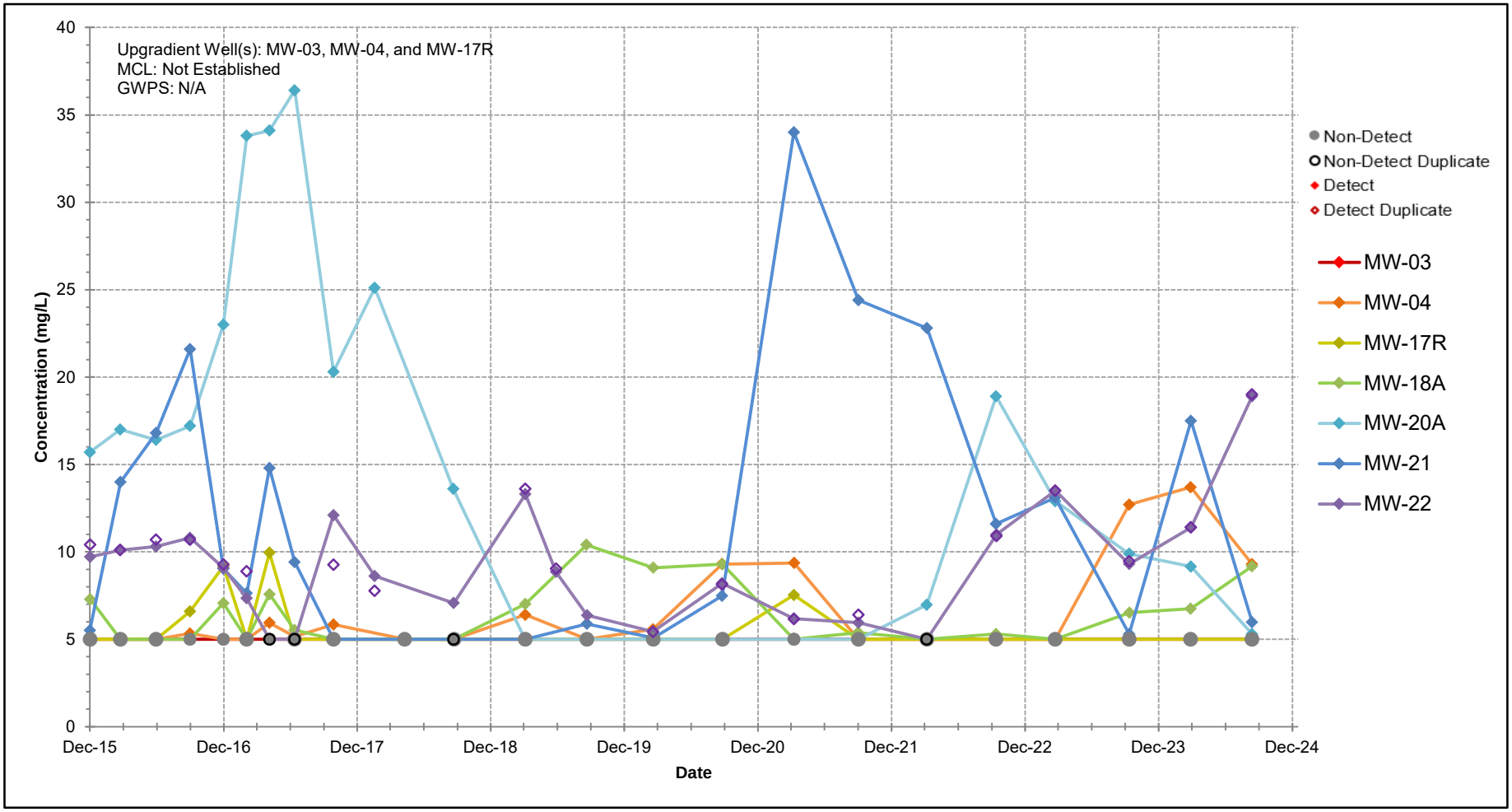
MIDAMERICAN ENERGY COMPANY
LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

11114676

OCT. 30, 2024

CALCIUM CONCENTRATION VS. TIME

FIGURE 2



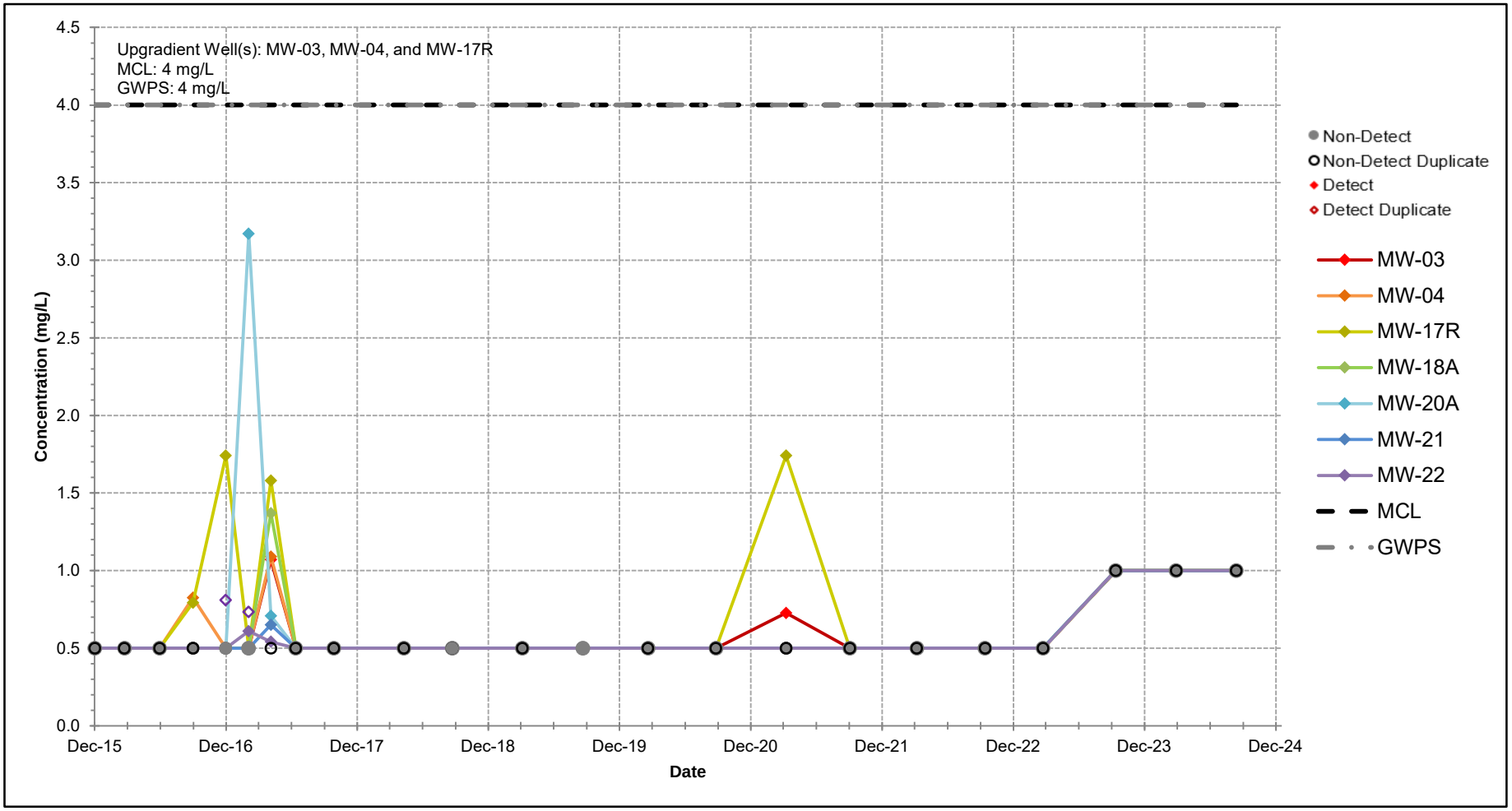
MIDAMERICAN ENERGY COMPANY
LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

11114676

OCT. 30, 2024

CHLORIDE CONCENTRATION VS. TIME

FIGURE 3



MIDAMERICAN ENERGY COMPANY
LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

11114676

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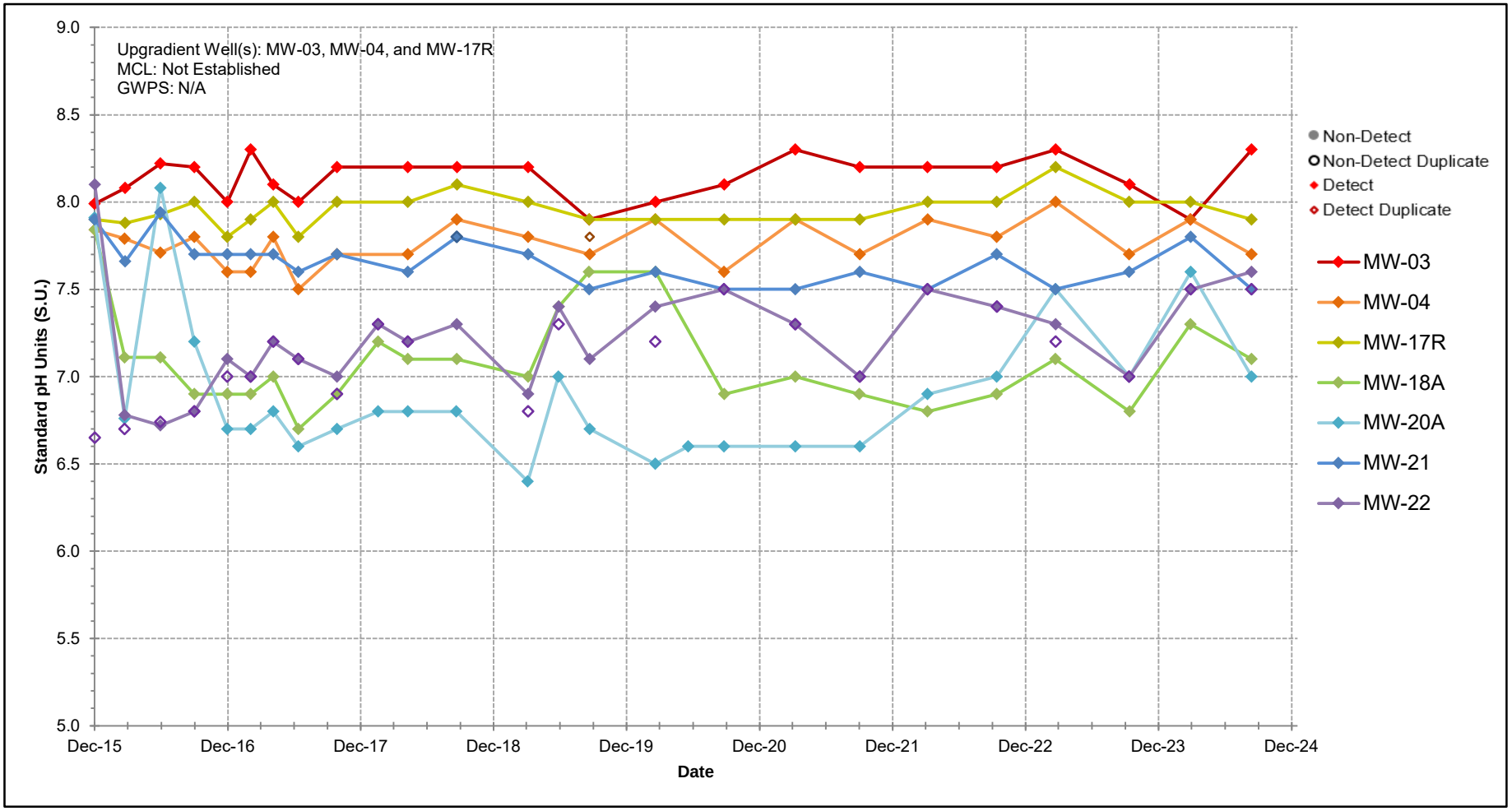
FLUORIDE CONCENTRATION VS. TIME

FIGURE 4



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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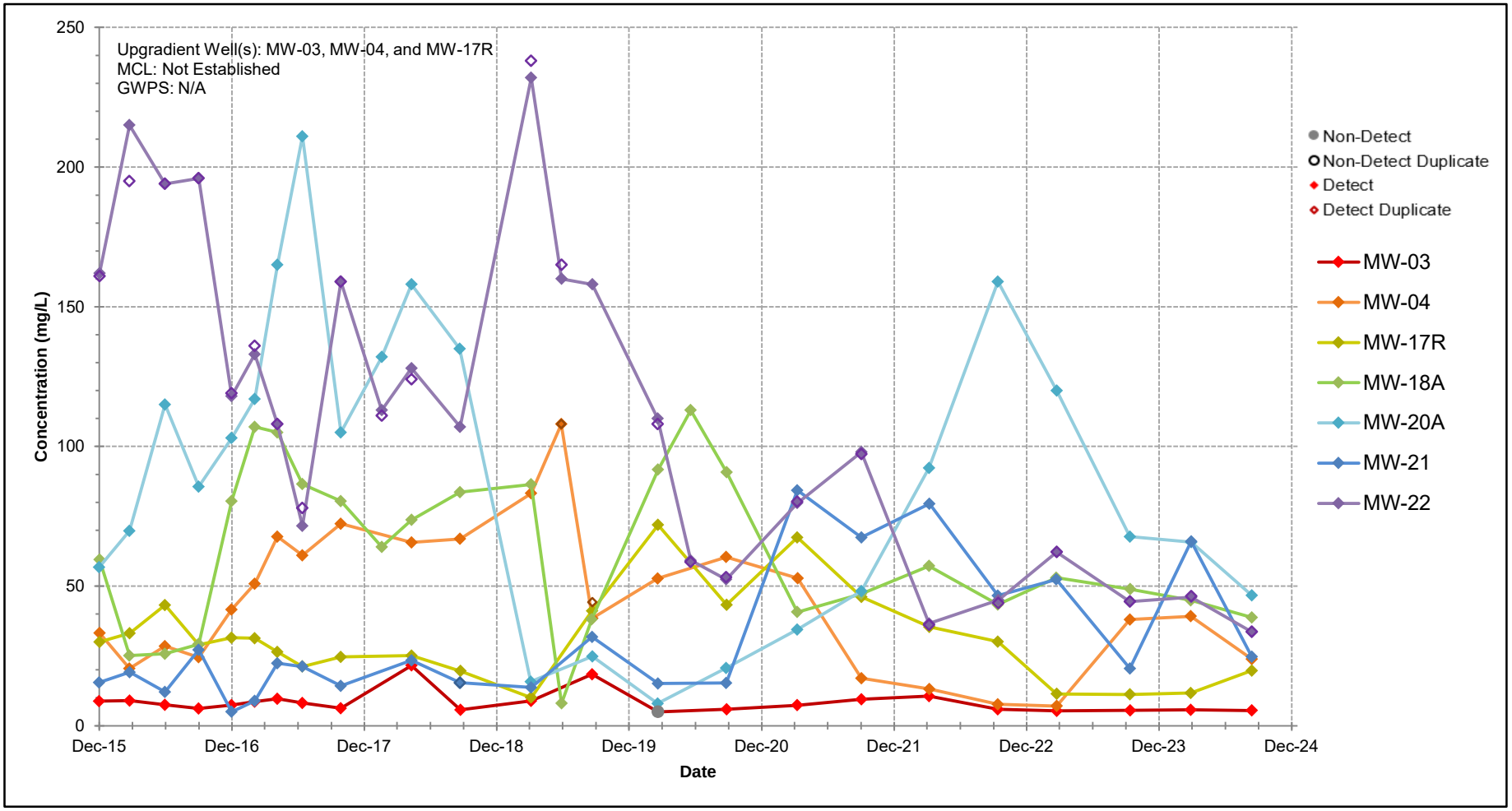
pH CONCENTRATION VS. TIME

