

2022 Annual Groundwater Monitoring and Corrective Action Report

Zero Liquid Discharge Pond
Ottumwa Generating Station
20775 Power Plant Road
Ottumwa, Iowa

Prepared for:



Interstate Power and Light Company
4902 N. Biltmore Lane
Madison, Wisconsin 53718

SCS ENGINEERS

25222072.00 | August 1, 2023

2830 Dairy Drive
Madison, WI 53718-6751
608-224-2830

OVERVIEW OF CURRENT STATUS

Ottumwa Generating Station, Zero Liquid Discharge Pond 2022 Annual Report

In accordance with §257.90(e)(6), this section at the beginning of the annual report provides an overview of the current status of groundwater monitoring and corrective action programs for the coal combustion residual (CCR) unit. The groundwater monitoring system for the Zero Liquid Discharge Pond at the Ottumwa Generating Station (OGS) monitors a single existing CCR unit. Supporting information is provided in the text of the annual report.

Category	Rule Requirement	Site Status
Monitoring Status – Start of Year	(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;	Assessment
Monitoring Status – End of Year	(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;	Assessment
Statistically Significant Increases (SSIs)	(iii) If it was determined that there was an SSI over background for one or more constituents listed in Appendix III to this part pursuant to §257.94(e):	
	(A) Identify those constituents listed in Appendix III to this part and the names of the monitoring wells associated with such an increase; and	SSIs initially determined on July 15, 2019, based on April 2019 monitoring results. In 2022, SSIs for semiannual events for compliance wells at waste boundary included the following; see Table 5A and Table 5B for complete results. <u>February 2022</u> Field pH: MW-307 <u>April 2022</u> Boron: MW-309 Calcium: MW-307, MW-308, MW-309 Chloride: MW-307 Field pH: MW-309

Category	Rule Requirement	Site Status
		Sulfate: MW-308, MW-309 Total Dissolved Solids (TDS): MW-307, MW-308, MW-309 <u>August 2022</u> Field pH: MW-307 <u>October 2022</u> Boron: MW-309 Calcium: MW-307, MW-308, MW-309 Chloride: MW-307 Field pH: MW-309 Sulfate: MW-308, MW-309 TDS: MW-307, MW-308, MW-309
	(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	January 13, 2020

Category	Rule Requirement	Site Status
Statistically Significant Levels (SSL) Above Groundwater Protection Standard (GPS)	(iv) If it was determined that there was an SSL above the GPS for one or more constituents listed in Appendix IV to this part pursuant to §257.95(g) include all of the following:	
	(A) Identify those constituents listed in Appendix IV to this part and the names of the monitoring wells associated with such an increase;	Cobalt: Initially determined to be at SSL above the GPS in July 2020 at compliance monitoring well MW-307. In 2022, concentrations determined to be at SSL above the GPS as follows: <u>February 2022</u> MW-307 <u>April 2022</u> MW-307 <u>August 2022</u> MW-307 <u>October 2022</u> MW-307
	(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;	May 9, 2022
	(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and	Public meeting will be held at least 30 days prior to the selection of remedy
	(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.	August 5, 2022
Selection of Remedy	(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	Selection of remedy is in progress.
Corrective Action	(vi) Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.	Remedial activities not initiated.

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1.0 INTRODUCTION

This 2022 Annual Groundwater Monitoring and Corrective Action Report was prepared to support compliance with the groundwater monitoring requirements of the “Coal Combustion Residuals (CCR) Final Rule” published by the U.S. Environmental Protection Agency (U.S. EPA) in the *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities*; Final Rule, dated April 17, 2015 (U.S. EPA, 2015) and subsequent amendments. Specifically, this report was prepared to fulfill the requirements of 40 Code of Federal Regulations (CFR) 100 and 40 CFR 257.90(e) for inactive CCR surface impoundments. The applicable sections of the Rule are provided below in *italics*, followed by applicable information relative to the 2022 Annual Groundwater Monitoring and Corrective Action Report for the CCR unit.

This report covers the period of groundwater monitoring from January 1, 2022, through December 31, 2022.

The groundwater monitoring system for the Zero Liquid Discharge Pond (ZLDP) at the Ottumwa Generating Station (OGS) monitors a single inactive CCR unit:

- OGS ZLDP (inactive CCR surface impoundment)

The ZLDP is in the process of closure in accordance with 40 CFR 102(c). Removal of CCR from the ZLDP was completed in October 2021. Closure will be completed when groundwater monitoring concentrations do not exceed the groundwater protection standard established pursuant to § 257.95(h) for constituents listed in Appendix IV to Part 257.

The groundwater monitoring system is designed to detect monitored constituents at the former waste boundary of the OGS ZLDP as required by 40 CFR 257.91(d). The groundwater monitoring system consisted of one upgradient and three downgradient monitoring wells in 2022 (**Table 1**, **Figure 1**, and **Figure 2**). A fourth downgradient well, MW-315, was installed in November 2022 and the well was formally incorporated into the monitoring network when the network certification was updated in 2023.

The OGS Ash Pond is a separate CCR unit at the OGS facility. The annual groundwater monitoring and corrective action report for the Ash Pond CCR unit is submitted separately by January 31 of each year in accordance with 40 CFR 257.90(e). Closure of the Ash Pond was initiated in 2022 and was completed in July 2023.

2.0 BACKGROUND

To provide context for the annual report, the following background information is provided in this section of the report, prior to the annual report requirement sections:

- Geologic and hydrogeologic setting
- CCR Rule monitoring system

2.1 GEOLOGIC AND HYDROGEOLOGIC SETTING

2.1.1 Regional Geologic Information

The uppermost aquifer unit at the site, as defined under 40 CFR 257.53, is the Mississippian bedrock aquifer and hydraulically connected overlying unconsolidated deposits. Regionally, unconsolidated alluvial aquifers near the Des Moines River and deeper bedrock aquifers are both used for water supply. The thickness and water-producing capacity of the unconsolidated material in the area is variable. A summary of the regional hydrogeologic stratigraphy is included in **Appendix A**.

The bedrock surface elevation is highly variable due to erosion. A map showing regional bedrock surface topography is included in **Appendix A**.

Although not encountered in drilling at the OGS site, the uppermost bedrock unit in the surrounding region consists of Pennsylvanian shales with minor siltstone, sandstone, limestone, and coal intervals. The continuity of these minor beds is highly variable. The Pennsylvanian bedrock unit is considered to be a regional aquitard. The thickness of the Pennsylvanian shale is variable; in some areas of Wapello County it is over 100 feet thick, while in other areas it is absent. The variation in thickness is due to erosion of the bedrock surface. Based on the available boring logs from the OGS site, it appears that the Pennsylvanian shale is absent at the site.

Underlying the Pennsylvanian shales are Mississippian limestone and dolomite, with some shale and sandstone. A map showing the elevation of the top of the Mississippian limestone in Southeastern Iowa is included in **Appendix A**. The Mississippian unit is the shallowest regional bedrock aquifer.

The Devonian units underlying the Mississippian are composed of shale, dolomite, and limestone, and are in turn underlain by Silurian dolomite and Cambrian-Ordovician dolomite and sandstone. The Cambrian-Ordovician aquifer is commonly the source of municipal and industrial high-capacity wells in the region (Coble, 1971).

Groundwater flow within the Mississippian limestone is generally to the east. A map showing the regional potentiometric surface in the Mississippian limestone is included with the hydrogeologic background information presented in **Appendix A**.

2.1.2 Site Information

Site boring logs indicate that the unconsolidated material at the site is thin (approximately 7 to 20 feet in thickness) and consists of overlying clay and sand. The unconsolidated material at these well locations is generally clay, silt, and sand, and the uppermost bedrock appears to be weathered. The total boring depths were between 15 and 28 feet, and weathered bedrock was encountered at depths between 19 and 21 feet below ground surface at the downgradient monitoring wells; bedrock was encountered at 7 feet below ground surface at the upgradient/background monitoring well MW-301. Boring logs, well construction, and development documentation for MW-301, MW-307 through MW-309, and MW-315 are included in **Appendix B**.

The shallow potentiometric surface and groundwater flow patterns based on April and October 2022 water level measurements are shown on **Figures 3** and **4**, respectively. These maps are based on water levels measured at all OGS monitoring wells, including the ZLDP compliance wells, Ash Pond compliance wells, and additional delineation wells installed for the Assessment of Corrective Measures (ACM) and selection of remedy for the Ash Pond CCR unit. Both potentiometric surface

maps show groundwater flow moving to the east, following the same flow patterns observed in regional flow maps of the area.

The groundwater monitoring well network summary is provided in **Table 1**. The sampling event summary is provided in **Table 2**, and the groundwater elevation data for the CCR monitoring wells is provided in **Table 3**. Estimated horizontal gradients and flow velocities for flow at the shallow and deep levels within the aquifer are provided in **Table 4**.

2.2 CCR RULE MONITORING SYSTEM

In 2022, the groundwater monitoring system established in accordance with the CCR Rule consisted of one upgradient (background) monitoring well and three downgradient monitoring for the OGS ZLDP. A fourth compliance well, MW-315, was added in November 2022 and was added to the monitoring network certification in 2023. (**Table 1** and **Figure 2**). The background well is MW-301 and the four downgradient compliance wells include MW-307, MW-308, MW-309 and MW-315. The CCR Rule wells are installed in the Mississippian aquifer and/or hydraulically connected overlying unconsolidated deposits, which comprise the uppermost aquifer unit at the site. Well depths range from approximately 15 to 28 feet.

The background well (MW-301) is located to the west of the site and is also used as a background well for the OGS Ash Pond CCR unit. The downgradient wells (MW-307 through MW-309) are located along the northeastern edge of the OGS ZLDP and parallel to the Des Moines River.

3.0 §257.100(E)(5) GROUNDWATER MONITORING AND CORRECTIVE ACTION FOR INACTIVE CCR SURFACE IMPOUNDMENTS

The owner or operator of the inactive CCR surface impoundment must: (i) No later than April 17, 2019, comply with groundwater monitoring requirements set forth in §§ 257.90(b) and 257.94(b); and (ii) No later than August 1, 2019, prepare the initial groundwater monitoring and corrective action report as set forth in § 257.90(e).

This report is submitted to fulfill the report requirement.

4.0 §257.90(E) ANNUAL REPORT REQUIREMENTS

Annual groundwater monitoring and corrective action report. For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by § 257.105(h)(1). At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:

4.1 §257.90(E)(1) SITE MAP

A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;

A map showing the site location of the OGS site is provided as **Figure 1**. A map showing the site layout and all background (or upgradient) and downgradient monitoring wells with identification numbers for the groundwater monitoring program for the OGS ZLDP is provided as **Figure 2**. The location of the OGS Ash Pond CCR unit, which is monitored by a separate network and is discussed in a separate groundwater monitoring report, is also shown on **Figure 2**.

4.2 §257.90(E)(2) MONITORING SYSTEM CHANGES

Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;

One new monitoring well, MW-315, was installed in November 2022. Well development and hydraulic conductivity testing were performed on November 29, 2022. The boring log and monitoring well construction documentation form is included in **Appendix B**. The groundwater monitoring system certification was updated in July 2023 to include well MW-315 as a new compliance well. The geology described in the boring log for MW0315 is consistent with the geology in other wells at OGS.

4.3 §257.90(E)(3) SUMMARY OF SAMPLING EVENTS

In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;

Four groundwater sampling events were completed for the inactive OGS ZLDP CCR unit in 2022. Two semiannual assessment monitoring events occurred in April 2022 and October 2022. Two supplemental sampling events occurred in February 2022 and August 2022 for select parameters.

The sampling results for Appendix III and Appendix IV parameters in 2022 are summarized in **Tables 5A** and **5B**. Field parameter results for the 2022 sampling events are provided in **Table 6**. The analytical laboratory reports for 2022 are provided in **Appendix C**. Historical results for each monitoring well are summarized in **Appendix D**.

4.4 §257.90(E)(4) MONITORING TRANSITION NARRATIVE

A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels);

There was no monitoring program transition in 2022.

Assessment monitoring for the ZLDP was initiated in January 2020 and continued through 2022. An ACM was initiated for the ZLDP in May 2022 and completed in August 2022. The ACM for the ZLDP CCR Unit was combined with Addendum No. 2 to the ACM for the Ash Pond CCR Unit to support a holistic approach to addressing the cobalt concentrations in groundwater. Assessment monitoring continued during the ACM and will continue during the selection of remedy and implementation of the corrective action program.

In accordance with the Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at Resource Conservation and Recovery Act (RCRA) Facilities (U.S. EPA, 2009), the comparison of assessment monitoring results to the Groundwater Protection Standard (GPS) was based on the

lower confidence limit (LCL) for the arithmetic mean. In 2022, LCL evaluations were completed for cobalt, which is the only Appendix IV parameter that has been detected at a concentration exceeding the GPS in at least one sample result since assessment monitoring was initiated. The LCLs were calculated with Sanitas™ using historical concentrations measured since assessment monitoring began in December 2019. The LCL evaluations completed for the February, April, and October 2022 events are provided in **Appendix E**.

Consistent with previous determinations, cobalt was determined to be at an SSL above the GPS at monitoring well MW-307 in the evaluation of the 2022 assessment monitoring results.

In 2022, the monitoring results for the February, April, August, and October 2022 monitoring events were evaluated for statistically significant increases (SSIs) in detection and assessment monitoring parameters relative to background. The comparison to background was based on a prediction limit or tolerance limit approach, comparing the results to interwell upper prediction limits (UPLs) or upper tolerance limits (UTLs) based on background monitoring results from the upgradient well (MW-301). In July 2022, the interwell UPLs for Appendix III parameters were updated and interwell UTLs for Appendix IV parameters were calculated using the background data collected through April 2022. The UPL calculations for Appendix III parameters and UTL calculations for Appendix IV parameters are included in **Appendix E**. The UPLs calculated in July 2022 were applied to the evaluation of the April, August, and October 2022 monitoring results.

The Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (U.S. EPA, 2009; Section 5.3.1) recommends periodic updating of background for both intrawell and interwell analyses. For semiannual monitoring, an update interval of 2 to 3 years is recommended; therefore, the next background update is planned for 2025.

4.5 §257.90(E)(5) OTHER REQUIREMENTS

Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.

Additional potentially applicable requirements for the annual report, and the location of the requirement within the Rule, are provided in the following sections. For each cited section of the Rule, the portion referencing the annual report requirement is provided below in *italics*, followed by applicable information relative to the 2022 Annual Groundwater Monitoring and Corrective Action Report for the CCR Unit.

4.5.1 §257.90(e) General Requirements

For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year.

Status of Groundwater Monitoring and Corrective Action Program. The groundwater monitoring and corrective action program remained in assessment monitoring in 2022.

Summary of Key Actions Completed.

- Statistical evaluation for the October 2021 monitoring event (Included in the 2021 Annual Report, dated January 31, 2022).

- 2017, 2018, and 2019 Annual Groundwater Monitoring and Corrective Action Reports Addendum 1 (May 2022).
- Statistical evaluation and determination of SSIs for the February 2022 supplemental monitoring event (June 6, 2022).
- Initiation of Assessment of Corrective Measures – Zero Liquids Discharge Pond (May 9, 2022).
- 2021 Annual Groundwater Monitoring and Corrective Action Report (July 29, 2022).
- Assessment of Corrective Measures Report – OGS Ash Pond Addendum No. 2 and OGS Zero Liquids Discharge Pond (August 2022).
- Two groundwater sampling and analysis events for select parameters (February and August 2022).
- Two semiannual groundwater sampling and analysis events (April and October 2022).
- Installation of groundwater monitoring compliance well MW-315 (November 29, 2022).
- Statistical evaluation and determination of SSIs for the August 2022 supplemental monitoring event (December 13, 2022).

Description of Any Problems Encountered: During the October 2022 sampling event, the PVC casing at well MW-301 was protruding and forcing the protective casing open. No other problems were encountered during the groundwater sampling events in 2022.

Discussion of Actions to Resolve the Problems: The MW-301 dedicated pump was temporarily removed from the well and the PVC casing was cut down to allow the protective casing to fully close and lock. The dedicated pump was replaced and the height of the PVC removed from the well was measured prior to being discarded.

Projection of Key Activities for the Upcoming Year (2023):

- Initial sampling of new compliance well MW-315 (February and March 2023).
- Statistical evaluation and determination of any SSLs exceeding the GPS for the October 2022 monitoring event (February 2023).
- Two semiannual groundwater sampling events (April and October 2023).
- Statistical evaluation and determination of any SSLs exceeding the GPS for the April 2023 monitoring event (July 2023).
- Continued progress on the selection of remedy for the Ash Pond and ZLDP.

4.5.2 §257.94(d) Alternative Detection Monitoring Frequency

The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer in the annual groundwater monitoring and corrective action report required by § 257.90(e).

Not applicable. The ZLDP is no longer in the detection monitoring program.

4.5.3 §257.94(e)(2) Alternative Source Demonstration for Detection Monitoring

The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

Not applicable. The ZLDP is no longer in the detection monitoring program.

4.5.4 §257.95(c) Alternative Assessment Monitoring Frequency

The owner or operator must include the demonstration providing the basis for the alternative monitoring frequency and the certification by a qualified professional engineer in the annual groundwater monitoring and corrective action report required by § 257.90(e).

Not applicable. Assessment monitoring has been initiated at the site, but no alternative assessment monitoring frequency is proposed at this time.

4.5.5 §257.95(d)(3) Assessment Monitoring Results and Standards

Include the recorded concentrations required by paragraph (d)(1) of this section, identify the background concentrations established under § 257.94(b), and identify the groundwater protection standards established under paragraph (d)(2) of this section in the annual groundwater monitoring and corrective action report required by § 257.90(e).

The 2022 assessment monitoring results, background UPLs, and GPSs established for the ZLDP are provided in **Table 5A** and **Table 5B**. The laboratory reports are provided in **Appendix C**. Historical monitoring results are summarized in **Appendix D**.

Supplemental groundwater quality parameters were included in the monitoring program in 2022 to support the selection of remedy process for the OGS Ash Pond and ZLDP CCR units. The results for the supplemental parameters are included in **Table 5A** and **Table 5B** and in the laboratory reports in **Appendix C**.

4.5.6 §257.95(g)(3)(ii) Alternative Source Demonstration for Assessment Monitoring

The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

No alternative source demonstrations for assessment monitoring were completed for the ZLDP in 2022.

4.5.7 §257.96(a) Extension of Time for Corrective Measures Assessment

The assessment of corrective measures must be completed within 90 days, unless the owner or operator demonstrates the need for additional time to complete the assessment of corrective measure due to site-specific conditions or circumstances. The owner or operator must obtain a certification from a qualified professional engineer attesting that the demonstration is accurate. The 90-day deadline to complete the assessment of corrective measures may be extended for longer than 60 days. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer.

Not applicable. The ACM for the ZLDP CCR unit was initiated on May 9, 2022, and completed on August 5, 2022, within the 90-day allowable time frame without an extension. The ACM for the ZLDP CCR Unit was combined with Addendum No. 2 to the ACM for the Ash Pond CCR Unit to support a holistic approach to addressing the cobalt concentrations in groundwater.

5.0 §257.90(e)(6) Overview

A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit. The specific requirements for the overview under §257.90(e)(6) are listed and the information is provided at the beginning of this report, before the Table of Contents.

6.0 REFERENCES

Coble, R.W., 1971, The Water Resources of Southeast Iowa, Iowa Geological Survey Water Atlas Number 4, 1971.

U.S. Environmental Protection Agency (U.S. EPA), 2009, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, EPA 530-R-09-007, March 2009.

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- 2 Groundwater Samples Summary
- 3 Groundwater Elevations – CCR Rule Monitoring Well Network
- 4 Groundwater Gradients and Average Linear Flow Velocity
- 5A Groundwater Analytical Results Summary – Assessment Monitoring – January to March 2022
- 5B Groundwater Analytical Results Summary – April to December 2022
- 6 2022 Groundwater Field Data Summary

**Table 1. Groundwater Monitoring Well Network
Ottumwa Generating Station - Zero Liquid Discharge Pond /
SCS Engineers Project #25222072.00**

Monitoring Well	Location in Monitoring Network	Role in Monitoring Network
MW-301	Upgradient	Background
MW-307	Downgradient	Compliance
MW-308	Downgradient	Compliance
MW-309	Downgradient	Compliance
MW-315	Downgradient	Compliance

Note:

1. The monitoring system certification was updated in 2023 to add well MW-315. Future reports will incorporate groundwater data from MW-315.

Created by: <u>RM</u>	Date: <u>12/14/2020</u>
Last revision by: <u>RM</u>	Date: <u>2/2/2021</u>
Checked by: <u>NDK</u>	Date: <u>2/9/2021</u>

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**Table 2. Groundwater Samples Summary
 Ottumwa Generating Station Zero Liquid Discharge Pond/
 SCS Engineers Project #25222072.00**

Sample Dates	Background Well	Compliance Wells		
	MW-301	MW-307	MW-308	MW-309
2/14/2022	--	A-S	--	--
4/11-14/2022	A	A	A	A
8/25/2022	--	A-S	--	--
10/25-26/2022	A	A	A	A
Total Samples	2	4	2	2

Abbreviations:

A = Required by Assessment Monitoring Program

A-S = Supplemental Monitoring Event for Select Parameters

Created by: NDK Date: 3/9/2021
 Last revision by: RM Date: 1/27/2023
 Checked by: DK Date: 2/7/2023

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**Table 3. Groundwater Elevations - CCR Rule Monitoring Well Network
IPL - Ottumwa Generating Station / SCS Engineers Project #25222072.00**

Ground Water or Surface Water Elevation in feet above mean sea level (amsl)																		
Well Number	MW-301	MW-302	MW-303	MW-304	MW-305	MW-305A	MW-306	MW-307	MW-308	MW-309	MW-310	MW-310A	MW-311	MW-311A	MW-312	MW-313	MW-314	River at Intake
Top of Well Casing Elevation / Surface Water Reference Elevation (feet amsl)	686.63	673.90	661.07	682.84	683.91	684.03	683.47	657.56	655.39	654.94	658.63	657.93	654.18	653.54	655.36	655.84	684.71	656.31
Screen Length (ft)	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	NA
Total Depth (ft from top of casing)	17.0	25.8	17.5	52.3	51.5	81.91	36.6	28.0	25.0	27.5	25.9	55.55	17.9	47.68	29.87	23.82	33.24	NA
Top of Well Screen Elevation (ft)	679.63	653.10	648.57	635.54	637.41	607.12	651.87	634.56	635.39	632.44	637.76	607.38	641.24	610.86	NS	NS	656.47	NA
Measurement Date																		
April 26, 2016	682.80	655.63	652.42	655.37	661.67	NI	670.86	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
June 23, 2016	682.58	655.65	652.89	656.53	662.36	NI	670.64	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
August 9, 2016	682.27	655.52	651.76	653.79	660.78	NI	670.35	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
October 26-27, 2016	682.04	655.67	652.17	655.03	661.37	NI	670.21	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
January 18-19, 2017	681.67	655.46	651.74	654.50	660.87	NI	669.89	648.81	647.42	646.66	660.04	653.62	651.09	650.16	NI	NI	NI	NI
April 19-20, 2017	682.15	656.35	654.57	657.48	663.27	NI	670.69	653.62	651.09	650.16	NI	NI	NI	NI	NI	NI	NI	NI
June 20-21, 2017	681.91	655.65	652.42	654.75	661.26	NI	669.94	649.85	648.26	647.60	NI	NI	NI	NI	NI	NI	NI	NI
August 21-23, 2017	681.28	655.13	650.58	652.39	659.00	NI	668.77	645.78	643.12	641.82	NI	NI	NI	NI	NI	NI	NI	NI
November 8, 2017	681.54	655.40	651.34	653.03	659.76	NI	669.04	647.37	644.99	644.20	NI	NI	NI	NI	NI	NI	NI	NI
April 18, 2018	681.53	655.71	652.47	655.55	660.99	NI	668.92	649.66	647.91	647.65	NI	NI	NI	NI	NI	NI	NI	NI
May 30, 2018	NM	NM	NM	NM	NM	NI	NM	652.45	651.05	650.98	NI	NI	NI	NI	NI	NI	NI	NI
June 28, 2018	NM	NM	NM	NM	NM	NI	NM	652.87	651.43	651.47	NI	NI	NI	NI	NI	NI	NI	NI
July 18, 2018	NM	NM	NM	NM	NM	NI	NM	652.27	650.67	650.69	NI	NI	NI	NI	NI	NI	NI	NI
August 14-15, 2018	680.91	656.05	652.57	656.35	661.56	NI	668.66	NM	NM	NM	NI	NI	NI	NI	NI	NI	NI	NI
August 29, 2018	681.09	655.89	655.07	657.82	NM	NI	NM	NM	NM	NM	NI	NI	NI	NI	NI	NI	NI	NI
October 16, 2018	682.50	656.91	656.17	658.20	663.37	NI	670.24	654.13	NM	651.61	NI	NI	NI	NI	NI	NI	NI	NI
January 8, 2019	682.22	656.03	654.65	656.28	662.13	NI	669.84	NM	NM	NM	NI	NI	NI	NI	NI	NI	NI	NI
April 8, 2019	682.69	657.23	655.55	659.33	664.01	NI	670.96	654.90	653.70	653.55	NI	NI	NI	NI	NI	NI	NI	NI
August 28, 2019	NM	NM	NM	NM	NM	NI	NM	NM	NM	NM	640.98	NI	642.10	NI	NI	NI	NI	NI
October 23-24, 2019	683.07	660.14	653.86	657.71	663.21	NI	671.28	651.89	651.31	651.28	649.31	NI	647.80	NI	NI	NI	NI	NI
December 11, 2019	NM	NM	NM	NM	NM	NI	NM	649.59	647.39	647.24	NM	NI	NM	NI	NI	NI	NI	NI
February 5, 2020	683.30	NM	NM	NM	NM	NI	NM	649.88	650.12	648.34	644.71	NI	645.00	NI	NI	NI	NI	NI
March 12-13, 2020	682.82	NM	NM	NM	661.41	651.64	NM	NM	NM	NM	645.45	617.84	644.18	624.11	NI	NI	NI	NI
April 1, 2020	683.27	657.00	655.89	658.57	660.59	655.05	671.13	653.76	651.88	651.23	651.09	649.16	649.35	648.27	NI	NI	NI	649.71
April 13-14, 2020	683.25	656.45	654.08	656.42	662.44	653.69	670.71	650.66	650.09	649.19	645.91	647.50	646.79	648.42	NI	NI	NI	645.71
May 4, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NM
June 30, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	647.73	NI	NI	NI	NM
October 5-12, 2020	682.34	655.80	650.37	652.95	659.81	648.01	670.18	646.18	642.85	641.50	638.46	640.20	638.73	641.09	NI	NI	NI	638.16
February 23, 2021	NM	NM	NM	NM	NM	NM	669.86	646.80	NM	NM	638.77	NM	NM	641.16	NI	NI	NI	NM
April 12 - 16, 2021	682.94	656.05	653.82	654.34	661.15	651.16	670.27	649.53	647.66	646.46	642.70	644.88	643.02	644.16	NI	NI	NI	640.91
July 6, 2021	NM	NM	NM	NM	NM	NM	661.87	647.03	NM	NM	639.32	NM	NM	642.38	NI	NI	NI	NM
October 6-8, 2021	681.95	654.86	649.80	649.53	654.83	645.57	662.27	644.49	641.81	640.71	638.19	639.57	Dry	640.58	NI	NI	NI	NM
January 11-12, 2022	681.58	NM	NM	NM	656.55	NM	NM	646.24	NM	NM	NM	NM	NM	NM	642.17	641.22	NI	NM
January 31, 2022	681.56	654.56	650.07	650.51	656.67	647.01	664.14	646.05	643.44	642.42	639.69	640.63	639.47	641.79	641.67	640.39	NI	642.96
February 14-15, 2022	681.43	654.42	650.03	650.42	656.35	646.84	663.66	645.82	643.25	642.32	639.64	640.68	below	641.50	641.86	640.58	NI	642.01
April 11-14, 2022	682.08	654.77	652.95	652.14	657.62	649.24	664.61	648.40	645.75	644.32	640.79	640.83	641.44	643.23	644.62	642.06	NI	643.21
August 25, 2022	NM	NM	NM	NM	NM	NM	NM	644.25	NM	NM	NM	NM	NM	NM	640.80	639.38	NM	NM
October 26-28, 2022	680.68	652.95	648.22	647.26	651.48	644.38	657.11	643.46	641.13	640.43	638.55	639.49	638.46	640.27	639.64	639.16	661.58	638.41
Bottom of Well Elevation (ft)	669.63	648.10	643.57	630.54	632.41	602.12	646.87	629.56	630.39	627.44	632.76	602.38	636.24	605.86	625.49	632.0	651.5	--

Notes: Created by: NDK Date: 1/15/20218
 NM = not measured Last rev. by: RM Date: 10/28/2022
 NI = not installed Checked by: DK Date: 10/28/2022
 ND = Not surveyed Proj Mgr QA/QC: TK Date: 1/20/2022

1. The PVC casing of MW-301 was cut down during the October 2023 sampling event. to allow the protective cover to fully close. The elevation calculation at this sampling point was adjusted for the October 2023 event onwards.

I:\25222072.00\Deliverables\2022 Fed Annual Report - OGS ZLDP\Tables\Table 3 - Groundwater Elevation Summary_OGS.xls\levels

**Table 4. Groundwater Gradients and Average Linear Velocity
 Ottumwa Generating Station - Zero Liquid Discharge Pond /
 SCS Engineers Project #25222072.00
 January - December 2022**

Sampling Dates	Northeast				
	h1 (ft)	h2 (ft)	Δl (ft)	Δh/Δl (ft/ft)	V (ft/d)
April 11-14, 2022	650.00	644.32	435.25	0.01	0.1
April 11-14, 2022	664.61	650.00	387.38	0.04	0.3
October 26-28, 2022	645.00	640.43	387.02	0.01	0.1
October 26-28, 2022	657.11	645.00	368.00	0.03	0.3

Well	K Value (cm/sec)	K Value (ft/d)
MW-301	4.6E-03	13
MW-307	5.0E-04	1.4
MW-308	2.0E-03	5.8
MW-309	1.5E-03	4.4
Geometric Mean	1.2E-03	3.3

Assumed Porosity, n
0.40

Groundwater flow velocity equation: $V = [K*(\Delta h/\Delta l)] / n$

ft = feet

ft/d = feet per day

K = hydraulic conductivity

n = effective porosity

V = groundwater flow velocity

h1, h2 = point interpreted groundwater elevation at locations 1 and 2

Δl = distance between locations 1 and 2

Δh/Δl = hydraulic gradient

Created by: RM
 Last revision by: RM
 Checked by: DK

Date: 12/29/2020
 Date: 2/10/2023
 Date: 2/10/2023

I:\25222072.00\Deliverables\2022 Fed Annual Report - OGS ZLDP\Tables\[Table 4 - Horizontal Gradients and Flow Velocity Table.xlsx]Sheet1

**Table 5A. Groundwater Analytical Results Summary - January to March 2022
Ottumwa Generating Station - Zero Liquid Discharge Pond (ZLDP) / SCS Engineers #25222072.00**

Parameter Name	UPL/UTL Method	UPL	GPS	Compliance Well
				MW-307 2/14/2022
Appendix III				
Boron, µg/L	P	821		--
Calcium, mg/L	P	101		--
Chloride, mg/L	P	195		--
Fluoride, mg/L	P	0.366		--
Field pH, Std. Units	P	6.71		7.03
Sulfate, mg/L	P	204		--
Total Dissolved Solids, mg/L	P	684		--
Appendix IV		UTL		
Antimony, µg/L	NP	1.10	6	--
Arsenic, µg/L	NP	0.880	10	--
Barium, µg/L	P	71.0	2,000	--
Beryllium, µg/L	NP	0.270	4	--
Cadmium, µg/L	P	0.149	5	--
Chromium, µg/L	NP	1.10	100	--
Cobalt, µg/L	P	5.26	6	24
Fluoride, mg/L	P	0.417	4	--
Lead, µg/L	NP	0.270	15	--
Lithium, µg/L	P	31.8	40	--
Mercury, µg/L	DQ	DQ	2	--
Molybdenum, µg/L	NP	1.30	100	--
Selenium, µg/L	P	9.01	50	--
Thallium, µg/L	NP	0.500	2	--
Radium 226/228 Combined, pCi/L	P	1.71	5	--

4.4	Blue shaded cell indicates the compliance well result exceeds the UPL (background) and the LOQ.
30.8	Yellow highlighted cell indicates the compliance well result exceeds the GPS.

Abbreviations:

UPL = Upper Prediction Limit	DQ = Double Quantification Rule (not detected in background)
-- = Not Analyzed	NP = Nonparametric UPL
P = Parametric UPL with 1-of-2 retesting	LOQ = Limit of Quantitation
GPS = Groundwater Protection Standard	pCi/L = picocuries per liter
mg/L = milligrams per liter	µg/L = micrograms per liter
SSI = Statistically Significant Increase	SSL = Statistically Significant Level
MCL = Maximum Contamination Level	U.S. EPA = United States Environmental Protection Agency

* = UPL is below the LOQ for background sampling. For compliance wells, only results confirmed above the LOQ are evaluated as potential SSIs above background or SSLs above GPS.

Notes:

1. An individual result above the UPL or GPS does not constitute an SSI above background or an SSL above the GPS. See the accompanying report text for identification of statistically significant results.
2. GPS is the U.S. EPA MCL, if established; otherwise, the values from 40 CFR 257.95(h)(2).
3. Interwell UPLs calculated based on results from background well MW-301.

Created by:	<u>NDK</u>	Date:	<u>5/21/2021</u>
Last revision by:	<u>RM</u>	Date:	<u>2/7/2023</u>
Checked by:	<u>DK</u>	Date:	<u>2/7/2023</u>
Proj Mgr QA/QC:	<u>TK</u>	Date:	<u>7/18/2023</u>

Table 5B. Groundwater Analytical Results Summary - April to December 2022
Ottumwa Generating Station - Zero Liquid Discharge Pond (ZLDP) / SCS Engineers Project #25222072.00

Parameter Name	UPL/UTL Method	UPL	GPS	Background Well		Compliance Wells						
				MW-301		MW-307		MW-308		MW-309		
				4/12/2022	10/26/2022	4/11/2022	8/25/2022	10/25/2022	4/12/2022	10/26/2022	4/14/2022	10/26/2022
Appendix III												
Boron, ug/L	P	821		640	780	250	--	250	300	260	1,600	1,400
Calcium, mg/L	P	101		92	110	260	--	260	240	240	150	160
Chloride, mg/L	P	195		140	160	330	--	260	180	160	61	67
Fluoride, mg/L	P	0.366		<0.22	<0.22	<0.22 H ^	--	<0.22	<0.22	<0.22	<0.22	<0.22
Field pH, Std. Units	P	6.71		6.37	6.29	6.63	6.71	6.50	6.70	6.50	7.16	6.89
Sulfate, mg/L	P	204		160	180	140	--	130	320	290	420	420
Total Dissolved Solids, mg/L	P	684		610	690	1,100 H	--	1,100	1,000 H	1,000	940 H	1100
Appendix IV												
Antimony, ug/L	NP	1.10	6	<0.69	<0.69	0.69 J	--	<0.69	<0.69	<0.69	<0.69	<0.69
Arsenic, ug/L	NP	0.880	10	<0.75	<0.75	0.77 J	--	<0.75	<0.75	<0.75	<0.75	<0.75
Barium, ug/L	P	71.0	2,000	40	44	150	--	130	140	120	55	51
Beryllium, ug/L	NP	0.270	4	<0.27	<0.27	<0.27	--	<0.27	<0.27	<0.27	<0.27	<0.27
Cadmium, ug/L	P	0.149	5	<0.055	0.055 J	<0.055	--	<0.055	<0.055	<0.055	<0.055	<0.055
Chromium, ug/L	NP	1.10	100	<1.1	1.2 J	<1.1	--	<1.1	<1.1	<1.1	<1.1	<1.1
Cobalt, ug/L	P	5.26	6	0.23 J	0.29 J	31	25	27	0.24 J	0.24 J	2.0	2.2
Fluoride, mg/L	P	0.417	4	<0.22	<0.22	<0.22 H	--	<0.22	<0.22	<0.22	<0.22	<0.22
Lead, ug/L	NP	0.270	15	<0.24	<0.24	<0.24	--	<0.24	<0.24	<0.24	<0.24	<0.24
Lithium, ug/L	P	31.8	40	19	30 J	14	--	10	17	14	9.2 J	7.3 J
Mercury, ug/L	DQ	DQ	2	<0.11	<0.11	<0.11	--	<0.11	<0.11	<0.11	<0.11	<0.11
Molybdenum, ug/L	NP	1.30	100	<1.2	<8.4	<1.2	--	<1.2	1.4 J	<1.2	<1.2	<1.2
Selenium, ug/L	P	9.01	50	6.0	6.9	<0.96	--	<0.96	<0.96	<0.96	<0.96	<0.96
Thallium, ug/L	NP	0.500	2	<0.26	<0.26	<0.26	--	<0.26	<0.26	<0.26	<0.26	<0.26
Radium 226/228 Combined, pCi/L	P	1.71	5	0.378	0.973	2.84	--	3.01	2.29	2.15	0.922	2.16
Additional Parameters Collected for Selection of Remedy												
Cobalt - dissolved, ug/L				--	--	29	--	30	--	--	--	--
Iron, dissolved, ug/L				<36	<36	2,500	--	3100	3,200	3800	590	710
Iron, ug/L				<36	<36	2,600	--	2700	3,400	4000	680	740
Magnesium, ug/L				36,000	28,000	26,000	--	28000	22,000	23000	16,000	18000
Manganese, dissolved, ug/L				5.0 J	7.9 J	260	--	270	1,500	1400	610	750
Manganese, ug/L				8.1 J	8.0 J	260	--	230	1,500	1300	600	750
Potassium, ug/L				1,100	980	1,900	--	1800	4,100	4300	690	720
Sodium, ug/L				89,000	73,000	110,000	--	91000	110,000	110000	180,000	180000
Bicarbonate Alkalinity, mg/L				190	250	470	--	500	380	390	250	260
Carbonate Alkalinity, mg/L				<4.6	<4.6	<4.6	--	<4.6	<4.6	<4.6	<4.6	<4.6
Total Alkalinity, mg/L				190	250	470	--	500	380	390	250	260

4.4
30.8
17

Blue shaded cell indicates the compliance well result exceeds the UPL (background) and the LOQ.
 Yellow highlighted cell indicates the compliance well result exceeds the GPS.
 Grayscale indicates Additional Parameters sampled for selection of remedy and evaluation of Monitored Natural Attenuation.

Abbreviations:

UPL = Upper Prediction Limit
 -- = Not Analyzed
 P = Parametric UPL with 1-of-2 retesting
 GPS = Groundwater Protection Standard
 mg/L = milligrams per liter
 LOQ = Limit of Quantitation
 DQ = Double Quantification Rule (not detected in background)
 NP = Nonparametric UPL (highest background value)
 LOD = Limit of Detection
 MNA = Monitored Natural Attenuation
 ug/L = micrograms per liter

J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
 * = UPL is below the LOQ for background sampling. For compliance wells, only results confirmed above the LOQ are evaluated as potential SSIs above background or statistically significant level above GPS.
 H = Sample was prepped or analyzed beyond the specified holding time.

H ^ = Sample was prepped or analyzed beyond the specified holding time. Fluoride at MW-307 was originally analyzed within the holding time, but the sample was re-analyzed due to an apparent analysis error. The re-analysis was performed outside the holding time, and that result is included in this table.

Notes:

1. An individual result above the UPL or GPS does not constitute a statistically significant increase (SSI) above background or statistically significant level above the GPS. See the accompanying report text for identification of statistically significant results.
2. GPS is the United States Environmental Protection Agency (USEPA) Maximum Contamination Level (MCL), if established; otherwise, the values from 40 CFR 257.95(h)(2).
3. Interwell UPLs calculated based on results from background well MW-301.

Created by: NDK	Date: 5/21/2021
Last revision by: RM	Date: 2/7/2023
Checked by: Dk	Date: 2/7/2023
Proj Mgr QA/QC: TK	Date: 7/18/2023

Table 6. 2022 Groundwater Field Data Summary
Ottumwa Generating Station - Zero Liquid Discharge Pond / SCS Engineers Project #25222072.00

Well	Sample Date	Groundwater Elevation (feet)	Field Temperature (deg C)	Field pH (Std. Units)	Oxygen, Dissolved (mg/L)	Field Specific Conductance (umhos/cm)	Field Oxidation Potential (mV)	Turbidity (NTU)
MW-301	2/14/2022	645.82	12.25	7.03	0.97	1,810	-51.0	0.00
	4/12/2022	682.08	7.40	6.37	3.26	976	117.6	5.03
	10/26/2022	680.68	14.6	6.29	4.74	1036	26.9	0.62
MW-307	2/14/2022	645.82	12.25	7.03	0.97	1,810	-51.0	0.00
	4/11/2022	648.40	11.80	6.63	0.13	1718	46.3	4.09
	8/25/2022	644.25	13.00	6.71	0.56	1727	67.5	2.17
	10/25/2022	643.46	12.90	6.50	0.22	1604	-36.4	7.21
MW-308	4/12/2022	645.75	12.7	6.70	0.26	1,491	-30.9	6.00
	10/26/2022	641.13	12.80	6.50	0.00	1507	-5.7	1.98
MW-309	4/14/2022	644.32	11.7	7.16	0.70	1,305	28.1	14.00
	10/26/2022	640.43	12.60	6.89	0.00	1378	4.9	0.79

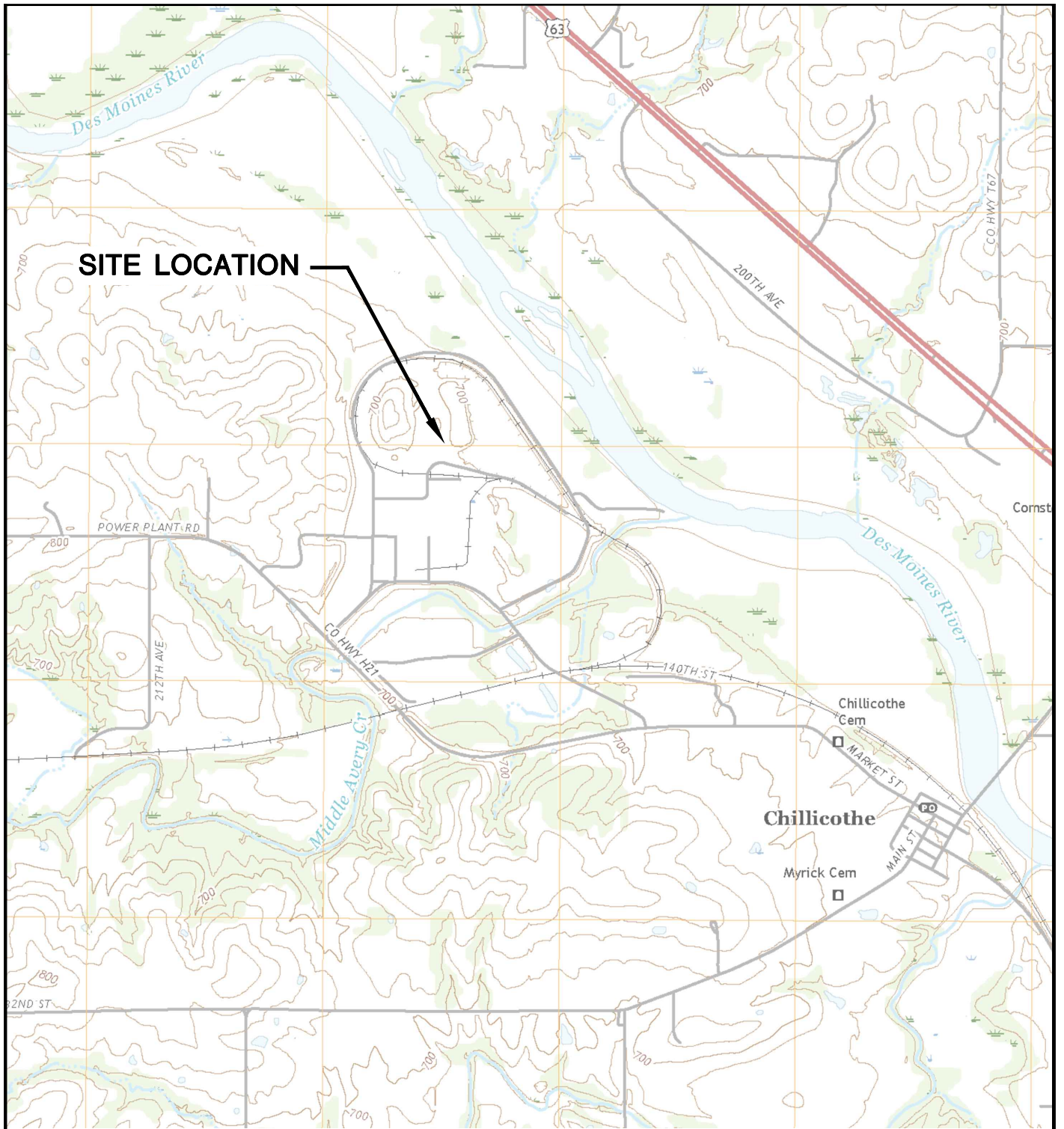
Created by: NDK
 Last revision by: RM
 Checked by: DK

Date: 3/9/2021
 Date: 1/27/2023
 Date: 2/8/2023

I:\25222072.00\Deliverables\2022 Fed Annual Report - OGS ZLDP\Tables\[Table 6 - 2022 Field Parameters_OGS ZLDP.xlsx]Table 6

Figures

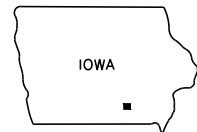
- 1 Site Location Map
- 2 Site Plan and Monitoring Well Locations
- 3 Shallow Potentiometric Surface, April 11-14, 2022
- 4 Shallow Potentiometric Surface, October 26-28, 2022



SITE LOCATION

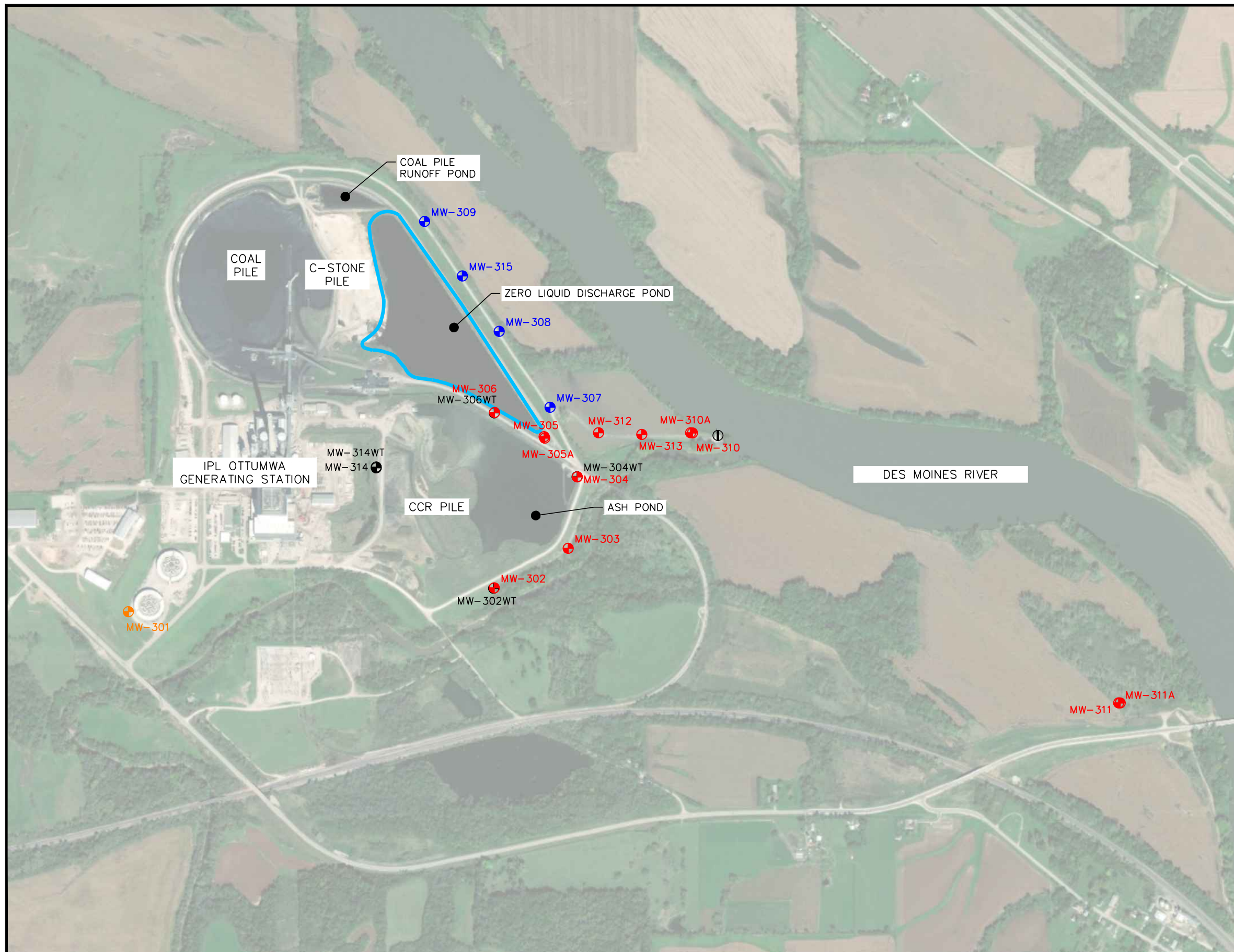


CHILICOTHE QUADRANGLE
 IOWA—WAPELLO CO.
 7.5 MINUTE SERIES (TOPOGRAPHIC)
 2018
 SCALE: 1" = 2,000'



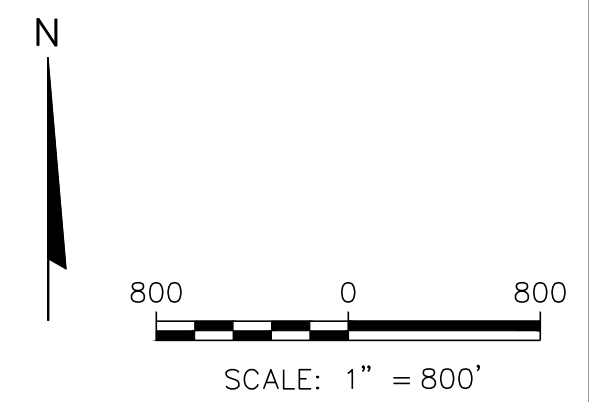
CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501		SITE	ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA		ENGINEER	SITE LOCATION MAP	
	PROJECT NO.	25219072.00		DRAWN BY:	BSS		SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	FIGURE
	DRAWN:	11/15/2019		CHECKED BY:	MDB			1
REVISED:	01/10/2020	APPROVED BY:	TK 01/30/2020					

I:\25219072.00\Drawings\CCR 2019 Annual Report\Site Location Map.dwg, 1/30/2020 3:51:43 PM



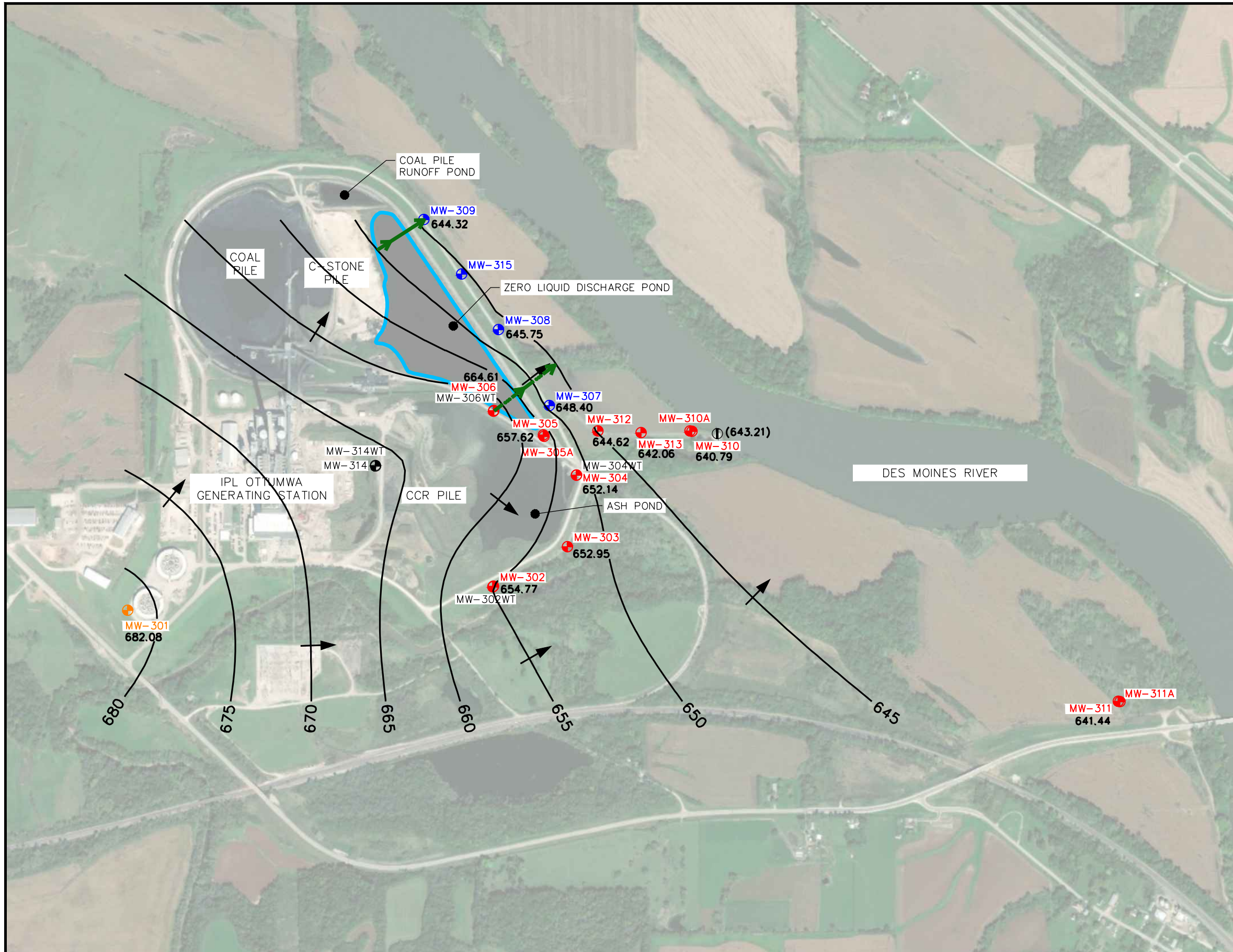
LEGEND	
	CCR UNIT
	CCR ZLDP MONITORING WELL
	CCR ASH POND MONITORING WELL
	CCR BACKGROUND MONITORING WELL
	WATER LEVEL WELL (NOT PART OF CCR RULE MONITORING SYSTEM)
	RIVER ELEVATION MEASUREMENT LOCATION

- NOTES:
- 2014 AERIAL PHOTOGRAPH SOURCES: ESRI, DIGITALGLOBE, GEOEYE, 1-CUBED, USDA FSA, USGS, AEX, GETMAPPING, AERGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY.
 - MONITORING WELLS MW-301, MW-302, AND MW-304, WERE INSTALLED BY CASCADE DRILLING, LLP. UNDER THE SUPERVISION OF SCS ENGINEERS FROM NOVEMBER 11-12, 2015.
 - MONITORING WELLS MW-303 AND MW-305 WERE INSTALLED BY CASCADE DRILLING LLP. UNDER THE SUPERVISION OF SCS ENGINEERS ON DECEMBER 7-8, 2015.
 - MONITORING WELLS MW-307, MW-308, AND MW-309 WERE INSTALLED BY CASCADE DRILLING, LLP. UNDER THE SUPERVISION OF SCS ENGINEERS FROM OCTOBER 25-27, 2016.
 - MONITORING WELLS MW-310 AND MW-311 WERE INSTALLED BY ROBERTS ENVIRONMENTAL DRILLING ON AUGUST 27, 2019.
 - MONITORING WELLS MW-305A, MW-310A, AND MW-311A WERE INSTALLED BY ROBERTS ENVIRONMENTAL DRILLING BETWEEN FEBRUARY 27, 2020 AND MARCH 3, 2020.
 - MONITORING WELLS MW-312 AND MW-313 WERE INSTALLED BY CASCADE DRILLING ON DECEMBER 14, 2021.
 - MONITORING WELL MW-315 WAS INSTALLED BY DIRECT PUSH ANALYTICAL UNDER THE SUPERVISION OF SCS ENGINEERS ON NOVEMBER 29, 2022.



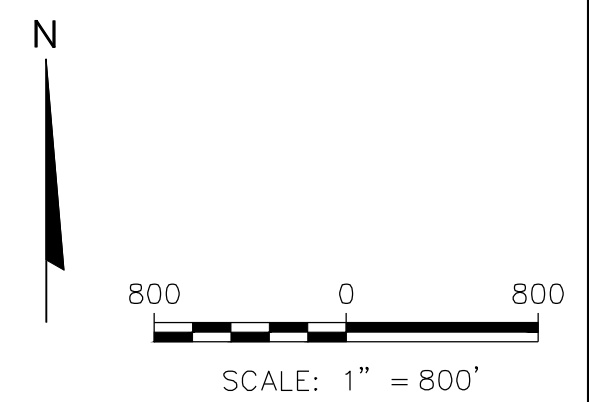
PROJECT NO. 25222072.00	DRAWN BY: KP	SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA	SITE PLAN AND MONITORING WELL LOCATIONS	FIGURE
DRAWN: 07/07/2022	CHECKED BY: RM					2
REVISED: 07/18/2023	APPROVED BY: TK					

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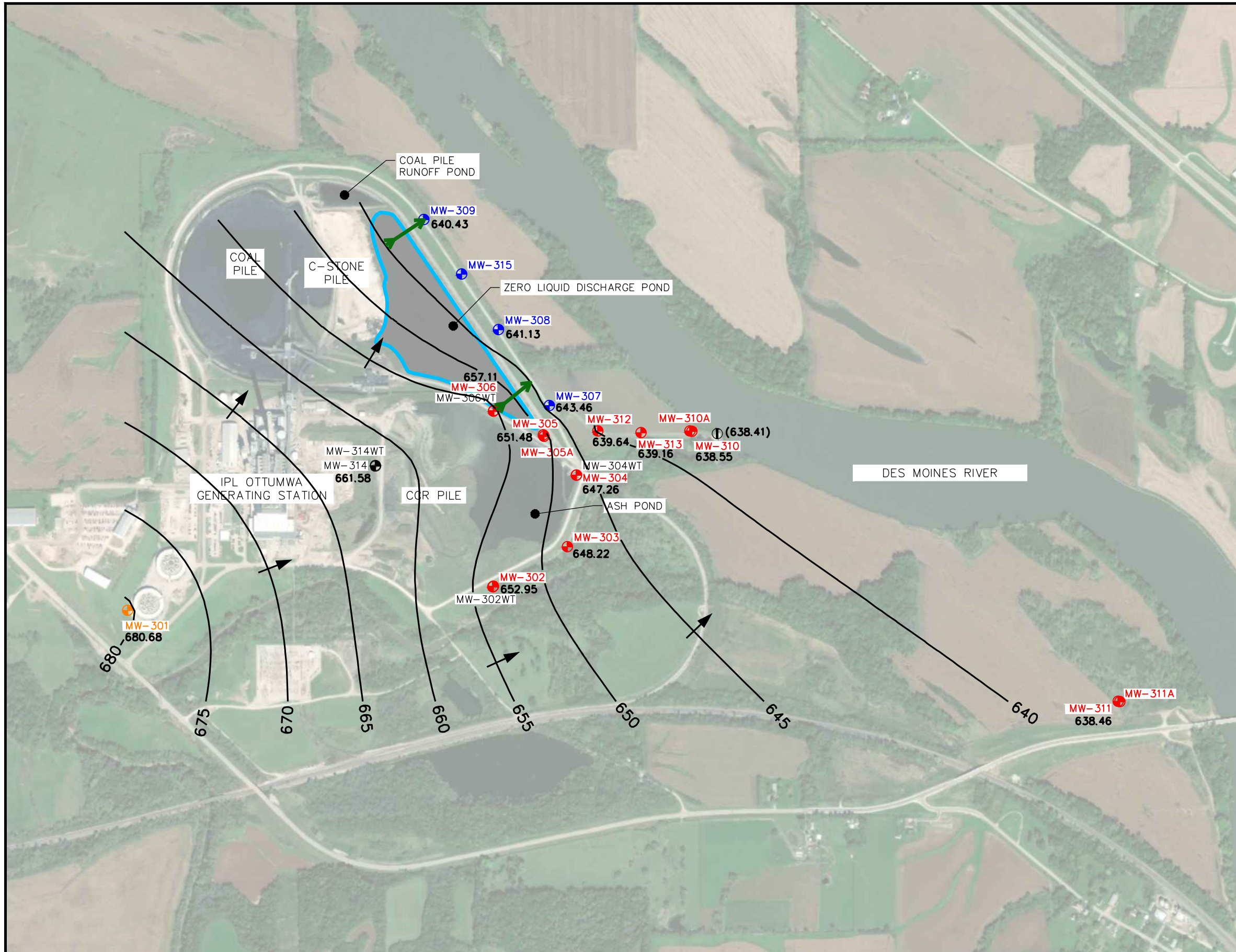
- LEGEND
- CCR UNIT
 - CCR ZLDP MONITORING WELL
 - CCR ASH POND MONITORING WELL
 - CCR BACKGROUND MONITORING WELL
 - WATER LEVEL WELL (NOT PART OF THE CCR RULE MONITORING SYSTEM)
 - ⊕ RIVER ELEVATION MEASUREMENT LOCATION
 - (643.21)** RIVER ELEVATION (APRIL 11, 2022)
 - 651.09** POTENTIOMETRIC ELEVATION AT WELL (APRIL 11-14, 2022)
 - POTENTIOMETRIC SURFACE CONTOUR
 - - - - - FLOW PATH FOR VELOCITY CALCULATION (SEE TABLE 4)
 - APPROXIMATE GROUNDWATER FLOW DIRECTION

- NOTE:
1. THE BACKGROUND MONITORING WELL FOR THE OGS ZERO LIQUID DISCHARGE POND IS MW-301.
 2. MW-315 WAS INSTALLED NOVEMBER 2022.