FIGURE 5



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LOUISA COUNTY, IOWA

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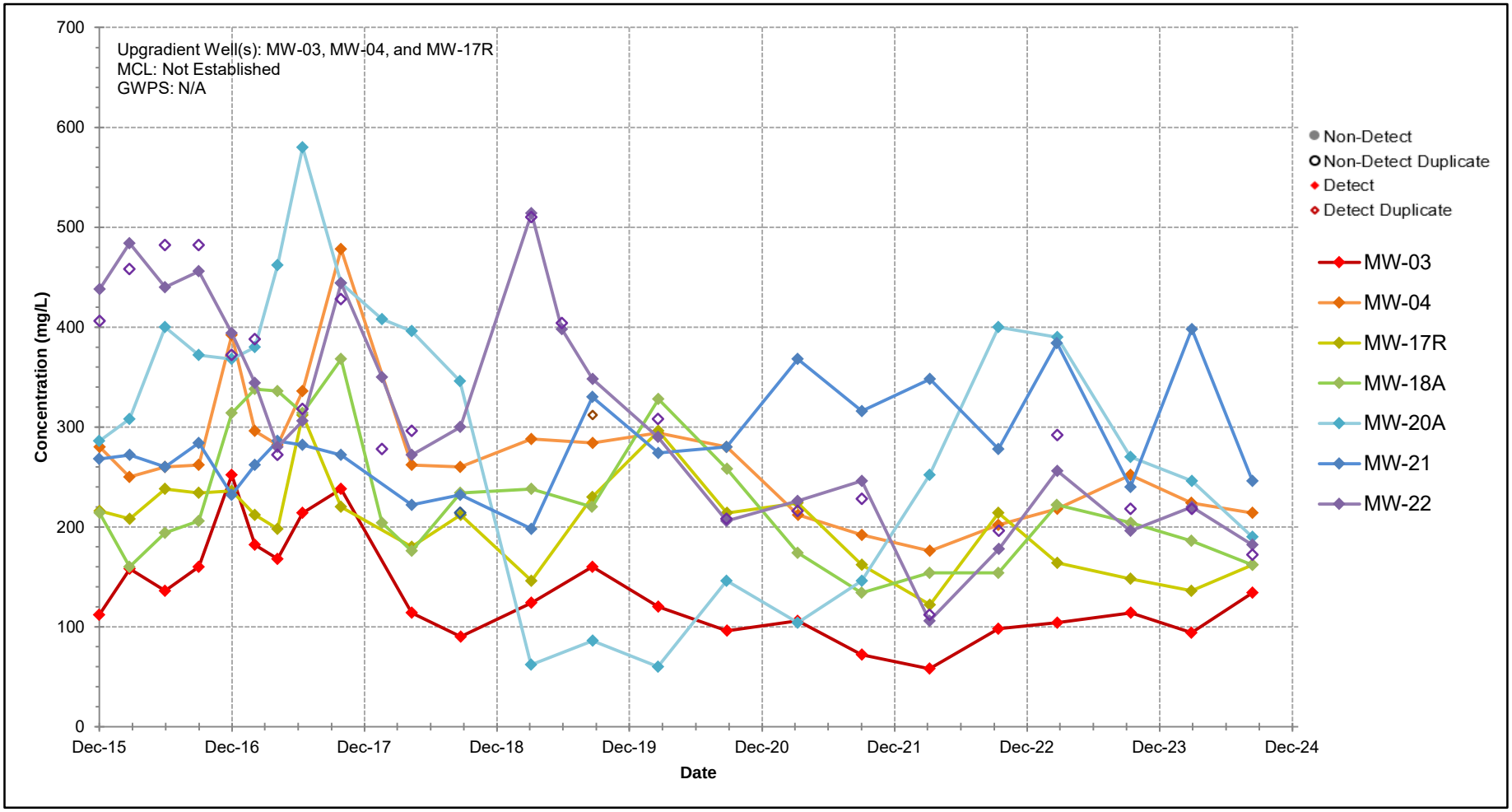
SULFATE CONCENTRATION VS. TIME

FIGURE 6



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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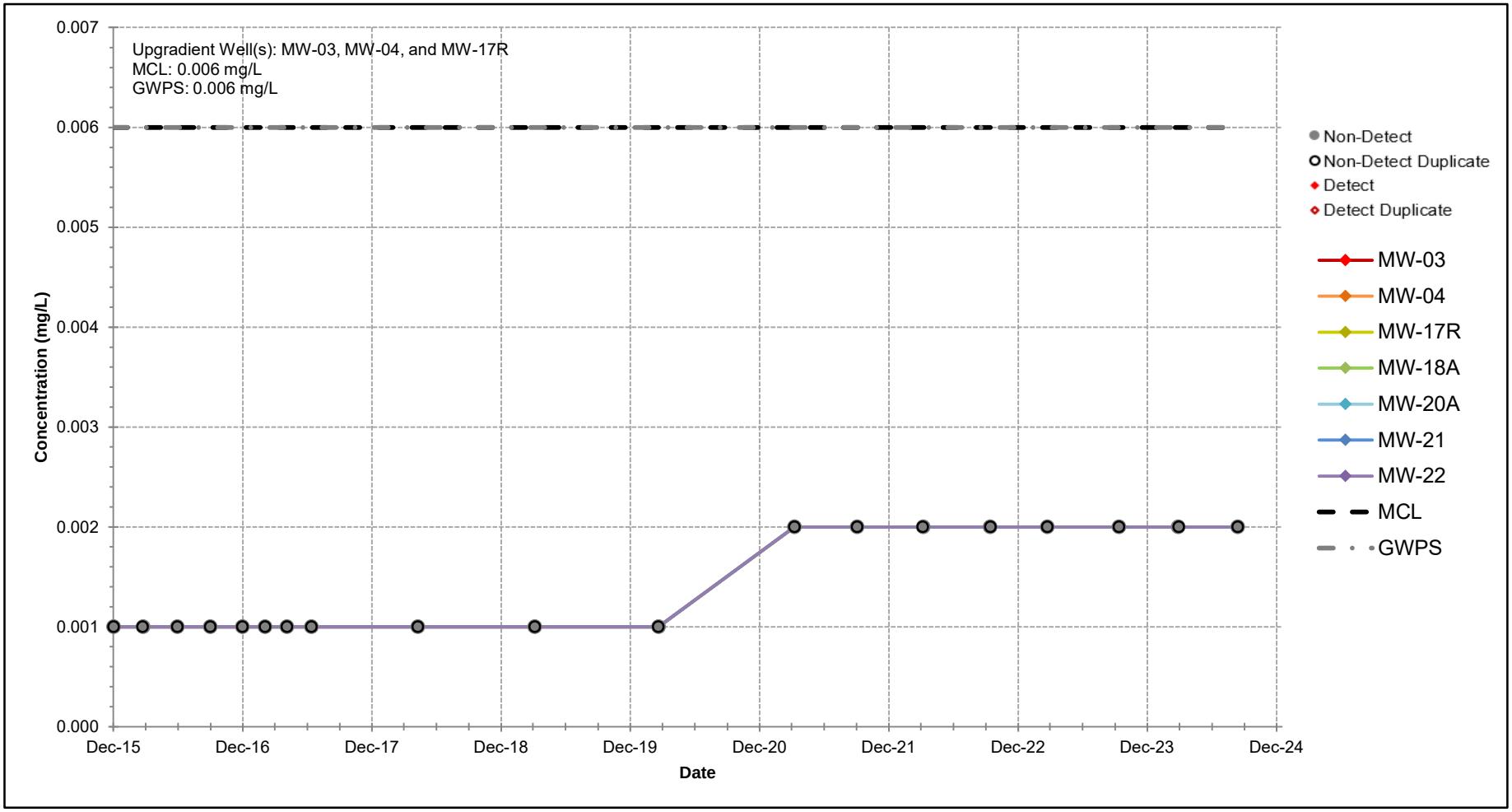
TOTAL DISSOLVED SOLIDS CONCENTRATION VS. TIME

FIGURE 7



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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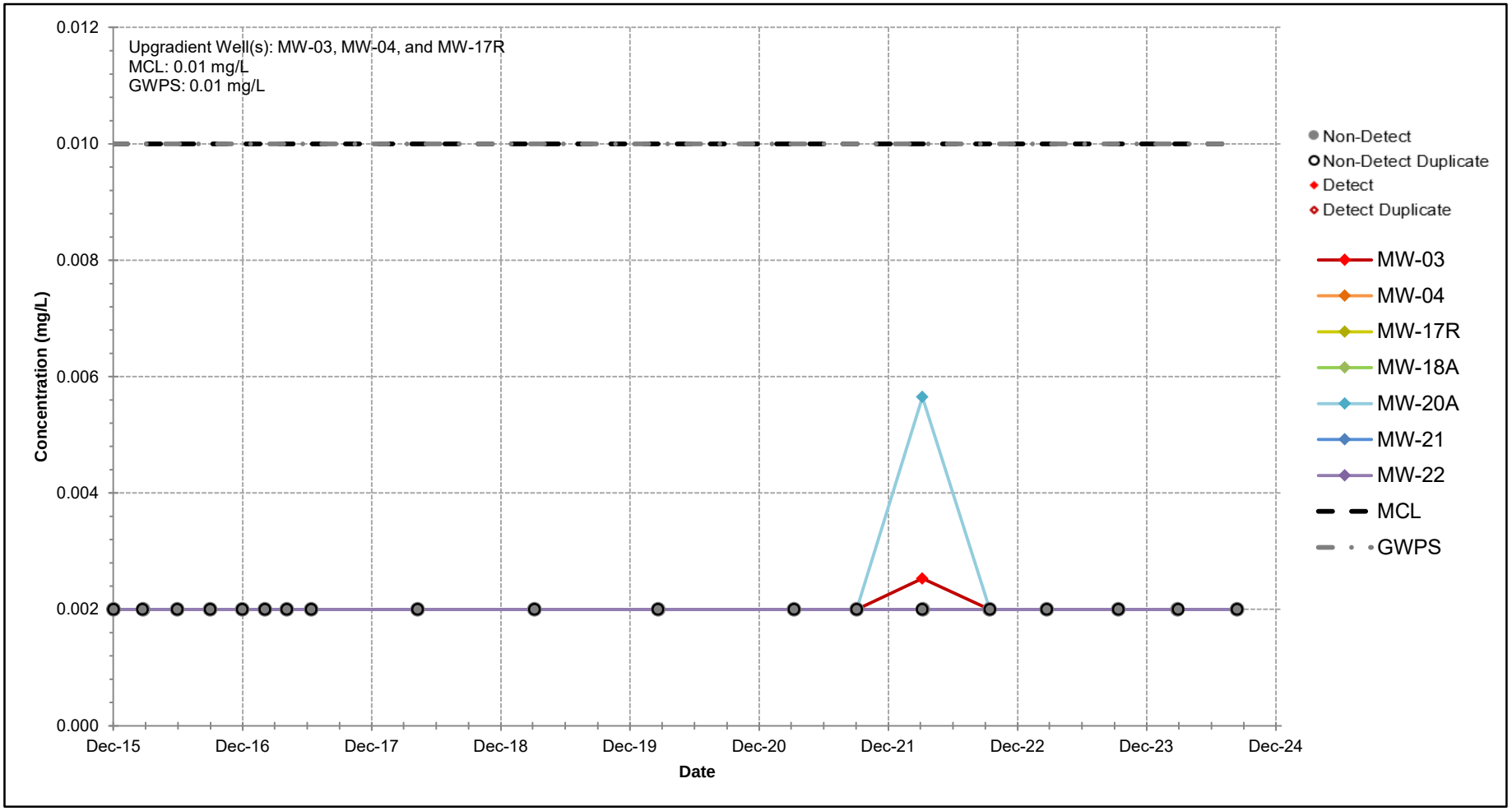
ANTIMONY CONCENTRATION VS. TIME

FIGURE 8



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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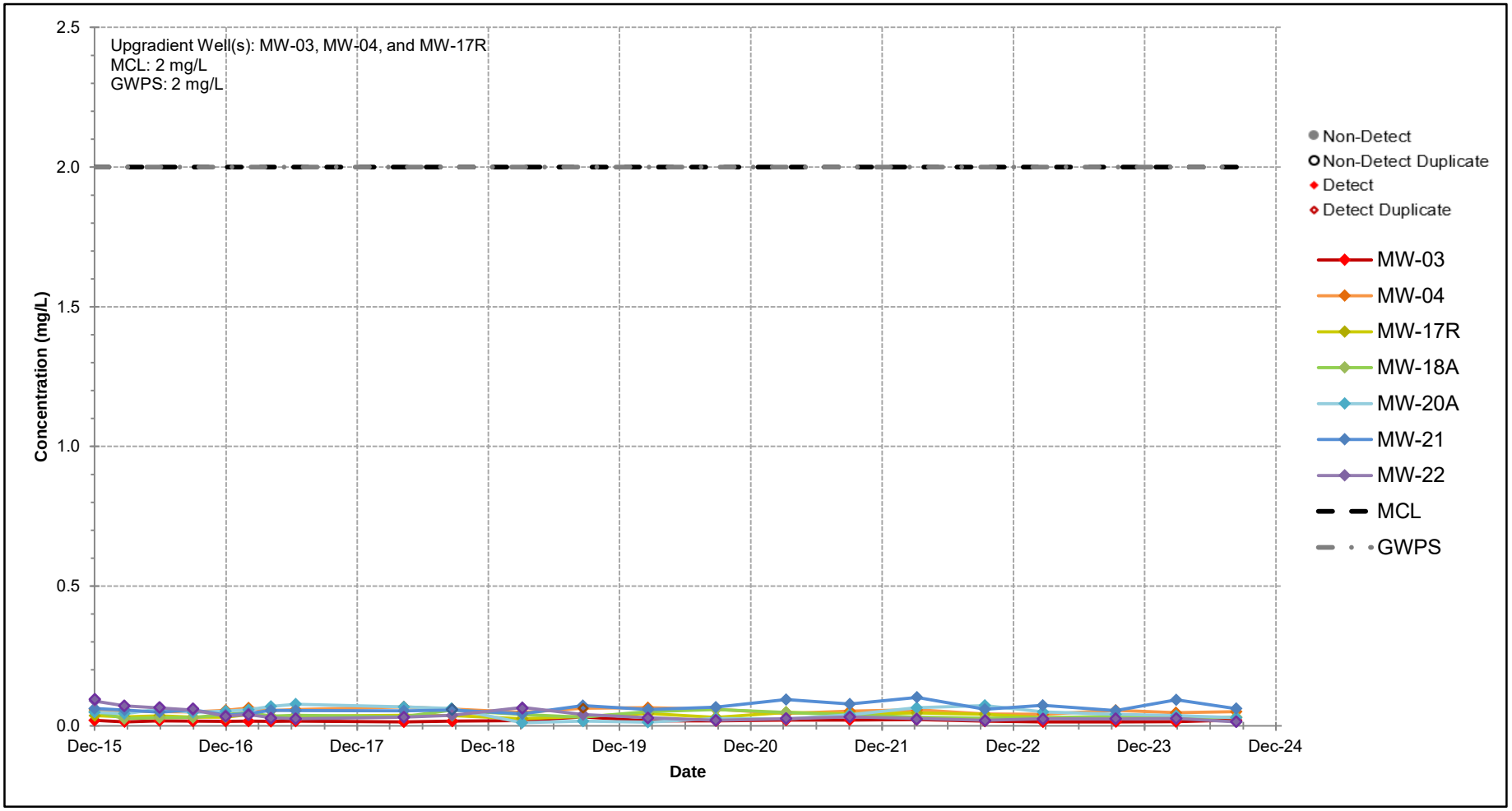
ARSENIC CONCENTRATION VS. TIME

FIGURE 9



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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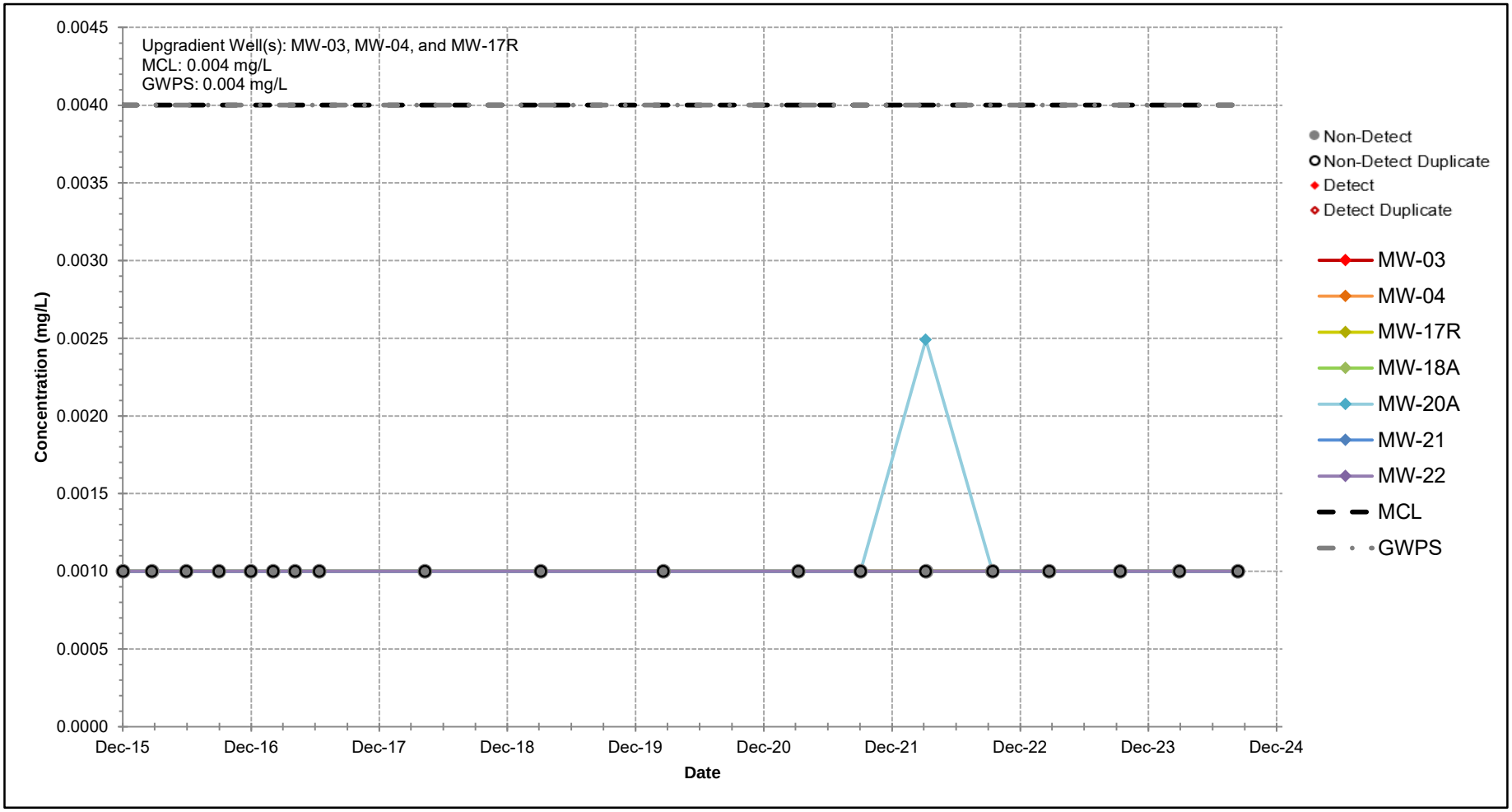
BARIUM CONCENTRATION VS. TIME

FIGURE 10



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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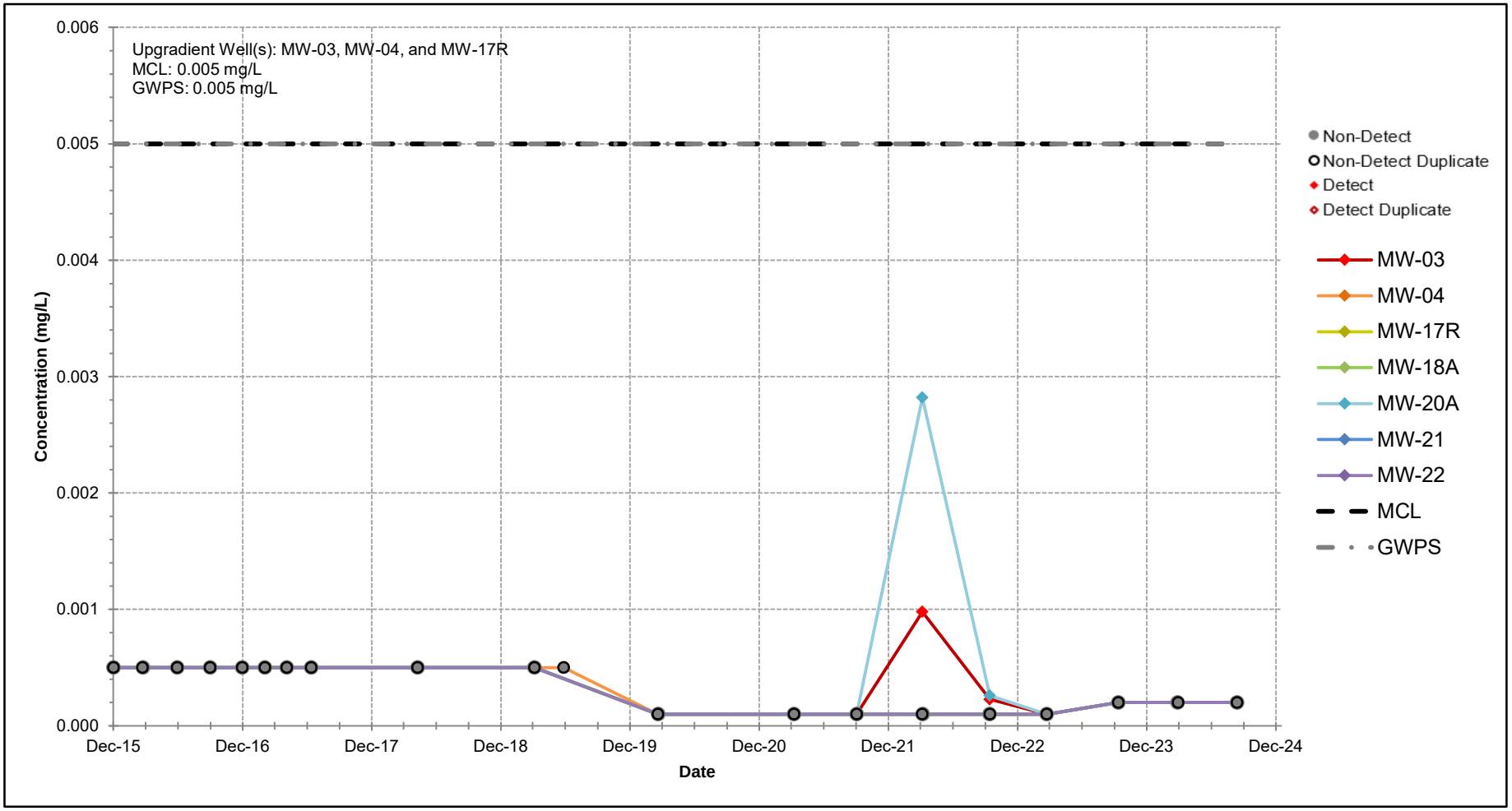
BERYLLIUM CONCENTRATION VS. TIME

FIGURE 11



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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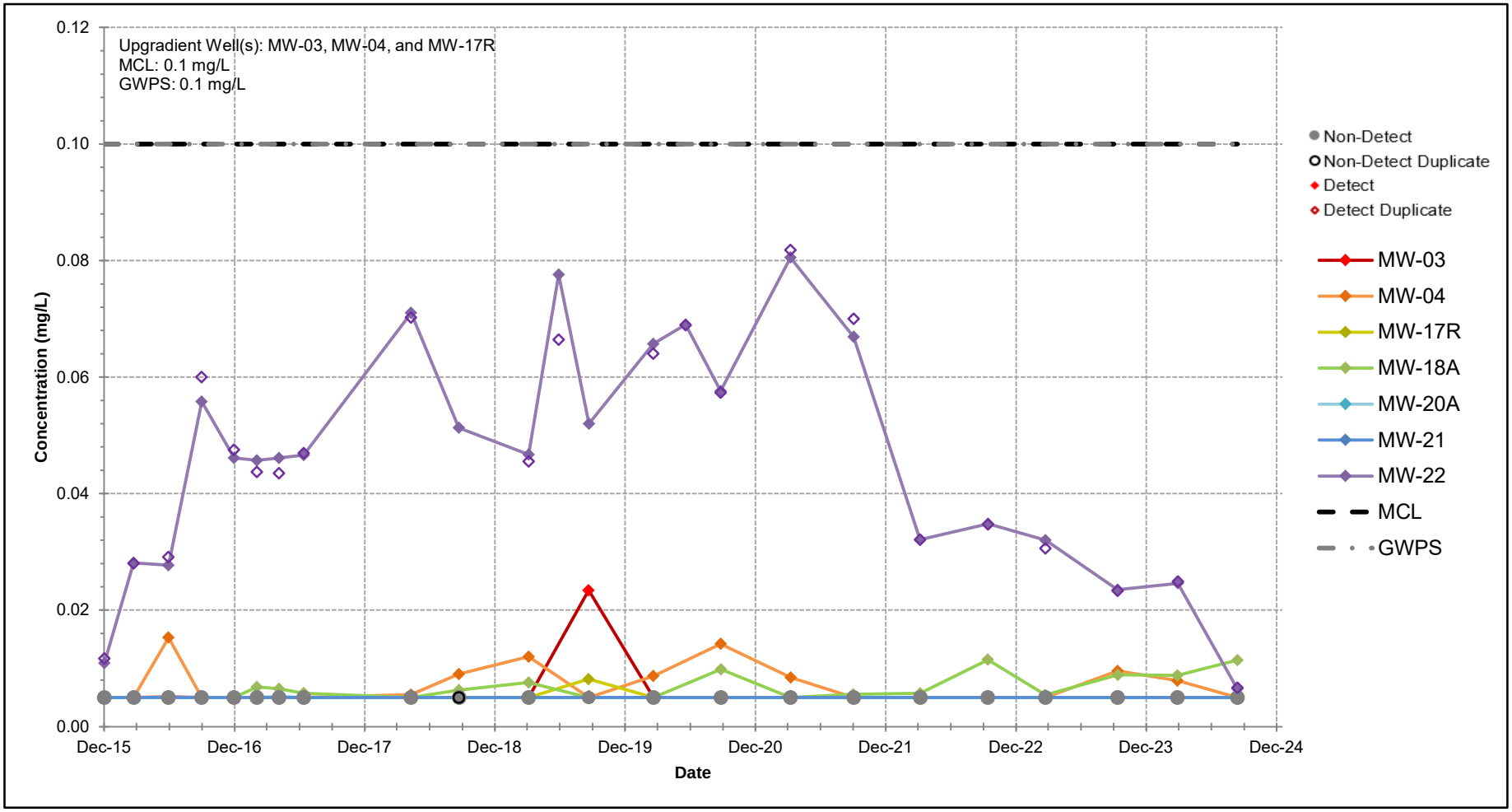
CADMIUM CONCENTRATION VS. TIME

FIGURE 12



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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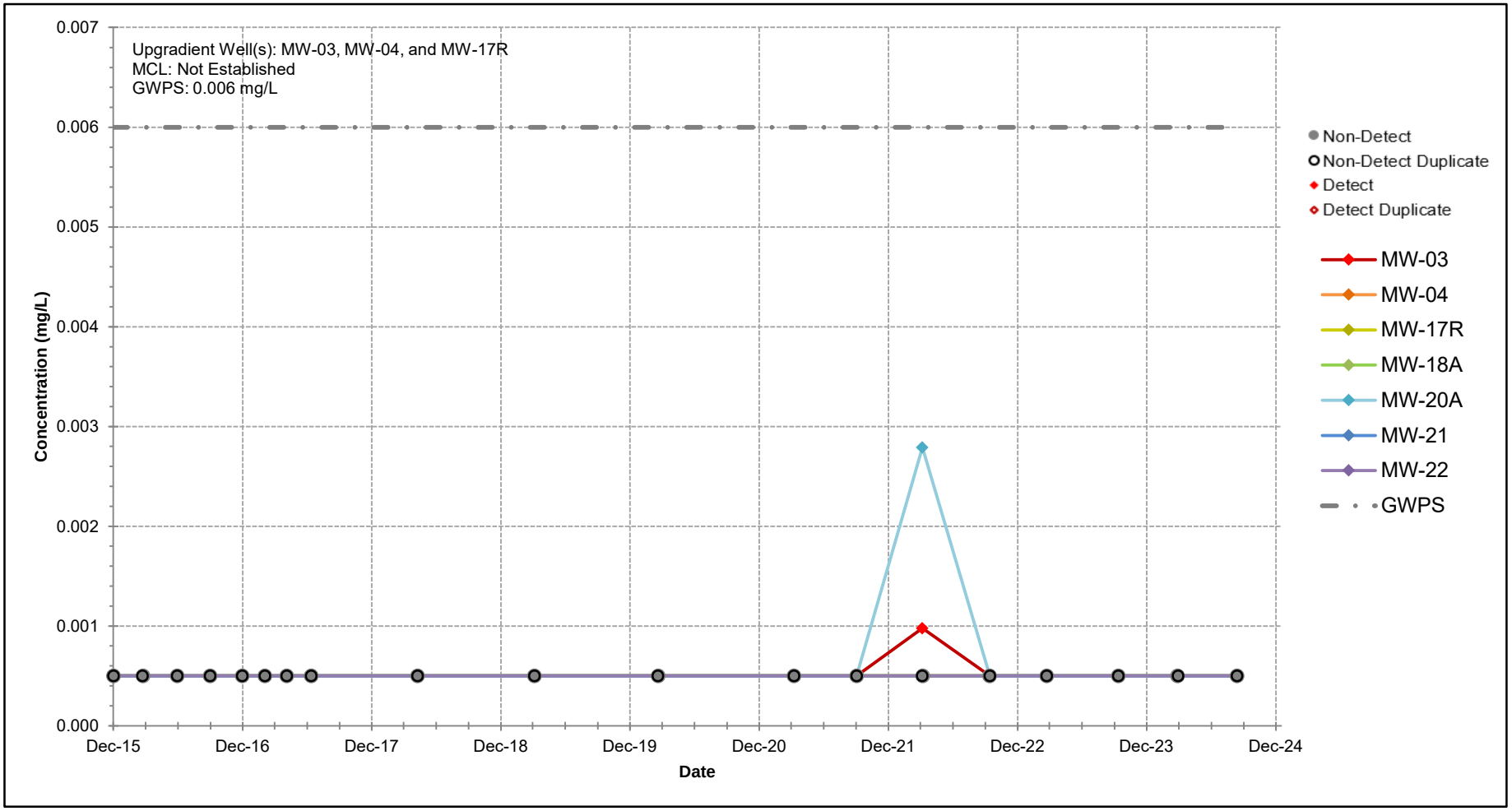
CHROMIUM CONCENTRATION VS. TIME