PROJECT NO.	25222072.00	DRAWN BY:	KP	SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE	ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA	SHALLOW POTENTIOMETRIC SURFACE APRIL 11-14, 2022	FIGURE	3
DRAWN:	09/23/2022	CHECKED BY:	RM								
REVISED:	07/28/2023	APPROVED BY:	TK 07/28/2023								

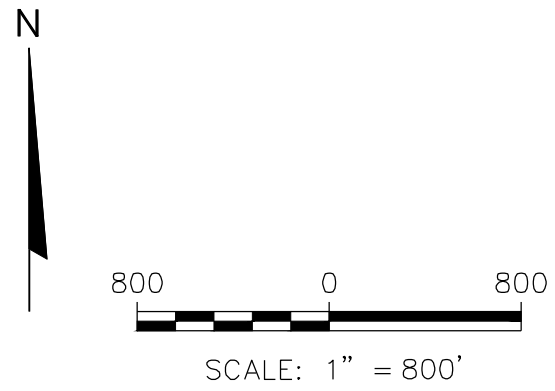
\\Mad-fs01\data\Projects\25222072.00\Drawings\Potentiometric Surface 2022 ZLDP.dwg, 7/28/2023 3:05:40 PM



LEGEND

- CCR UNIT
- CCR ZLDP MONITORING WELL
- CCR ASH POND MONITORING WELL
- CCR BACKGROUND MONITORING WELL
- WATER LEVEL WELL (NOT PART OF THE CCR RULE MONITORING SYSTEM)
- ⊕ RIVER ELEVATION MEASUREMENT LOCATION
- (638.41)** RIVER ELEVATION (OCTOBER 26, 2022)
- 651.09** POTENTIOMETRIC ELEVATION AT WELL (OCTOBER 26–28, 2022)
- POTENTIOMETRIC SURFACE CONTOUR
- - - - - FLOW PATH FOR VELOCITY CALCULATION (SEE TABLE 4)
- APPROXIMATE GROUNDWATER FLOW DIRECTION

- NOTE:**
1. THE BACKGROUND MONITORING WELL FOR THE OGS ZERO LIQUID DISCHARGE POND IS MW-301.
 2. MW-315 WAS INSTALLED NOVEMBER 2022.



PROJECT NO.	25222072.00	DRAWN BY:	KP	SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE	ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA	DRAWN:	12/23/2022	CHECKED BY:	RM	SHALLOW POTENTIOMETRIC SURFACE OCTOBER 26–28, 2022	FIGURE 4
REVISD:	07/18/2023	APPROVED BY:	TK 07/28/2023											
ENGINEER														

\\Mad-fs01\data\Projects\25222072.00\Drawings\Potentiometric Surface 2022 ZLDP.dwg, 7/28/2023 3:03:21 PM

Appendix A

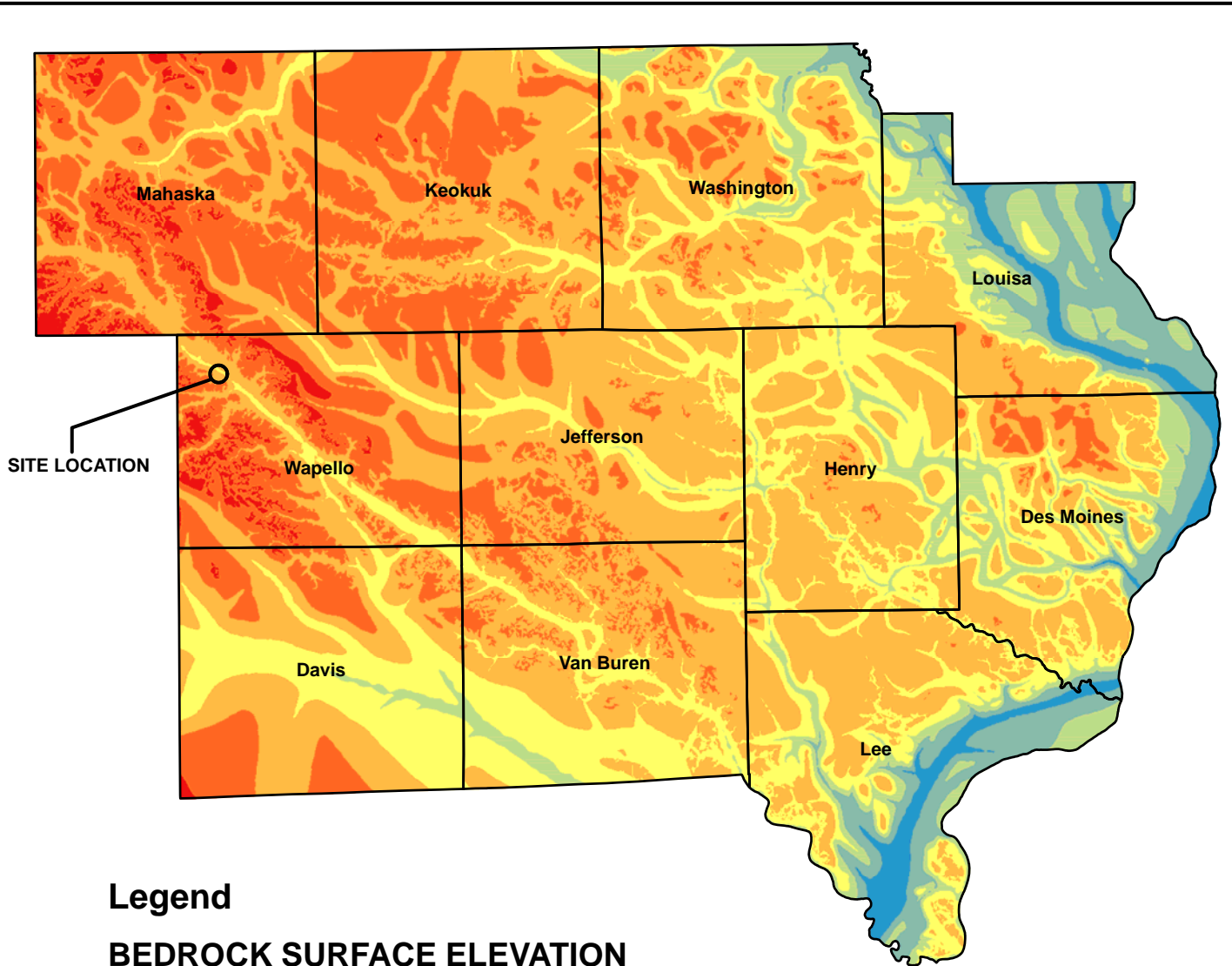
Summary of Regional Hydrogeologic Stratigraphy

**Table OGS-2. Regional Hydrogeologic Stratigraphy
Ottumwa Midland Landfill / SCS Engineers Project #25215053.01**

Age of Rocks	Hydrogeologic Unit	General Thickness (feet)	Name of Rock Unit*	Type of Rock
Quaternary (0-1 million years old)	Surficial Aquifers • Alluvial • Buried-Channel • Drift	0 to 320	Undifferentiated	<ul style="list-style-type: none"> • Sand, gravel, silt, and clay • Sand, gravel, silt, and clay • Till (sandy, pebbly clay), sand, and silt
Pennsylvanian (180 to 310 million years old)	Aquiclude	0 to 370	Undifferentiated	<ul style="list-style-type: none"> • Shale, sandstone, limestone, and coal
Mississippian (310 to 345 million years old)	Mississippian Aquifer • Upper	0 to 600	St. Louis Spergen	<ul style="list-style-type: none"> • Limestone and sandstone • Limestone
	• Lower		Warsaw Keokuk Burlington Hampton Starrs Cave	<ul style="list-style-type: none"> • Shale and dolomite • Dolomite, limestone, and shale • Dolomite and limestone • Limestone and dolomite • Limestone
	Aquiclude	0 to 425	Prospect Hill McCraney	<ul style="list-style-type: none"> • Siltstone • Limestone
Devonian (345 to 400 million years old)	Aquiclude	110 to 420	Yellow Spring Lime Creek	<ul style="list-style-type: none"> • Shale, dolomite, and siltstone • Dolomite and shale
	Devonian Aquifer		Cedar Valley Wapsipinicon	<ul style="list-style-type: none"> • Limestone and dolomite • Dolomite, limestone, shale, and gypsum
Silurian (400 to 425 million years old)		0 to 105	Undifferentiated	<ul style="list-style-type: none"> • Dolomite
Ordovician (425 to 500 million years old)	Aquiclude	150 to 600	Maquoketa Galena Decorah Platteville	<ul style="list-style-type: none"> • Dolomite and shale • Dolomite and chert • Limestone and shale • Limestone, shale, and sandstone
	Cambrian-Ordovician aquifer	750 to 1,110	St. Peter Prairie du Chien	<ul style="list-style-type: none"> • Sandstone • Dolomite and sandstone
Cambrian (500 to 600 million years old)		450 to 750+	Jordan St. Lawrence	<ul style="list-style-type: none"> • Sandstone • Dolomite
	Not considered an aquifer in southeast Iowa		Franconia Galesville Eau Claire Mt. Simon	<ul style="list-style-type: none"> • Shale, siltstone, and sandstone • Sandstone • Sandstone, shale, and dolomite • Sandstone
Precambrian (600 million to 2 billion + years old)				<ul style="list-style-type: none"> • Sandstone, igneous rocks, and metamorphic rocks

*This nomenclature and classification of rock units in this report are those of the Iowa Geological Survey and do not necessarily coincide with those accepted by the U.S. Geological Survey.

Source: "Water Resources of Southeast Iowa," Iowa Geologic Survey Water Atlas No. 4.

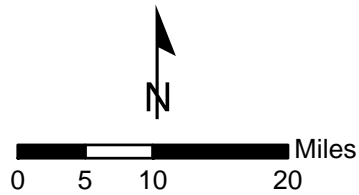


Legend

BEDROCK SURFACE ELEVATION

ELEVATION ABOVE MEAN SEA LEVEL IN FEET

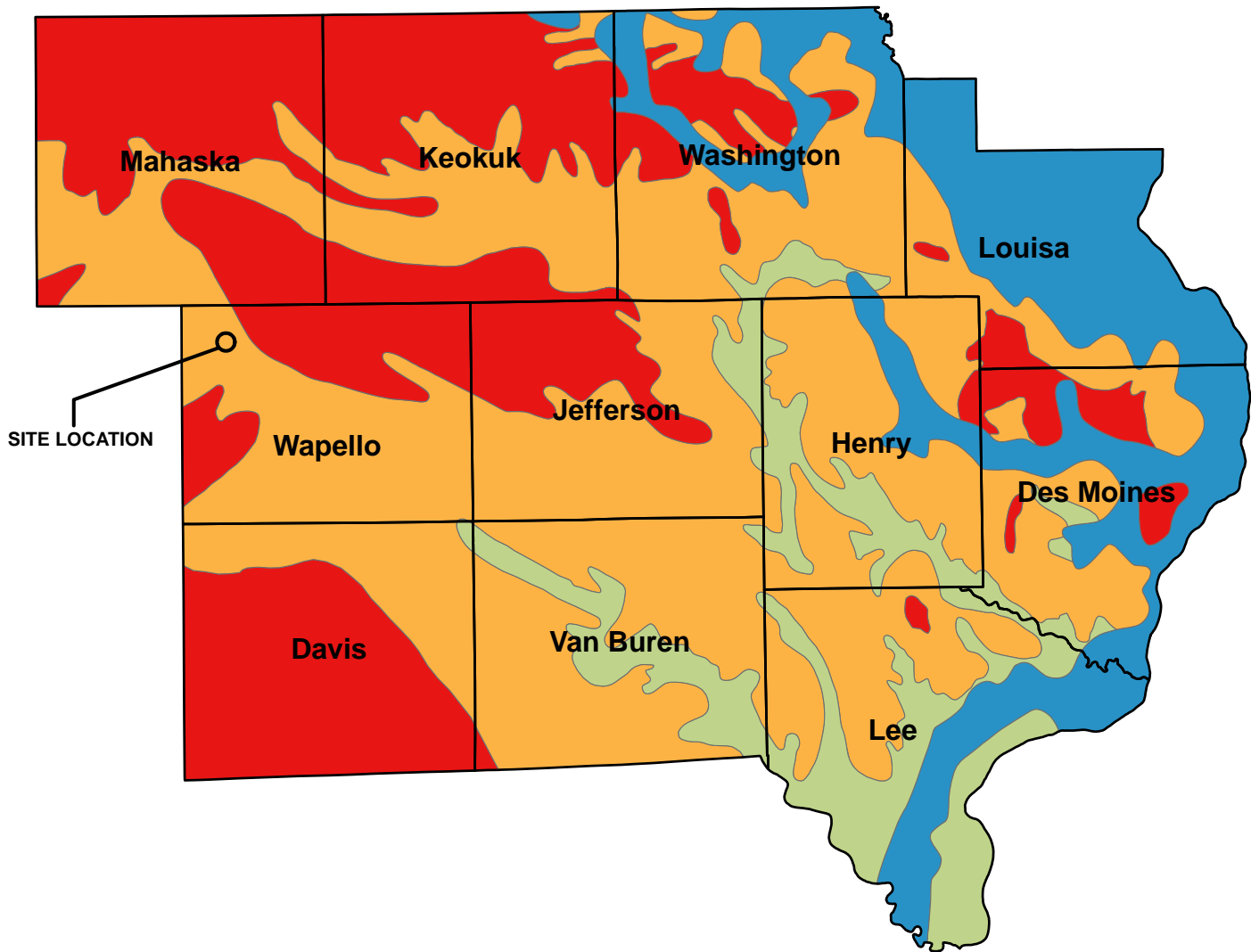
- BELOW 300
- 300 TO 400
- 400 TO 500
- 500 TO 600
- 600 TO 700
- 700 TO 800
- 800 TO 900



MAP DATA DERIVED FROM IOWA GEOLOGICAL AND WATER SURVEY
 IOWA BEDROCK SURFACE ELEVATION AS OBTAINED
 FROM IOWA NATURAL RESOURCES
 GEOGRAPHIC INFORMATION SYSTEMS LIBRARY

CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE	OTTUMWA GENERATING STATION OTTUMWA, IOWA	SE IOWA REGIONAL BEDROCK SURFACE ELEVATION
PROJECT NO.	25215053.03	DRAWN BY:	JB	SCS ENGINEERS <small>2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830 FAX: (608) 224-2839</small>
DRAWN:	07/29/13	CHECKED BY:	MDB	
REVISED:	05/29/15	APPROVED BY:		
ENGINEER				FIGURE

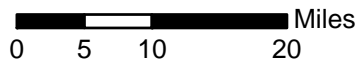
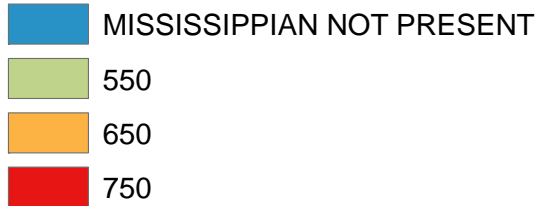
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Legend

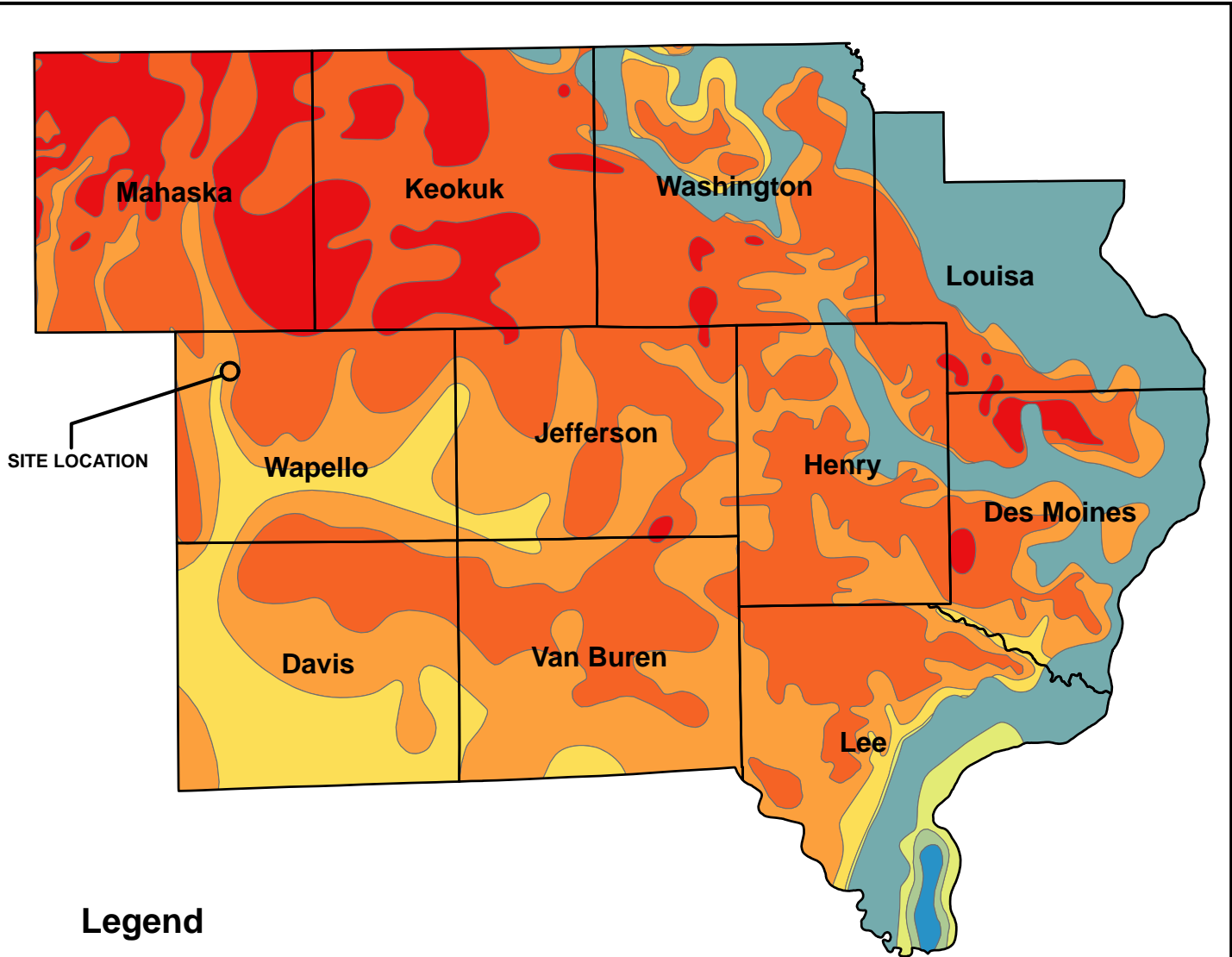
MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE

ELEVATION ABOVE MEAN SEA LEVEL IN FEET



MAP DATA DERIVED FROM IOWA GEOLOGICAL AND WATER SURVEY
 MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE ELEVATION AS OBTAINED
 FROM IOWA NATURAL RESOURCES
 GEOGRAPHIC INFORMATION SYSTEMS LIBRARY

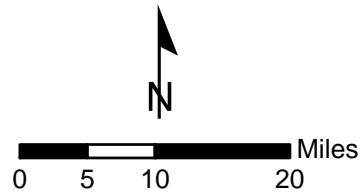
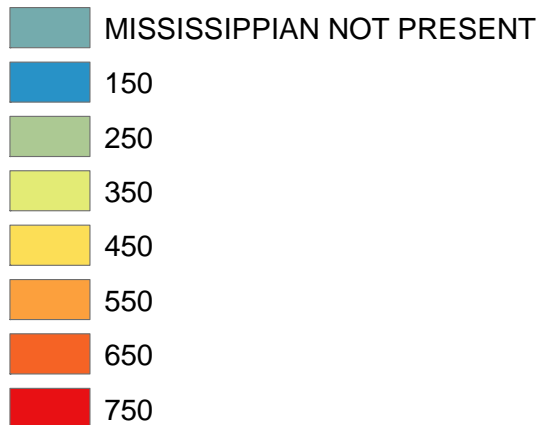
CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE	OTTUMWA GENERATING STATION OTTUMWA, IOWA	SE IOWA REGIONAL MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE ELEVATION	
	PROJECT NO. 25215053.03		DRAWN BY: JB	SCS ENGINEERS	FIGURE
DRAWN: 07/29/13	CHECKED BY: MDB	2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830 FAX: (608) 224-2839			
REVISED: 05/29/15	APPROVED BY:				



Legend

MISSISSIPPIAN AQUIFER ELEVATION

ELEVATION ABOVE MEAN SEA LEVEL IN FEET



MAP DATA DERIVED FROM IOWA GEOLOGICAL AND WATER SURVEY
 MISSISSIPPIAN AQUIFER SURFACE ELEVATION AS OBTAINED
 FROM IOWA NATURAL RESOURCES
 GEOGRAPHIC INFORMATION SYSTEMS LIBRARY

CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501		SITE	OTTUMWA GENERATING STATION OTTUMWA, IOWA		ENGINEER	SE IOWA REGIONAL MISSISSIPPIAN AQUIFER SURFACE ELEVATION	
	PROJECT NO.	25215053.03		DRAWN BY:	JB		SCS ENGINEERS	FIGURE
	DRAWN:	07/29/13		CHECKED BY:	MDB			
REVISD:	05/29/15	APPROVED BY:						

Appendix B

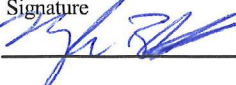
Boring Logs and Well Construction Documentation

Route To: Watershed/Wastewater Waste Management
Remediation/Redevelopment Other

Facility/Project Name IPL- Ottumwa Generating Station SCS#: 25215135.40		License/Permit/Monitoring Number		Boring Number MW-301	
Boring Drilled By: Name of crew chief (first, last) and Firm Todd Schmalfeld Cascade Drilling			Date Drilling Started 11/10/2015	Date Drilling Completed 11/10/2015	Drilling Method 4-1/4 hollow stem auger
Unique Well No.	DNR Well ID No.	Common Well Name MW-301	Final Static Water Level Feet	Surface Elevation 684.3 Feet	Borehole Diameter 8.5 in
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/> State Plane 400,077 N, 1,899,709 E S/C/N			Lat ° ' "		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> F
NW 1/4 of SW 1/4 of Section 26, T 73 N, R 15 W			Long ° ' "		Feet <input type="checkbox"/> S Feet <input type="checkbox"/> W
Facility ID		County Wapello	Civil Town/City/ or Village Ottumwa		

Sample Number and Type	Length A.t. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well	Diagram	PID/FID	Soil Properties					RQD/ Comments	
										Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200		
			1	TOPSOIL.	TOPSOIL											
S1	10	woh 1 39	2-6	SANDY SILT WITH GRAVEL, gray (7.5YR 6/1), gravel is fine.	ML							W				
S2	13	24 50	7-8	WEATHERED SANDSTONE, very weak, light gray matrix (10YR 7/1), secondary color very dark gray 910YR 3/1), massive.								W				
S3	5	50	9-11		SANDSTONE							W				
S4	6	50	12-13									W				
S5	4	50	14-15									W				
				Endo of Boring at 15 feet bgs.												

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature 	Firm SCS Engineers 2830 Dairy Drive Madison, WI 53718	Tel: (608) 224-2830 Fax:
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SCS ENGINEERS

Environmental Consultants and Contractors

SOIL BORING LOG INFORMATION

Route To: Watershed/Wastewater Waste Management
 Remediation/Redevelopment Other

Facility/Project Name IPL-Ottumwa Generating Station SCS#: 25216148.00		License/Permit/Monitoring Number		Boring Number MW-307	
Boring Drilled By: Name of crew chief (first, last) and Firm Mike Mueller Cascade Drilling		Date Drilling Started 10/25/2016		Date Drilling Completed 10/25/2016	
Unique Well No.		DNR Well ID No.		Common Well Name MW-307	
Final Static Water Level Feet		Surface Elevation 655.1 Feet		Borehole Diameter 8.5 in	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/> State Plane 401,707 N, 1,903,070 E S/C/N		Lat <input type="checkbox"/> ° <input type="checkbox"/> ' <input type="checkbox"/> "		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
NE 1/4 of SE 1/4 of Section 26, T 73 N, R 15 W		Long <input type="checkbox"/> ° <input type="checkbox"/> ' <input type="checkbox"/> "		Feet <input type="checkbox"/> S Feet <input type="checkbox"/> W	
Facility ID		County Wapello		Civil Town/City/ or Village Ottumwa	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/Comments	
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200		
S1	24	22 32	1	POORLY GRADED SAND WITH GRAVEL, tan, fine to coarse sand and gravel, (construction fill sand to fill in hydrovac hole cleared to 8.5 ft bgs).	SP										
			2												
S2	14	41 44	10	LEAN CLAY, dark yellowish brown (10YR 4/4), slightly dense.	CL										
			11												

water level 6.5 ft bgs.

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Firm: **SCS Engineers** 2830 Dairy Drive Madison, WI 53711 Tel: (608) 224-2830 Fax:

Boring Number **MW-307**

Page 2 of 2

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S3	24	1 2	16	LEAN CLAY, dark yellowish brown (10YR 4/4), slightly dense. <i>(continued)</i>	CL									
		2 4	17	SILT, dark yellowish brown (10YR 3/4), fine to medium sand.	ML									
S4	17	3 3 3	18 19											
S5	5	50/0.5	20 21	SANDSTONE, dark brown (10YR 3/3),										
			22 23 24 25 26 27	more weathered.										
S6	1	100	28	Same as above except, gray (10YR 6/1). End of boring at 28 ft bgs.										

Bedrock
@19.5 ft
bgs.

More
competent
@20.5'
-24.5' bgs.

SCS ENGINEERS

Environmental Consultants and Contractors

SOIL BORING LOG INFORMATION

Route To: Watershed/Wastewater Waste Management
 Remediation/Redevelopment Other

Facility/Project Name IPL-Ottumwa Generating Station SCS#: 25216148.00		License/Permit/Monitoring Number		Boring Number MW-308	
Boring Drilled By: Name of crew chief (first, last) and Firm Mike Mueller Cascade Drilling		Date Drilling Started 10/25/2016		Date Drilling Completed 10/25/2016	
Unique Well No.		DNR Well ID No.		Common Well Name MW-308	
Final Static Water Level Feet		Surface Elevation 652.9 Feet		Borehole Diameter 8.5 in	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/> State Plane 402,312 N, 1,902,665 E S/C/N		Lat _____ ° _____ ' _____ "		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
NE 1/4 of SE 1/4 of Section 26, T 73 N, R 15 W		Long _____ ° _____ ' _____ "		Feet <input type="checkbox"/> S <input type="checkbox"/> W	

Facility ID	County Wapello	Civil Town/City/ or Village Ottumwa
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Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments		
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200			
			1	POORLY GRADED SAND WITH GRAVEL, tan, fine to coarse sand and gravel, (construction fill sand to fill in hydrovac hole cleared to 9.5 ft bgs).	SP											
			2													
			3													
			4													
			5													
			6													
			7													
			8													
			9													
			10	LEAN CLAY, brown (10YR 4/3), dense.	CL											
S1	24	19 4 22	11													
			12	SILT, brown (10YR 4/3), some clay.	ML											
			13													
S2	13	12 22	14													
			15													


water @ 6.5 ft bgs.

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature 	Firm SCS Engineers 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:
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Boring Number MW-308

Page 2 of 2

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S3	18	12 13	16	SILT, brown (10YR 4/3), some clay. <i>(continued)</i>	ML									
			16.5	SILTY SAND, brown (10YR 4/3).	SM					W				
			17	POORLY GRADED SAND, brown (10YR 4/3), fine grained.	SP									
S4	13	4 12 13 3	18	WELL GRADED SAND AND GRAVEL, dark grayish brown (10YR 3/2), fine to coarse grained, (weathered bedrock).	SW									
			19	SANDSTONE, dark grayish brown (10YR 4/2), weathered bedrock.						W				
S5	6	12 26 50/0.4	20	Same as above except, brown (10YR 4/3).										
			21							W				
S6	4	50/0.4	24	Same as above except, dark grayish brown (10YR 4/2).										
			25	End of boring at 25 ft bgs.						W				


Route To: Watershed/Wastewater Waste Management
 Remediation/Redevelopment Other

Facility/Project Name IPL-Ottumwa Generating Station SCS#: 25216148.00		License/Permit/Monitoring Number		Boring Number MW-309	
Boring Drilled By: Name of crew chief (first, last) and Firm Mike Mueller Cascade Drilling		Date Drilling Started 10/27/2016		Date Drilling Completed 10/27/2016	
Drilling Method HSA		Final Static Water Level Feet		Surface Elevation 652.5 Feet	
Borehole Diameter 8.5 in		Common Well Name MW-309		DNR Well ID No.	
Unique Well No.		Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/>		Local Grid Location	
State Plane 403,189 N, 1,902,070 E S/C/N		Lat <input type="checkbox"/> N <input type="checkbox"/> E		Feet <input type="checkbox"/> S <input type="checkbox"/> W	
NE 1/4 of SE 1/4 of Section 26, T 73 N, R 15 W		Long <input type="checkbox"/> W <input type="checkbox"/> E		Feet <input type="checkbox"/> S <input type="checkbox"/> W	

Facility ID	County Wapello	Civil Town/City/ or Village Ottumwa
-------------	--------------------------	---

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments	
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200		
			1-9	Hydrovac borehole to 10 ft bgs.											
S1	33 67		10-11	LEAN CLAY, very dark grayish brown (10YR 3/2), trace sand.	CL						W				
S2	22 22		13-14								W				

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature 	Firm SCS Engineers 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:
--	--	-----------------------------

Boring Number MW-309

Page 2 of 2

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S3	11 11	16	17	SILTY SAND, very dark grayish brown (10YR 3/2), fine to medium grained.	SM									
		W												
S4	35 46	18	19	POORLY GRADED SAND, yellowish brown (10YR 5/4), coarse grained.	SP									
		W												
S5	23 750	20	21	WEATHERED SANDSTONE.										
		W												
S6		22	25	WEATHERED SANDSTONE.										
		W												
		27		End of boring at 27.5 ft bgs.										