FIGURE 13



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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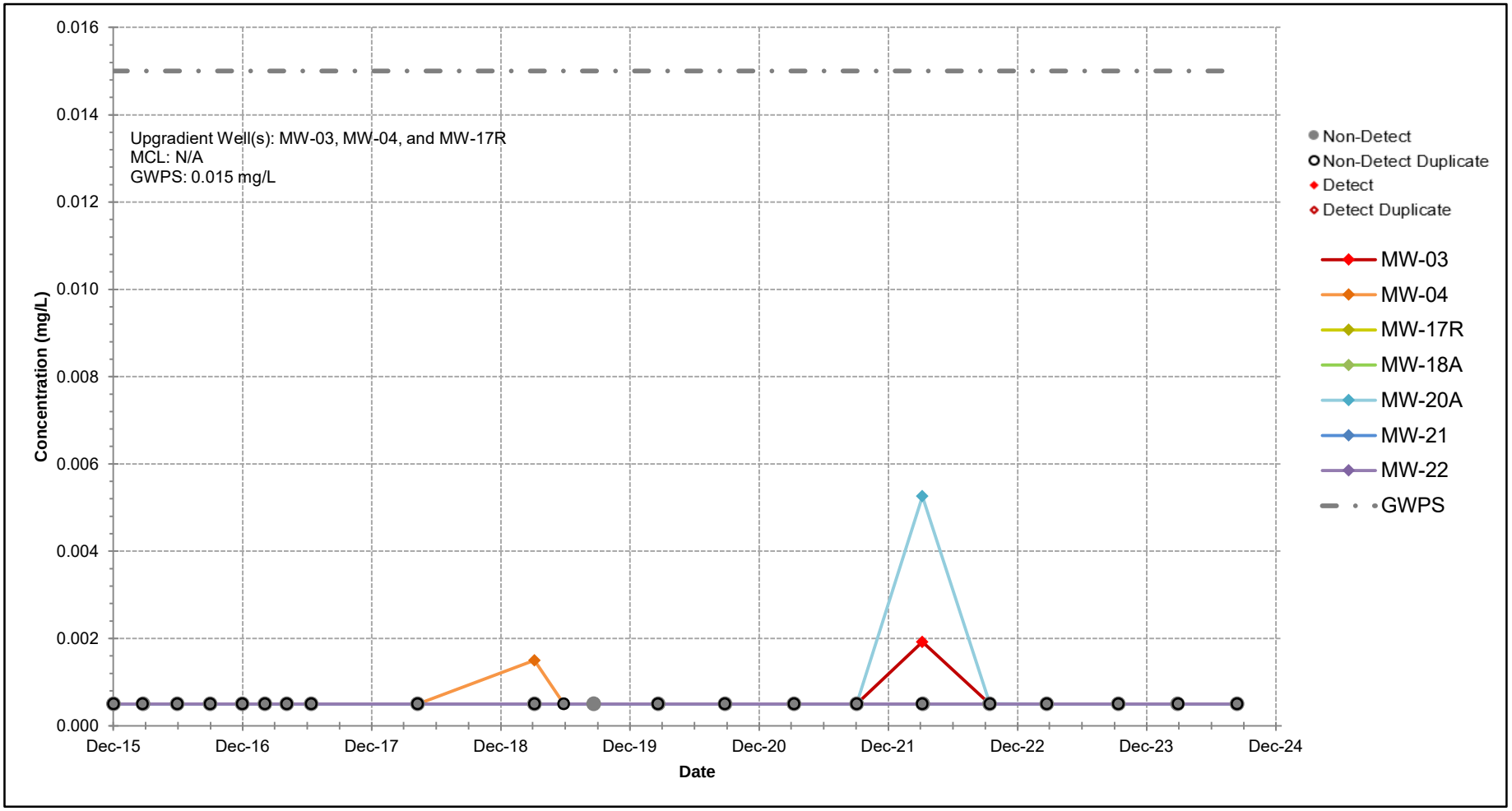
COBALT CONCENTRATION VS. TIME

FIGURE 14



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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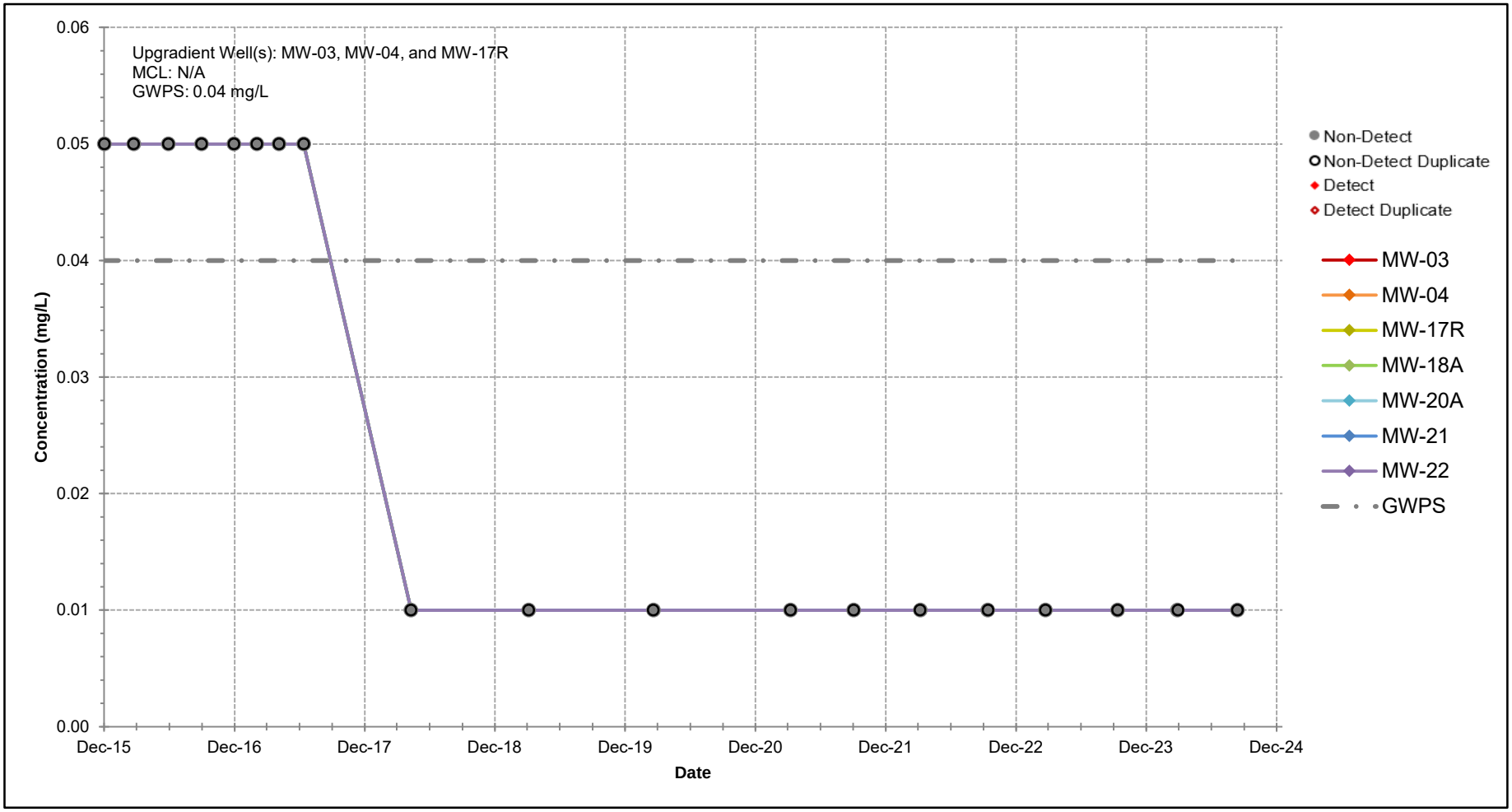
LEAD CONCENTRATION VS. TIME

FIGURE 15



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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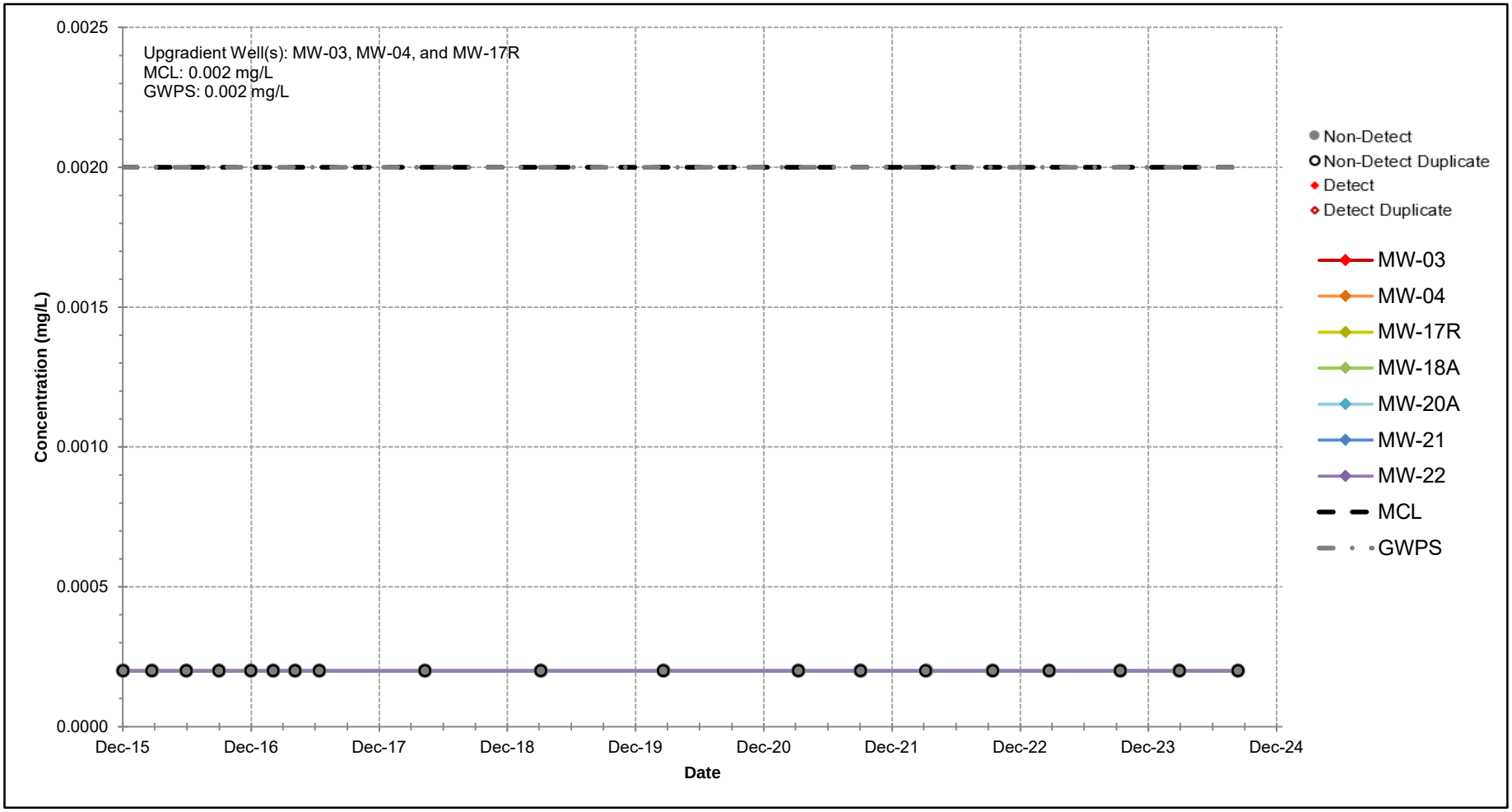
LITHIUM CONCENTRATION VS. TIME

FIGURE 16



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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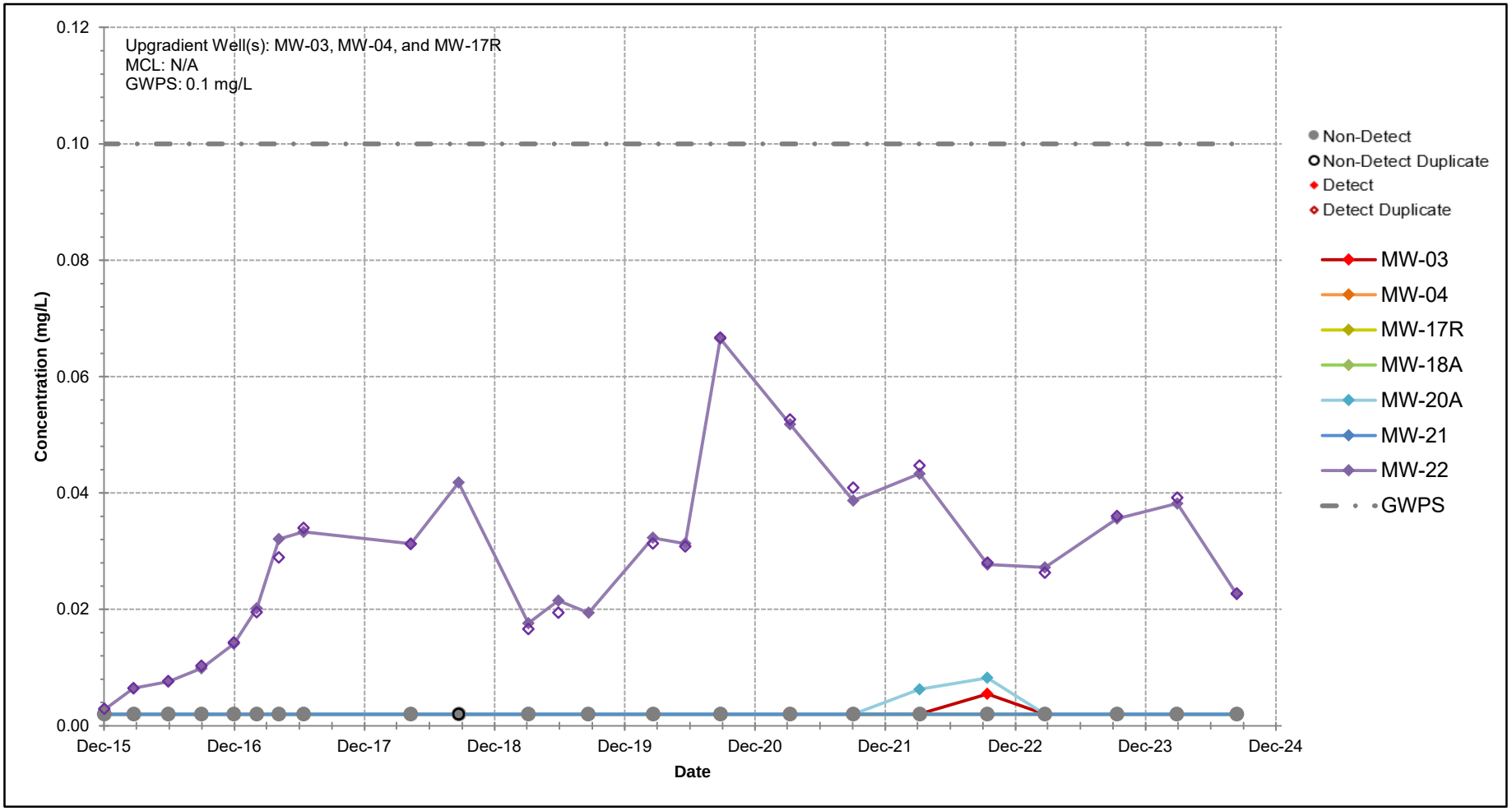
MERCURY CONCENTRATION VS. TIME