SCS ENGINEERS

Environmental Consultants and Contractors

SOIL BORING LOG INFORMATION


Route To: Watershed/Wastewater Waste Management
 Remediation/Redevelopment Other

Facility/Project Name IPL-Ottumwa Generating Station SCS#: 25216148.00		License/Permit/Monitoring Number		Boring Number B-309X	
Boring Drilled By: Name of crew chief (first, last) and Firm Mike Mueller Cascade Drilling		Date Drilling Started 10/26/2016		Date Drilling Completed 10/26/2016	
Drilling Method HSA		Unique Well No.		DNR Well ID No.	
Common Well Name		Final Static Water Level Feet		Surface Elevation Feet	
Borehole Diameter 8.5 in		Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/> State Plane N, E S/C/N NE 1/4 of SE 1/4 of Section 26, T 73 N, R 15 W		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID		County Wapello		Civil Town/City/ or Village Ottumwa	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S1	12	13 34	1	POORLY GRADED SAND WITH GRAVEL, tan, fine to coarse sand and gravel, (construction fill sand to fill in hydrovac hole cleared to 9 ft bgs).	SP									
			2											
			3											
S2	18	33 33	4	LEAN CLAY, dark brown (10YR 3/3), medium dense.	CL									
			5											
			6											
			7	SILT, dark brown (10YR 3/3), some clay.	ML									
			8											
			9											
			10											
			11											
			12											
			13											
			14											
			15											

Water at 6.5 ft bgs

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature 	Firm SCS Engineers 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:
--	--	-----------------------------

Boring Number B-309X

Page 2 of 2

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S3	20	3 3	16	SILT, dark brown (10YR 3/3), some clay. <i>(continued)</i>	ML									
		3 2	17	POORLY GRADED SAND, very dark grayish brown (10YR 3/2), fine grained.	SP					W				
S4	15	1 17	18	SILT, dark brown (10YR 3/3).	ML									
		50/0.2	19	POORLY GRADED SAND, brown (10YR 4/3).	SP					W			Bedrock at 18.5 ft bgs	
S5	6	50/0.3	20	WEATHERED SANDSTONE, grayish brown (10YR 5/2).					W					
			21											
			22											
			23											
			24											
			25											
			26											
				End of boring at 26.5 ft bgs.										

Route To: Watershed/Wastewater Waste Management
Remediation/Redevelopment Other

Facility/Project Name IPL-Ottumwa Generating Station SCS#: 25221162.00		License/Permit/Monitoring Number		Boring Number MW-315	
Boring Drilled By: Name of crew chief (first, last) and Firm Bryan Kinzer Direct Push Analytical		Date Drilling Started 11/29/2022		Date Drilling Completed 11/29/2022	
Unique Well No.		DNR Well ID No.		Common Well Name MW-315	
Final Static Water Level Feet MSL		Surface Elevation Feet MSL		Borehole Diameter 8.25" in	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/> State Plane 402757.793 N 1902367.433 E S/C/N		Lat 41° 06' 05.558 "		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
SE 1/4 of NE 1/4 of Section 26, T 73 N, R 15 W		Long -92° 32' 58.170 "		Feet <input type="checkbox"/> S Feet <input type="checkbox"/> W	

Facility ID	County Wapello	Civil Town/City/ or Village Ottumwa
-------------	--------------------------	---

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments	
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200		
			1	Hydrovacated to 8' below ground surface (bgs) through sandy rocky clay, then backfilled with fine to medium grained brown sand.											
			2												
			3												
			4												
			5												
			6												
			7												
			8												
S1	27		9	POORLY GRADED SAND, fine to medium grained, brown (backfill).	FILL										
			10	LEAN CLAY, dark brown with trace dark reddish brown mottling, medium stiff.					1.0	M					
			11		CL										
			12	Same as above but with dark grayish brown with trace roots and wood.											
S2	32		14						0.75	M/W					
			15		ML				0.25 - 0.5						Measured water at 14' bgs.

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature 	Firm SCS Engineers 2830 Dairy Drive Madison, WI 53718	Tel: Fax:
--	--	--------------

Boring Number MW-315

Page 2 of 2

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S3	40		16	SANDY SILT, dark gray and trace reddish brown with trace roots and wood, sand is fine grained, gray. <i>(continued)</i>	ML									
			17	POORLY GRADED SAND, fine to course grained, gray to dark gray with trace lenses of clay and 1" piece of weathered rock at the bottom of the sample.	SP									
S4	26		18											
			19											
			20	POORLY GRADED SAND, fine grained, orange-brown (weathered bedrock). Same as above but orangish tan, transitioning to olive green to white,	SP									
			21											
			22											
			23											
			24											
			25	End of boring at 25' below ground surface.										

Refusal at 22' bgs with Geoprobe, tripped out of boring and continued drilling with hollow stem augers to 25' bgs.



IOWA DEPARTMENT OF NATURAL RESOURCES
MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name: IPL - Ottumwa Generating Station Permit No.: _____

Well or Piezometer No: MW-301

Dates Started: 11/10/15 Date Completed: 11/10/15

A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations (± 0.5 ft): _____ Specify corner of site: <u>SE of Parcel 003052640340000</u> Distance & direction along boundary: <u>106' W</u> Distance & direction from boundary to wall: <u>306' N</u> Elevations (± 0.01 ft MSL): _____ Ground Surface: <u>684.28</u> Top of protective casing: <u>687.12</u> Top of well casing: _____ <u>686.63</u> Benchmark elevation: _____ Benchmark description: _____	Name & Address of Construction Company: _____ <u>Cascade Drilling, LP</u> <u>301 Alderson St</u> <u>Schofield, WI 54476</u> Name of Driller: <u>Todd Schmalfeld</u> Drilling Method: <u>HSA</u> Drilling Fluid: <u>NA</u> Bore Hole Diameter: <u>8 inch</u> Soil Sampling Method: <u>Spoon</u> Depth of Boring: <u>15 ft</u>

C. MONITORING WELL INSTALLATION	
Casing material: _____ <u>PVC sch 40</u> Length of casing: _____ <u>4 ft</u> Outside casing diameter: _____ <u>2.38"</u> Inside casing diameter: _____ <u>2"</u> Casing joint type: _____ <u>threaded</u> Casing/screen joint type: <u>threaded</u> Screen material: _____ <u>PVC</u> Screen opening size: <u>0.010"</u> Screen length: _____ <u>10 ft</u> Depth of well: _____ <u>14 ft</u> Filter Pack: _____ Material: _____ <u>Red Flint</u> Grain size: _____ <u>#40</u> Volume: _____ <u>4 cu. ft.</u> Seal (minimum 3 ft length above filter pack): _____ Material: <u>3/8 inch bentonite chips</u>	Placement method: <u>Gravity</u> Volume: <u>8 cu. ft.</u> Backfill (if different from seal): _____ Material: _____ Placement method: _____ Volume: _____ Surface seal design: _____ Material of protective casing: <u>Steel 6 inch</u> Material of grout between protective casing and well casing: <u>sand</u> Protective cap: _____ Material: <u>Steel, vented</u> Vented: <input type="checkbox"/> Yes <input type="checkbox"/> No Locking: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Well Cap: _____ Material: <u>PVC</u> Vented: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

D. GROUNDWATER MEASUREMENT (± 0.01 ft below top of inner well casing)	
Water level: <u>3.09 ft</u> Well development method: <u>Surged with block and pumped to reduce turbidity. 435 gallons pumped.</u> Average depth of frostline: <u>3.5'</u>	Stabilization Time: <u><5 minutes</u>

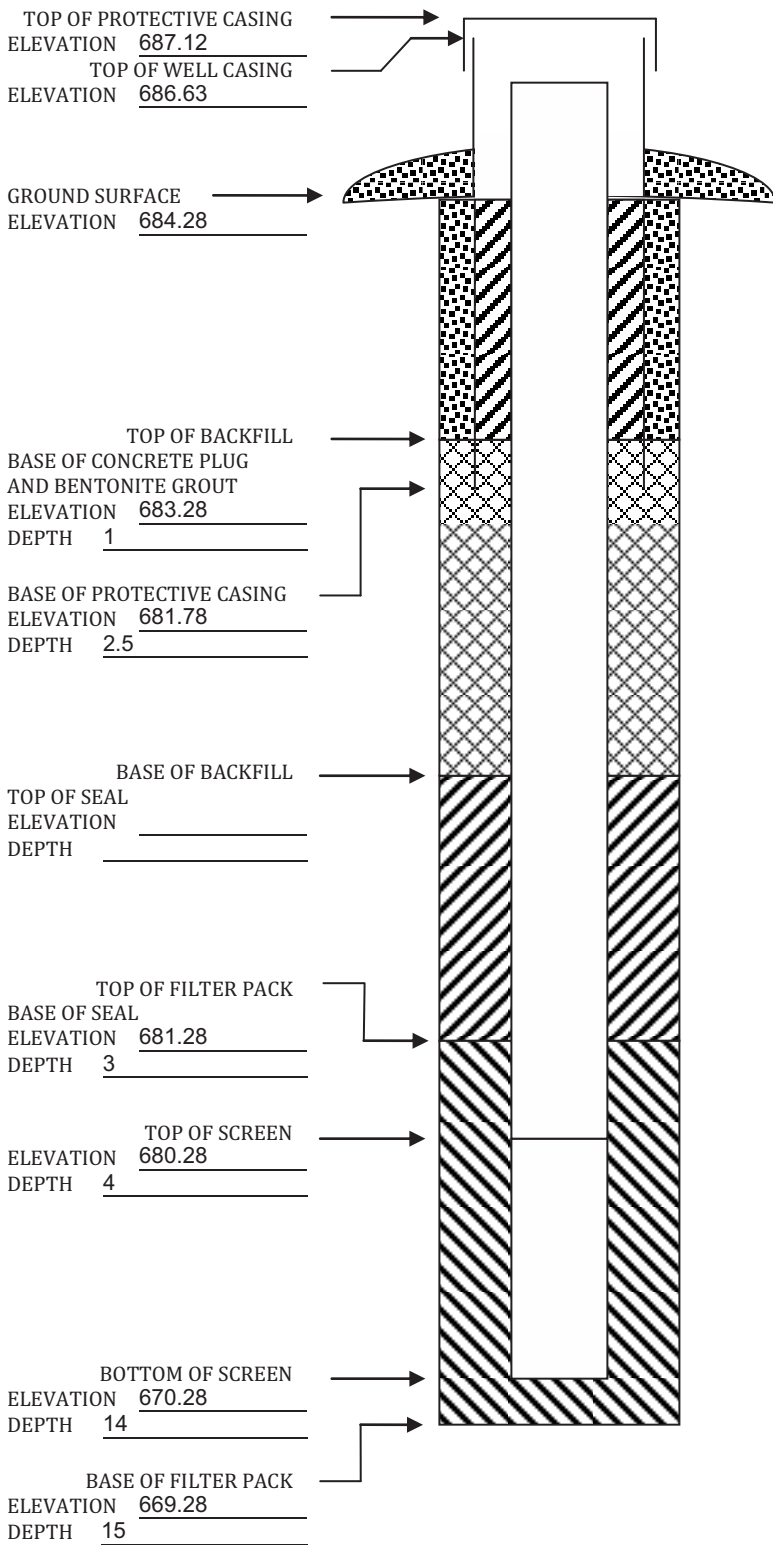
Attachments: Driller's log, Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.

Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

ELEVATIONS: ± 0.01 ft MSL
DEPTHS: ± 0.1 ft FROM GROUND SURFACE

SPACE TO ATTACH ENTIRE SOIL BORING LOG
(SHOW SCREENED INTERVAL AND FILTER PACK INTERVAL.)





IOWA DEPARTMENT OF NATURAL RESOURCES
MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name: IPL - Ottumwa Generating Station Permit No.: _____
 Well or Piezometer No: MW-307
 Dates Started: 10/25/16 Date Completed: 10/25/16

A. SURVEYED LOCATIONS AND ELEVATIONS

Locations (± 0.5 ft): _____
 Specify corner of site: NE of Parcel 003052620200000
 Distance & direction along boundary: 683' W
 Distance & direction from boundary to wall: 296' S
 Elevations (± 0.01 ft MSL): _____
 Ground Surface: 655.08
 Top of protective casing: 657.58
 Top of well casing: _____ 657.56
 Benchmark elevation: _____
 Benchmark description: _____

B. SOIL BORING INFORMATION

Name & Address of Construction Company: _____
Cascade Drilling, LP
301 Alderson St
Schofield, WI 54476
 Name of Driller: Mike Mueller
 Drilling Method: HSA
 Drilling Fluid: NA
 Bore Hole Diameter: 8 inch
 Soil Sampling Method: Spoon
 Depth of Boring: 28 ft

C. MONITORING WELL INSTALLATION

<p>Casing material: <u>PVC sch 40</u> Length of casing: <u>22 ft</u> Outside casing diameter: <u>2.38"</u> Inside casing diameter: <u>2"</u> Casing joint type: <u>threaded</u> Casing/screen joint type: <u>threaded</u> Screen material: <u>PVC</u> Screen opening size: <u>0.010"</u> Screen length: <u>5 ft</u> Depth of well: <u>27 ft</u> Filter Pack: _____ Material: <u>Red Flint</u> Grain size: <u>#40</u> Volume: <u>200 lbs</u> Seal (minimum 3 ft length above filter pack): _____ Material: <u>3/8 inch bentonite chips</u></p>	<p>Placement method: <u>Gravity</u> Volume: <u>250 lbs</u> Backfill (if different from seal): _____ Material: _____ Placement method: _____ Volume: _____ Surface seal design: _____ Material of protective casing: <u>Steel 6 inch</u> Material of grout between protective casing and well casing: <u>sand</u> Protective cap: _____ Material: <u>Steel, vented</u> Vented: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Locking: <input type="checkbox"/> Yes <input type="checkbox"/> No Well Cap: _____ Material: <u>PVC</u> Vented: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
--	---

D. GROUNDWATER MEASUREMENT (± 0.01 ft below top of inner well casing)

Water level: 8.12 Stabilization Time: 5 minutes
 Well development method: surged with bailer and pumped
 Average depth of frostline: 3.5'

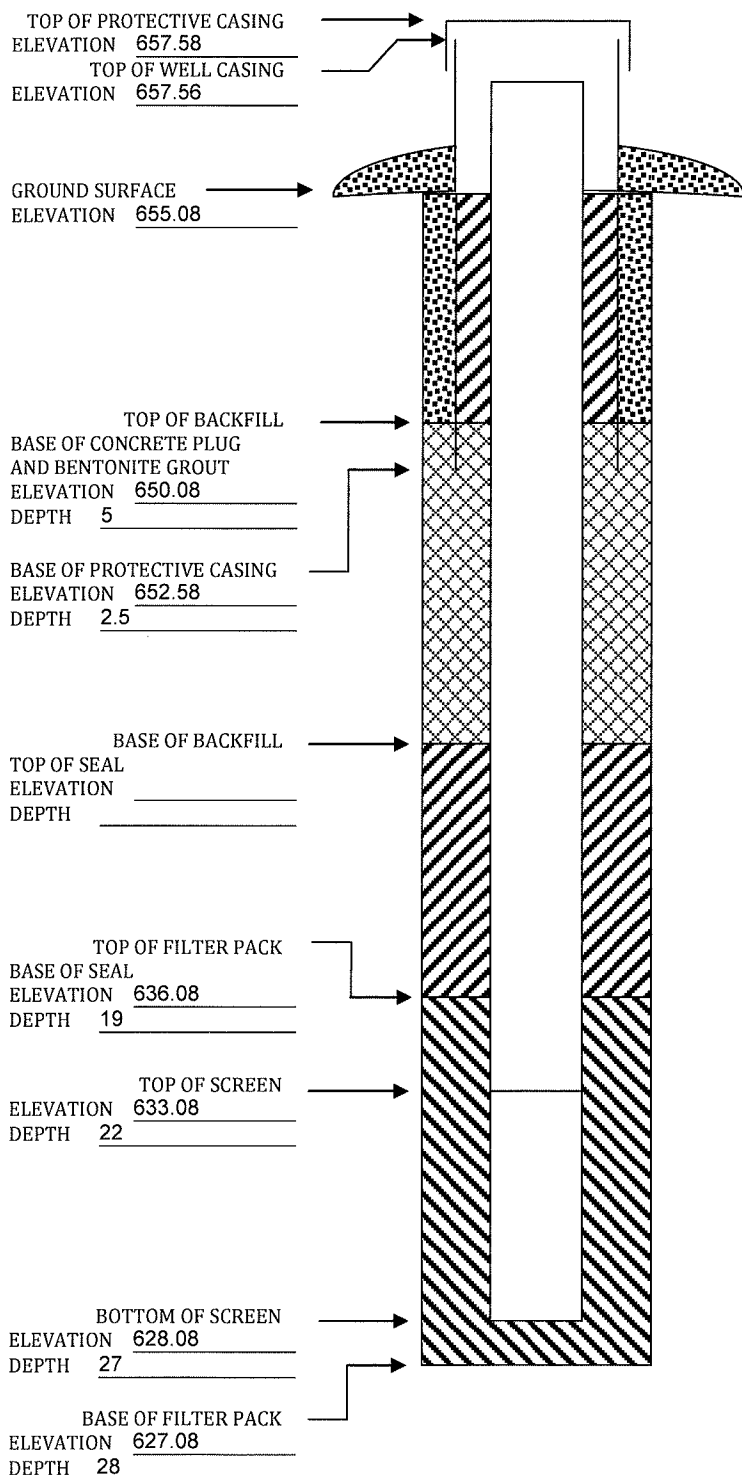
Attachments: Driller's log, Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.

Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

ELEVATIONS: ± 0.01 ft MSL
DEPTHS: ± 0.1 ft FROM GROUND SURFACE

SPACE TO ATTACH ENTIRE SOIL BORING LOG
(SHOW SCREENED INTERVAL AND FILTER PACK INTERVAL.)





IOWA DEPARTMENT OF NATURAL RESOURCES
MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name: IPL - Ottumwa Generating Station Permit No.: _____
 Well or Piezometer No: MW-308
 Dates Started: 10/26/16 Date Completed: 10/26/16

A. SURVEYED LOCATIONS AND ELEVATIONS

Locations (± 0.5 ft): _____
 Specify corner of site: SW of Parcel 0030502620203000
 Distance & direction along boundary: 158' E
 Distance & direction from boundary to wall: 417' N
 Elevations (± 0.01 ft MSL): _____
 Ground Surface: 652.87
 Top of protective casing: 655.23
 Top of well casing: _____ 655.39
 Benchmark elevation: _____
 Benchmark description: _____

B. SOIL BORING INFORMATION

Name & Address of Construction Company: _____
Cascade Drilling, LP
301 Alderson St
Schofield, WI 54476
 Name of Driller: Mike Mueller
 Drilling Method: HSA
 Drilling Fluid: NA
 Bore Hole Diameter: 8 inch
 Soil Sampling Method: Spoon
 Depth of Boring: 25 ft

C. MONITORING WELL INSTALLATION

<p>Casing material: <u>PVC sch 40</u> Length of casing: <u>19 ft</u> Outside casing diameter: <u>2.38"</u> Inside casing diameter: <u>2"</u> Casing joint type: <u>threaded</u> Casing/screen joint type: <u>threaded</u> Screen material: <u>PVC</u> Screen opening size: <u>0.010"</u> Screen length: <u>5 ft</u> Depth of well: <u>24 ft</u> Filter Pack: _____ Material: <u>Red Flint</u> Grain size: <u>#40</u> Volume: <u>200 lbs</u> Seal (minimum 3 ft length above filter pack): _____ Material: <u>3/8 inch bentonite chips</u></p>	<p>Placement method: <u>Gravity</u> Volume: <u>200 lbs</u> Backfill (if different from seal): _____ Material: _____ Placement method: _____ Volume: _____ Surface seal design: _____ Material of protective casing: <u>Steel 6 inch</u> Material of grout between protective casing and well casing: <u>sand</u> Protective cap: _____ Material: <u>Steel, vented</u> Vented: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Locking: <input type="checkbox"/> Yes <input type="checkbox"/> No Well Cap: _____ Material: <u>PVC</u> Vented: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
--	---

D. GROUNDWATER MEASUREMENT (± 0.01 ft below top of inner well casing)

Water level: 9.85 Stabilization Time: 5 minutes
 Well development method: surged with bailer and pumped
 Average depth of frostline: 3.5'

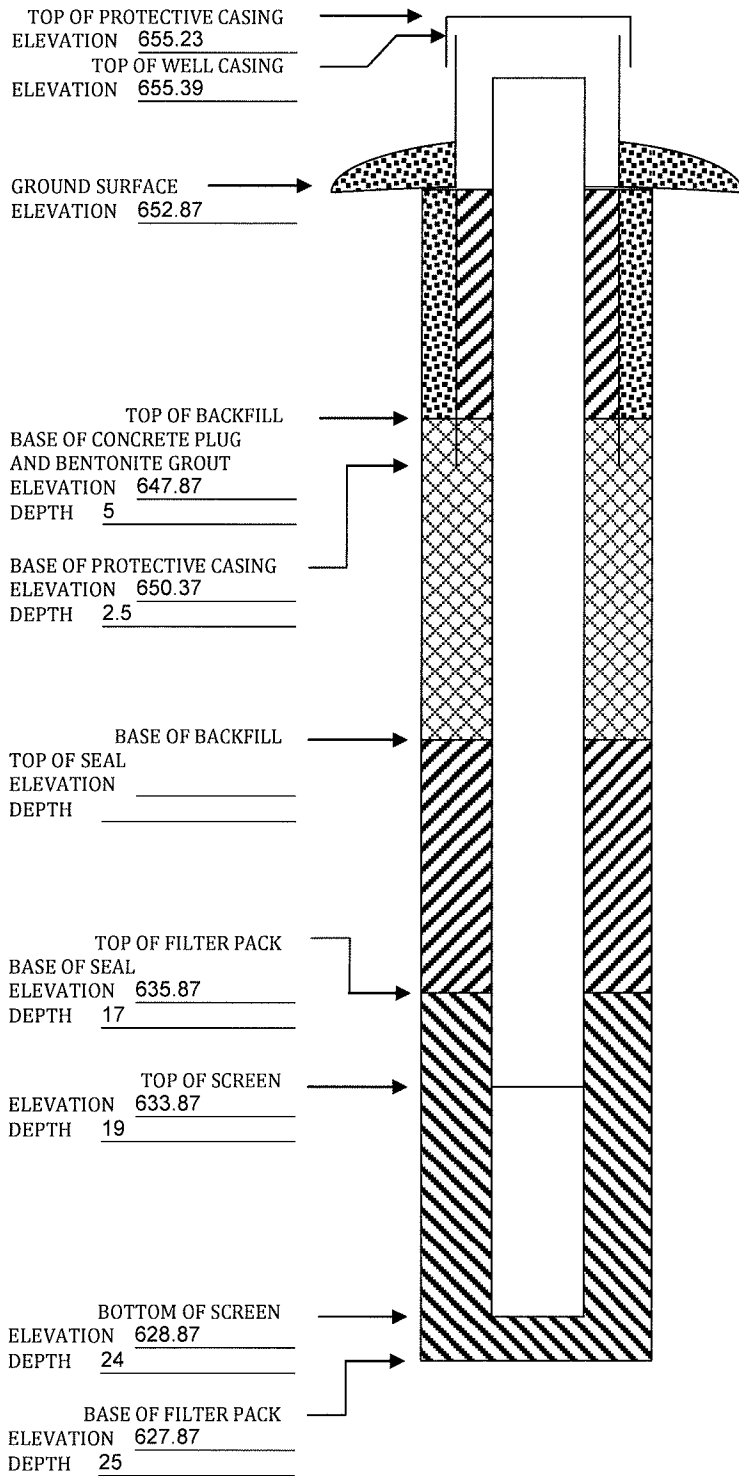
Attachments: Driller's log. Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.

Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

ELEVATIONS: ± 0.01 ft MSL
DEPTHS: ± 0.1 ft FROM GROUND SURFACE

SPACE TO ATTACH ENTIRE SOIL BORING LOG
(SHOW SCREENED INTERVAL AND FILTER PACK INTERVAL.)





IOWA DEPARTMENT OF NATURAL RESOURCES
MONITORING WELL/PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name: IPL - Ottumwa Generating Station Permit No.: _____

Well or Piezometer No: MW-309

Dates Started: 10/27/16 Date Completed: 10/27/16

A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations (± 0.5 ft): _____	Name & Address of Construction Company: _____
Specify corner of site: <u>NE of Parcel 003052620204000</u>	<u>Cascade Drilling, LP</u>
Distance & direction along boundary: <u>480' W</u>	<u>301 Alderson St</u>
Distance & direction from boundary to wall: <u>438' S</u>	<u>Schofield, WI 54476</u>
Elevations (± 0.01 ft MSL): _____	Name of Driller: <u>Mike Mueller</u>
Ground Surface: <u>652.45</u>	Drilling Method: <u>HSA</u>
Top of protective casing: <u>654.97</u>	Drilling Fluid: <u>NA</u>
Top of well casing: _____ <u>654.94</u>	Bore Hole Diameter: <u>8 inch</u>
Benchmark elevation: _____	Soil Sampling Method: <u>Spoon</u>
Benchmark description: _____	Depth of Boring: <u>27.5 ft</u>

C. MONITORING WELL INSTALLATION	
Casing material: <u>PVC sch 40</u>	Placement method: <u>Gravity</u>
Length of casing: <u>21.5 ft</u>	Volume: <u>600 lbs</u>
Outside casing diameter: <u>2.38"</u>	Backfill (if different from seal): _____
Inside casing diameter: <u>2"</u>	Material: _____
Casing joint type: <u>threaded</u>	Placement method: _____
Casing/screen joint type: <u>threaded</u>	Volume: _____
Screen material: <u>PVC</u>	Surface seal design: _____
Screen opening size: <u>0.010"</u>	Material of protective casing: <u>Steel 6 inch</u>
Screen length: <u>5 ft</u>	Material of grout between protective casing and well casing: <u>sand</u>
Depth of well: <u>26.5 ft</u>	Protective cap: _____
Filter Pack: _____	Material: <u>Steel, vented</u>
Material: <u>Red Flint</u>	Vented: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Locking: <input type="checkbox"/> Yes <input type="checkbox"/> No
Grain size: <u>#40</u>	Well Cap: _____
Volume: <u>200 lbs</u>	Material: <u>PVC</u>
Seal (minimum 3 ft length above filter pack): _____	Vented: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Material: <u>3/8 inch bentonite chips</u>	

D. GROUNDWATER MEASUREMENT (± 0.01 ft below top of inner well casing)	
Water level: <u>9.87</u>	Stabilization Time: <u>5 minutes</u>
Well development method: <u>surged with bailer and pumped</u>	
Average depth of frostline: <u>3.5'</u>	

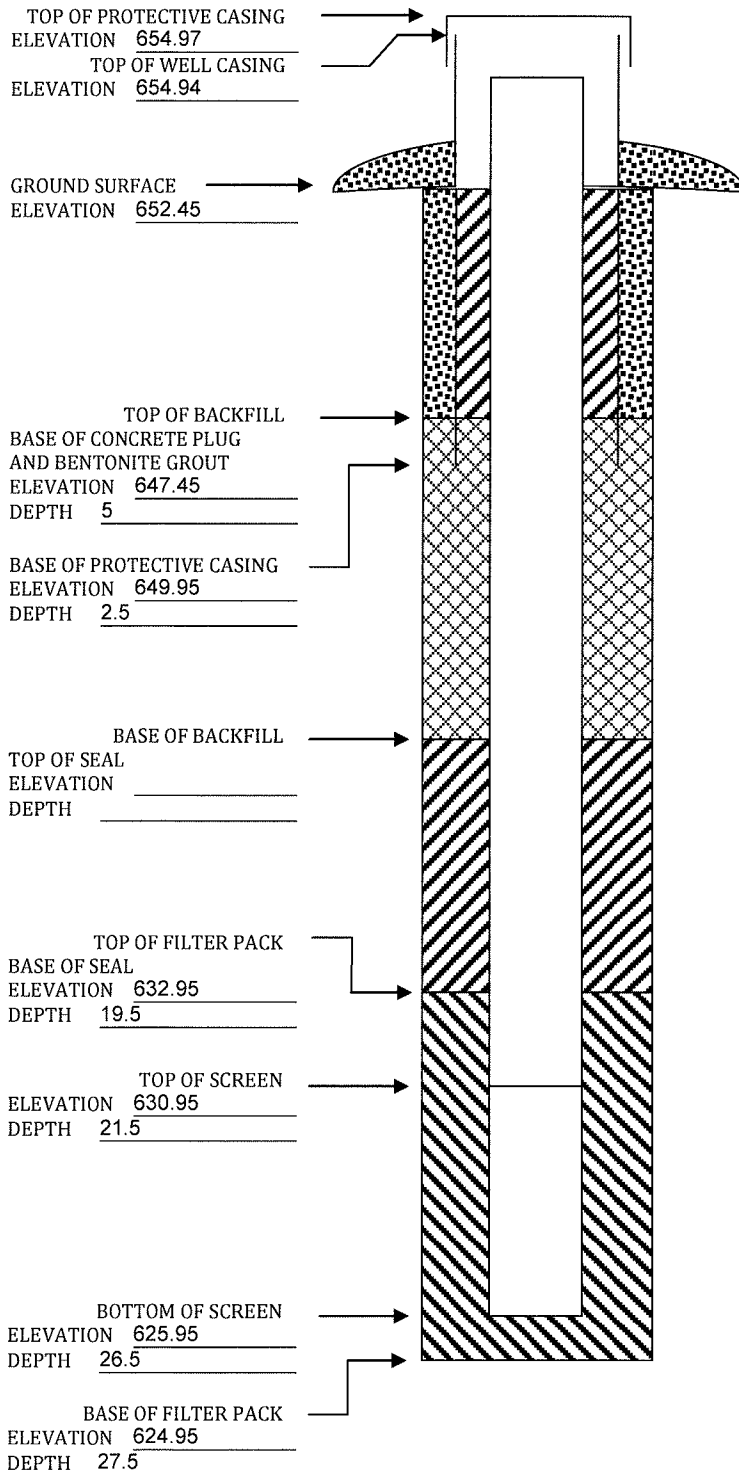
Attachments: Driller's log, Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.

Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

ELEVATIONS: ± 0.01 ft MSL
DEPTHS: ± 0.1 ft FROM GROUND SURFACE

SPACE TO ATTACH ENTIRE SOIL BORING LOG
(SHOW SCREENED INTERVAL AND FILTER PACK INTERVAL.)



MONITORING WELL / PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name IPL - Ottumwa Generating Station Permit No. 60288
Well or Piezometer No. MW-315 Dates Started 11/29/2022 Date Completed 11/29/2022

A. SURVEYED LOCATION AND ELEVATION OF POINT (+0.5 ft.)

Specify corner of site SE parcel 3052620204000 Distance and direction along boundary 346' north
Distance and direction from boundary to surface monitoring well 77' west
Elevation (+0.01 ft. MSL) _____
Ground Surface 653.06' Top of protective casing 655.92'
Top of well casing 655.65' Benchmark elevation _____
Benchmark description _____

B. SOIL BORING INFORMATION

Construction Company Name Direct Push Analytical
Address 4N99 Old Ladox Rd. Unit E. City, State, Zip Code Saint Charles IL. 60175
Name of driller Bryan Kinzer
Drilling method Geoprobe/HSA Drilling fluid None Bore Hole diameter 8.25"
Soil sampling method Geoprobed/bagged Depth of boring 25

C. MONITORING WELL INSTALLATION


Casing material Sch. 40 PVC Placement method Poured
Length of casing 22.59' Volume 4 cu. ft.
Outside casing diameter 2.4" Backfill (if different from seal): _____
Inside casing diameter 2.04" Material _____
Casing joint type Threaded Placement method _____
Casing/screen joint type Threaded Volume _____
Screen material Sch. 40 PVC Surface seal design: _____
Screen opening size 0.01" Material of protective casing: Steel
Screen length 5' Material of grout between
Depth of Well 24' below ground surface protective casing and well casing: Bentonite chips and sand
Filter Pack: _____ Protective cap: _____
Material R.W. Sidley filter sand Material Steel
Grain Size #5 Vented?: Y N Locking?: Y N
Volume 3.5 bags/1.75 Ft³ Well cap: _____
Seal (minimum 3 ft. length above filter pack): _____ Material Plastic
Material 3/8" Bentonite Chips Vented?: Y N

D. GROUNDWATER MEASUREMENT (± 0.01 foot below top of inner well casing)

Water level 14.25' Stabilization time 65 minutes
Well development method Surged and pumped
Average depth of frost line 4.5'

DRILLER'S CERTIFICATION

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

Signature  Certification # 8498 Date 2-6-2023

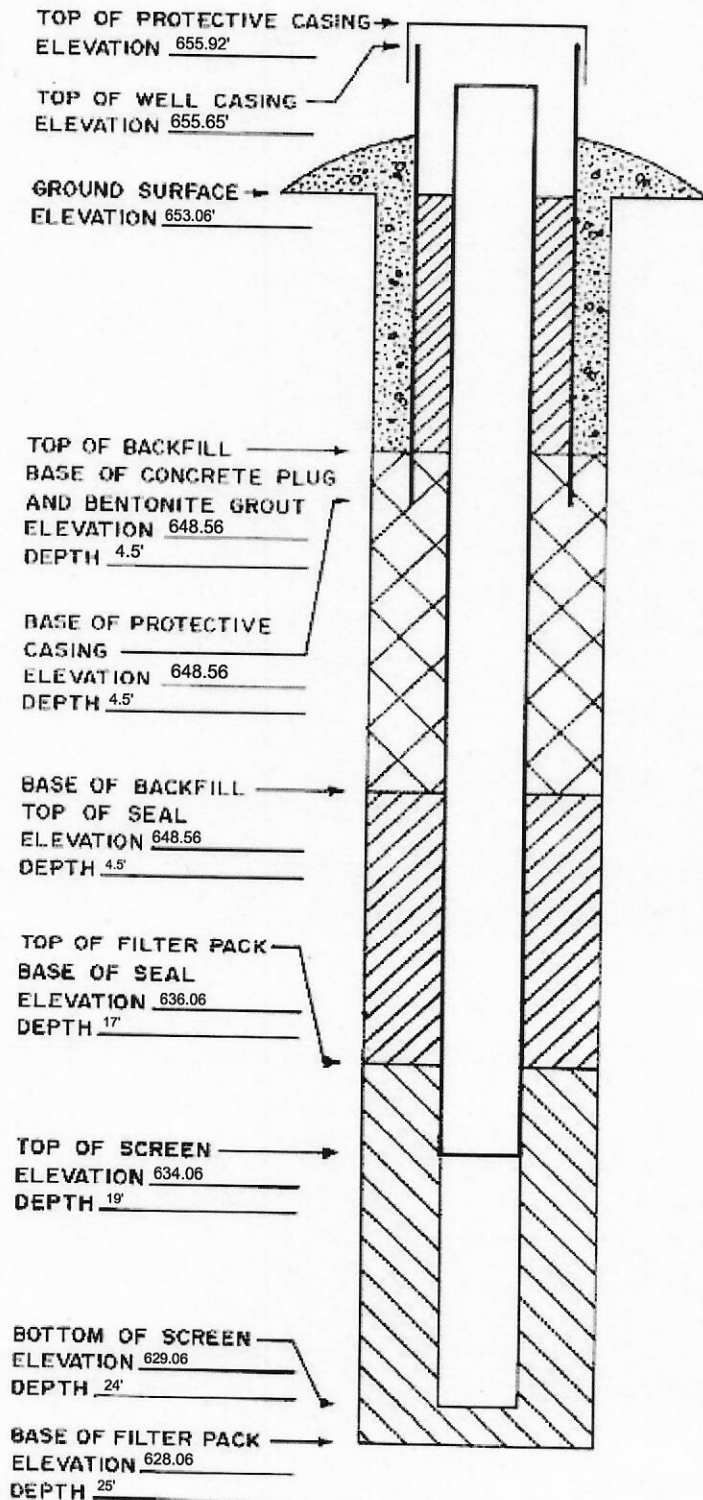
Attachments: Driller's log. Pipe schedules and grouting schedules. 8 1/2 inch x 11 inch map showing locations of all monitoring wells and piezometers.


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

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

ELEVATIONS: \pm 0.01 FT. MSL
DEPTHS: \pm 0.1 FT. FROM
GROUND SURFACE

SPACE TO ATTACH ENTIRE SOIL BORING LOG
(SHOW SCREENED INTERVAL AND FILTER PACK INTERVAL).





Appendix C
Analytical Laboratory Reports

C1 February 2022 Supplemental Assessment Monitoring

ANALYTICAL REPORT

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

Laboratory Job ID: 310-225358-1

Client Project/Site: Ottumwa Generating Station - 25222072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:
3/8/2022 10:25:05 AM*

Sandie Fredrick, Project Manager II
(920)261-1660
sandra.fredrick@eurofinset.com

LINKS

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results through
Total Access

Have a Question?



Visit us at:

www.eurofinsus.com/Env

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

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



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Chain of Custody	13
Receipt Checklists	15
Field Data Sheets	16

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-225358-1

Job ID: 310-225358-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-225358-1

Comments

No additional comments.

Receipt

The sample was received on 2/16/2022 4:45 PM. Unless otherwise noted below, the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was -0.1° C.

Metals

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

Narrative

Job Narrative
310-225358-2

Comments

Added field data

Receipt

The sample was received on 2/16/2022 4:45 PM. Unless otherwise noted below, the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was -0.1° C.

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

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-225358-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-225358-1	MW-307	Ground Water	02/14/22 12:35	02/16/22 16:45

1

2

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Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-225358-1

Client Sample ID: MW-307

Lab Sample ID: 310-225358-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cobalt	24		0.50	0.19	ug/L	1		6020A	Total/NA
Ground Water Elevation	645.82				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-51.0				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.97				mg/L	1		Field Sampling	Total/NA
pH, Field	7.03				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1810				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	12.25				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	0.00				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-225358-1

Client Sample ID: MW-307
 Date Collected: 02/14/22 12:35
 Date Received: 02/16/22 16:45

Lab Sample ID: 310-225358-1
 Matrix: Ground Water

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	24		0.50	0.19	ug/L		02/18/22 09:00	02/21/22 20:47	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	645.82				ft			02/14/22 12:35	1
Oxidation Reduction Potential	-51.0				millivolts			02/14/22 12:35	1
Oxygen, Dissolved, Client Supplied	0.97				mg/L			02/14/22 12:35	1
pH, Field	7.03				SU			02/14/22 12:35	1
Specific Conductance, Field	1810				umhos/cm			02/14/22 12:35	1
Temperature, Field	12.25				Degrees C			02/14/22 12:35	1
Turbidity, Field	0.00				NTU			02/14/22 12:35	1

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Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-225358-1

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-225358-1

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-344287/1-A
Matrix: Water
Analysis Batch: 344583

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 344287

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.19		0.50	0.19	ug/L		02/18/22 09:00	02/21/22 20:38	1

Lab Sample ID: LCS 310-344287/2-A
Matrix: Water
Analysis Batch: 344583

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 344287

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cobalt	100	97.1		ug/L		97	80 - 120

Lab Sample ID: 310-225358-1 MS
Matrix: Ground Water
Analysis Batch: 344583

Client Sample ID: MW-307
Prep Type: Total/NA
Prep Batch: 344287

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cobalt	24		100	122		ug/L		98	75 - 125

Lab Sample ID: 310-225358-1 MSD
Matrix: Ground Water
Analysis Batch: 344583

Client Sample ID: MW-307
Prep Type: Total/NA
Prep Batch: 344287

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cobalt	24		100	121		ug/L		96	75 - 125	1	20

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QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-225358-1

Metals

Prep Batch: 344287

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-225358-1	MW-307	Total/NA	Ground Water	3005A	
MB 310-344287/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-344287/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-225358-1 MS	MW-307	Total/NA	Ground Water	3005A	
310-225358-1 MSD	MW-307	Total/NA	Ground Water	3005A	

Analysis Batch: 344583

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-225358-1	MW-307	Total/NA	Ground Water	6020A	344287
MB 310-344287/1-A	Method Blank	Total/NA	Water	6020A	344287
LCS 310-344287/2-A	Lab Control Sample	Total/NA	Water	6020A	344287
310-225358-1 MS	MW-307	Total/NA	Ground Water	6020A	344287
310-225358-1 MSD	MW-307	Total/NA	Ground Water	6020A	344287

Field Service / Mobile Lab

Analysis Batch: 345858

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-225358-1	MW-307	Total/NA	Ground Water	Field Sampling	

Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-225358-1

Client Sample ID: MW-307
Date Collected: 02/14/22 12:35
Date Received: 02/16/22 16:45

Lab Sample ID: 310-225358-1
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			344287	02/18/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	344583	02/21/22 20:47	SAP	TAL CF
Total/NA	Analysis	Field Sampling		1	345858	02/14/22 12:35	SJF	TAL CF

Laboratory References:

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

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Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-225358-1

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-21 *

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

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-225358-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS)	SW846	TAL CF
3005A	Preparation, Total Metals	SW846	TAL CF

Protocol References:

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

Laboratory References:

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





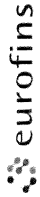
Environment Testing
America



310-225358 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS</u>			
City/State:	CITY <u>Madison</u>	STATE <u>WI</u>	Project:
Receipt Information			
Date/Time Received:	DATE <u>2-16-22</u>	TIME <u>1645</u>	Received By: <u>PL</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____
Multiple Coolers?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____
Cooler Custody Seals Present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>0</u>		Correction Factor (°C): <u>0</u>	
* Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>-0.1</u>		Corrected Temp (°C): <u>-0.1</u>	
Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Environmental Consulting
TestAmerica

Cedar Falls Division
3019 Venture Way
Cedar Falls, IA 50613

Phone 319 - 277 - 2401 or 1 - 800 - 750 - 2401
Fax 319 - 277 - 2425

Company: **SCS Engineers**

Your PO #: **25221072**

Send Report To **Meghan Blodgett**

Invoice To

Address **2830 Dairy Drive**

City/State/Zip Code **Madison, WI, 53718**

Project Name **Ottumwa Generating Station**

Telephone Number:

Project Number: **25221072**

Sampled by (Print Name) **Rosa Cruz**

Email Address **Mblodgett@scsengineers.com**

(Signature)

CC

Sample ID	Date Sampled	Time Sampled	# of containers shipped	Grab	Composite	Field Filtered	Preservative									Matrix							Analyze For	RUSH TAT (Must call ahead)	Standard TAT	E-mail results	Fax Results	Send QC with report									
							Ice	HNO ₃ (Red & White Label)	HCl (Blue & White Label)	NaOH (Orange & White Label)	H ₂ SO ₄ Plastic (Yellow & White Label)	H ₂ SO ₄ Glass (Yellow & White Label)	None (Black & White Label)	Other (Specify)	Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other Specify Stormwater	6020A - Metals (5) CO																
MMV-307	2-14-22	12:35	1	X																																	

NOTES: Please fill in shaded areas

NOTE: All turn around times are calculated from the time of receipt at TestAmerica
NOTICE: Pre-Arrangements must be made AT LEAST 48 Hours in ADVANCE to receive results with RUSH turn around time commitments; additional charges may be assessed.
NOTE: There may be a charge assessed for TestAmerica disposing of sample remainders

Relinquished by _____ Received by _____

Date: 2-16-22 Date: _____

Time: _____ Time: _____

Relinquished by _____ Relinquished by _____

Date: _____ Date: _____

Time: _____ Time: _____

Relinquished by _____

Date: _____

Time: _____

Shipped Via _____ Shipped Via _____

Received for TestAmerica by _____ Temperature Upon Receipt _____

Comments: _____

1645



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-225358-2

SDG Number:

Login Number: 225358

List Number: 1

Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	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 <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Table 1. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station / SCS Engineers Project No. 25222072.00
February 2022

Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmhos/cm)	ORP (mV)	Turbidity
MW-307	2/14/2022 1233	645.82	12.25	7.03	0.97	1810	-51.0	0.00

Abbreviations:

mg/L = milligrams per liter

amsl = above mean sea level

NA = Not Analyzed

NM= Not Measured

Created by: KAK
 Last revision by: RM
 Checked by: JAO

Date: 5/1/2017
 Date: 3/7/2022
 Date: 3/7/2022

C:\Users\FredrickS\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\D8427408\[2022_February - OGS ZLDP_CCR_Field.xlsx]GW Field Parameters

C2 April 2022 Assessment Monitoring

ANALYTICAL REPORT

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

Laboratory Job ID: 310-229347-1

Client Project/Site: Ottumwa Generating Station 25222072
Revision: 1

For:
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:
5/13/2022 3:17:42 PM

Sandie Fredrick, Project Manager II
(920)261-1660
Sandra.Fredrick@et.eurofinsus.com

LINKS

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results through
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www.eurofinsus.com/Env

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

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



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Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-1

Job ID: 310-229347-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-229347-1

Comments

No additional comments.

Revision

The report being provided is a revision of the original report sent on 5/9/2022. The report (revision 1) is being revised due to: Client requested reanalysis of Antimony due to possible carryover.

Receipt

The samples were received on 4/15/2022 5:10 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.8° C.

HPLC/IC

Method 9056A: The following sample was diluted due to the nature of the sample matrix: MW-301 (310-229347-1). 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 analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

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

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-229347-1	MW-301	Water	04/12/22 08:41	04/15/22 17:10
310-229347-2	Field Blank	Water	04/14/22 16:25	04/15/22 17:10

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Detection Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-1

Client Sample ID: MW-301

Lab Sample ID: 310-229347-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	140		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	160		5.0	2.0	mg/L	5		9056A	Total/NA
Barium	40		2.0	0.88	ug/L	1		6020A	Total/NA
Boron	640		100	58	ug/L	1		6020A	Total/NA
Calcium	92		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.23	J	0.50	0.19	ug/L	1		6020A	Total/NA
Lithium	19		10	2.5	ug/L	1		6020A	Total/NA
Selenium	6.0		5.0	0.96	ug/L	1		6020A	Total/NA
Total Dissolved Solids	610		50	26	mg/L	1		SM 2540C	Total/NA
pH	6.6	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	682.08				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	117.6				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	3.26				mg/L	1		Field Sampling	Total/NA
pH, Field	6.37				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	976				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	7.4				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	5.03				NTU	1		Field Sampling	Total/NA

Client Sample ID: Field Blank

Lab Sample ID: 310-229347-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
pH	5.9	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-1

Client Sample ID: MW-301

Lab Sample ID: 310-229347-1

Date Collected: 04/12/22 08:41

Matrix: Water

Date Received: 04/15/22 17:10

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	140		5.0	2.3	mg/L			04/26/22 20:12	5
Fluoride	<0.22		0.50	0.22	mg/L			04/26/22 20:12	5
Sulfate	160		5.0	2.0	mg/L			04/26/22 20:12	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.69		2.0	0.69	ug/L		04/25/22 09:00	05/07/22 16:30	1
Arsenic	<0.75		2.0	0.75	ug/L		04/25/22 09:00	04/29/22 18:54	1
Barium	40		2.0	0.88	ug/L		04/25/22 09:00	04/29/22 18:54	1
Beryllium	<0.27		1.0	0.27	ug/L		04/25/22 09:00	04/29/22 18:54	1
Boron	640		100	58	ug/L		04/25/22 09:00	04/29/22 18:54	1
Cadmium	<0.055		0.10	0.055	ug/L		04/25/22 09:00	04/29/22 18:54	1
Calcium	92		0.50	0.19	mg/L		04/25/22 09:00	04/29/22 18:54	1
Chromium	<1.1		5.0	1.1	ug/L		04/25/22 09:00	04/29/22 18:54	1
Cobalt	0.23	J	0.50	0.19	ug/L		04/25/22 09:00	04/29/22 18:54	1
Lead	<0.24		0.50	0.24	ug/L		04/25/22 09:00	04/29/22 18:54	1
Lithium	19		10	2.5	ug/L		04/25/22 09:00	04/29/22 18:54	1
Molybdenum	<1.2		2.0	1.2	ug/L		04/25/22 09:00	04/29/22 18:54	1
Selenium	6.0		5.0	0.96	ug/L		04/25/22 09:00	04/29/22 18:54	1
Thallium	<0.26		1.0	0.26	ug/L		04/25/22 09:00	04/29/22 18:54	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.11		0.20	0.11	ug/L		04/27/22 13:20	04/28/22 14:38	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	610		50	26	mg/L			04/19/22 15:09	1
pH	6.6	HF	0.1	0.1	SU			04/18/22 12:06	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	682.08				ft			04/12/22 08:41	1
Oxidation Reduction Potential	117.6				millivolts			04/12/22 08:41	1
Oxygen, Dissolved, Client Supplied	3.26				mg/L			04/12/22 08:41	1
pH, Field	6.37				SU			04/12/22 08:41	1
Specific Conductance, Field	976				umhos/cm			04/12/22 08:41	1
Temperature, Field	7.4				Degrees C			04/12/22 08:41	1
Turbidity, Field	5.03				NTU			04/12/22 08:41	1

Client Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-1

Client Sample ID: Field Blank

Lab Sample ID: 310-229347-2

Date Collected: 04/14/22 16:25

Matrix: Water

Date Received: 04/15/22 17:10

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.45		1.0	0.45	mg/L			04/26/22 20:28	1
Fluoride	<0.044		0.10	0.044	mg/L			04/26/22 20:28	1
Sulfate	<0.40		1.0	0.40	mg/L			04/26/22 20:28	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.69		2.0	0.69	ug/L		04/25/22 09:00	05/13/22 14:00	1
Arsenic	<0.75		2.0	0.75	ug/L		04/25/22 09:00	04/29/22 18:58	1
Barium	<0.88		2.0	0.88	ug/L		04/25/22 09:00	04/29/22 18:58	1
Beryllium	<0.27		1.0	0.27	ug/L		04/25/22 09:00	04/29/22 18:58	1
Boron	<58		100	58	ug/L		04/25/22 09:00	04/29/22 18:58	1
Cadmium	<0.055		0.10	0.055	ug/L		04/25/22 09:00	04/29/22 18:58	1
Calcium	<0.19		0.50	0.19	mg/L		04/25/22 09:00	04/29/22 18:58	1
Chromium	<1.1		5.0	1.1	ug/L		04/25/22 09:00	04/29/22 18:58	1
Cobalt	<0.19		0.50	0.19	ug/L		04/25/22 09:00	04/29/22 18:58	1
Lead	<0.24		0.50	0.24	ug/L		04/25/22 09:00	04/29/22 18:58	1
Lithium	<2.5		10	2.5	ug/L		04/25/22 09:00	04/29/22 18:58	1
Molybdenum	<1.2		2.0	1.2	ug/L		04/25/22 09:00	04/29/22 18:58	1
Selenium	<0.96		5.0	0.96	ug/L		04/25/22 09:00	04/29/22 18:58	1
Thallium	<0.26		1.0	0.26	ug/L		04/25/22 09:00	04/29/22 18:58	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.11		0.20	0.11	ug/L		04/27/22 13:20	04/28/22 14:41	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<26		50	26	mg/L			04/20/22 14:22	1
pH	5.9	HF	0.1	0.1	SU			04/18/22 12:07	1

Eurofins Cedar Falls

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

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

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-351278/3
Matrix: Water
Analysis Batch: 351278

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

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Chloride	<0.45		1.0	0.45	mg/L			04/26/22 16:34	1
Fluoride	<0.044		0.10	0.044	mg/L			04/26/22 16:34	1
Sulfate	<0.40		1.0	0.40	mg/L			04/26/22 16:34	1

Lab Sample ID: LCS 310-351278/4
Matrix: Water
Analysis Batch: 351278

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

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec	Limits
		Result	Qualifier					
Chloride	10.0	9.37		mg/L		94		90 - 110
Fluoride	2.00	2.09		mg/L		105		90 - 110
Sulfate	10.0	9.67		mg/L		97		90 - 110

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-350868/1-A
Matrix: Water
Analysis Batch: 351583

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 350868

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	<0.75		2.0	0.75	ug/L		04/25/22 09:00	04/29/22 16:53	1
Barium	<0.88		2.0	0.88	ug/L		04/25/22 09:00	04/29/22 16:53	1
Beryllium	<0.27		1.0	0.27	ug/L		04/25/22 09:00	04/29/22 16:53	1
Boron	<58		100	58	ug/L		04/25/22 09:00	04/29/22 16:53	1
Cadmium	<0.055		0.10	0.055	ug/L		04/25/22 09:00	04/29/22 16:53	1
Calcium	<0.19		0.50	0.19	mg/L		04/25/22 09:00	04/29/22 16:53	1
Chromium	<1.1		5.0	1.1	ug/L		04/25/22 09:00	04/29/22 16:53	1
Cobalt	<0.19		0.50	0.19	ug/L		04/25/22 09:00	04/29/22 16:53	1
Lead	<0.24		0.50	0.24	ug/L		04/25/22 09:00	04/29/22 16:53	1
Lithium	<2.5		10	2.5	ug/L		04/25/22 09:00	04/29/22 16:53	1
Molybdenum	<1.2		2.0	1.2	ug/L		04/25/22 09:00	04/29/22 16:53	1
Selenium	<0.96		5.0	0.96	ug/L		04/25/22 09:00	04/29/22 16:53	1
Thallium	<0.26		1.0	0.26	ug/L		04/25/22 09:00	04/29/22 16:53	1

Lab Sample ID: MB 310-350868/1-A
Matrix: Water
Analysis Batch: 352391

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 350868

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Antimony	<0.69		2.0	0.69	ug/L		04/25/22 09:00	05/07/22 15:32	1

Lab Sample ID: LCS 310-350868/2-A
Matrix: Water
Analysis Batch: 351583

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 350868

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec	Limits
		Result	Qualifier					
Arsenic	200	232		ug/L		116		80 - 120
Barium	100	109		ug/L		109		80 - 120
Beryllium	100	109		ug/L		109		80 - 120
Boron	200	215		ug/L		108		80 - 120

Eurofins Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-1

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

Lab Sample ID: LCS 310-350868/2-A
 Matrix: Water
 Analysis Batch: 351583

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 350868

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cadmium	100	111		ug/L		111	80 - 120
Calcium	2.00	2.05		mg/L		103	80 - 120
Chromium	100	110		ug/L		110	80 - 120
Cobalt	100	108		ug/L		108	80 - 120
Lead	200	219		ug/L		110	80 - 120
Lithium	200	221		ug/L		110	80 - 120
Molybdenum	200	215		ug/L		107	80 - 120
Selenium	400	427		ug/L		107	80 - 120
Thallium	200	219		ug/L		109	80 - 120

Lab Sample ID: LCS 310-350868/2-A
 Matrix: Water
 Analysis Batch: 352391

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 350868

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	200	215		ug/L		107	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-351241/1-A
 Matrix: Water
 Analysis Batch: 351414

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 351241

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.11		0.20	0.11	ug/L		04/27/22 13:20	04/28/22 14:09	1

Lab Sample ID: LCS 310-351241/2-A
 Matrix: Water
 Analysis Batch: 351414

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 351241

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	1.67	1.65		ug/L		99	80 - 120

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

Lab Sample ID: MB 310-350365/1
 Matrix: Water
 Analysis Batch: 350365

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	<26		50	26	mg/L			04/19/22 15:09	1

Lab Sample ID: MB 310-350518/1
 Matrix: Water
 Analysis Batch: 350518

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	<26		50	26	mg/L			04/20/22 14:22	1

Eurofins Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-1

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

Lab Sample ID: LCS 310-350518/2
 Matrix: Water
 Analysis Batch: 350518

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	946		mg/L		95	90 - 110

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-350217/28
 Matrix: Water
 Analysis Batch: 350217

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

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

- 1
- 2
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- 13
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QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-1

HPLC/IC

Analysis Batch: 351278

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229347-1	MW-301	Total/NA	Water	9056A	
310-229347-2	Field Blank	Total/NA	Water	9056A	
MB 310-351278/3	Method Blank	Total/NA	Water	9056A	
LCS 310-351278/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 350868

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229347-1	MW-301	Total/NA	Water	3005A	
310-229347-2	Field Blank	Total/NA	Water	3005A	
MB 310-350868/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-350868/2-A	Lab Control Sample	Total/NA	Water	3005A	

Prep Batch: 351241

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229347-1	MW-301	Total/NA	Water	7470A	
310-229347-2	Field Blank	Total/NA	Water	7470A	
MB 310-351241/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-351241/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 351414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229347-1	MW-301	Total/NA	Water	7470A	351241
310-229347-2	Field Blank	Total/NA	Water	7470A	351241
MB 310-351241/1-A	Method Blank	Total/NA	Water	7470A	351241
LCS 310-351241/2-A	Lab Control Sample	Total/NA	Water	7470A	351241

Analysis Batch: 351583

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229347-1	MW-301	Total/NA	Water	6020A	350868
310-229347-2	Field Blank	Total/NA	Water	6020A	350868
MB 310-350868/1-A	Method Blank	Total/NA	Water	6020A	350868
LCS 310-350868/2-A	Lab Control Sample	Total/NA	Water	6020A	350868

Analysis Batch: 352391

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229347-1	MW-301	Total/NA	Water	6020A	350868
MB 310-350868/1-A	Method Blank	Total/NA	Water	6020A	350868
LCS 310-350868/2-A	Lab Control Sample	Total/NA	Water	6020A	350868

Analysis Batch: 353054

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229347-2	Field Blank	Total/NA	Water	6020A	350868

General Chemistry

Analysis Batch: 350217

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229347-1	MW-301	Total/NA	Water	SM 4500 H+ B	
310-229347-2	Field Blank	Total/NA	Water	SM 4500 H+ B	
LCS 310-350217/28	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Eurofins Cedar Falls

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-1

General Chemistry

Analysis Batch: 350365

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229347-1	MW-301	Total/NA	Water	SM 2540C	
MB 310-350365/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-350365/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Analysis Batch: 350518

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229347-2	Field Blank	Total/NA	Water	SM 2540C	
MB 310-350518/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-350518/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 351494

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229347-1	MW-301	Total/NA	Water	Field Sampling	

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- 13
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Lab Chronicle

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-1

Client Sample ID: MW-301

Lab Sample ID: 310-229347-1

Date Collected: 04/12/22 08:41

Matrix: Water

Date Received: 04/15/22 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	351278	04/26/22 20:12	JNR	TAL CF
Total/NA	Prep	3005A			350868	04/25/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	351583	04/29/22 18:54	SAP	TAL CF
Total/NA	Prep	3005A			350868	04/25/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	352391	05/07/22 16:30	SAP	TAL CF
Total/NA	Prep	7470A			351241	04/27/22 13:20	EAM	TAL CF
Total/NA	Analysis	7470A		1	351414	04/28/22 14:38	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	350365	04/19/22 15:09	TGF	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	350217	04/18/22 12:06	JAJ	TAL CF
Total/NA	Analysis	Field Sampling		1	351494	04/12/22 08:41	SLD	TAL CF

Client Sample ID: Field Blank

Lab Sample ID: 310-229347-2

Date Collected: 04/14/22 16:25

Matrix: Water

Date Received: 04/15/22 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1	351278	04/26/22 20:28	JNR	TAL CF
Total/NA	Prep	3005A			350868	04/25/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	351583	04/29/22 18:58	SAP	TAL CF
Total/NA	Prep	3005A			350868	04/25/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	353054	05/13/22 14:00	SAP	TAL CF
Total/NA	Prep	7470A			351241	04/27/22 13:20	EAM	TAL CF
Total/NA	Analysis	7470A		1	351414	04/28/22 14:41	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	350518	04/20/22 14:22	TGF	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	350217	04/18/22 12:07	JAJ	TAL CF

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-1

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-21 *

- 1
- 2
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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-1

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

Protocol References:

EPA = US Environmental Protection Agency

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

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

Laboratory References:

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





Environment Testing
America



310-229347 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client <u>SCS Engineers</u>			
City/State	CITY <u>Madison</u>	STATE <u>WI</u>	Project:
Receipt Information			
Date/Time Received	DATE <u>4/15/22</u>	TIME <u>1710</u>	Received By <u>MRH</u>
Delivery Type <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes Cooler ID _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other _____ <input type="checkbox"/> NONE		
Thermometer ID	<u>0-8 MRH 4/15/22</u>	Correction Factor (°C)	<u>00</u>
* Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C)	<u>1.8</u>	Corrected Temp (°C)	<u>1.8</u>
Sample Container Temperature			
Container(s) used	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C)			
Corrected Temp (°C)			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE If yes, contact PM before proceeding If no, proceed with login			
Additional Comments			

Chain of Custody Record

Client Information		Sampler: <u>Wasa CIVZ</u>		Lab P#:		Carrier Tracking No(s):	
Client Contact: Meghan Blodgett		Phone: <u>515-864-9340</u>		Fredrick, Sandie		COC No: <u>310-70155-17485.1</u>	
Company: SCS Engineers		PWSID:		E-Mail: Sandra.Fredrick@et.eurofins.com		Page: <u>Page 1 of 1</u>	
Address: 2830 Dairy Drive		Due Date Requested:		State of Origin:		Job #:	
City: Madison		TAT Requested (days):					
State, Zip: WI 53718		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					
Phone: 25221072		PO #:					
Email: mblodgett@scsengineers.com		WO #:					
Project Name: Ottumwa Generating Station		Project #:					
Site: 25221072		SSOW#:					

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (Water, Solid, Other)	Preservation Code:	Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)		Analysis Requested		Special Instructions/Note
						Y	N	Y	N	Y	N	
MW-301	4-12-22	8:41	G	Water				903.0 Radium-226 (GFC)	Y			
Field Blank	4-14-22	16:25	G	Water				904.0 Radium-228 (GFC)	Y			
								905A, ORGM, 28D Chloride, Fluoride & Sulfate	Y			
								6020A, 7470A	Y			
								2540C Calcd, SM4500-H+	N			
Total Number of Containers												

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

Special Instructions/QC Requirements:

Received by: <u>James Vaux</u>	Date/Time: <u>4/15/22 1358</u>	Company: <u>Eurofins IA</u>
Received by:	Date/Time:	Company:
Received by: <u>ML</u>	Date/Time: <u>4-15-22 1710</u>	Company:

Empty Kit Relinquished by: _____ Date: _____

Relinquished by: _____ Date/Time: _____ Company: _____

Relinquished by: _____ Date/Time: _____ Company: _____

Custody Seals Intact: _____ Custody Seal No. _____
 Yes No



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-229347-1

SDG Number:

Login Number: 229347

List Number: 1

Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

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



ANALYTICAL REPORT

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

Laboratory Job ID: 310-229341-1

Client Project/Site: Ottumwa Generating Station 25222072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:
5/3/2022 12:04:07 PM

Sandie Fredrick, Project Manager II
(920)261-1660
Sandra.Fredrick@et.eurofinsus.com

LINKS

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results through
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www.eurofinsus.com/Env

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

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



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Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229341-1

Job ID: 310-229341-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-229341-1

Comments

No additional comments.