FIGURE 17



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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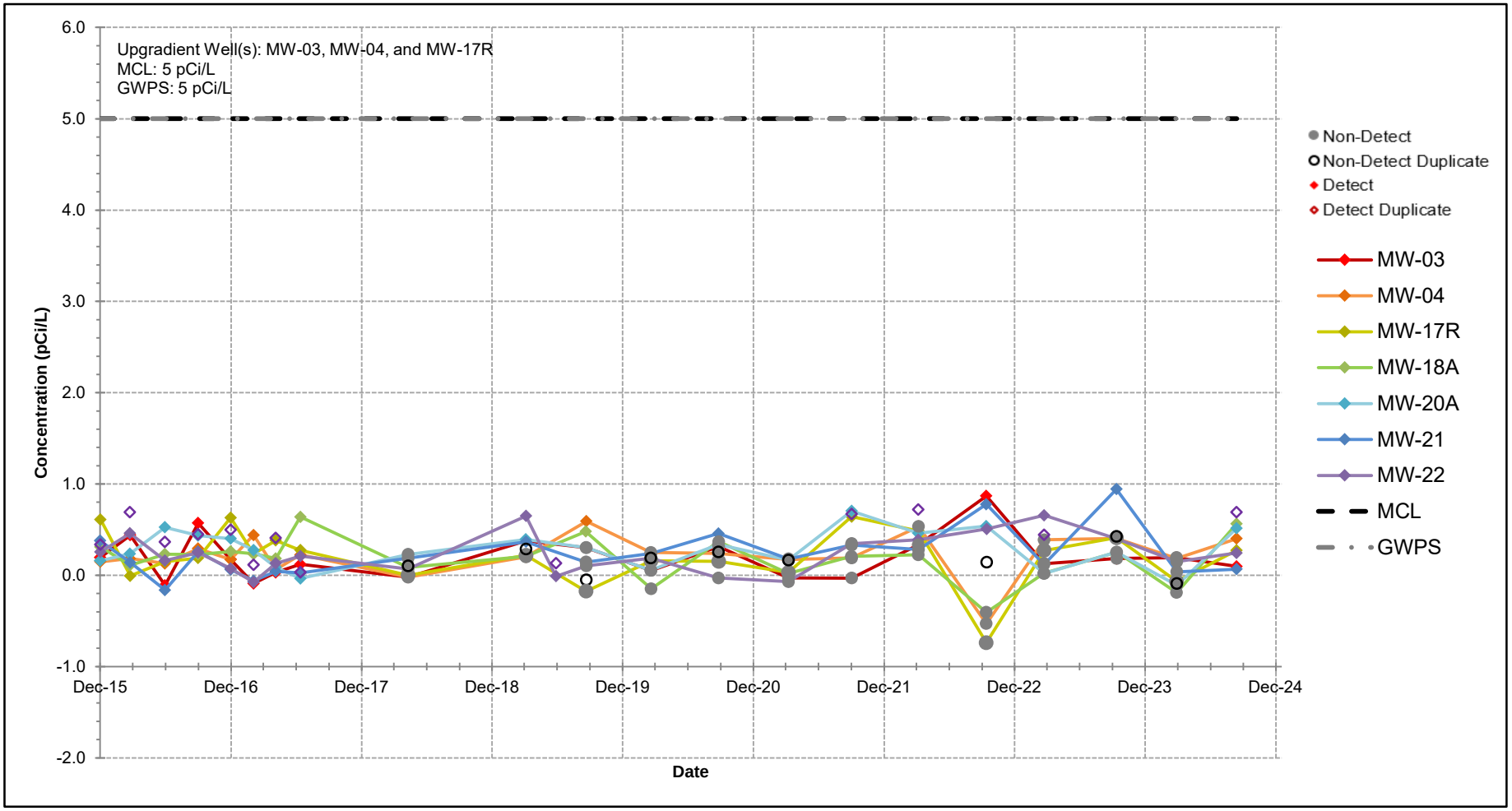
MOLYBDENUM CONCENTRATION VS. TIME

FIGURE 18



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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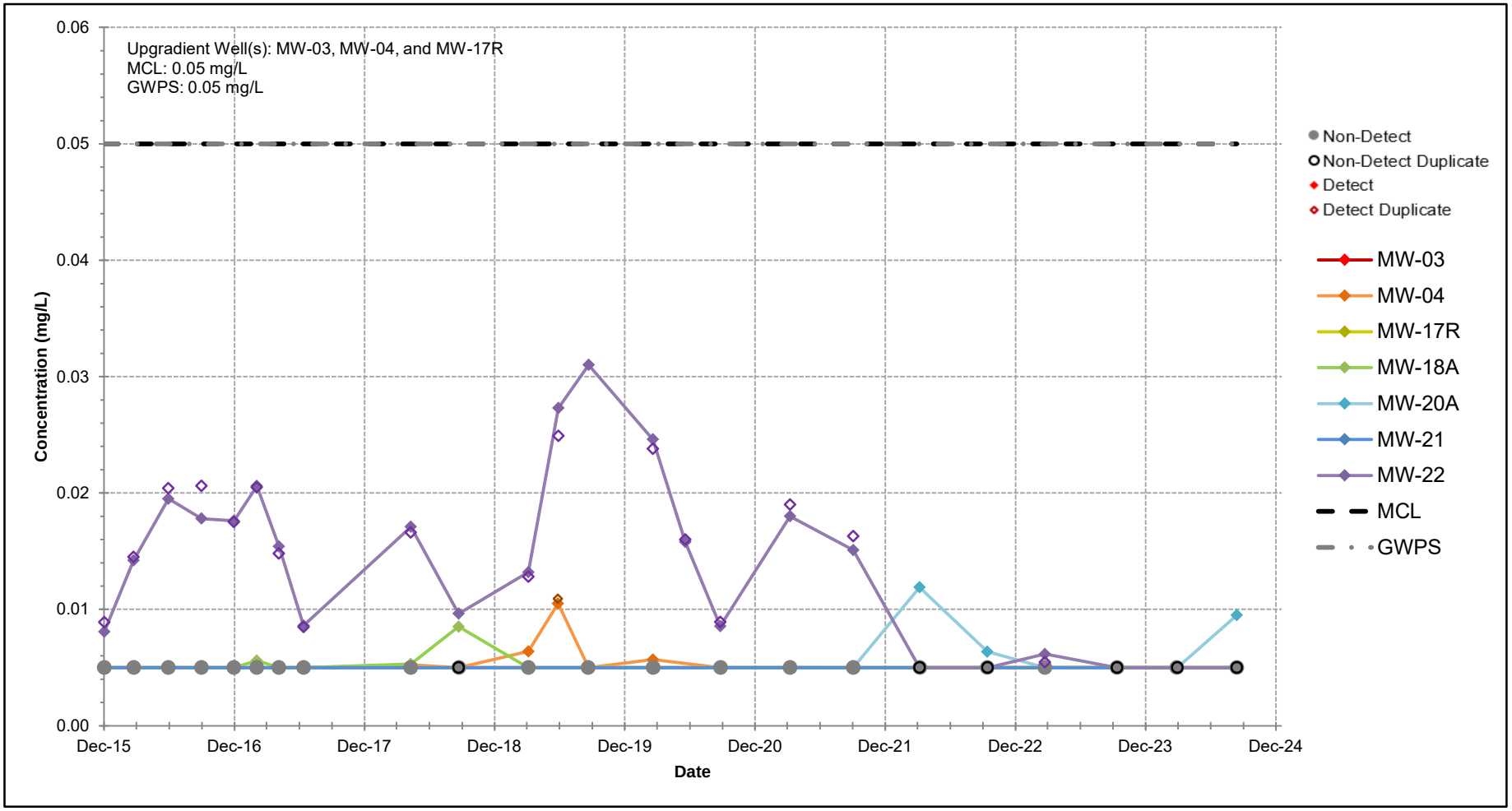
RADIUM-226 & 228 CONCENTRATION VS. TIME

FIGURE 19



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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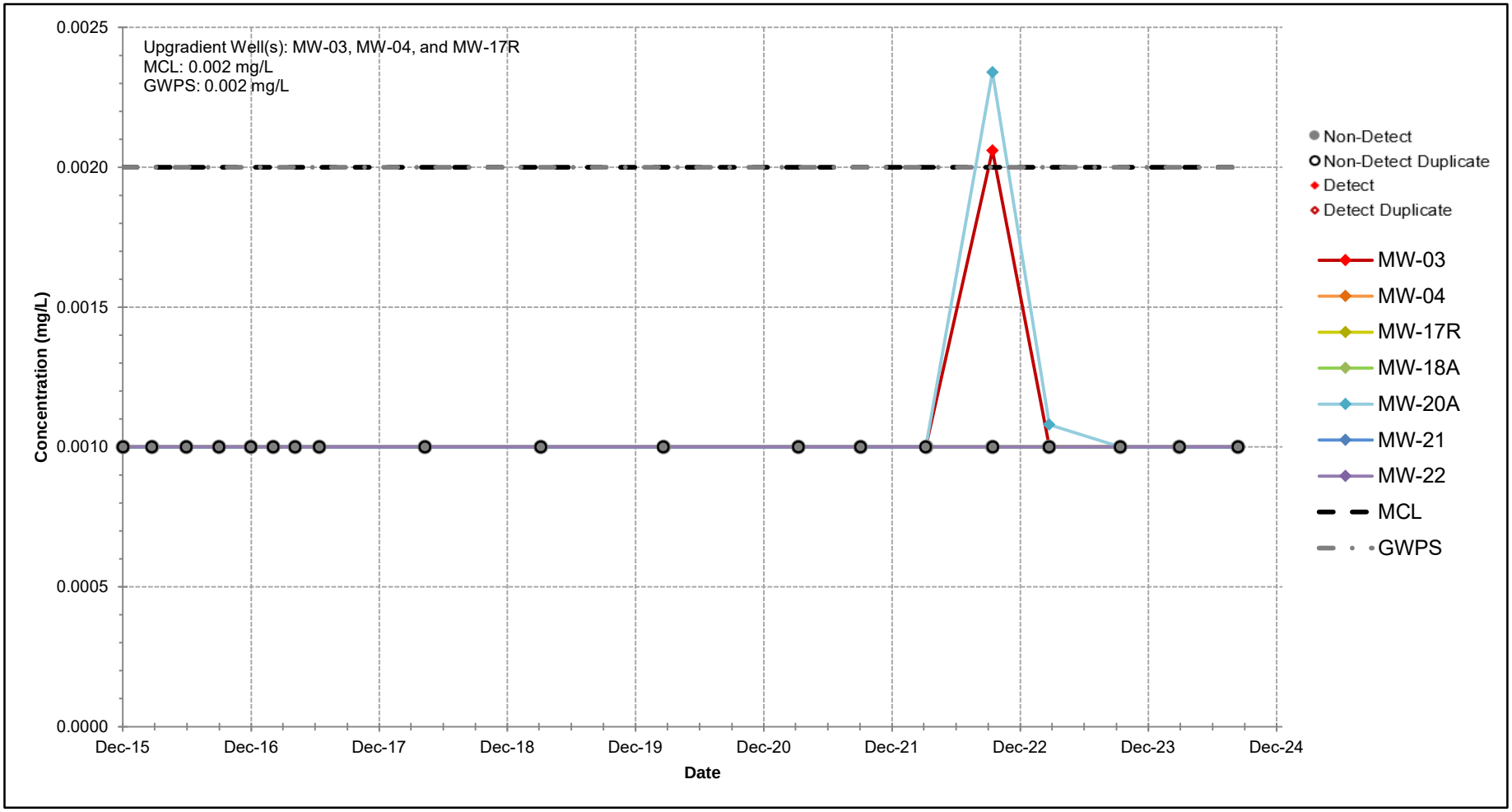
SELENIUM CONCENTRATION VS. TIME

FIGURE 20



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LOUISA GENERATING STATION - WEST MONOFILL
LOUISA COUNTY, IOWA

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THALLIUM CONCENTRATION VS. TIME

FIGURE 21

Appendix D

Groundwater Analytical Data
(December 2015 through 2024)

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:			MW-03	MW-03	MW-03	MW-03	MW-03	MW-03	MW-03	MW-03	MW-03	MW-03	MW-03
Sample ID:			**MW-03**	**MW-03**	**MW-03**	**MW-03**	**MW-03**	**MW-03**	**MW-03**	**MW-03**	**MW-03**	**MW-03**	**MW-3**
Sample Date:			**12/15/2015**	**3/8/2016**	**6/13/2016**	**9/14/2016**	**12/14/2016**	**2/16/2017**	**4/19/2017**	**6/27/2017**	**10/11/2017**	**4/24/2018**	**9/6/2018**
Parameters	**Units**	**Groundwater Protection Standard**											
Appendix III													
Boron	mg/L	None	0.0500 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
Calcium	mg/L	None	30.0	23.7	29.2	27.8	26.4	27.4	22.7	26.2	22.4	19.3	23.6
Chloride	mg/L	None	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 UJ	5.00 U
Fluoride	mg/L	4	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.07	0.500 U	0.500 U	0.500 UJ	0.500 U
pH, lab	s.u.	None	7.99 J	8.08 J	8.22 J	8.2 J	8.0 J	8.3 J	8.1 J	8.0 J	8.2 J	8.2 J	8.2 J
Sulfate	mg/L	None	8.78	8.97	7.50	6.16	7.39	8.63	9.67	8.16	6.27	21.6	5.69
Total dissolved solids (TDS)	mg/L	None	112	158	136	160	252	182	168	214	238	114	90.0
Appendix IV													
Antimony	mg/L	0.006	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	--	0.00100 U	--
Arsenic	mg/L	0.01	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	--	0.00200 U	--
Barium	mg/L	2	0.0191	0.0140	0.0178	0.0165	0.0160	0.0167	0.0155	0.0166	--	0.0137	0.0163 J
Beryllium	mg/L	0.004	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	--	0.00100 U	--
Cadmium	mg/L	0.005	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	--	0.000500 U	--
Chromium	mg/L	0.1	0.00500 U	0.00500 U	0.00508	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	--	0.00500 U	0.00500 U
Cobalt	mg/L	0.006	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	--	0.000500 U	--
Lead	mg/L	0.015	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	--	0.000500 U	--
Lithium	mg/L	0.04	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	--	0.0100 U	--
Mercury	mg/L	0.002	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	--	0.000200 U	--
Molybdenum	mg/L	0.1	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	--	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	5	0.194	0.439	-0.110	0.572	0.174	-0.0899	0.0316	0.120	--	-0.0210 U	--
Selenium	mg/L	0.05	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	--	0.00500 U	0.00500 U
Thallium	mg/L	0.002	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	--	0.00100 U	--

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		**MW-03**	**MW-03**	**MW-03**	**MW-03**	**MW-03**	**MW-03**	**MW-03**	**MW-03**	**MW-03**
Sample ID:		**MW-03**	**MW03-GW-0919**	**MW-03-GW-0320**	**MW03-GW-0920**	**MW03-GW-0321**	**MW03-GW-0921**	**MW03-GW-0322**	**MW03-GW-0922**	**MW3-GW-0323**
Sample Date:		**3/20/2019**	**9/4/2019**	**3/4/2020**	**9/9/2020**	**3/23/2021**	**9/16/2021**	**3/21/2022**	**9/27/2022**	**3/8/2023**
Parameters	**Units**									
Appendix III										
Boron	mg/L	0.200 U	0.200 U	0.200 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
Calcium	mg/L	26.6	37.3	27.4	28.0	32.0	33.1	32.7	24.4	22.2
Chloride	mg/L	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U
Fluoride	mg/L	0.500 U	0.500 U	0.500 U	0.500 U	0.727	0.500 U	0.500 UJ	0.500 U	0.500 U
pH, lab	s.u.	8.2 J	7.9 J	8.0 J	8.1 J	8.3 J	8.2 J	8.2 J	8.2 J	8.3 J
Sulfate	mg/L	8.89	18.4	5.00 U	5.92	7.34	9.43	10.6	5.91	5.28
Total dissolved solids (TDS)	mg/L	124	160	120	96.0	106	72.0	58.0	98.0	104
Appendix IV										
Antimony	mg/L	0.00100 U	--	0.00100 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	0.00200 U	--	0.00200 U	--	0.00200 U	0.00200 U	0.00253	0.00200 U	0.00200 U
Barium	mg/L	0.0183	0.0314	0.0175	0.0174	0.0203	0.0206	0.0217	0.0161	0.0139
Beryllium	mg/L	0.00100 U	--	0.00100 U	--	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.000500 U	--	0.000100 U	--	0.000100 U	0.000100 U	0.000979	0.000228	0.000100 U
Chromium	mg/L	0.00500 U	0.0234	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Cobalt	mg/L	0.000500 U	--	0.000500 U	--	0.000500 U	0.000500 U	0.000977	0.000500 U	0.000500 U
Lead	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.00192	0.000500 U	0.000500 U
Lithium	mg/L	0.0100 U	--	0.0100 U	--	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U
Mercury	mg/L	0.000200 U	--	0.000200 U	--	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00202	0.00547	0.00200 U
Radium-226 & 228	pCi/L	0.376	0.303 U	0.0529 U	0.315 U	-0.0301 U	-0.0313 U	0.333 U	0.869	0.128 U
Selenium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.00100 U	--	0.00100 U	--	0.00100 U	0.00100 U	0.00100 U	0.00206	0.00100 U

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		**MW-03**	**MW-03**	**MW-03**	**MW-04**	**MW-04**	**MW-04**	**MW-04**	**MW-04**	**MW-04**	**MW-04**	**MW-04**
Sample ID:		**MW03-GW-0923**	**MW03-GW-0324**	**MW03-GW-0824**	**MW-04**	**MW-04**	**MW-04**	**MW-04**	**MW-04**	**MW-04**	**MW-04**	**MW-04**
Sample Date:		**9/27/2023**	**3/12/2024**	**8/27/2024**	**12/16/2015**	**3/7/2016**	**6/13/2016**	**9/14/2016**	**12/14/2016**	**2/16/2017**	**4/19/2017**	**6/27/2017**
Parameters	**Units**											
Appendix III												
Boron	mg/L	0.100	0.100 U	0.100 U	0.584	0.276	0.201	0.225	0.369	0.417	0.341	0.454
Calcium	mg/L	22.7	22.6	31.0	53.9	60.2	59.6	56.5	66.2	70.4	59.2	57.9
Chloride	mg/L	5.00	5.00 U	5.00 U	5.00 U	5.00 U	5.00 U	5.33	5.00 U	5.00 U	5.94	5.15
Fluoride	mg/L	1.00	1.00 U	1.00 U	0.500 U	0.500 U	0.500 U	0.825	0.500 U	0.500 U	1.09	0.500 U
pH, lab	s.u.	8.1	7.9 J	8.3 J	7.84 J	7.79 J	7.71 J	7.8 J	7.6 J	7.6 J	7.8 J	7.5 J
Sulfate	mg/L	5.48	5.68	5.46	33.2	20.5	28.5	24.5	41.6	50.8	67.7	61.0
Total dissolved solids (TDS)	mg/L	114	94.0	134	280	250	260	262	392	296	282	336
Appendix IV												
Antimony	mg/L	0.00200	0.00200 U	0.00200 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Arsenic	mg/L	0.00200	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	0.0141	0.0149	0.0203	0.0571	0.0525	0.0508	0.0495	0.0552	0.0634	0.0539	0.0575
Beryllium	mg/L	0.00100	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.000200	0.000200 U	0.000200 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Chromium	mg/L	0.00500	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.0153	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Cobalt	mg/L	0.000500	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.000500	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.0100	0.0100 U	0.0100 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U
Mercury	mg/L	0.000200	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.00200	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	0.184	0.194 U	0.0975	0.148	0.183	0.129	0.292	0.173	0.441	0.0626	0.224
Selenium	mg/L	0.00500	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-04	MW-04	MW-04	MW-04	MW-04	MW-04	MW-04	MW-04	MW-04	MW-04
Sample ID:		MW-04	MW-04	MW-4	MW-04	MW-04-GW-0619	DP-01-GW-0619	MW04-GW-0919	DP02-GW-0919	MW-04-GW-0320	MW04-GW-0920
Sample Date:		10/11/2017	4/24/2018	9/5/2018	3/20/2019	6/11/2019	6/11/2019 (Duplicate)	9/5/2019	9/5/2019 (Duplicate)	3/3/2020	9/8/2020
Parameters	**Units**										
Appendix III											
Boron	mg/L	0.588	0.471	0.491	0.612	0.887	1.03	0.441	0.464	0.575	0.595
Calcium	mg/L	59.5	61.7	55.2	46.8	--	--	61.0	60.6	66.8	54.1
Chloride	mg/L	5.84	5.00 UJ	5.00 U	6.40	--	--	5.00 U	5.00 U	5.57	9.30
Fluoride	mg/L	0.500 U	0.500 UJ	0.500 U	0.500 U	--	--	0.500 U	0.500 U	0.500 U	0.500 U
pH, lab	s.u.	7.7 J	7.7 J	7.9 J	7.8 J	--	--	7.7 J	7.8 J	7.9 J	7.6 J
Sulfate	mg/L	72.3	65.6	66.9	83.2	108	108	38.5	44.2	52.7	60.4
Total dissolved solids (TDS)	mg/L	478	262	260	288	--	--	284	312	294	280
Appendix IV											
Antimony	mg/L	--	0.00100 U	--	0.00100 U	--	--	--	--	0.00100 U	--
Arsenic	mg/L	--	0.00200 U	--	0.00200 U	--	--	--	--	0.00200 U	--
Barium	mg/L	--	0.0674	0.0599 J	0.0474	--	--	0.0629	0.0628	0.0642	0.0593
Beryllium	mg/L	--	0.00100 U	--	0.00100 U	--	--	--	--	0.00100 U	--
Cadmium	mg/L	--	0.000500 U	--	0.000500 U	0.000500 U	0.000500 U	--	--	0.000100 U	--
Chromium	mg/L	--	0.00550	0.00903	0.0120	--	--	0.00500 U	0.00535	0.00868	0.0142
Cobalt	mg/L	--	0.000500 U	--	0.000500 U	--	--	--	--	0.000500 U	--
Lead	mg/L	--	0.000500 U	--	0.00150	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	--	0.0100 U	--	0.0100 U	--	--	--	--	0.0100 U	--
Mercury	mg/L	--	0.000200 U	--	0.000200 U	--	--	--	--	0.000200 U	--
Molybdenum	mg/L	--	0.00200 U	0.00200 U	0.00200 U	--	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	--	-0.0191 U	--	0.201 U	--	--	0.592	-0.0514 U	0.250 U	0.240 U
Selenium	mg/L	--	0.00523	0.00500 U	0.00639	0.0105	0.0109	0.00500 U	0.00500 U	0.00568	0.00500 U
Thallium	mg/L	--	0.00100 U	--	0.00100 U	--	--	--	--	0.00100 U	--

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-04	MW-04	MW-04	MW-04	MW-04	MW-04	MW-04	MW-04	MW-17R
Sample ID:		MW04-GW-0321	MW04-GW-0921	MW04-GW-0322	MW04-GW-0922	MW4-GW-0323	MW04-GW-0923	MW04-GW-0324	MW04-GW-0824	MW-17R
Sample Date:		3/24/2021	9/16/2021	3/22/2022	9/27/2022	3/8/2023	9/26/2023	3/12/2024	8/27/2024	12/16/2015
Parameters	**Units**									
Appendix III										
Boron	mg/L	0.500	0.493	0.339	0.300	0.164	0.556	0.383	0.367	0.0500 U
Calcium	mg/L	39.5	51.2	55.4	41.1	43.1	56.3	45.7	46.8	45.8
Chloride	mg/L	9.36	5.00 U	5.00 U	5.00 U	5.00 U	12.7	13.7	9.29	5.00 U
Fluoride	mg/L	0.500 U	0.500 U	0.500 UJ	0.500 U	0.500 U	1.00	1.00 U	1.00 U	0.500 U
pH, lab	s.u.	7.9 J	7.7 J	7.9 J	7.8 J	8.0 J	7.7	7.9 J	7.7 J	7.90 J
Sulfate	mg/L	52.8	17.0	13.1	7.64	7.09	38.0	39.2	23.9	30.0
Total dissolved solids (TDS)	mg/L	212	192	176	202	218	252	224	214	216
Appendix IV										
Antimony	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200	0.00200 U	0.00200 U	0.00100 U
Arsenic	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	0.0435	0.0522	0.0568	0.0416	0.0412	0.0553	0.0464	0.0505	0.0364
Beryllium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.000100 U	0.000100 U	0.000100 U	0.000100 U	0.000100 U	0.000200	0.000200 U	0.000200 U	0.000500 U
Chromium	mg/L	0.00843	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00958	0.00788	0.00500 U	0.00500 U
Cobalt	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100	0.0100 U	0.0100 U	0.0500 U
Mercury	mg/L	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	0.173 U	0.190 U	0.534 U	-0.529 U	0.389 U	0.404	0.184 U	0.401	0.611
Selenium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00502	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 UJ	0.00100 U	0.00100 U	0.00100 U

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R
Sample ID:		MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW-17R	MW17R-GW-0919
Sample Date:		3/8/2016	6/13/2016	9/14/2016	12/14/2016	2/16/2017	4/19/2017	6/27/2017	10/11/2017	4/24/2018	9/6/2018	3/20/2019	9/4/2019
Parameters	**Units**												
Appendix III													
Boron	mg/L	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U
Calcium	mg/L	47.5	56.3	47.4	51.1	52.7	39.9	41.8	41.8	38.9	40.4	33.6	49.4
Chloride	mg/L	5.00 U	5.00 U	6.60	9.17	5.00 U	9.95	5.00 U	5.00 U	5.00 UJ	5.00 U	5.00 U	5.00 U
Fluoride	mg/L	0.500 U	0.500 U	0.793	1.74	0.500 U	1.58	0.500 U	0.500 U	0.500 UJ	0.500 U	0.500 U	0.500 U
pH, lab	s.u.	7.88 J	7.93 J	8.0 J	7.8 J	7.9 J	8.0 J	7.8 J	8.0 J	8.0 J	8.1 J	8.0 J	7.9 J
Sulfate	mg/L	33.1	43.2	29.0	31.5	31.3	26.4	21.2	24.6	25.1	19.6	10.1	41.1
Total dissolved solids (TDS)	mg/L	208	238	234	236	212	198	312	220	180	212	146	230
Appendix IV													
Antimony	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	--	0.00100 U	--	0.00100 U	--
Arsenic	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	--	0.00200 U	--	0.00200 U	--
Barium	mg/L	0.0311	0.0357	0.0310	0.0305	0.0402	0.0328	0.0346	--	0.0370	0.0366 J	0.0257	0.0339
Beryllium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	--	0.00100 U	--	0.00100 U	--
Cadmium	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	--	0.000500 U	--	0.000500 U	--
Chromium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	--	0.00500 U	0.00500 U	0.00500 U	0.00817
Cobalt	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	--	0.000500 U	--	0.000500 U	--
Lead	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	--	0.000500 U	--	0.000500 U	0.000500 U
Lithium	mg/L	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	--	0.0100 U	--	0.0100 U	--
Mercury	mg/L	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	--	0.000200 U	--	0.000200 U	--
Molybdenum	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	-0.00637	0.150	0.188	0.631	0.235	0.381	0.275	--	0.000965 U	--	0.218 U	-0.175 U
Selenium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	--	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	--	0.00100 U	--	0.00100 U	--

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		**MW-17R**	**MW-17R**	**MW-17R**	**MW-17R**	**MW-17R**	**MW-17R**	**MW-17R**	**MW-17R**
Sample ID:		**MW-17R-GW-0320**	**MW17R-GW-0920**	**MW17R-GW-0321**	**MW17R-GW-0921**	**MW17R-GW-0322**	**MW17R-GW-0922**	**MW17R-GW-0323**	**MW17R-GW-0923**
Sample Date:		**3/4/2020**	**9/9/2020**	**3/23/2021**	**9/16/2021**	**3/22/2022**	**9/27/2022**	**3/8/2023**	**9/26/2023**
Parameters	**Units**								
Appendix III									
Boron	mg/L	0.200 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100
Calcium	mg/L	65.7	44.3	56.2	48.2	51.3	47.9	33.0	36.4
Chloride	mg/L	5.00 U	5.00 U	7.53	5.00 U	5.00 U	5.00 U	5.00 U	5.00
Fluoride	mg/L	0.500 U	0.500 U	1.74	0.500 U	0.500 UJ	0.500 U	0.500 U	1.00
pH, lab	s.u.	7.9 J	7.9 J	7.9 J	7.9 J	8.0 J	8.0 J	8.2 J	8.0
Sulfate	mg/L	71.9	43.3	67.4	46.1	35.4	30.1	11.4	11.2
Total dissolved solids (TDS)	mg/L	296	214	224	162	122	214	164	148
Appendix IV									
Antimony	mg/L	0.00100 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200
Arsenic	mg/L	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200
Barium	mg/L	0.0435	0.0301	0.0481	0.0427	0.0460	0.0410	0.0286	0.0296
Beryllium	mg/L	0.00100 U	--	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100
Cadmium	mg/L	0.000100 U	--	0.000100 U	0.000100 U	0.000100 U	0.000100 U	0.000100 U	0.000200
Chromium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500
Cobalt	mg/L	0.000500 U	--	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500
Lead	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500
Lithium	mg/L	0.0100 U	--	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100
Mercury	mg/L	0.000200 U	--	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200
Molybdenum	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200
Radium-226 & 228	pCi/L	0.159 U	0.152 U	0.0313 U	0.642	0.485	-0.738 U	0.272 U	0.411
Selenium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500
Thallium	mg/L	0.00100 U	--	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 UJ

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-17R	MW-17R	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A
Sample ID:		MW17R-GW-0324	MW17R-GW-0824	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A
Sample Date:		3/12/2024	8/27/2024	12/16/2015	3/7/2016	6/13/2016	9/14/2016	12/14/2016	2/16/2017	4/19/2017	6/27/2017	10/11/2017	2/1/2018
Parameters	**Units**												
Appendix III													
Boron	mg/L	0.100 U	0.100 U	0.350	0.200 U	0.200 U	0.200 U	0.210	0.263	0.268	0.310	0.360	--
Calcium	mg/L	34.2	38.0	41.2	30.7	37.1	32.3	51.7	60.4	47.5	44.4	40.3	--
Chloride	mg/L	5.00 U	5.00 U	7.29	5.00 U	5.00 U	5.00 U	7.06	5.00 U	7.58	5.53	5.00 U	--
Fluoride	mg/L	1.00 U	1.00 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	1.37	0.500 U	0.500 U	--
pH, lab	s.u.	8.0 J	7.9 J	7.84 J	7.11 J	7.11 J	6.9 J	6.9 J	6.9 J	7.0 J	6.7 J	6.9 J	7.2 J
Sulfate	mg/L	11.7	19.7	59.5	25.1	25.8	29.2	80.4	107	105	86.5	80.4	64.0
Total dissolved solids (TDS)	mg/L	136	162	214	160	194	206	314	338	336	314	368	204
Appendix IV													
Antimony	mg/L	0.00200 U	0.00200 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	--	--
Arsenic	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	--	--
Barium	mg/L	0.0301	0.0299	0.0502	0.0260	0.0287	0.0296	0.0398	0.0473	0.0343	0.0368	--	--
Beryllium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	--	--
Cadmium	mg/L	0.000200 U	0.000200 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	--	--
Chromium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00680	0.00648	0.00574	--	--
Cobalt	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	--	--
Lead	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	--	--
Lithium	mg/L	0.0100 U	0.0100 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	--	--
Mercury	mg/L	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	--	--
Molybdenum	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	--	--
Radium-226 & 228	pCi/L	-0.0678 U	0.273	0.311	0.108	0.231	0.228	0.260	0.235	0.183	0.639	--	--
Selenium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00559	0.00500 U	0.00500 U	--	--
Thallium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	--	--