Receipt

The samples were received on 4/15/2022 5:10 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.3° C.

Metals

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

General Chemistry

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

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Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229341-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-229341-1	MW-301	Water	04/12/22 08:41	04/15/22 17:10
310-229341-2	Field Blank	Water	04/14/22 16:25	04/15/22 17:10

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Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229341-1

Client Sample ID: MW-301

Lab Sample ID: 310-229341-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	36000		500	150	ug/L	1		6020A	Total/NA
Manganese	8.1	J	10	3.6	ug/L	1		6020A	Total/NA
Potassium	1100		500	150	ug/L	1		6020A	Total/NA
Sodium	89000		1000	610	ug/L	1		6020A	Total/NA
Manganese	5.0	J	10	3.6	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	190		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	190		10	4.6	mg/L	1		SM 2320B	Total/NA

Client Sample ID: Field Blank

Lab Sample ID: 310-229341-2

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229341-1

Client Sample ID: MW-301
 Date Collected: 04/12/22 08:41
 Date Received: 04/15/22 17:10

Lab Sample ID: 310-229341-1
 Matrix: Water

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		04/25/22 09:00	04/29/22 17:24	1
Magnesium	36000		500	150	ug/L		04/25/22 09:00	04/29/22 17:24	1
Manganese	8.1	J	10	3.6	ug/L		04/25/22 09:00	04/29/22 17:24	1
Potassium	1100		500	150	ug/L		04/25/22 09:00	04/29/22 17:24	1
Sodium	89000		1000	610	ug/L		04/25/22 09:00	04/29/22 17:24	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		04/26/22 09:30	05/02/22 17:15	1
Manganese	5.0	J	10	3.6	ug/L		04/26/22 09:30	05/02/22 17:15	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	190		10	4.6	mg/L			04/20/22 07:59	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			04/20/22 07:59	1
Total Alkalinity as CaCO3	190		10	4.6	mg/L			04/20/22 07:59	1



Client Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229341-1

Client Sample ID: Field Blank

Lab Sample ID: 310-229341-2

Date Collected: 04/14/22 16:25

Matrix: Water

Date Received: 04/15/22 17:10

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		04/25/22 09:00	04/29/22 17:28	1
Magnesium	<150		500	150	ug/L		04/25/22 09:00	04/29/22 17:28	1
Manganese	<3.6		10	3.6	ug/L		04/25/22 09:00	04/29/22 17:28	1
Potassium	<150		500	150	ug/L		04/25/22 09:00	04/29/22 17:28	1
Sodium	<610		1000	610	ug/L		04/25/22 09:00	04/29/22 17:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/25/22 10:59	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/25/22 10:59	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/25/22 10:59	1

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Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229341-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229341-1

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-350868/1-A
Matrix: Water
Analysis Batch: 351583

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 350868

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	<36		100	36	ug/L		04/25/22 09:00	04/29/22 16:53	1
Magnesium	<150		500	150	ug/L		04/25/22 09:00	04/29/22 16:53	1
Manganese	<3.6		10	3.6	ug/L		04/25/22 09:00	04/29/22 16:53	1
Potassium	<150		500	150	ug/L		04/25/22 09:00	04/29/22 16:53	1
Sodium	<610		1000	610	ug/L		04/25/22 09:00	04/29/22 16:53	1

Lab Sample ID: LCS 310-350868/2-A
Matrix: Water
Analysis Batch: 351583

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 350868

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Magnesium	2000	2220		ug/L		111	80 - 120
Manganese	100	108		ug/L		108	80 - 120
Potassium	2000	2230		ug/L		112	80 - 120
Sodium	2000	2280		ug/L		114	80 - 120

Lab Sample ID: MB 310-350970/1-A
Matrix: Water
Analysis Batch: 351804

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 350970

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	<36		100	36	ug/L		04/26/22 09:30	05/02/22 16:28	1
Manganese	<3.6		10	3.6	ug/L		04/26/22 09:30	05/02/22 16:28	1

Lab Sample ID: LCS 310-350970/2-A
Matrix: Water
Analysis Batch: 351804

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 350970

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Manganese	100	97.4		ug/L		97	80 - 120

Method: 2320B - Alkalinity (Low Level)

Lab Sample ID: MB 310-350906/1
Matrix: Water
Analysis Batch: 350906

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

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L		04/25/22 10:59		1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L		04/25/22 10:59		1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L		04/25/22 10:59		1

Lab Sample ID: LCS 310-350906/2
Matrix: Water
Analysis Batch: 350906

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits

Eurofins Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229341-1

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 310-350414/1
Matrix: Water
Analysis Batch: 350414

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/20/22 07:59	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/20/22 07:59	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/20/22 07:59	1

Lab Sample ID: LCS 310-350414/2
Matrix: Water
Analysis Batch: 350414

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Alkalinity as CaCO3	1000	1030		mg/L		103	90 - 110

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QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229341-1

Metals

Prep Batch: 350868

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229341-1	MW-301	Total/NA	Water	3005A	
310-229341-2	Field Blank	Total/NA	Water	3005A	
MB 310-350868/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-350868/2-A	Lab Control Sample	Total/NA	Water	3005A	

Prep Batch: 350970

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229341-1	MW-301	Dissolved	Water	3005A	
MB 310-350970/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-350970/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 351583

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229341-1	MW-301	Total/NA	Water	6020A	350868
310-229341-2	Field Blank	Total/NA	Water	6020A	350868
MB 310-350868/1-A	Method Blank	Total/NA	Water	6020A	350868
LCS 310-350868/2-A	Lab Control Sample	Total/NA	Water	6020A	350868

Analysis Batch: 351804

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229341-1	MW-301	Dissolved	Water	6020A	350970
MB 310-350970/1-A	Method Blank	Total/NA	Water	6020A	350970
LCS 310-350970/2-A	Lab Control Sample	Total/NA	Water	6020A	350970

General Chemistry

Analysis Batch: 350414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229341-1	MW-301	Total/NA	Water	SM 2320B	
MB 310-350414/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-350414/2	Lab Control Sample	Total/NA	Water	SM 2320B	

Analysis Batch: 350906

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229341-2	Field Blank	Total/NA	Water	2320B	
MB 310-350906/1	Method Blank	Total/NA	Water	2320B	
LCS 310-350906/2	Lab Control Sample	Total/NA	Water	2320B	

Eurofins Cedar Falls

Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229341-1

Client Sample ID: MW-301

Date Collected: 04/12/22 08:41

Date Received: 04/15/22 17:10

Lab Sample ID: 310-229341-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			350970	04/26/22 09:30	ACM2	TAL CF
Dissolved	Analysis	6020A		1	351804	05/02/22 17:15	SAP	TAL CF
Total/NA	Prep	3005A			350868	04/25/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	351583	04/29/22 17:24	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	350414	04/20/22 07:59	JMH2	TAL CF

Client Sample ID: Field Blank

Date Collected: 04/14/22 16:25

Date Received: 04/15/22 17:10

Lab Sample ID: 310-229341-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			350868	04/25/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	351583	04/29/22 17:28	SAP	TAL CF
Total/NA	Analysis	2320B		1	350906	04/25/22 10:59	JMH2	TAL CF

Laboratory References:

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

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Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229341-1

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-21 *

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

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229341-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS)	SW846	TAL CF
2320B	Alkalinity (Low Level)	SM	TAL CF
SM 2320B	Alkalinity	SM	TAL CF
3005A	Preparation, Total Metals	SW846	TAL CF

Protocol References:

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

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

Laboratory References:

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





Environment Testing
America

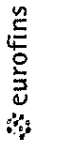


310-229341 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client <u>SCS Engineers</u>			
City/State	CITY <u>Madison</u>	STATE <u>WI</u>	Project
Receipt Information			
Date/Time Received	DATE <u>4-15-22</u>	TIME <u>1710</u>	Received By <u>HED</u>
Delivery Type <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes Cooler ID <u>PC-71</u>	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Cooler # _____ of _____	
Cooler Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID <u>P</u>	Correction Factor (°C) <u>-0.1</u>		
* Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C) <u>3.4</u>	Corrected Temp (°C) <u>3.3</u>		
* Sample Container Temperature			
Container(s) used	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C)			
Corrected Temp (°C)			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding If no, proceed with login			
Additional Comments			
<u>received empty dis-nitric bottle for field blank</u>			

Chain of Custody Record



Client Information		Sampler: <i>Resa CVRZ</i>		Lab P/N: Fredrick, Sandie		Carrier Tracking No(s):		COC No: 310-70158-17486.1					
Client Contact: Meghan Blodgett		Phone: 515-864-4340		E-Mail: Sandra.Fredrick@et.eurofins.com		State of Origin:		Page: Page 1 of 1					
Company: SCS Engineers		Address: 2830 Dairy Drive		City: Madison		State, Zip: WI 53718		Job #:					
PO #: 25221072		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		TAT Requested (days):		Due Date Requested:		Analysis Requested					
WO #: 31011020		Project #: 25221072		Project Name: Ottumwa Generating Station		SSOW#:		Preservation Codes: A HCL M Hexane B NaOH N None C Zn Acetate O Ash/O2 D Nitric Acid P Na2O4S E NaHSO4 Q Na2SO3 F MeOH R Na2SO3 G Amchlor S H2SO4 H Ascorbic Acid T TSP Dodecahydrate I Ice U Acetone J DI Water V MCAA K EDTA W PH 4-5 L EDA Z other (specify) Other					
Sample Identification		Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (view water, solid, on water, soil)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	220B Alkalinity/Carb/Bicarb	6020A Metals (5)	6020A D, Metals (2-4)	Total Number of Containers	Special Instructions/Note:	
MW-301	4-17-22	8:41	G	Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Field Blank	4-14-22	16:25	G	Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, IV Other (specify)													
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Special Instructions/QC Requirements: 13 SX													
Empty Kit Relinquished by:		Date/Time: 4-15-22 8:50 AM		Company:		Time:		Method of Shipment:		Date/Time: 4/15/22 1358		Company: Eurofins	
Relinquished by: <i>Roy</i>		Date/Time: 4-15-22 8:50 AM		Company:		Time:		Method of Shipment:		Date/Time: 4-15-22 1710		Company: Eurofins	
Relinquished by:		Date/Time:		Company:		Time:		Method of Shipment:		Date/Time:		Company:	
Custody Seals Intact: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Custody Seal No.		Cooler Temperature(s) °C and Other Remarks:									



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-229341-1

SDG Number:

Login Number: 229341

List Number: 1

Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

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



ANALYTICAL REPORT

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

Laboratory Job ID: 310-229347-2

Client Project/Site: Ottumwa Generating Station 25222072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:
5/16/2022 12:24:58 PM*

Sandie Fredrick, Project Manager II
(920)261-1660
Sandra.Fredrick@et.eurofinsus.com

LINKS

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results through
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www.eurofinsus.com/Env

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

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



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Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-2

Job ID: 310-229347-2

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-229347-2

Comments

No additional comments.

Receipt

The samples were received on 4/15/2022 5:10 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.8° C.

RAD

Methods 903.0, 9315: Radium-226 batch 561488

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-301 (310-229347-1), Field Blank (310-229347-2), (LCS 160-561488/1-A), (LCSD 160-561488/2-A) and (MB 160-561488/23-A)

Methods 904.0, 9320: Radium-228 prep batch 160-561498:

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-301 (310-229347-1), Field Blank (310-229347-2), (LCS 160-561498/1-A), (LCSD 160-561498/2-A) and (MB 160-561498/23-A)

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



Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-229347-1	MW-301	Water	04/12/22 08:41	04/15/22 17:10
310-229347-2	Field Blank	Water	04/14/22 16:25	04/15/22 17:10

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Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-2

Client Sample ID: MW-301

Lab Sample ID: 310-229347-1

No Detections.

Client Sample ID: Field Blank

Lab Sample ID: 310-229347-2

No Detections.

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This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-2

Client Sample ID: MW-301

Lab Sample ID: 310-229347-1

Date Collected: 04/12/22 08:41

Matrix: Water

Date Received: 04/15/22 17:10

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	0.149	U	0.135	0.136	1.00	0.207	pCi/L	04/21/22 10:14	05/13/22 22:34	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	72.7		40 - 110					04/21/22 10:14	05/13/22 22:34	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	0.229	U	0.301	0.302	1.00	0.501	pCi/L	04/21/22 10:59	05/10/22 12:25	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	72.7		40 - 110					04/21/22 10:59	05/10/22 12:25	1
Y Carrier	89.7		40 - 110					04/21/22 10:59	05/10/22 12:25	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.378	U	0.330	0.331	5.00	0.501	pCi/L		05/16/22 11:24	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-2

Client Sample ID: Field Blank

Lab Sample ID: 310-229347-2

Date Collected: 04/14/22 16:25

Matrix: Water

Date Received: 04/15/22 17:10

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	0.00794	U	0.118	0.118	1.00	0.230	pCi/L	04/21/22 10:14	05/13/22 22:35	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	78.3		40 - 110					04/21/22 10:14	05/13/22 22:35	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	0.144	U	0.270	0.270	1.00	0.459	pCi/L	04/21/22 10:59	05/10/22 12:25	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	78.3		40 - 110					04/21/22 10:59	05/10/22 12:25	1
Y Carrier	87.5		40 - 110					04/21/22 10:59	05/10/22 12:25	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.152	U	0.295	0.295	5.00	0.459	pCi/L		05/16/22 11:24	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-2

Qualifiers

Rad

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

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-2

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-561488/23-A
Matrix: Water
Analysis Batch: 565428

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 561488

Analyte	MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 226	-0.03358	U	0.105	0.105	1.00	0.214	pCi/L	04/21/22 10:14	05/13/22 22:35	1
Carrier	MB		Limits			Prepared	Analyzed	Dil Fac		
	%Yield	Qualifier								
Ba Carrier	98.8		40 - 110			04/21/22 10:14	05/13/22 22:35	1		

Lab Sample ID: LCS 160-561488/1-A
Matrix: Water
Analysis Batch: 565428

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 561488

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium 226	11.3	11.09		1.22	1.00	0.169	pCi/L	98	75 - 125
Carrier	LCS		Limits			Prepared	Analyzed	Dil Fac	
	%Yield	Qualifier							
Ba Carrier	95.8		40 - 110						

Lab Sample ID: LCSD 160-561488/2-A
Matrix: Water
Analysis Batch: 565428

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 561488

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits	RER	Limit
				Uncert. (2σ+/-)							
Radium 226	11.3	10.68		1.20	1.00	0.202	pCi/L	94	75 - 125	0.17	1
Carrier	LCSD		Limits			Prepared	Analyzed	Dil Fac			
	%Yield	Qualifier									
Ba Carrier	93.8		40 - 110								

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-561498/23-A
Matrix: Water
Analysis Batch: 564844

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 561498

Analyte	MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 228	0.2973	U	0.209	0.211	1.00	0.325	pCi/L	04/21/22 10:59	05/10/22 12:25	1
Carrier	MB		Limits			Prepared	Analyzed	Dil Fac		
	%Yield	Qualifier								
Ba	98.8		40 - 110			04/21/22 10:59	05/10/22 12:25	1		
Y Carrier	89.7		40 - 110			04/21/22 10:59	05/10/22 12:25	1		

Eurofins Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-2

Method: 904.0 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCS 160-561498/1-A
Matrix: Water
Analysis Batch: 564827

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 561498

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	
Radium 228	8.63	10.09		1.15	1.00	0.373	pCi/L	117	75 - 125	
LCS LCS										
Carrier	%Yield	Qualifier	Limits							
Ba	95.8		40 - 110							
Y Carrier	86.4		40 - 110							

Lab Sample ID: LCSD 160-561498/2-A
Matrix: Water
Analysis Batch: 564827

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 561498

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		RER	RER Limit
Radium 228	8.63	10.16		1.16	1.00	0.379	pCi/L	118	75 - 125	0.03	1	
LCSD LCSD												
Carrier	%Yield	Qualifier	Limits									
Ba	93.8		40 - 110									
Y Carrier	85.2		40 - 110									

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QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-2

Rad

Prep Batch: 561488

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229347-1	MW-301	Total/NA	Water	PrecSep-21	
310-229347-2	Field Blank	Total/NA	Water	PrecSep-21	
MB 160-561488/23-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-561488/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-561488/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 561498

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229347-1	MW-301	Total/NA	Water	PrecSep_0	
310-229347-2	Field Blank	Total/NA	Water	PrecSep_0	
MB 160-561498/23-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-561498/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-561498/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

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Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-2

Client Sample ID: MW-301

Date Collected: 04/12/22 08:41

Date Received: 04/15/22 17:10

Lab Sample ID: 310-229347-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			561488	04/21/22 10:14	LPS	TAL SL
Total/NA	Analysis	903.0		1	565428	05/13/22 22:34	JCB	TAL SL
Total/NA	Prep	PrecSep_0			561498	04/21/22 10:59	LPS	TAL SL
Total/NA	Analysis	904.0		1	564844	05/10/22 12:25	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	565778	05/16/22 11:24	EMH	TAL SL

Client Sample ID: Field Blank

Date Collected: 04/14/22 16:25

Date Received: 04/15/22 17:10

Lab Sample ID: 310-229347-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			561488	04/21/22 10:14	LPS	TAL SL
Total/NA	Analysis	903.0		1	565428	05/13/22 22:35	JCB	TAL SL
Total/NA	Prep	PrecSep_0			561498	04/21/22 10:59	LPS	TAL SL
Total/NA	Analysis	904.0		1	564844	05/10/22 12:25	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	565778	05/16/22 11:24	EMH	TAL SL

Laboratory References:

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

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Accreditation/Certification Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-2

Laboratory: Eurofins St. Louis

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

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



Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-2

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL
Ra226_Ra228 Pos	Combined Radium-226 and Radium-228	TAL-STL	TAL SL
PrecSep_0	Preparation, Precipitate Separation	None	TAL SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	TAL SL

Protocol References:

- EPA = US Environmental Protection Agency
- None = None
- TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

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





Environment Testing
America



310-229347 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client <u>SCS Engineers</u>			
City/State	CITY <u>Madison</u>	STATE <u>WI</u>	Project:
Receipt Information			
Date/Time Received	DATE <u>4/15/22</u>	TIME <u>1710</u>	Received By <u>MRH</u>
Delivery Type <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes Cooler ID	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other _____ <input type="checkbox"/> NONE		
Thermometer ID	<u>0-8 MRH 4/15/22</u>	Correction Factor (°C)	<u>00</u>
* Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C)	<u>1.8</u>	Corrected Temp (°C)	<u>1.8</u>
Sample Container Temperature			
Container(s) used	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C)			
Corrected Temp (°C)			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g , bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE If yes, contact PM before proceeding If no, proceed with login			
Additional Comments			

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-229347-2

SDG Number:

Login Number: 229347

List Number: 1

Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

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



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-229347-2

SDG Number:

Login Number: 229347

List Number: 2

Creator: Worthington, Sierra M

List Source: Eurofins St. Louis

List Creation: 04/19/22 01:59 PM

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



Tracer/Carrier Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229347-2

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	
310-229347-1	MW-301	72.7	
310-229347-2	Field Blank	78.3	
LCS 160-561488/1-A	Lab Control Sample	95.8	
LCSD 160-561488/2-A	Lab Control Sample Dup	93.8	
MB 160-561488/23-A	Method Blank	98.8	

Tracer/Carrier Legend
Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
310-229347-1	MW-301	72.7	89.7
310-229347-2	Field Blank	78.3	87.5
LCS 160-561498/1-A	Lab Control Sample	95.8	86.4
LCSD 160-561498/2-A	Lab Control Sample Dup	93.8	85.2
MB 160-561498/23-A	Method Blank	98.8	89.7

Tracer/Carrier Legend
Ba = Ba
Y = Y Carrier

ANALYTICAL REPORT

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

Laboratory Job ID: 310-229326-1

Client Project/Site: Ottumwa Generating Station 25222072
Revision: 1

For:
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:
5/23/2022 11:28:07 AM

Sandie Fredrick, Project Manager II
(920)261-1660
Sandra.Fredrick@et.eurofinsus.com

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

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



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Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

Job ID: 310-229326-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-229326-1

Comments

No additional comments.

Revision

The report being provided is a revision of the original report sent on 5/9/2022. The report (revision 1) is being revised due to: Client requested reanalysis of Fluoride on sample MW-307.

Receipt

The samples were received on 4/15/2022 5:10 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.3° C.

HPLC/IC

Methods 300.0, 9056A: The following sample was re-analyzed outside of holding time at client request: MW-307 (310-229326-1).

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

Metals

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

General Chemistry

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



Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-229326-1	MW-307	Ground Water	04/11/22 18:20	04/15/22 17:10
310-229326-2	MW-308	Ground Water	04/12/22 16:49	04/15/22 17:10
310-229326-3	MW-309	Ground Water	04/14/22 16:40	04/15/22 17:10

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Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

Client Sample ID: MW-307

Lab Sample ID: 310-229326-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	330		100	45	mg/L	100		9056A	Total/NA
Sulfate	140		100	40	mg/L	100		9056A	Total/NA
Antimony	0.69	J	2.0	0.69	ug/L	1		6020A	Total/NA
Arsenic	0.77	J	2.0	0.75	ug/L	1		6020A	Total/NA
Barium	150		2.0	0.88	ug/L	1		6020A	Total/NA
Boron	250		100	58	ug/L	1		6020A	Total/NA
Calcium	260		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	31		0.50	0.19	ug/L	1		6020A	Total/NA
Lithium	14		10	2.5	ug/L	1		6020A	Total/NA
pH	6.9	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	648.40				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	46.3				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.13				mg/L	1		Field Sampling	Total/NA
pH, Field	6.63				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1718				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	11.8				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	4.09				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-308

Lab Sample ID: 310-229326-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	180		100	45	mg/L	100		9056A	Total/NA
Sulfate	320		100	40	mg/L	100		9056A	Total/NA
Barium	140		2.0	0.88	ug/L	1		6020A	Total/NA
Boron	300		100	58	ug/L	1		6020A	Total/NA
Calcium	240		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.24	J	0.50	0.19	ug/L	1		6020A	Total/NA
Lithium	17		10	2.5	ug/L	1		6020A	Total/NA
Molybdenum	1.4	J	2.0	1.2	ug/L	1		6020A	Total/NA
pH	7.0	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	645.75				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-30.9				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.26				mg/L	1		Field Sampling	Total/NA
pH, Field	6.70				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1491				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	12.7				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	6.00				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-309

Lab Sample ID: 310-229326-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	61		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	420		100	40	mg/L	100		9056A	Total/NA
Barium	55		2.0	0.88	ug/L	1		6020A	Total/NA
Boron	1600		100	58	ug/L	1		6020A	Total/NA
Calcium	150		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	2.0		0.50	0.19	ug/L	1		6020A	Total/NA
Lithium	9.2	J	10	2.5	ug/L	1		6020A	Total/NA
pH	7.3	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	644.32				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	28.1				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.70				mg/L	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

Client Sample ID: MW-309 (Continued)

Lab Sample ID: 310-229326-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
pH, Field	7.16				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1305				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	11.7				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	14.00				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

Client Sample ID: MW-307

Lab Sample ID: 310-229326-1

Date Collected: 04/11/22 18:20

Matrix: Ground Water

Date Received: 04/15/22 17:10

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	330		100	45	mg/L			04/27/22 12:03	100
Fluoride	<0.22	H	0.50	0.22	mg/L			05/19/22 20:48	5
Sulfate	140		100	40	mg/L			04/27/22 12:03	100

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.69	J	2.0	0.69	ug/L		04/25/22 09:00	05/07/22 15:55	1
Arsenic	0.77	J	2.0	0.75	ug/L		04/25/22 09:00	04/29/22 17:01	1
Barium	150		2.0	0.88	ug/L		04/25/22 09:00	04/29/22 17:01	1
Beryllium	<0.27		1.0	0.27	ug/L		04/25/22 09:00	04/29/22 17:01	1
Boron	250		100	58	ug/L		04/25/22 09:00	04/29/22 17:01	1
Cadmium	<0.055		0.10	0.055	ug/L		04/25/22 09:00	04/29/22 17:01	1
Calcium	260		0.50	0.19	mg/L		04/25/22 09:00	04/29/22 17:01	1
Chromium	<1.1		5.0	1.1	ug/L		04/25/22 09:00	04/29/22 17:01	1
Cobalt	31		0.50	0.19	ug/L		04/25/22 09:00	04/29/22 17:01	1
Lead	<0.24		0.50	0.24	ug/L		04/25/22 09:00	04/29/22 17:01	1
Lithium	14		10	2.5	ug/L		04/25/22 09:00	04/29/22 17:01	1
Molybdenum	<1.2		2.0	1.2	ug/L		04/25/22 09:00	04/29/22 17:01	1
Selenium	<0.96		5.0	0.96	ug/L		04/25/22 09:00	04/29/22 17:01	1
Thallium	<0.26		1.0	0.26	ug/L		04/25/22 09:00	04/29/22 17:01	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.11		0.20	0.11	ug/L		04/27/22 13:20	04/28/22 14:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.9	HF	0.1	0.1	SU			04/15/22 20:01	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	648.40				ft			04/11/22 18:20	1
Oxidation Reduction Potential	46.3				millivolts			04/11/22 18:20	1
Oxygen, Dissolved, Client Supplied	0.13				mg/L			04/11/22 18:20	1
pH, Field	6.63				SU			04/11/22 18:20	1
Specific Conductance, Field	1718				umhos/cm			04/11/22 18:20	1
Temperature, Field	11.8				Degrees C			04/11/22 18:20	1
Turbidity, Field	4.09				NTU			04/11/22 18:20	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

Client Sample ID: MW-308
 Date Collected: 04/12/22 16:49
 Date Received: 04/15/22 17:10

Lab Sample ID: 310-229326-2
 Matrix: Ground Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	180		100	45	mg/L			04/27/22 15:50	100
Fluoride	<0.22		0.50	0.22	mg/L			04/27/22 14:39	5
Sulfate	320		100	40	mg/L			04/27/22 15:50	100

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.69		2.0	0.69	ug/L		04/25/22 09:00	05/07/22 16:07	1
Arsenic	<0.75		2.0	0.75	ug/L		04/25/22 09:00	04/29/22 17:16	1
Barium	140		2.0	0.88	ug/L		04/25/22 09:00	04/29/22 17:16	1
Beryllium	<0.27		1.0	0.27	ug/L		04/25/22 09:00	04/29/22 17:16	1
Boron	300		100	58	ug/L		04/25/22 09:00	04/29/22 17:16	1
Cadmium	<0.055		0.10	0.055	ug/L		04/25/22 09:00	04/29/22 17:16	1
Calcium	240		0.50	0.19	mg/L		04/25/22 09:00	04/29/22 17:16	1
Chromium	<1.1		5.0	1.1	ug/L		04/25/22 09:00	04/29/22 17:16	1
Cobalt	0.24	J	0.50	0.19	ug/L		04/25/22 09:00	04/29/22 17:16	1
Lead	<0.24		0.50	0.24	ug/L		04/25/22 09:00	04/29/22 17:16	1
Lithium	17		10	2.5	ug/L		04/25/22 09:00	04/29/22 17:16	1
Molybdenum	1.4	J	2.0	1.2	ug/L		04/25/22 09:00	04/29/22 17:16	1
Selenium	<0.96		5.0	0.96	ug/L		04/25/22 09:00	04/29/22 17:16	1
Thallium	<0.26		1.0	0.26	ug/L		04/25/22 09:00	04/29/22 17:16	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.11		0.20	0.11	ug/L		04/27/22 13:20	04/28/22 14:32	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.0	HF	0.1	0.1	SU			04/15/22 19:59	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	645.75				ft			04/12/22 16:49	1
Oxidation Reduction Potential	-30.9				millivolts			04/12/22 16:49	1
Oxygen, Dissolved, Client Supplied	0.26				mg/L			04/12/22 16:49	1
pH, Field	6.70				SU			04/12/22 16:49	1
Specific Conductance, Field	1491				umhos/cm			04/12/22 16:49	1
Temperature, Field	12.7				Degrees C			04/12/22 16:49	1
Turbidity, Field	6.00				NTU			04/12/22 16:49	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

Client Sample ID: MW-309

Lab Sample ID: 310-229326-3

Date Collected: 04/14/22 16:40

Matrix: Ground Water

Date Received: 04/15/22 17:10

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	61		5.0	2.3	mg/L			04/27/22 15:12	5
Fluoride	<0.22		0.50	0.22	mg/L			04/27/22 15:12	5
Sulfate	420		100	40	mg/L			04/27/22 13:06	100