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A
Sample ID:		MW-18A	MW-18A	MW-18A	MW-18A-GW-0619	MW18A-GW-0919	MW-18A-GW-0320	MW-18A-GW-0620	MW18A-GW-0920	MW18A-GW-0321
Sample Date:		4/24/2018	9/5/2018	3/20/2019	6/12/2019	9/3/2019	3/4/2020	6/2/2020	9/9/2020	3/23/2021
Parameters	**Units**									
Appendix III										
Boron	mg/L	0.335	0.635	0.349	--	0.200 U	0.236	--	0.321	0.193
Calcium	mg/L	34.5	47.5	51.9	--	45.9	64.9	--	40.8	40.0
Chloride	mg/L	24.7 J-	5.00 U	7.02	--	10.4	9.09	--	9.29	5.00 U
Fluoride	mg/L	7.04 J-	0.500 U	0.500 U	--	0.500 U	0.500 U	--	0.500 U	0.500 U
pH, lab	s.u.	7.1 J	7.1 J	7.0 J	7.4 J	7.6 J	7.6 J	--	6.9 J	7.0 J
Sulfate	mg/L	73.7	83.6	86.4	8.01	38.1	91.7	113	90.8	40.7
Total dissolved solids (TDS)	mg/L	176	234	238	--	220	328	--	258	174
Appendix IV										
Antimony	mg/L	0.00100 U	--	0.00100 U	--	--	0.00100 U	--	--	0.00200 U
Arsenic	mg/L	0.00200 U	--	0.00200 U	--	--	0.00200 U	--	--	0.00200 U
Barium	mg/L	0.0329	0.0558 J	0.0396	--	0.0307	0.0507	--	0.0584	0.0475
Beryllium	mg/L	0.00100 U	--	0.00100 U	--	--	0.00100 U	--	--	0.00100 U
Cadmium	mg/L	0.000500 U	--	0.000500 U	--	--	0.000100 U	--	--	0.000100 U
Chromium	mg/L	0.00500 U	0.00625	0.00756	--	0.00500 U	0.00500 U	--	0.00985	0.00500 U
Cobalt	mg/L	0.000500 U	--	0.000500 U	--	--	0.000500 U	--	--	0.000500 U
Lead	mg/L	0.000500 U	--	0.000500 U	--	0.000500 U	0.000500 U	--	0.000500 U	0.000500 U
Lithium	mg/L	0.0100 U	--	0.0100 U	--	--	0.0100 U	--	--	0.0100 U
Mercury	mg/L	0.000200 U	--	0.000200 U	--	--	0.000200 U	--	--	0.000200 U
Molybdenum	mg/L	0.00200 U	0.00200 U	0.00200 U	--	0.00200 U	0.00200	--	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	0.0874 U	--	0.206 U	--	0.479	-0.148 U	--	0.368 U	0.0206 U
Selenium	mg/L	0.00530	0.00851	0.00500 U	--	0.00500 U	0.00500 U	--	0.00500 U	0.00500 U
Thallium	mg/L	0.00100 U	--	0.00100 U	--	--	0.00100 U	--	--	0.00100 U

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-18A	MW-20A	MW-20A
Sample ID:		MW18A-GW-0921	MW18A-GW-0322	MW18A-GW-0922	MW18A-GW-0323	MW18A-GW-0923	MW18A-GW-0324	MW18A-GW-0824	MW-20A	MW-20A
Sample Date:		9/15/2021	3/21/2022	9/27/2022	3/7/2023	9/27/2023	3/12/2024	8/27/2024	12/15/2015	3/7/2016
Parameters	**Units**									
Appendix III										
Boron	mg/L	0.276	0.194	0.287	0.162	0.245	0.172	0.240	0.0862	0.200 U
Calcium	mg/L	31.9	36.1	25.0	31.4	34.9	33.6	32.0	45.5	46.4
Chloride	mg/L	5.38	5.00 U	5.30	5.00 U	6.52	6.75	9.17	15.7	17.0
Fluoride	mg/L	0.500 U	0.500 UJ	0.500 U	0.500 U	1.00	1.00 U	1.00 U	0.500 U	0.500 U
pH, lab	s.u.	6.9 J	6.8 J	6.9 J	7.1 J	6.8	7.3 J	7.1 J	7.91 J	6.76 J
Sulfate	mg/L	47.2	57.2	43.4	53.0	48.9	44.9	38.8	56.8	69.8
Total dissolved solids (TDS)	mg/L	134	154	154	222	204	186	162	286	308
Appendix IV										
Antimony	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200	0.00200 U	0.00200 U	0.00100 U	0.00100 U
Arsenic	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	0.0395	0.0310	0.0264	0.0283	0.0332	0.0289	0.0310	0.0488	0.0432
Beryllium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.000100 U	0.000100 U	0.000100 U	0.000100 U	0.000200	0.000200 U	0.000200 U	0.000500 U	0.000500 U
Chromium	mg/L	0.00555	0.00573	0.0115	0.00543	0.00890	0.00879	0.0114	0.00500 U	0.00500 U
Cobalt	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100	0.0100 U	0.0100 U	0.0500 U	0.0500 U
Mercury	mg/L	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	0.206 U	0.225 U	-0.405 U	0.0230 U	0.189	-0.190 U	0.564	0.159	0.236
Selenium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00608	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 UJ	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A
Sample ID:		MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A-GW-0619
Sample Date:		6/13/2016	9/14/2016	12/14/2016	2/16/2017	4/19/2017	6/27/2017	10/11/2017	2/1/2018	4/24/2018	9/4/2018	3/19/2019	6/11/2019
Parameters	**Units**												
Appendix III													
Boron	mg/L	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	--	0.200 U	0.200 U	0.200 U	--
Calcium	mg/L	57.9	47.7	51.4	57.3	61.1	62.8	53.9	--	46.1	62.2	7.82	--
Chloride	mg/L	16.4	17.2	23.0	33.8	34.1	36.4	20.3	25.1	46.5 J-	13.6	5.00 U	--
Fluoride	mg/L	0.500 U	0.500 U	0.500 U	3.17	0.708	0.500 U	0.500 U	--	4.95 J-	0.500 U	0.500 U	--
pH, lab	s.u.	8.08 J	7.2 J	6.7 J	6.7 J	6.8 J	6.6 J	6.7 J	6.8 J	6.8 J	6.8 J	6.4 J	7.0 J
Sulfate	mg/L	115	85.6	103	117	165	211	105	132	158	135	15.8	--
Total dissolved solids (TDS)	mg/L	400	372	368	380	462	580	444	408	396	346	62.0	--
Appendix IV													
Antimony	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	--	--	0.00100 U	--	0.00100 U	--
Arsenic	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	--	--	0.00200 U	--	0.00200 U	--
Barium	mg/L	0.0595	0.0476	0.0521	0.0570	0.0694	0.0772	--	--	0.0672	0.0616	0.0110	--
Beryllium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	--	--	0.00100 U	--	0.00100 U	--
Cadmium	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	--	--	0.000500 U	--	0.000500 U	--
Chromium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00521	0.00500 U	--	--	0.00500 U	0.00500 U	0.00500 U	--
Cobalt	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	--	--	0.000500 U	--	0.000500 U	--
Lead	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	--	--	0.000500 U	--	0.000500 U	--
Lithium	mg/L	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	--	--	0.0100 U	--	0.0100 U	--
Mercury	mg/L	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	--	--	0.000200 U	--	0.000200 U	--
Molybdenum	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	--	--	0.00200 U	0.00200 U	0.00200 U	--
Radium-226 & 228	pCi/L	0.525	0.435	0.401	0.276	0.0869	-0.0348	--	--	0.228 U	--	0.393	--
Selenium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	--	--	0.00500 U	0.00500 U	0.00500 U	--
Thallium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	--	--	0.00100 U	--	0.00100 U	--

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A	MW-20A
Sample ID:		MW20A-GW-0919	MW-20A-GW-0320	MW-20A-GW-0620	MW20A-GW-0920	MW20A-GW-0321	MW20A-GW-0921	MW20A-GW-0322	MW-20-GW-0922
Sample Date:		9/5/2019	3/3/2020	6/2/2020	9/8/2020	3/23/2021	9/16/2021	3/21/2022	9/27/2022
Parameters	**Units**								
Appendix III									
Boron	mg/L	0.200 U	0.200 U	--	0.100 U	0.100 U	0.129	0.170	0.277
Calcium	mg/L	16.0	9.82	--	31.1	25.3	38.7	66.5	66.2
Chloride	mg/L	5.00 U	5.00 U	--	5.00 U	5.00 U	5.00 U	6.97	18.9
Fluoride	mg/L	0.500 U	0.500 U	--	0.500 U	0.500 U	0.500 U	0.500 UJ	0.500 U
pH, lab	s.u.	6.7 J	6.5 J	6.6 J	6.6 J	6.6 J	6.6 J	6.9 J	7.0 J
Sulfate	mg/L	24.8	7.95	--	20.7	34.4	48.2	92.3	159
Total dissolved solids (TDS)	mg/L	86.0	60.0	--	146	104	146	252	400
Appendix IV									
Antimony	mg/L	--	0.00100 U	--	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	--	0.00200 U	--	--	0.00200 U	0.00200 U	0.00565	0.00200 U
Barium	mg/L	0.0161	0.0126	--	0.0258	0.0244	0.0393	0.0643	0.0725
Beryllium	mg/L	--	0.00100 U	--	--	0.00100 U	0.00100 U	0.00249	0.00100 U
Cadmium	mg/L	--	0.000100 U	--	--	0.000100 U	0.000100 U	0.00282	0.000260
Chromium	mg/L	0.00500 U	0.00500 U	--	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Cobalt	mg/L	--	0.000500 U	--	--	0.000500 U	0.000500 U	0.00279	0.000500 U
Lead	mg/L	0.000500 U	0.000500 U	--	0.000500 U	0.000500 U	0.000500 U	0.00526	0.000503
Lithium	mg/L	--	0.0100 U	--	--	0.0100 U	0.0100 U	0.0100 U	0.0100 U
Mercury	mg/L	--	0.000200 U	--	--	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.00200 U	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00625	0.00824
Radium-226 & 228	pCi/L	0.302 U	0.0543 U	--	0.336 U	0.166 U	0.704	0.461	0.539
Selenium	mg/L	0.00500 U	0.00500 U	--	0.00500 U	0.00500 U	0.00500 U	0.0119	0.00637
Thallium	mg/L	--	0.00100 U	--	--	0.00100 U	0.00100 U	0.00100 U	0.00234

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-20A	MW-20A	MW-20A	MW-20A	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21
Sample ID:		MW20A-GW-0323	MW20A-GW-0923	MW20A-GW-0324	MW20A-GW-0824	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21
Sample Date:		3/8/2023	9/26/2023	3/13/2024	8/27/2024	12/15/2015	3/8/2016	6/13/2016	9/14/2016	12/14/2016	2/16/2017
Parameters	**Units**										
Appendix III											
Boron	mg/L	0.190	0.259	0.214	0.199	0.184	0.311	0.224	0.346	0.200 U	0.200 U
Calcium	mg/L	38.0	37.0	32.0	24.3	70.5	71.9	64.9	69.9	49.2	51.0
Chloride	mg/L	12.9	9.89	9.16	5.30	5.51	14.0	16.8	21.6	9.04	7.63
Fluoride	mg/L	0.500 U	1.00	1.00 U	1.00 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
pH, lab	s.u.	7.5 J	7.0	7.6 J	7.0 J	7.90 J	7.66 J	7.94 J	7.7 J	7.7 J	7.7 J
Sulfate	mg/L	120	67.7	65.7	46.7	15.5	19.2	12.1	27.2	5.01	8.91
Total dissolved solids (TDS)	mg/L	390	270	246	190	268	272	260	284	232	262
Appendix IV											
Antimony	mg/L	0.00200 U	0.00200	0.00200 U	0.00200 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Arsenic	mg/L	0.00200 U	0.00200	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	0.0491	0.0406	0.0364	0.0290	0.0616	0.0565	0.0489	0.0569	0.0388	0.0442
Beryllium	mg/L	0.00100 U	0.00100	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.000100 U	0.000200	0.000200 U	0.000200 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Chromium	mg/L	0.00500 U	0.00500	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Cobalt	mg/L	0.000500 U	0.000500	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.000500 U	0.000500	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.0100 U	0.0100	0.0100 U	0.0100 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U
Mercury	mg/L	0.000200 U	0.000200	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.00200 U	0.00200	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	0.0193 U	0.253	-0.109 U	0.516	0.378	0.140	-0.162	0.259	0.0625	-0.0622
Selenium	mg/L	0.00500 U	0.00500	0.00500 U	0.00950	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.00108	0.00100 UJ	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21
Sample ID:		MW-21	MW-21	MW-21	MW-21	MW-21	DP-02	MW-21	MW21-GW-0919	MW-21-GW-0320	MW21-GW-0920	MW21-GW-0321
Sample Date:		4/19/2017	6/27/2017	10/11/2017	4/24/2018	9/5/2018	9/5/2018 (Duplicate)	3/20/2019	9/4/2019	3/4/2020	9/8/2020	3/23/2021
Parameters	**Units**											
Appendix III												
Boron	mg/L	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	0.100 U	0.100 U
Calcium	mg/L	63.7	54.1	55.7	55.8	61.9	64.1	50.2	81.9	71.9	81.1	91.5
Chloride	mg/L	14.8	9.41	5.00 U	21.8 J-	5.00 U	5.00 U	5.00 U	5.88	5.07	7.49	34.0
Fluoride	mg/L	0.650	0.500 U	0.500 U	3.61 J-	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
pH, lab	s.u.	7.7 J	7.6 J	7.7 J	7.6 J	7.8 J	7.8 J	7.7 J	7.5 J	7.6 J	7.5 J	7.5 J
Sulfate	mg/L	22.4	21.2	14.3	23.4	15.4	15.4	13.7	31.8	15.1	15.3	84.3
Total dissolved solids (TDS)	mg/L	286	282	272	222	232	214	198	330	274	280	368
Appendix IV												
Antimony	mg/L	0.00100 U	0.00100 U	--	0.00100 U	--	--	0.00100 U	--	0.00100 U	--	0.00200 U
Arsenic	mg/L	0.00200 U	0.00200 U	--	0.00200 U	--	--	0.00200 U	--	0.00200 U	--	0.00200 U
Barium	mg/L	0.0550	0.0543	--	0.0533	0.0556 J	0.0575 J	0.0427	0.0722	0.0578	0.0661	0.0934
Beryllium	mg/L	0.00100 U	0.00100 U	--	0.00100 U	--	--	0.00100 U	--	0.00100 U	--	0.00100 U
Cadmium	mg/L	0.000500 U	0.000500 U	--	0.000500 U	--	--	0.000500 U	--	0.000100 U	--	0.000100 U
Chromium	mg/L	0.00500 U	0.00500 U	--	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Cobalt	mg/L	0.000500 U	0.000500 U	--	0.000500 U	--	--	0.000500 U	--	0.000500 U	--	0.000500 U
Lead	mg/L	0.000500 U	0.000500 U	--	0.000500 U	--	--	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.0500 U	0.0500 U	--	0.0100 U	--	--	0.0100 U	--	0.0100 U	--	0.0100 U
Mercury	mg/L	0.000200 U	0.000200 U	--	0.000200 U	--	--	0.000200 U	--	0.000200 U	--	0.000200 U
Molybdenum	mg/L	0.00200 U	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Radium-226 & 228	pCi/L	0.0439	0.0259	--	0.187 U	--	--	0.367	0.145 U	0.238 U	0.457	0.179 U
Selenium	mg/L	0.00500 U	0.00500 U	--	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.00100 U	0.00100 U	--	0.00100 U	--	--	0.00100 U	--	0.00100 U	--	0.00100 U

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21	MW-22	MW-22	MW-22
Sample ID:		MW21-GW-0921	MW21-GW-0322	MW21-GW-0922	MW21-GW-0323	MW21-GW-0923	MW21-GW-0324	MW21-GW-0824	MW-22	DP-02	MW-22
Sample Date:		9/16/2021	3/22/2022	9/27/2022	3/7/2023	9/26/2023	3/13/2024	8/27/2024	12/16/2015	12/16/2015 (Duplicate)	3/7/2016
Parameters	**Units**										
Appendix III											
Boron	mg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100	0.100 U	0.100 U	0.477	0.457	0.708
Calcium	mg/L	78.5	94.6	64.1	70.1	61.6	90.6	69.0	66.4	70.6	64.2
Chloride	mg/L	24.4	22.8	11.6	13.1	5.30	17.5	5.98	9.72	10.4	10.1
Fluoride	mg/L	0.500 U	0.500 UJ	0.500 U	0.500 U	1.00	1.00 U	1.00 U	0.500 U	0.500 U	0.500 U
pH, lab	s.u.	7.6 J	7.5 J	7.7 J	7.5 J	7.6	7.8 J	7.5 J	8.10 J	6.65 J	6.78 J
Sulfate	mg/L	67.4	79.5	46.6	52.4	20.5	66.0	24.7	162	161	215
Total dissolved solids (TDS)	mg/L	316	348	278	384	240	398	246	438	406	484
Appendix IV											
Antimony	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200	0.00200 U	0.00200 U	0.00100 U	0.00100 U	0.00100 U
Arsenic	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	0.0776	0.102	0.0589	0.0730	0.0542	0.0929	0.0612	0.0885	0.0943	0.0713
Beryllium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.000100 U	0.000100 U	0.000100 U	0.000100 U	0.000200	0.000200 U	0.000200 U	0.000500 U	0.000500 U	0.000500 U
Chromium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500	0.00500 U	0.00500 U	0.0109	0.0117	0.0281
Cobalt	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100	0.0100 U	0.0100 U	0.0500 U	0.0500 U	0.0500 U
Mercury	mg/L	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200	0.00200 U	0.00200 U	0.00274	0.00292	0.00644
Radium-226 & 228	pCi/L	0.330 U	0.281 U	0.777	0.118 U	0.944	0.0380 U	0.0668	0.255	0.335	0.459
Selenium	mg/L	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00500	0.00500 U	0.00500 U	0.00807	0.00889	0.0142
Thallium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 UJ	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22
Sample ID:		DP-02	MW-22	DP-02	MW-22	DP-02	MW-22	DP-02	MW-22	DP-02	MW-22	DP-02	MW-22
Sample Date:		3/7/2016 (Duplicate)	6/13/2016	6/13/2016 (Duplicate)	9/14/2016	9/14/2016 (Duplicate)	12/14/2016	12/14/2016 (Duplicate)	2/16/2017	2/16/2017 (Duplicate)	4/19/2017	4/19/2017 (Duplicate)	6/27/2017
Parameters	**Units**												
Appendix III													
Boron	mg/L	0.697	0.588	0.551	0.535	0.570	0.542	0.533	0.511	0.508	0.384	0.384	0.380
Calcium	mg/L	63.5	55.4	56.5	58.8	65.1	44.6	46.2	47.8	43.8	34.1	32.0	32.3
Chloride	mg/L	10.1	10.3	10.7	10.8	10.7	9.08	9.27	7.34	8.89	5.00 U	5.00 U	5.00 U
Fluoride	mg/L	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.810	0.610	0.733	0.541	0.500 U	0.500 U
pH, lab	s.u.	6.70 J	6.72 J	6.74 J	6.8 J	6.8 J	7.1 J	7.0 J	7.0 J	7.0 J	7.2 J	7.2 J	7.1 J
Sulfate	mg/L	195	194	194	196	196	118	119	133	136	108	108	71.5
Total dissolved solids (TDS)	mg/L	458	440	482	456	482	394	372	344	388	280	272	306
Appendix IV													
Antimony	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Arsenic	mg/L	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	0.0707	0.0640	0.0652	0.0556	0.0606	0.0344	0.0336	0.0405	0.0387	0.0290	0.0266	0.0251
Beryllium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Chromium	mg/L	0.0280	0.0277	0.0291	0.0558	0.0600	0.0461	0.0475	0.0457	0.0437	0.0461	0.0435	0.0466
Cobalt	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U	0.0500 U
Mercury	mg/L	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.00644	0.00758	0.00765	0.00988	0.0103	0.0141	0.0143	0.0202	0.0195	0.0321	0.0289	0.0333
Radium-226 & 228	pCi/L	0.692	0.161	0.366	0.249	0.449	0.0733	0.498	-0.0754	0.114	0.130	0.407	0.209
Selenium	mg/L	0.0145	0.0195	0.0204	0.0178	0.0206	0.0176	0.0175	0.0206	0.0205	0.0154	0.0148	0.00861
Thallium	mg/L	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22
Sample ID:		DP-02	MW-22	DP-02	MW-22	DP-02	MW-22	DP-02	MW-22	MW-22	DP-02	MW-22-GW-0619	DP-02-GW-0619
Sample Date:		6/27/2017	10/11/2017	10/11/2017	2/1/2018	2/1/2018	4/24/2018	4/24/2018	9/5/2018	3/20/2019	3/20/2019	6/12/2019	6/12/2019
		(Duplicate)		(Duplicate)		(Duplicate)		(Duplicate)			(Duplicate)		(Duplicate)
Parameters	**Units**												
Appendix III													
Boron	mg/L	0.375	0.675	0.673	0.478	0.527	0.425	0.411	0.368	0.623	0.603	0.514	0.439
Calcium	mg/L	32.3	42.2	41.6	--	--	35.4	34.7	48.2	80.5	76.8	57.4	50.6
Chloride	mg/L	5.00 U	12.1	9.26	8.62	7.77	8.20 J-	8.06 J-	7.07	13.3	13.6	8.85	9.03
Fluoride	mg/L	0.500 U	0.500 U	0.500 U	--	--	0.500 UJ	0.500 UJ	0.500 U	0.500 U	0.500 U	--	--
pH, lab	s.u.	7.1 J	7.0 J	6.9 J	7.3 J	7.3 J	7.2 J	7.2 J	7.3 J	6.9 J	6.8 J	7.4 J	7.3 J
Sulfate	mg/L	78.0	159	159	113	111	128	124	107	232	238	160	165
Total dissolved solids (TDS)	mg/L	318	444	428	350	278	272	296	300	514	510	398	404
Appendix IV													
Antimony	mg/L	0.00100 U	--	--	--	--	0.00100 U	0.00100 U	--	0.00100 U	0.00100 U	--	--
Arsenic	mg/L	0.00200 U	--	--	--	--	0.00200 U	0.00200 U	--	0.00200 U	0.00200 U	--	--
Barium	mg/L	0.0252	--	--	--	--	0.0307	0.0307	0.0368 J	0.0657	0.0627	--	--
Beryllium	mg/L	0.00100 U	--	--	--	--	0.00100 U	0.00100 U	--	0.00100 U	0.00100 U	--	--
Cadmium	mg/L	0.000500 U	--	--	--	--	0.000500 U	0.000500 U	--	0.000500 U	0.000500 U	--	--
Chromium	mg/L	0.0469	--	--	--	--	0.0710	0.0702	0.0513	0.0467	0.0455	0.0776	0.0664
Cobalt	mg/L	0.000500 U	--	--	--	--	0.000500 U	0.000500 U	--	0.000500 U	0.000500 U	--	--
Lead	mg/L	0.000500 U	--	--	--	--	0.000500 U	0.000500 U	--	0.000500 U	0.000500 U	--	--
Lithium	mg/L	0.0500 U	--	--	--	--	0.0100 U	0.0100 U	--	0.0100 U	0.0100 U	--	--
Mercury	mg/L	0.000200 U	--	--	--	--	0.000200 U	0.000200 U	--	0.000200 U	0.000200 U	--	--
Molybdenum	mg/L	0.0340	--	--	--	--	0.0313	0.0312	0.0418	0.0176	0.0166	0.0215	0.0194
Radium-226 & 228	pCi/L	0.0320	--	--	--	--	0.0696 U	0.102 U	--	0.649	0.288 U	-0.0105	0.132
Selenium	mg/L	0.00848	--	--	--	--	0.0171	0.0166	0.00963	0.0132	0.0128	0.0273	0.0249
Thallium	mg/L	0.00100 U	--	--	--	--	0.00100 U	0.00100 U	--	0.00100 U	0.00100 U	--	--

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22
Sample ID:		MW22-GW-0919	MW-22-GW-0320	DP-02-GW-0320	MW-22-GW-0620	DP-01-GW-0620	MW22-GW-0920	DP02-GW-0920	MW22-GW-0321	DP02-GW-0321
Sample Date:		9/5/2019	3/3/2020	3/3/2020 (Duplicate)	6/2/2020	6/2/2020 (Duplicate)	9/8/2020	9/8/2020 (Duplicate)	3/23/2021	3/23/2021 (Duplicate)
Parameters	**Units**									
Appendix III										
Boron	mg/L	0.516	0.650	0.634	0.427	0.411	0.368	0.369	0.463	0.484
Calcium	mg/L	43.7	28.4	27.5	--	--	23.6	23.5	26.6	26.4
Chloride	mg/L	6.37	5.44	5.42	--	--	8.20	8.13	6.18	6.15
Fluoride	mg/L	0.500 U	0.500 U	0.500 U	--	--	0.500 U	0.500 U	0.500 U	0.500 U
pH, lab	s.u.	7.1 J	7.4 J	7.2 J	--	--	7.5 J	7.5 J	7.3 J	7.3 J
Sulfate	mg/L	158	110	108	59.2	58.6	52.4	53.2	79.7	80.2
Total dissolved solids (TDS)	mg/L	348	290	308	--	--	206	208	226	216
Appendix IV										
Antimony	mg/L	--	0.00100 U	0.00100 U	--	--	--	--	0.00200 U	0.00200 U
Arsenic	mg/L	--	0.00200 U	0.00200 U	--	--	--	--	0.00200 U	0.00200 U
Barium	mg/L	0.0398	0.0285	0.0279	--	--	0.0189	0.0191	0.0249	0.0255
Beryllium	mg/L	--	0.00100 U	0.00100 U	--	--	--	--	0.00100 U	0.00100 U
Cadmium	mg/L	--	0.000100 U	0.000100 U	--	--	--	--	0.000100 U	0.000100 U
Chromium	mg/L	0.0520	0.0657	0.0640	0.0690	0.0689	0.0576	0.0573	0.0805	0.0818
Cobalt	mg/L	--	0.000500 U	0.000500 U	--	--	--	--	0.000500 U	0.000500 U
Lead	mg/L	0.000500 U	0.000500 U	0.000500 U	--	--	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	--	0.0100 U	0.0100 U	--	--	--	--	0.0100 U	0.0100 U
Mercury	mg/L	--	0.000200 U	0.000200 U	--	--	--	--	0.000200 U	0.000200 U
Molybdenum	mg/L	0.0194	0.0323	0.0313	0.0313	0.0308	0.0665	0.0667	0.0518	0.0526
Radium-226 & 228	pCi/L	0.103 U	0.187 U	0.190 U	--	--	-0.0304 U	0.255 U	-0.0709 U	0.167 U
Selenium	mg/L	0.0310	0.0246	0.0238	0.0158	0.0160	0.00856	0.00891	0.0180	0.0190
Thallium	mg/L	--	0.00100 U	0.00100 U	--	--	--	--	0.00100 U	0.00100 U

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22
Sample ID:		MW22-GW-0921	DP02-GW-0921	MW22-GW-1121	MW22-GW-0322	DP02-GW-0322	MW22-GW-0922	DP02-GW-0922	MW22-GW-0323	DP02-GW-0323
Sample Date:		9/16/2021	9/16/2021 (Duplicate)	11/2/2021	3/21/2022	3/21/2022 (Duplicate)	9/28/2022	9/28/2022 (Duplicate)	3/8/2023	3/8/2023 (Duplicate)
Parameters	**Units**									
Appendix III										
Boron	mg/L	0.789	0.818	0.773	0.241	0.244	0.377	0.375	0.289	0.290
Calcium	mg/L	28.7	29.2	--	22.9	20.3	30.0	29.5	34.1	32.1
Chloride	mg/L	5.95	6.40	--	5.00 U	5.00 U	11.0	10.9	13.5	13.5
Fluoride	mg/L	0.500 U	0.500 U	--	0.500 UJ	0.500 UJ	0.500 U	0.500 U	0.500 U	0.500 U
pH, lab	s.u.	7.0 J	7.0 J	--	7.5 J	7.5 J	7.4 J	7.4 J	7.3 J	7.2 J
Sulfate	mg/L	98.0	97.3	--	36.6	36.1	45.0	43.9	62.2	62.2
Total dissolved solids (TDS)	mg/L	246	228	--	106	112	178	196	256	292
Appendix IV										
Antimony	mg/L	0.00200 U	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	0.00200 U	0.00200 U	--	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	0.0311	0.0312	--	0.0262	0.0229	0.0190	0.0183	0.0246	0.0239
Beryllium	mg/L	0.00100 U	0.00100 U	--	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.000100 U	0.000100 U	--	0.000100 U	0.000100 U	0.000100 U	0.000100 U	0.000100 U	0.000100 U
Chromium	mg/L	0.0669	0.0700	--	0.0321	0.0321	0.0348	0.0347	0.0320	0.0306
Cobalt	mg/L	0.000500 U	0.000500 U	--	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.000500 U	0.000500 U	--	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.0100 U	0.0100 U	--	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U	0.0100 U
Mercury	mg/L	0.000200 U	0.000200 U	--	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.0387	0.0409	--	0.0433	0.0447	0.0277	0.0280	0.0272	0.0263
Radium-226 & 228	pCi/L	0.347 U	0.670	--	0.389	0.718	0.507	0.143 U	0.656	0.443 U
Selenium	mg/L	0.0151	0.0163	--	0.00500 U	0.00500 U	0.00500 U	0.00500 U	0.00616	0.00546
Thallium	mg/L	0.00100 U	0.00100 U	--	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Groundwater Analytical Results Summary (2015 through 2024)
Louisa Generating Station - West Monofill
Muscatine, Iowa

Sample Location:		MW-22	MW-22	MW-22	MW-22	MW-22	MW-22
Sample ID:		MW22-GW-0923	DP02-GW-0923	MW22-GW-0324	DP02-GW-0324	MW22-GW-0824	DP02-GW-0824
Sample Date:		9/26/2023	9/26/2023 (Duplicate)	3/13/2024	3/13/2024 (Duplicate)	8/27/2024	8/27/2024 (Duplicate)
Parameters	**Units**						
Appendix III							
Boron	mg/L	0.408	0.405	0.318	0.331	0.158	0.158
Calcium	mg/L	29.7	30.3	32.3	32.3	38.6	38.7
Chloride	mg/L	9.30	9.45	11.4	11.4	18.9	19.0
Fluoride	mg/L	1.00	1.00	1.00 U	1.00 U	1.00 U	1.00 U
pH, lab	s.u.	7.0	7.0	7.5 J	7.5 J	7.6 J	7.5 J
Sulfate	mg/L	44.4	44.5	46.0	46.4	33.6	33.7
Total dissolved solids (TDS)	mg/L	196	218	220	218	182	172
Appendix IV							
Antimony	mg/L	0.00200	0.00200	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Arsenic	mg/L	0.00200	0.00200	0.00200 U	0.00200 U	0.00200 U	0.00200 U
Barium	mg/L	0.0244	0.0244	0.0256	0.0256	0.0140	0.0141
Beryllium	mg/L	0.00100	0.00100	0.00100 U	0.00100 U	0.00100 U	0.00100 U
Cadmium	mg/L	0.000200	0.000200	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Chromium	mg/L	0.0235	0.0233	0.0246	0.0249	0.00648	0.00665
Cobalt	mg/L	0.000500	0.000500	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lead	mg/L	0.000500	0.000500	0.000500 U	0.000500 U	0.000500 U	0.000500 U
Lithium	mg/L	0.0100	0.0100	0.0100 U	0.0100 U	0.0100 U	0.0100 U
Mercury	mg/L	0.000200	0.000200	0.000200 U	0.000200 U	0.000200 U	0.000200 U
Molybdenum	mg/L	0.0356	0.0360	0.0382	0.0392	0.0226	0.0227
Radium-226 & 228	pCi/L	0.401	0.425	0.150 U	-0.0904 U	0.245	0.692
Selenium	mg/L	0.00500	0.00500	0.00500 U	0.00500 U	0.00500 U	0.00500 U
Thallium	mg/L	0.00100 UJ	0.00100 UJ	0.00100 U	0.00100 U	0.00100 U	0.00100 U

Footnotes:
U - Not detected at the associated reporting limit.
J - Estimated concentration.
UJ - Not detected; associated reporting limit is estimated.
J- - Estimated concentration, result may be biased low.