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.69		2.0	0.69	ug/L		04/25/22 09:00	05/07/22 16:11	1
Arsenic	<0.75		2.0	0.75	ug/L		04/25/22 09:00	04/29/22 17:20	1
Barium	55		2.0	0.88	ug/L		04/25/22 09:00	04/29/22 17:20	1
Beryllium	<0.27		1.0	0.27	ug/L		04/25/22 09:00	04/29/22 17:20	1
Boron	1600		100	58	ug/L		04/25/22 09:00	04/29/22 17:20	1
Cadmium	<0.055		0.10	0.055	ug/L		04/25/22 09:00	04/29/22 17:20	1
Calcium	150		0.50	0.19	mg/L		04/25/22 09:00	04/29/22 17:20	1
Chromium	<1.1		5.0	1.1	ug/L		04/25/22 09:00	04/29/22 17:20	1
Cobalt	2.0		0.50	0.19	ug/L		04/25/22 09:00	04/29/22 17:20	1
Lead	<0.24		0.50	0.24	ug/L		04/25/22 09:00	04/29/22 17:20	1
Lithium	9.2 J		10	2.5	ug/L		04/25/22 09:00	04/29/22 17:20	1
Molybdenum	<1.2		2.0	1.2	ug/L		04/25/22 09:00	04/29/22 17:20	1
Selenium	<0.96		5.0	0.96	ug/L		04/25/22 09:00	04/29/22 17:20	1
Thallium	<0.26		1.0	0.26	ug/L		04/25/22 09:00	04/29/22 17:20	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.11		0.20	0.11	ug/L		04/27/22 13:20	04/28/22 14:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.3	HF	0.1	0.1	SU			04/15/22 20:02	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	644.32				ft			04/14/22 16:40	1
Oxidation Reduction Potential	28.1				millivolts			04/14/22 16:40	1
Oxygen, Dissolved, Client Supplied	0.70				mg/L			04/14/22 16:40	1
pH, Field	7.16				SU			04/14/22 16:40	1
Specific Conductance, Field	1305				umhos/cm			04/14/22 16:40	1
Temperature, Field	11.7				Degrees C			04/14/22 16:40	1
Turbidity, Field	14.00				NTU			04/14/22 16:40	1

Eurofins Cedar Falls

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time

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.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

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

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-351482/3
Matrix: Water
Analysis Batch: 351482

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.45		1.0	0.45	mg/L			04/26/22 23:54	1
Fluoride	<0.044		0.10	0.044	mg/L			04/26/22 23:54	1
Sulfate	<0.40		1.0	0.40	mg/L			04/26/22 23:54	1

Lab Sample ID: LCS 310-351482/21
Matrix: Water
Analysis Batch: 351482

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	9.57		mg/L		96	90 - 110
Fluoride	2.00	2.07		mg/L		104	90 - 110
Sulfate	10.0	9.87		mg/L		99	90 - 110

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-350868/1-A
Matrix: Water
Analysis Batch: 351583

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 350868

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.75		2.0	0.75	ug/L		04/25/22 09:00	04/29/22 16:53	1
Barium	<0.88		2.0	0.88	ug/L		04/25/22 09:00	04/29/22 16:53	1
Beryllium	<0.27		1.0	0.27	ug/L		04/25/22 09:00	04/29/22 16:53	1
Boron	<58		100	58	ug/L		04/25/22 09:00	04/29/22 16:53	1
Cadmium	<0.055		0.10	0.055	ug/L		04/25/22 09:00	04/29/22 16:53	1
Calcium	<0.19		0.50	0.19	mg/L		04/25/22 09:00	04/29/22 16:53	1
Chromium	<1.1		5.0	1.1	ug/L		04/25/22 09:00	04/29/22 16:53	1
Cobalt	<0.19		0.50	0.19	ug/L		04/25/22 09:00	04/29/22 16:53	1
Lead	<0.24		0.50	0.24	ug/L		04/25/22 09:00	04/29/22 16:53	1
Lithium	<2.5		10	2.5	ug/L		04/25/22 09:00	04/29/22 16:53	1
Molybdenum	<1.2		2.0	1.2	ug/L		04/25/22 09:00	04/29/22 16:53	1
Selenium	<0.96		5.0	0.96	ug/L		04/25/22 09:00	04/29/22 16:53	1
Thallium	<0.26		1.0	0.26	ug/L		04/25/22 09:00	04/29/22 16:53	1

Lab Sample ID: MB 310-350868/1-A
Matrix: Water
Analysis Batch: 352391

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 350868

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.69		2.0	0.69	ug/L		04/25/22 09:00	05/07/22 15:32	1

Lab Sample ID: LCS 310-350868/2-A
Matrix: Water
Analysis Batch: 351583

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 350868

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	200	232		ug/L		116	80 - 120
Barium	100	109		ug/L		109	80 - 120
Beryllium	100	109		ug/L		109	80 - 120
Boron	200	215		ug/L		108	80 - 120

Eurofins Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

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

Lab Sample ID: LCS 310-350868/2-A
Matrix: Water
Analysis Batch: 351583

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 350868

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cadmium	100	111		ug/L		111	80 - 120
Calcium	2.00	2.05		mg/L		103	80 - 120
Chromium	100	110		ug/L		110	80 - 120
Cobalt	100	108		ug/L		108	80 - 120
Lead	200	219		ug/L		110	80 - 120
Lithium	200	221		ug/L		110	80 - 120
Molybdenum	200	215		ug/L		107	80 - 120
Selenium	400	427		ug/L		107	80 - 120
Thallium	200	219		ug/L		109	80 - 120

Lab Sample ID: LCS 310-350868/2-A
Matrix: Water
Analysis Batch: 352391

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 350868

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	200	215		ug/L		107	80 - 120

Lab Sample ID: 310-229326-1 MS
Matrix: Ground Water
Analysis Batch: 351583

Client Sample ID: MW-307
Prep Type: Total/NA
Prep Batch: 350868

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	0.77	J	200	240		ug/L		120	75 - 125
Barium	150		100	258		ug/L		111	75 - 125
Beryllium	<0.27		100	116		ug/L		116	75 - 125
Boron	250		200	466		ug/L		107	75 - 125
Cadmium	<0.055		100	106		ug/L		106	75 - 125
Calcium	260		2.00	252	4	mg/L		-294	75 - 125
Chromium	<1.1		100	104		ug/L		104	75 - 125
Cobalt	31		100	134		ug/L		103	75 - 125
Lead	<0.24		200	215		ug/L		108	75 - 125
Lithium	14		200	237		ug/L		111	75 - 125
Molybdenum	<1.2		200	219		ug/L		109	75 - 125
Selenium	<0.96		400	436		ug/L		109	75 - 125
Thallium	<0.26		200	208		ug/L		104	75 - 125

Lab Sample ID: 310-229326-1 MS
Matrix: Ground Water
Analysis Batch: 352391

Client Sample ID: MW-307
Prep Type: Total/NA
Prep Batch: 350868

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	0.69	J	200	218		ug/L		109	75 - 125

Lab Sample ID: 310-229326-1 MSD
Matrix: Ground Water
Analysis Batch: 351583

Client Sample ID: MW-307
Prep Type: Total/NA
Prep Batch: 350868

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	0.77	J	200	236		ug/L		118	75 - 125	2	20
Barium	150		100	260		ug/L		113	75 - 125	0	20

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QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

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

Lab Sample ID: 310-229326-1 MSD
Matrix: Ground Water
Analysis Batch: 351583

Client Sample ID: MW-307
Prep Type: Total/NA
Prep Batch: 350868

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Beryllium	<0.27		100	111		ug/L		111	75 - 125	4	20
Boron	250		200	461		ug/L		104	75 - 125	1	20
Cadmium	<0.055		100	105		ug/L		105	75 - 125	1	20
Calcium	260		2.00	256	4	mg/L		-89	75 - 125	2	20
Chromium	<1.1		100	102		ug/L		102	75 - 125	3	20
Cobalt	31		100	134		ug/L		103	75 - 125	0	20
Lead	<0.24		200	213		ug/L		106	75 - 125	1	20
Lithium	14		200	228		ug/L		107	75 - 125	4	20
Molybdenum	<1.2		200	219		ug/L		109	75 - 125	0	20
Selenium	<0.96		400	438		ug/L		109	75 - 125	0	20
Thallium	<0.26		200	207		ug/L		104	75 - 125	1	20

Lab Sample ID: 310-229326-1 MSD
Matrix: Ground Water
Analysis Batch: 352391

Client Sample ID: MW-307
Prep Type: Total/NA
Prep Batch: 350868

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Antimony	0.69	J	200	217		ug/L		108	75 - 125	0	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-351241/1-A
Matrix: Water
Analysis Batch: 351414

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 351241

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.11		0.20	0.11	ug/L		04/27/22 13:20	04/28/22 14:09	1

Lab Sample ID: LCS 310-351241/2-A
Matrix: Water
Analysis Batch: 351414

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 351241

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	1.67	1.65		ug/L		99	80 - 120

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-350071/1
Matrix: Water
Analysis Batch: 350071

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

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

Eurofins Cedar Falls

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

HPLC/IC

Analysis Batch: 351482

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229326-1	MW-307	Total/NA	Ground Water	9056A	
310-229326-2	MW-308	Total/NA	Ground Water	9056A	
310-229326-2	MW-308	Total/NA	Ground Water	9056A	
310-229326-3	MW-309	Total/NA	Ground Water	9056A	
310-229326-3	MW-309	Total/NA	Ground Water	9056A	
MB 310-351482/3	Method Blank	Total/NA	Water	9056A	
LCS 310-351482/21	Lab Control Sample	Total/NA	Water	9056A	

Analysis Batch: 353973

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229326-1	MW-307	Total/NA	Ground Water	9056A	

Metals

Prep Batch: 350868

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229326-1	MW-307	Total/NA	Ground Water	3005A	
310-229326-2	MW-308	Total/NA	Ground Water	3005A	
310-229326-3	MW-309	Total/NA	Ground Water	3005A	
MB 310-350868/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-350868/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-229326-1 MS	MW-307	Total/NA	Ground Water	3005A	
310-229326-1 MSD	MW-307	Total/NA	Ground Water	3005A	

Prep Batch: 351241

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229326-1	MW-307	Total/NA	Ground Water	7470A	
310-229326-2	MW-308	Total/NA	Ground Water	7470A	
310-229326-3	MW-309	Total/NA	Ground Water	7470A	
MB 310-351241/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-351241/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 351414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229326-1	MW-307	Total/NA	Ground Water	7470A	351241
310-229326-2	MW-308	Total/NA	Ground Water	7470A	351241
310-229326-3	MW-309	Total/NA	Ground Water	7470A	351241
MB 310-351241/1-A	Method Blank	Total/NA	Water	7470A	351241
LCS 310-351241/2-A	Lab Control Sample	Total/NA	Water	7470A	351241

Analysis Batch: 351583

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229326-1	MW-307	Total/NA	Ground Water	6020A	350868
310-229326-2	MW-308	Total/NA	Ground Water	6020A	350868
310-229326-3	MW-309	Total/NA	Ground Water	6020A	350868
MB 310-350868/1-A	Method Blank	Total/NA	Water	6020A	350868
LCS 310-350868/2-A	Lab Control Sample	Total/NA	Water	6020A	350868
310-229326-1 MS	MW-307	Total/NA	Ground Water	6020A	350868
310-229326-1 MSD	MW-307	Total/NA	Ground Water	6020A	350868

Eurofins Cedar Falls

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

Metals

Analysis Batch: 352391

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229326-1	MW-307	Total/NA	Ground Water	6020A	350868
310-229326-2	MW-308	Total/NA	Ground Water	6020A	350868
310-229326-3	MW-309	Total/NA	Ground Water	6020A	350868
MB 310-350868/1-A	Method Blank	Total/NA	Water	6020A	350868
LCS 310-350868/2-A	Lab Control Sample	Total/NA	Water	6020A	350868
310-229326-1 MS	MW-307	Total/NA	Ground Water	6020A	350868
310-229326-1 MSD	MW-307	Total/NA	Ground Water	6020A	350868

General Chemistry

Analysis Batch: 350071

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229326-1	MW-307	Total/NA	Ground Water	SM 4500 H+ B	
310-229326-2	MW-308	Total/NA	Ground Water	SM 4500 H+ B	
310-229326-3	MW-309	Total/NA	Ground Water	SM 4500 H+ B	
LCS 310-350071/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Field Service / Mobile Lab

Analysis Batch: 351494

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229326-1	MW-307	Total/NA	Ground Water	Field Sampling	
310-229326-2	MW-308	Total/NA	Ground Water	Field Sampling	
310-229326-3	MW-309	Total/NA	Ground Water	Field Sampling	

Lab Chronicle

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

Client Sample ID: MW-307

Lab Sample ID: 310-229326-1

Date Collected: 04/11/22 18:20

Matrix: Ground Water

Date Received: 04/15/22 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		100	351482	04/27/22 12:03	JNR	TAL CF
Total/NA	Analysis	9056A		5	353973	05/19/22 20:48	JNR	TAL CF
Total/NA	Prep	3005A			350868	04/25/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	351583	04/29/22 17:01	SAP	TAL CF
Total/NA	Prep	3005A			350868	04/25/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	352391	05/07/22 15:55	SAP	TAL CF
Total/NA	Prep	7470A			351241	04/27/22 13:20	EAM	TAL CF
Total/NA	Analysis	7470A		1	351414	04/28/22 14:30	EAM	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	350071	04/15/22 20:01	JWH	TAL CF
Total/NA	Analysis	Field Sampling		1	351494	04/11/22 18:20	SLD	TAL CF

Client Sample ID: MW-308

Lab Sample ID: 310-229326-2

Date Collected: 04/12/22 16:49

Matrix: Ground Water

Date Received: 04/15/22 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	351482	04/27/22 14:39	JNR	TAL CF
Total/NA	Analysis	9056A		100	351482	04/27/22 15:50	JNR	TAL CF
Total/NA	Prep	3005A			350868	04/25/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	351583	04/29/22 17:16	SAP	TAL CF
Total/NA	Prep	3005A			350868	04/25/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	352391	05/07/22 16:07	SAP	TAL CF
Total/NA	Prep	7470A			351241	04/27/22 13:20	EAM	TAL CF
Total/NA	Analysis	7470A		1	351414	04/28/22 14:32	EAM	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	350071	04/15/22 19:59	JWH	TAL CF
Total/NA	Analysis	Field Sampling		1	351494	04/12/22 16:49	SLD	TAL CF

Client Sample ID: MW-309

Lab Sample ID: 310-229326-3

Date Collected: 04/14/22 16:40

Matrix: Ground Water

Date Received: 04/15/22 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		100	351482	04/27/22 13:06	JNR	TAL CF
Total/NA	Analysis	9056A		5	351482	04/27/22 15:12	JNR	TAL CF
Total/NA	Prep	3005A			350868	04/25/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	351583	04/29/22 17:20	SAP	TAL CF
Total/NA	Prep	3005A			350868	04/25/22 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	352391	05/07/22 16:11	SAP	TAL CF
Total/NA	Prep	7470A			351241	04/27/22 13:20	EAM	TAL CF
Total/NA	Analysis	7470A		1	351414	04/28/22 14:34	EAM	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	350071	04/15/22 20:02	JWH	TAL CF
Total/NA	Analysis	Field Sampling		1	351494	04/14/22 16:40	SLD	TAL CF

Eurofins Cedar Falls

Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

Laboratory References:

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

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Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-21 *

- 1
- 2
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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-1

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

Protocol References:

EPA = US Environmental Protection Agency

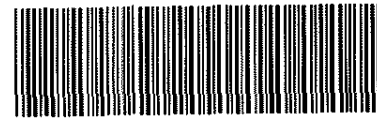
SM = "Standard Methods For The Examination Of Water And Wastewater"

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

Laboratory References:

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





Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client <u>SCS Engineers</u>			
City/State	CITY <u>Madison</u>	STATE <u>WI</u>	Project
Receipt Information			
Date/Time Received	DATE <u>4/15/22</u>	TIME <u>1710</u>	Received By <u>MRH</u>
Delivery Type <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee			
<input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes Cooler ID	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Cooler # ____ of ____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID	<u>08 MRH 4/15/22</u>	Correction Factor (°C) <u>00</u>	
* Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C)	<u>2.3</u>	Corrected Temp (°C) <u>2.3</u>	
Sample Container Temperature			
Container(s) used	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C)			
Corrected Temp (°C)			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g , bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-229326-1

Login Number: 229326

List Number: 1

Creator: Kizer, Preston V

List Source: Eurofins Cedar Falls

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



Table 1. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station / SCS Engineers Project No. 25222072.00
April 2022

Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmhos/cm)	ORP (mV)	Turbidity
MW-301	4/12/2022 841	682.08	7.4	6.37	3.26	976	117.6	5.03
MW-307	4/11/2022 1820	648.40	11.8	6.63	0.13	1718	46.3	4.09
MW-308	4/12/2022 1649	645.75	12.7	6.70	0.26	1491	-30.9	6.00
MW-309	4/14/2022 1640	644.32	11.7	7.16	0.70	1305	28.1	14.00

Abbreviations:

mg/L = milligrams per liter

amsl = above mean sea level

NA = Not Analyzed

NM= Not Measured

Created by: MDB
 Last revision by: RM
 Checked by: JAO

Date: 5/1/2017
 Date: 4/20/2022
 Date: 4/28/2022

C:\Users\fredricks\AppData\Local\Microsoft\Windows\NetCache\Content.Outlook\D8427408\2204_April - OGS ZLDP_CCR_Field.xlsx\GW Field Parameters

ANALYTICAL REPORT

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

Laboratory Job ID: 310-229340-1

Client Project/Site: Ottumwa Generating Station 25222072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:
5/9/2022 12:15:25 PM

Sandie Fredrick, Project Manager II
(920)261-1660
Sandra.Fredrick@et.eurofinsus.com

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

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



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Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229340-1

Job ID: 310-229340-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-229340-1

Comments

No additional comments.

Receipt

The samples were received on 4/18/2022 7:10 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.3° C.

Metals

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

General Chemistry

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

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Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229340-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-229340-1	MW-307	Water	04/11/22 18:20	04/18/22 07:10
310-229340-2	MW-308	Water	04/12/22 16:49	04/18/22 07:10
310-229340-3	MW-309	Water	04/14/22 16:40	04/18/22 07:10

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Detection Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229340-1

Client Sample ID: MW-307

Lab Sample ID: 310-229340-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	2600		100	36	ug/L	1		6020A	Total/NA
Magnesium	26000		500	150	ug/L	1		6020A	Total/NA
Manganese	260		10	3.6	ug/L	1		6020A	Total/NA
Potassium	1900		500	150	ug/L	1		6020A	Total/NA
Sodium	110000		1000	610	ug/L	1		6020A	Total/NA
Cobalt	29		0.50	0.19	ug/L	1		6020A	Dissolved
Iron	2500		100	36	ug/L	1		6020A	Dissolved
Manganese	260		10	3.6	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	470		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	470		10	4.6	mg/L	1		SM 2320B	Total/NA

Client Sample ID: MW-308

Lab Sample ID: 310-229340-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	3400		100	36	ug/L	1		6020A	Total/NA
Magnesium	22000		500	150	ug/L	1		6020A	Total/NA
Manganese	1500		10	3.6	ug/L	1		6020A	Total/NA
Potassium	4100		500	150	ug/L	1		6020A	Total/NA
Sodium	110000		1000	610	ug/L	1		6020A	Total/NA
Iron	3200		100	36	ug/L	1		6020A	Dissolved
Manganese	1500		10	3.6	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	380		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	380		10	4.6	mg/L	1		SM 2320B	Total/NA

Client Sample ID: MW-309

Lab Sample ID: 310-229340-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	680		100	36	ug/L	1		6020A	Total/NA
Magnesium	16000		500	150	ug/L	1		6020A	Total/NA
Manganese	600		10	3.6	ug/L	1		6020A	Total/NA
Potassium	690		500	150	ug/L	1		6020A	Total/NA
Sodium	180000		1000	610	ug/L	1		6020A	Total/NA
Iron	590		100	36	ug/L	1		6020A	Dissolved
Manganese	610		10	3.6	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	250		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	250		10	4.6	mg/L	1		SM 2320B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229340-1

Client Sample ID: MW-307
 Date Collected: 04/11/22 18:20
 Date Received: 04/18/22 07:10

Lab Sample ID: 310-229340-1
 Matrix: Water

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	2600		100	36	ug/L		04/27/22 09:15	05/02/22 18:21	1
Magnesium	26000		500	150	ug/L		04/27/22 09:15	05/02/22 18:21	1
Manganese	260		10	3.6	ug/L		04/27/22 09:15	05/02/22 18:21	1
Potassium	1900		500	150	ug/L		04/27/22 09:15	05/02/22 18:21	1
Sodium	110000		1000	610	ug/L		04/27/22 09:15	05/02/22 18:21	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	29		0.50	0.19	ug/L		04/26/22 09:30	05/02/22 16:47	1
Iron	2500		100	36	ug/L		04/26/22 09:30	05/02/22 16:47	1
Manganese	260		10	3.6	ug/L		04/26/22 09:30	05/02/22 16:47	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	470		10	4.6	mg/L			04/20/22 07:59	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			04/20/22 07:59	1
Total Alkalinity as CaCO3	470		10	4.6	mg/L			04/20/22 07:59	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229340-1

Client Sample ID: MW-308
 Date Collected: 04/12/22 16:49
 Date Received: 04/18/22 07:10

Lab Sample ID: 310-229340-2
 Matrix: Water

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	3400		100	36	ug/L		04/27/22 09:15	05/02/22 18:25	1
Magnesium	22000		500	150	ug/L		04/27/22 09:15	05/02/22 18:25	1
Manganese	1500		10	3.6	ug/L		04/27/22 09:15	05/02/22 18:25	1
Potassium	4100		500	150	ug/L		04/27/22 09:15	05/02/22 18:25	1
Sodium	110000		1000	610	ug/L		04/27/22 09:15	05/02/22 18:25	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	3200		100	36	ug/L		04/26/22 09:30	05/02/22 16:51	1
Manganese	1500		10	3.6	ug/L		04/26/22 09:30	05/02/22 16:51	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	380		10	4.6	mg/L			04/23/22 08:10	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			04/23/22 08:10	1
Total Alkalinity as CaCO3	380		10	4.6	mg/L			04/23/22 08:10	1



Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229340-1

Client Sample ID: MW-309
 Date Collected: 04/14/22 16:40
 Date Received: 04/18/22 07:10

Lab Sample ID: 310-229340-3
 Matrix: Water

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	680		100	36	ug/L		04/27/22 09:15	05/02/22 18:29	1
Magnesium	16000		500	150	ug/L		04/27/22 09:15	05/02/22 18:29	1
Manganese	600		10	3.6	ug/L		04/27/22 09:15	05/02/22 18:29	1
Potassium	690		500	150	ug/L		04/27/22 09:15	05/02/22 18:29	1
Sodium	180000		1000	610	ug/L		04/27/22 09:15	05/02/22 18:29	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	590		100	36	ug/L		04/26/22 09:30	05/02/22 17:11	1
Manganese	610		10	3.6	ug/L		04/26/22 09:30	05/02/22 17:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	250		10	4.6	mg/L			04/27/22 09:00	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			04/27/22 09:00	1
Total Alkalinity as CaCO3	250		10	4.6	mg/L			04/27/22 09:00	1

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Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229340-1

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229340-1

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-350970/1-A
Matrix: Water
Analysis Batch: 351804

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 350970

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.19		0.50	0.19	ug/L		04/26/22 09:30	05/02/22 16:28	1
Iron	<36		100	36	ug/L		04/26/22 09:30	05/02/22 16:28	1
Manganese	<3.6		10	3.6	ug/L		04/26/22 09:30	05/02/22 16:28	1

Lab Sample ID: LCS 310-350970/2-A
Matrix: Water
Analysis Batch: 351804

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 350970

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cobalt	100	107		ug/L		107	80 - 120
Iron	200	206		ug/L		103	80 - 120
Lithium	200	187		ug/L		94	80 - 120
Manganese	100	97.4		ug/L		97	80 - 120

Lab Sample ID: MB 310-351128/1-A
Matrix: Water
Analysis Batch: 351804

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 351128

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		04/27/22 09:15	05/02/22 17:30	1
Magnesium	<150		500	150	ug/L		04/27/22 09:15	05/02/22 17:30	1
Manganese	<3.6		10	3.6	ug/L		04/27/22 09:15	05/02/22 17:30	1
Potassium	<150		500	150	ug/L		04/27/22 09:15	05/02/22 17:30	1
Sodium	<610		1000	610	ug/L		04/27/22 09:15	05/02/22 17:30	1

Lab Sample ID: LCS 310-351128/2-A
Matrix: Water
Analysis Batch: 351804

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 351128

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	200	193		ug/L		96	80 - 120
Magnesium	2000	1830		ug/L		91	80 - 120
Manganese	100	94.6		ug/L		95	80 - 120
Potassium	2000	1840		ug/L		92	80 - 120
Sodium	2000	2170		ug/L		108	80 - 120

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 310-350414/1
Matrix: Water
Analysis Batch: 350414

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/20/22 07:59	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/20/22 07:59	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/20/22 07:59	1

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QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229340-1

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCS 310-350414/2
Matrix: Water
Analysis Batch: 350414

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Alkalinity as CaCO3	1000	1030		mg/L		103	90 - 110

Lab Sample ID: MB 310-350840/1
Matrix: Water
Analysis Batch: 350840

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/23/22 08:10	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/23/22 08:10	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/23/22 08:10	1

Lab Sample ID: LCS 310-350840/2
Matrix: Water
Analysis Batch: 350840

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Alkalinity as CaCO3	1000	980		mg/L		98	90 - 110

Lab Sample ID: MB 310-351169/1
Matrix: Water
Analysis Batch: 351169

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/27/22 09:00	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/27/22 09:00	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/27/22 09:00	1

Lab Sample ID: LCS 310-351169/2
Matrix: Water
Analysis Batch: 351169

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Alkalinity as CaCO3	1000	964		mg/L		96	90 - 110

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229340-1

Metals

Prep Batch: 350970

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229340-1	MW-307	Dissolved	Water	3005A	
310-229340-2	MW-308	Dissolved	Water	3005A	
310-229340-3	MW-309	Dissolved	Water	3005A	
MB 310-350970/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-350970/2-A	Lab Control Sample	Total/NA	Water	3005A	

Prep Batch: 351128

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229340-1	MW-307	Total/NA	Water	3005A	
310-229340-2	MW-308	Total/NA	Water	3005A	
310-229340-3	MW-309	Total/NA	Water	3005A	
MB 310-351128/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-351128/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 351804

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229340-1	MW-307	Dissolved	Water	6020A	350970
310-229340-1	MW-307	Total/NA	Water	6020A	351128
310-229340-2	MW-308	Dissolved	Water	6020A	350970
310-229340-2	MW-308	Total/NA	Water	6020A	351128
310-229340-3	MW-309	Dissolved	Water	6020A	350970
310-229340-3	MW-309	Total/NA	Water	6020A	351128
MB 310-350970/1-A	Method Blank	Total/NA	Water	6020A	350970
MB 310-351128/1-A	Method Blank	Total/NA	Water	6020A	351128
LCS 310-350970/2-A	Lab Control Sample	Total/NA	Water	6020A	350970
LCS 310-351128/2-A	Lab Control Sample	Total/NA	Water	6020A	351128

General Chemistry

Analysis Batch: 350414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229340-1	MW-307	Total/NA	Water	SM 2320B	
MB 310-350414/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-350414/2	Lab Control Sample	Total/NA	Water	SM 2320B	

Analysis Batch: 350840

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229340-2	MW-308	Total/NA	Water	SM 2320B	
MB 310-350840/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-350840/2	Lab Control Sample	Total/NA	Water	SM 2320B	

Analysis Batch: 351169

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229340-3	MW-309	Total/NA	Water	SM 2320B	
MB 310-351169/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-351169/2	Lab Control Sample	Total/NA	Water	SM 2320B	

Eurofins Cedar Falls

Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229340-1

Client Sample ID: MW-307

Date Collected: 04/11/22 18:20

Date Received: 04/18/22 07:10

Lab Sample ID: 310-229340-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			350970	04/26/22 09:30	ACM2	TAL CF
Dissolved	Analysis	6020A		1	351804	05/02/22 16:47	SAP	TAL CF
Total/NA	Prep	3005A			351128	04/27/22 09:15	ACM2	TAL CF
Total/NA	Analysis	6020A		1	351804	05/02/22 18:21	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	350414	04/20/22 07:59	JMH2	TAL CF

Client Sample ID: MW-308

Date Collected: 04/12/22 16:49

Date Received: 04/18/22 07:10

Lab Sample ID: 310-229340-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			350970	04/26/22 09:30	ACM2	TAL CF
Dissolved	Analysis	6020A		1	351804	05/02/22 16:51	SAP	TAL CF
Total/NA	Prep	3005A			351128	04/27/22 09:15	ACM2	TAL CF
Total/NA	Analysis	6020A		1	351804	05/02/22 18:25	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	350840	04/23/22 08:10	JMH2	TAL CF

Client Sample ID: MW-309

Date Collected: 04/14/22 16:40

Date Received: 04/18/22 07:10

Lab Sample ID: 310-229340-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			350970	04/26/22 09:30	ACM2	TAL CF
Dissolved	Analysis	6020A		1	351804	05/02/22 17:11	SAP	TAL CF
Total/NA	Prep	3005A			351128	04/27/22 09:15	ACM2	TAL CF
Total/NA	Analysis	6020A		1	351804	05/02/22 18:29	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	351169	04/27/22 09:00	JMH2	TAL CF

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229340-1

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-21 *

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

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229340-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS)	SW846	TAL CF
SM 2320B	Alkalinity	SM	TAL CF
3005A	Preparation, Total Metals	SW846	TAL CF

Protocol References:

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

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

Laboratory References:

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





Environment Testing
America



310-229340 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client <u>SCS Engineers</u>			
City/State	CITY <u>Madison</u>	STATE <u>WI</u>	Project
Receipt Information			
Date/Time Received	DATE <u>4-15-22</u>	TIME <u>1710</u>	Received By <u>HED</u>
Delivery Type <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other. _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes Cooler ID <u>MB-32</u>	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Cooler # _____ of _____	
Cooler Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other. _____ <input type="checkbox"/> NONE		
Thermometer ID <u>P</u>	Correction Factor (°C) <u>-0.1</u>		
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C) <u>2.4</u>	Corrected Temp (°C) <u>2.3</u>		
• Sample Container Temperature			
Container(s) used	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C)			
Corrected Temp (°C)			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE If yes, contact PM before proceeding If no, proceed with login			
Additional Comments			

Chain of Custody Record

Client Information Client Contact: Meghan Blodgett Company: SCS Engineers Address: 2830 Dairy Drive City: Madison State, Zip: WI 53718 Phone: 25221072 Email: mblodgett@scsengineers.com Project Name: Ottumwa Generating Station 25221072 Site:		Lab Pkt: Fredrick, Sandie E-Mail: Sandra.Fredrick@et.euofins.com PWSID:		Carrier Tracking No(s): 310-70160-17490.1 State of Origin: Page 1 of 1 Job #:								
Due Date Requested: TAT Requested (days): Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No PO #: 25221072 WO #:		Analysis Requested										
Sample Identification MW-307 MW-308 MW-309		Sample Date 4-11-22 4-12-22 4-14-22	Sample Time 18:20 16:44 14:40	Sample Type (C=comp, G=grab) G G G	Matrix (Water, Solid, Tissue, AAT) Water Water Water Water	Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Perform MS/MSD (Yes or No) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	220B Alkalinity/Carbonate <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	602A Metals (5) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	602A D Metals (2-4) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Total Number of Containers X	Special Instructions/Note: Preservation Codes: A HCL B NaOH C Zn Acetate D Nitric Acid E NaHSO4 F MeOH G Amchlor H Ascorbic Acid I Ice J DI Water K EDTA L EDA Other:
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV <input type="checkbox"/> Other (specify)												
Empty Kit Relinquished by: [Signature] Relinquished by: [Signature] Relinquished by: [Signature] Relinquished by: [Signature]												
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Special Instructions/QC Requirements:												
Method of Shipment:												
Date/Time: 4-15-22 8:00 Date/Time: 4-15-22 13:58 Date/Time: 4-15-22 17:10		Received by: [Signature] Received by: [Signature] Received by: [Signature]										
Date/Time: 4-15-22 8:00 Date/Time: 4-15-22 13:58 Date/Time: 4-15-22 17:10		Company: [Signature] Company: [Signature] Company: [Signature]										
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No.												



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-229340-1

Login Number: 229340

List Number: 1

Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

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

ANALYTICAL REPORT

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

Laboratory Job ID: 310-229326-2

Client Project/Site: Ottumwa Generating Station 25222072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:
5/16/2022 12:23:28 PM*

Sandie Fredrick, Project Manager II
(920)261-1660
Sandra.Fredrick@et.eurofinsus.com

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

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



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Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-2

Job ID: 310-229326-2

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-229326-2

Comments

No additional comments.

Receipt

The samples were received on 4/15/2022 5:10 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.3° C.

RAD

Methods 903.0, 9315: Radium-226 batch 561488

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-307 (310-229326-1), MW-308 (310-229326-2), MW-309 (310-229326-3), (LCS 160-561488/1-A), (LCSD 160-561488/2-A) and (MB 160-561488/23-A)

Methods 904.0, 9320: Radium-228 prep batch 160-561498:

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-307 (310-229326-1), MW-308 (310-229326-2), MW-309 (310-229326-3), (LCS 160-561498/1-A), (LCSD 160-561498/2-A) and (MB 160-561498/23-A)

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

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-229326-1	MW-307	Ground Water	04/11/22 18:20	04/15/22 17:10
310-229326-2	MW-308	Ground Water	04/12/22 16:49	04/15/22 17:10
310-229326-3	MW-309	Ground Water	04/14/22 16:40	04/15/22 17:10

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Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-2

Client Sample ID: MW-307

Lab Sample ID: 310-229326-1

No Detections.

Client Sample ID: MW-308

Lab Sample ID: 310-229326-2

No Detections.

Client Sample ID: MW-309

Lab Sample ID: 310-229326-3

No Detections.

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This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-2

Client Sample ID: MW-307
 Date Collected: 04/11/22 18:20
 Date Received: 04/15/22 17:10

Lab Sample ID: 310-229326-1
 Matrix: Ground Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	1.51		0.310	0.339	1.00	0.231	pCi/L	04/21/22 10:14	05/13/22 22:26	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	70.4		40 - 110					04/21/22 10:14	05/13/22 22:26	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	1.34		0.429	0.446	1.00	0.586	pCi/L	04/21/22 10:59	05/10/22 12:23	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	70.4		40 - 110					04/21/22 10:59	05/10/22 12:23	1
Y Carrier	90.1		40 - 110					04/21/22 10:59	05/10/22 12:23	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	2.84		0.529	0.560	5.00	0.586	pCi/L		05/16/22 11:24	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-2

Client Sample ID: MW-308
 Date Collected: 04/12/22 16:49
 Date Received: 04/15/22 17:10

Lab Sample ID: 310-229326-2
 Matrix: Ground Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	1.19		0.233	0.256	1.00	0.145	pCi/L	04/21/22 10:14	05/13/22 22:30	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	96.1		40 - 110					04/21/22 10:14	05/13/22 22:30	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	1.10		0.277	0.295	1.00	0.329	pCi/L	04/21/22 10:59	05/10/22 12:24	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	96.1		40 - 110					04/21/22 10:59	05/10/22 12:24	1
Y Carrier	90.1		40 - 110					04/21/22 10:59	05/10/22 12:24	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	2.29		0.362	0.391	5.00	0.329	pCi/L		05/16/22 11:24	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-2

Client Sample ID: MW-309

Lab Sample ID: 310-229326-3

Date Collected: 04/14/22 16:40

Matrix: Ground Water

Date Received: 04/15/22 17:10

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	0.576		0.182	0.189	1.00	0.175	pCi/L	04/21/22 10:14	05/13/22 22:27	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	85.2		40 - 110					04/21/22 10:14	05/13/22 22:27	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	0.346	U	0.271	0.273	1.00	0.431	pCi/L	04/21/22 10:59	05/10/22 12:25	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	85.2		40 - 110					04/21/22 10:59	05/10/22 12:25	1
Y Carrier	91.6		40 - 110					04/21/22 10:59	05/10/22 12:25	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.922		0.326	0.332	5.00	0.431	pCi/L		05/16/22 11:24	1

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Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-2

Qualifiers

Rad

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

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-2

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-561488/23-A
Matrix: Water
Analysis Batch: 565428

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 561488

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 226	-0.03358	U	0.105	0.105	1.00	0.214	pCi/L	04/21/22 10:14	05/13/22 22:35	1
Carrier	MB	MB	Limits			Prepared	Analyzed	Dil Fac		
	%Yield	Qualifier								
Ba Carrier	98.8		40 - 110			04/21/22 10:14	05/13/22 22:35	1		

Lab Sample ID: LCS 160-561488/1-A
Matrix: Water
Analysis Batch: 565428

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 561488

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium 226	11.3	11.09		1.22	1.00	0.169	pCi/L	98	75 - 125
Carrier	LCS	LCS	Limits			Prepared	Analyzed	Dil Fac	
	%Yield	Qualifier							
Ba Carrier	95.8		40 - 110						

Lab Sample ID: LCSD 160-561488/2-A
Matrix: Water
Analysis Batch: 565428

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 561488

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
				Uncert. (2σ+/-)							
Radium 226	11.3	10.68		1.20	1.00	0.202	pCi/L	94	75 - 125	0.17	1
Carrier	LCSD	LCSD	Limits			Prepared	Analyzed	Dil Fac			
	%Yield	Qualifier									
Ba Carrier	93.8		40 - 110								

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-561498/23-A
Matrix: Water
Analysis Batch: 564844

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 561498

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 228	0.2973	U	0.209	0.211	1.00	0.325	pCi/L	04/21/22 10:59	05/10/22 12:25	1
Carrier	MB	MB	Limits			Prepared	Analyzed	Dil Fac		
	%Yield	Qualifier								
Ba	98.8		40 - 110			04/21/22 10:59	05/10/22 12:25	1		
Y Carrier	89.7		40 - 110			04/21/22 10:59	05/10/22 12:25	1		

Eurofins Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-2

Method: 904.0 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCS 160-561498/1-A
Matrix: Water
Analysis Batch: 564827

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 561498

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	
Radium 228	8.63	10.09		1.15	1.00	0.373	pCi/L	117	75 - 125	
LCS LCS										
Carrier	%Yield	Qualifier	Limits							
Ba	95.8		40 - 110							
Y Carrier	86.4		40 - 110							

Lab Sample ID: LCSD 160-561498/2-A
Matrix: Water
Analysis Batch: 564827

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 561498

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		RER	RER Limit
Radium 228	8.63	10.16		1.16	1.00	0.379	pCi/L	118	75 - 125	0.03	1	
LCSD LCSD												
Carrier	%Yield	Qualifier	Limits									
Ba	93.8		40 - 110									
Y Carrier	85.2		40 - 110									

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QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-2

Rad

Prep Batch: 561488

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229326-1	MW-307	Total/NA	Ground Water	PrecSep-21	
310-229326-2	MW-308	Total/NA	Ground Water	PrecSep-21	
310-229326-3	MW-309	Total/NA	Ground Water	PrecSep-21	
MB 160-561488/23-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-561488/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-561488/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 561498

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229326-1	MW-307	Total/NA	Ground Water	PrecSep_0	
310-229326-2	MW-308	Total/NA	Ground Water	PrecSep_0	
310-229326-3	MW-309	Total/NA	Ground Water	PrecSep_0	
MB 160-561498/23-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-561498/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-561498/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

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Lab Chronicle

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-2

Client Sample ID: MW-307
Date Collected: 04/11/22 18:20
Date Received: 04/15/22 17:10

Lab Sample ID: 310-229326-1
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			561488	04/21/22 10:14	LPS	TAL SL
Total/NA	Analysis	903.0		1	565428	05/13/22 22:26	JCB	TAL SL
Total/NA	Prep	PrecSep_0			561498	04/21/22 10:59	LPS	TAL SL
Total/NA	Analysis	904.0		1	564827	05/10/22 12:23	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	565778	05/16/22 11:24	EMH	TAL SL

Client Sample ID: MW-308
Date Collected: 04/12/22 16:49
Date Received: 04/15/22 17:10

Lab Sample ID: 310-229326-2
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			561488	04/21/22 10:14	LPS	TAL SL
Total/NA	Analysis	903.0		1	565428	05/13/22 22:30	JCB	TAL SL
Total/NA	Prep	PrecSep_0			561498	04/21/22 10:59	LPS	TAL SL
Total/NA	Analysis	904.0		1	564827	05/10/22 12:24	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	565778	05/16/22 11:24	EMH	TAL SL

Client Sample ID: MW-309
Date Collected: 04/14/22 16:40
Date Received: 04/15/22 17:10

Lab Sample ID: 310-229326-3
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			561488	04/21/22 10:14	LPS	TAL SL
Total/NA	Analysis	903.0		1	565428	05/13/22 22:27	JCB	TAL SL
Total/NA	Prep	PrecSep_0			561498	04/21/22 10:59	LPS	TAL SL
Total/NA	Analysis	904.0		1	564844	05/10/22 12:25	SCB	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	565778	05/16/22 11:24	EMH	TAL SL

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-2

Laboratory: Eurofins St. Louis

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

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



Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-2

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL
Ra226_Ra228 Pos	Combined Radium-226 and Radium-228	TAL-STL	TAL SL
PrecSep_0	Preparation, Precipitate Separation	None	TAL SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	TAL SL

Protocol References:

EPA = US Environmental Protection Agency

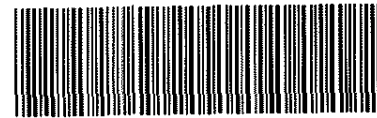
None = None

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

Laboratory References:

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





Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client <u>SCS Engineers</u>			
City/State	CITY <u>Madison</u>	STATE <u>WI</u>	Project
Receipt Information			
Date/Time Received	DATE <u>4/15/22</u>	TIME <u>1710</u>	Received By <u>MRH</u>
Delivery Type <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee			
<input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes Cooler ID	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Cooler # ____ of ____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID	<u>08 MRH 4/15/22</u>	Correction Factor (°C) <u>00</u>	
* Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C)	<u>2.3</u>	Corrected Temp (°C) <u>2.3</u>	
Sample Container Temperature			
Container(s) used	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C)			
Corrected Temp (°C)			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g , bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-229326-2

Login Number: 229326

List Number: 1

Creator: Kizer, Preston V

List Source: Eurofins Cedar Falls

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



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-229326-2

Login Number: 229326

List Number: 2

Creator: Booker, Autumn R

List Source: Eurofins St. Louis

List Creation: 04/20/22 06:22 PM

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



Tracer/Carrier Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-229326-2

Method: 903.0 - Radium-226 (GFPC)

Matrix: Ground Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	
310-229326-1	MW-307	70.4	
310-229326-2	MW-308	96.1	
310-229326-3	MW-309	85.2	

Tracer/Carrier Legend
Ba = Ba Carrier

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	
LCS 160-561488/1-A	Lab Control Sample	95.8	
LCSD 160-561488/2-A	Lab Control Sample Dup	93.8	
MB 160-561488/23-A	Method Blank	98.8	

Tracer/Carrier Legend
Ba = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Ground Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
310-229326-1	MW-307	70.4	90.1
310-229326-2	MW-308	96.1	90.1
310-229326-3	MW-309	85.2	91.6

Tracer/Carrier Legend
Ba = Ba
Y = Y Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
LCS 160-561498/1-A	Lab Control Sample	95.8	86.4
LCSD 160-561498/2-A	Lab Control Sample Dup	93.8	85.2
MB 160-561498/23-A	Method Blank	98.8	89.7

Tracer/Carrier Legend
Ba = Ba
Y = Y Carrier

Eurofins Cedar Falls

ANALYTICAL REPORT

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

Laboratory Job ID: 310-229326-3

Client Project/Site: Ottumwa Generating Station 25222072 TDS

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:
5/13/2022 1:30:26 PM*

Sandie Fredrick, Project Manager II
(920)261-1660
Sandra.Fredrick@et.eurofinsus.com

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

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

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Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072 TDS

Job ID: 310-229326-3

Job ID: 310-229326-3

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-229326-3

Comments

No additional comments.

Receipt

The samples were received on 4/15/2022 5:10 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.3° C.

General Chemistry

Method SM 2540C: The following sample(s) were requested after holding time expired: MW-307 (310-229326-1), MW-308 (310-229326-2) and MW-309 (310-229326-3).

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

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Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072 TDS

Job ID: 310-229326-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-229326-1	MW-307	Ground Water	04/11/22 18:20	04/15/22 17:10
310-229326-2	MW-308	Ground Water	04/12/22 16:49	04/15/22 17:10
310-229326-3	MW-309	Ground Water	04/14/22 16:40	04/15/22 17:10

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Detection Summary

Client: SCS Engineers

Job ID: 310-229326-3

Project/Site: Ottumwa Generating Station 25222072 TDS

Client Sample ID: MW-307

Lab Sample ID: 310-229326-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	1100	H	50	26	mg/L	1		SM 2540C	Total/NA

Client Sample ID: MW-308

Lab Sample ID: 310-229326-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	1000	H	50	26	mg/L	1		SM 2540C	Total/NA

Client Sample ID: MW-309

Lab Sample ID: 310-229326-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	940	H	50	26	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072 TDS

Job ID: 310-229326-3

Client Sample ID: MW-307

Lab Sample ID: 310-229326-1

Date Collected: 04/11/22 18:20

Matrix: Ground Water

Date Received: 04/15/22 17:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1100	H	50	26	mg/L			05/11/22 15:46	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072 TDS

Job ID: 310-229326-3

Client Sample ID: MW-308

Lab Sample ID: 310-229326-2

Date Collected: 04/12/22 16:49

Matrix: Ground Water

Date Received: 04/15/22 17:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1000	H	50	26	mg/L			05/11/22 15:46	1

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Client Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072 TDS

Job ID: 310-229326-3

Client Sample ID: MW-309

Lab Sample ID: 310-229326-3

Date Collected: 04/14/22 16:40

Matrix: Ground Water

Date Received: 04/15/22 17:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	940	H	50	26	mg/L			05/11/22 15:46	1

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Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072 TDS

Job ID: 310-229326-3

Qualifiers

General Chemistry

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25222072 TDS

Job ID: 310-229326-3

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

Lab Sample ID: MB 310-352776/1
Matrix: Water
Analysis Batch: 352776

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	<26		50	26	mg/L			05/11/22 15:46	1

Lab Sample ID: LCS 310-352776/2
Matrix: Water
Analysis Batch: 352776

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	928		mg/L		93	90 - 110

Lab Sample ID: 310-229326-1 DU
Matrix: Ground Water
Analysis Batch: 352776

Client Sample ID: MW-307
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	1100	H	1050		mg/L		0.2	20



QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072 TDS

Job ID: 310-229326-3

General Chemistry

Analysis Batch: 352776

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-229326-1	MW-307	Total/NA	Ground Water	SM 2540C	
310-229326-2	MW-308	Total/NA	Ground Water	SM 2540C	
310-229326-3	MW-309	Total/NA	Ground Water	SM 2540C	
MB 310-352776/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-352776/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-229326-1 DU	MW-307	Total/NA	Ground Water	SM 2540C	

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Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072 TDS

Job ID: 310-229326-3

Client Sample ID: MW-307

Lab Sample ID: 310-229326-1

Date Collected: 04/11/22 18:20

Matrix: Ground Water

Date Received: 04/15/22 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	352776	05/11/22 15:46	TGF	TAL CF

Client Sample ID: MW-308

Lab Sample ID: 310-229326-2

Date Collected: 04/12/22 16:49

Matrix: Ground Water

Date Received: 04/15/22 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	352776	05/11/22 15:46	TGF	TAL CF

Client Sample ID: MW-309

Lab Sample ID: 310-229326-3

Date Collected: 04/14/22 16:40

Matrix: Ground Water

Date Received: 04/15/22 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	352776	05/11/22 15:46	TGF	TAL CF

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072 TDS

Job ID: 310-229326-3

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-21 *

- 1
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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25222072 TDS

Job ID: 310-229326-3

Method	Method Description	Protocol	Laboratory
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL CF

Protocol References:

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

Laboratory References:

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



Fredrick, Sandie

From: Matzuk, Ryan <RMatzuk@scsengineers.com>
Sent: Wednesday, May 11, 2022 12:06 PM
To: Fredrick, Sandie; Blodgett, Meghan; Kron, Nicole
Subject: Re: Eurofins Environment Testing North Central, LLC report and EDD files from 310-229326-1 Ottumwa Generating Station 25222072

EXTERNAL EMAIL*

Hello Sandie,

We need TDS reported on this if possible, are the samples still around or have they been disposed of? Sorry I didn't catch that when reviewing SAFs.

Ryan Matzuk
Hydrogeologist
2830 Dairy Drive
Madison, WI 53718-6751 USA
608-216-7326 (W)
608-400-9597 (C)
rmatzuk@scsengineers.com

Driven by Client Success
www.scsengineers.com

From: Sandie Fredrick <Sandra.Fredrick@et.eurofinsus.com>
Sent: Monday, May 9, 2022 12:15 PM
To: Radunzel, Ashley <ARadunzel@scsengineers.com>; Jeffrey Maxted <jeffreymaxted@alliantenergy.com>; Matthew Bizjack <MatthewBizjack@alliantenergy.com>; Blodgett, Meghan <mblodgett@scsengineers.com>; Kron, Nicole <NKron@scsengineers.com>; Matzuk, Ryan <RMatzuk@scsengineers.com>; Clark, Sherren <SClark@scsengineers.com>; Karwoski, Thomas <TKarwoski@scsengineers.com>
Subject: Eurofins Environment Testing North Central, LLC report and EDD files from 310-229326-1 Ottumwa Generating Station 25222072

This email originated from outside of SCS Engineers. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello All,

Attached please find the report and EDD files for job 310-229326-1; Ottumwa Generating Station 25222072

Please feel free to contact me if you have any questions.

Thank you.

Sandie Fredrick
Project Manager

Eurofins Chicago
Phone: 920-261-1660

E-mail: Sandra.Fredrick@et.eurofinsus.com
www.eurofinsus.com/env



Reference: [500-653463]
Attachments: 2

* WARNING - EXTERNAL: This email originated from outside of Eurofins Environment Testing America. Do not click any links or open any attachments unless you trust the sender and know that the content is safe!

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Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-229326-3

Login Number: 229326

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Kizer, Preston V

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



C3 August 2022 Supplemental Assessment Monitoring

ANALYTICAL REPORT

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

Laboratory Job ID: 310-238852-3

Client Project/Site: Ottumwa Generating Station - 25222072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:
9/20/2022 4:28:43 PM

Sandie Fredrick, Project Manager II
(920)261-1660
Sandra.Fredrick@et.eurofinsus.com

LINKS

Review your project
results through



Have a Question?



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www.eurofinsus.com/Env

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

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

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Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-238852-3

Job ID: 310-238852-3

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-238852-3

Comments

Split reports

Receipt

The samples were received on 8/25/2022 4:30 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 4.8° C.

Metals

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

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Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-238852-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-238852-4	MW-307	Water	08/25/22 10:45	08/25/22 16:30

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Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-238852-3

Client Sample ID: MW-307

Lab Sample ID: 310-238852-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cobalt	25		0.50	0.19	ug/L	1		6020A	Total/NA
Ground Water Elevation	644.25				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	67.5				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.56				mg/L	1		Field Sampling	Total/NA
pH, Field	6.71				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1727				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.0				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	2.17				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-238852-3

Client Sample ID: MW-307
 Date Collected: 08/25/22 10:45
 Date Received: 08/25/22 16:30

Lab Sample ID: 310-238852-4
 Matrix: Water

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	25		0.50	0.19	ug/L		08/29/22 10:30	09/09/22 21:21	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	644.25				ft			08/25/22 10:45	1
Oxidation Reduction Potential	67.5				millivolts			08/25/22 10:45	1
Oxygen, Dissolved, Client Supplied	0.56				mg/L			08/25/22 10:45	1
pH, Field	6.71				SU			08/25/22 10:45	1
Specific Conductance, Field	1727				umhos/cm			08/25/22 10:45	1
Temperature, Field	13.0				Degrees C			08/25/22 10:45	1
Turbidity, Field	2.17				NTU			08/25/22 10:45	1

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Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-238852-3

Glossary

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

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-238852-3

Metals

Prep Batch: 363894

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-238852-4	MW-307	Total/NA	Water	3005A	

Analysis Batch: 365238

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-238852-4	MW-307	Total/NA	Water	6020A	363894

Field Service / Mobile Lab

Analysis Batch: 364984

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-238852-4	MW-307	Total/NA	Water	Field Sampling	

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Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-238852-3

Client Sample ID: MW-307

Lab Sample ID: 310-238852-4

Date Collected: 08/25/22 10:45

Matrix: Water

Date Received: 08/25/22 16:30

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Analyst</u>	<u>Lab</u>	<u>Prepared or Analyzed</u>
Total/NA	Prep	3005A			363894	QTZ5	EET CF	08/29/22 10:30
Total/NA	Analysis	6020A		1	365238	DHM5	EET CF	09/09/22 21:21
Total/NA	Analysis	Field Sampling		1	364984	BJ0R	EET CF	08/25/22 10:45

Laboratory References:

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



Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-238852-3

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-21 *

- 1
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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25222072

Job ID: 310-238852-3

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS)	SW846	EET CF
Field Sampling	Field Sampling	EPA	EET CF
3005A	Preparation, Total Metals	SW846	EET CF

Protocol References:

EPA = US Environmental Protection Agency

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

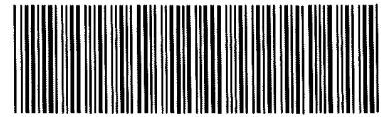
Laboratory References:

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





Environment Testing
America



310-238852 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS ENGINEERS</u>			
City/State:	<u>MADISON</u>	<u>WI</u>	Project:
Receipt Information			
Date/Time Received:	<u>8/25/22</u>	<u>1630</u>	Received By: <u>EM</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other, _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID.	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # ____ of ____	
Cooler Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>R</u>	Correction Factor (°C):	<u>0</u>
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>4.8</u>	Corrected Temp (°C):	<u>4.8</u>
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE If yes, contact PM before proceeding If no, proceed with login			
Additional Comments			





CHAIN OF CUSTODY

Preservation Codes
 A=None B=HCL C=H2SO4 D=HNO3 E=DI Water F=Methanol G=NaOH
 H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

FILTERED? (YES/NO)
 PRESERVATION (CODE)*

6020A-Metals (Cd)
 Analysis Requested

(Please Print Clearly)

Company Name: SCS Engineers
 Branch/Location: Madison, WI
 Project Contact: Tom Karwoski
 Phone: (608) 224-2830
 Project Number: 25220072.00
 Project Name: IPL-OGS GW Monitoring
 Project State: Iowa
 Sampled By (Print): Ryan Matzek
 Sampled By (Sign): *[Signature]*
 PO #:

Regulatory Program:

Data Package Options
 EPA Level III
 EPA Level IV

MS/MSD
 On your sample (billable)
 NOT needed on your sample

Matrix Codes
 W = Water
 DW = Drinking Water
 GW = Ground Water
 SW = Surface Water
 WW = Waste Water
 WP = Wipe

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	TIME	MATRIX
MW-301				GW
MW-307		8/25	1045	GW
MW-308				GW
MW-309				GW
Field Blank				W

Quote #:	Mail To Contact:	Mail To Company:	Mail To Address:	Invoice To Contact:	Invoice To Company:	Invoice To Address:	Invoice To Phone:	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
	Tom Karwoski	SCS Engineers	2830 Dairy Drive Madison, WI 53718	Tom Karwoski	SCS Engineers	2830 Dairy Drive Madison, WI 53718	(608) 224-2830			

Received By:	Date/Time:	Received By:	Date/Time:	Received By:	Date/Time:	Received By:	Date/Time:	Received By:	Date/Time:	Received By:	Date/Time:
<i>[Signature]</i>	8/25/22 1200	<i>[Signature]</i>	8/25/22 1200	<i>[Signature]</i>	8/25/22 1200	<i>[Signature]</i>	8/25/22 1200	<i>[Signature]</i>	8/25/22 1200	<i>[Signature]</i>	8/25/22 1200

Rush Turnaround Time Requested - Prelims
 (Rush TAT subject to approval/surcharge)
 Date Needed:

Transmit Prelim Rush Results by (complete what you want):

Email #1:
 Email #2:
 Telephone:
 Fax:

Samples on HOLD are subject to special pricing and release of liability

Parameter	MW-301	LUL SET #2 (ASN Pond)										LUL SET #3 (CULF)				TOTAL		
		Field Blank	MW-302	MW-303	MW-304	MW-305	MW-305A	MW-306	MW-310	MW-310A	MW-311	MW-311A	MW-312	MW-313	MW-307		MW-308	MW-309
Boron																		0
Calcium																		0
Chloride																		0
Fluoride																		0
pH																		0
Sulfate																		0
TDS																		0
Antimony																		0
Arsenic																		0
Barium																		0
Beryllium																		0
Cadmium																		0
Chromium																		0
Cobalt		X										X	X	X				4
Fluoride																		0
Lead																		0
Lithium																		0
Mercury																		0
Molybdenum																		0
Selenium																		0
Thallium																		0
Radium (separate COC)																		0
Bicarbonate (total)												X	X					2
Carbonate (total)												X	X					2
Calcium (total)												X	X					2
Iron (total)												X	X					2
Magnesium (total)												X	X					2
Manganese (total)												X	X					2
Potassium (total)												X	X					2
Sodium (total)												X	X					2
Cobalt (filtered)												X	X					2
Iron (filtered)												X	X					2
Lithium (filtered)												X	X					2
Manganese (filtered)												X	X					2
Ferrous Iron (CHEMets)												X	X					2
Sulfide (CHEMets)												X	X					2
Groundwater Elevation												X	X					3
Surface Water Elevation																		0
Well Depth																		0
pH (field)												X	X					3
Specific Conductance												X	X					3
Dissolved Oxygen												X	X					3
ORP												X	X					3
Temperature												X	X					3
Turbidity												X	X					3
Color												X	X					3
Odor												X	X					3



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-238852-3

Login Number: 238852

List Number: 1

Creator: Kizer, Preston V

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	

C4 October 2022 Assessment Monitoring

ANALYTICAL REPORT

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

Laboratory Job ID: 310-243398-1

Client Project/Site: Alliant OGS - 25222072 Background MNA

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:

11/8/2022 5:27:48 PM

Sandie Fredrick, Project Manager II
(920)261-1660

Sandra.Fredrick@et.eurofinsus.com

LINKS

Review your project
results through



Have a Question?



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www.eurofinsus.com/Env

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

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



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Case Narrative

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background MNA

Job ID: 310-243398-1

Job ID: 310-243398-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-243398-1

Comments

No additional comments.

Receipt

The samples were received on 10/27/2022 5:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was -0.2° C.

Metals

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

General Chemistry

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

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Sample Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background MNA

Job ID: 310-243398-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-243398-1	MW-301	Water	10/26/22 08:05	10/27/22 17:00
310-243398-2	Field Blank	Water	10/26/22 07:40	10/27/22 17:00

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Detection Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background MNA

Job ID: 310-243398-1

Client Sample ID: MW-301

Lab Sample ID: 310-243398-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	73000		1000	610	ug/L	1		6020B	Total/NA
Potassium	980		500	150	ug/L	1		6020B	Total/NA
Magnesium	28000		500	150	ug/L	1		6020B	Total/NA
Manganese	8.0	J	10	3.6	ug/L	1		6020B	Total/NA
Manganese	7.9	J	10	3.6	ug/L	1		6020B	Dissolved
Bicarbonate Alkalinity as CaCO3	250		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	250		10	4.6	mg/L	1		SM 2320B	Total/NA

Client Sample ID: Field Blank

Lab Sample ID: 310-243398-2

No Detections.

This Detection Summary does not include radiochemical test results.

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Client Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 Backgournd MNA

Job ID: 310-243398-1

Client Sample ID: MW-301
 Date Collected: 10/26/22 08:05
 Date Received: 10/27/22 17:00

Lab Sample ID: 310-243398-1
 Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	73000		1000	610	ug/L		10/31/22 09:45	11/04/22 20:34	1
Potassium	980		500	150	ug/L		10/31/22 09:45	11/04/22 20:34	1
Iron	<36		100	36	ug/L		10/31/22 09:45	11/04/22 20:34	1
Magnesium	28000		500	150	ug/L		10/31/22 09:45	11/04/22 20:34	1
Manganese	8.0	J	10	3.6	ug/L		10/31/22 09:45	11/04/22 20:34	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/31/22 09:45	11/07/22 21:34	1
Manganese	7.9	J	10	3.6	ug/L		10/31/22 09:45	11/07/22 21:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	250		10	4.6	mg/L			11/08/22 11:10	1
Carbonate Alkalinity as CaCO3 (SM 2320B)	<4.6		10	4.6	mg/L			11/08/22 11:10	1
Total Alkalinity as CaCO3 (SM 2320B)	250		10	4.6	mg/L			11/08/22 11:10	1

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Client Sample Results

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Backgournd MNA

Job ID: 310-243398-1

Client Sample ID: Field Blank

Lab Sample ID: 310-243398-2

Date Collected: 10/26/22 07:40

Matrix: Water

Date Received: 10/27/22 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/31/22 09:45	11/04/22 20:59	1
Magnesium	<150		500	150	ug/L		10/31/22 09:45	11/04/22 20:59	1
Manganese	<3.6		10	3.6	ug/L		10/31/22 09:45	11/04/22 20:59	1
Potassium	<150		500	150	ug/L		10/31/22 09:45	11/04/22 20:59	1
Sodium	<610		1000	610	ug/L		10/31/22 09:45	11/04/22 20:59	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	<2.3		5.0	2.3	mg/L			10/29/22 14:39	1
Carbonate Alkalinity as CaCO3 (SM 2320B)	<2.3		5.0	2.3	mg/L			10/29/22 14:39	1
Total Alkalinity as CaCO3 (SM 2320B)	<2.3		5.0	2.3	mg/L			10/29/22 14:39	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background MNA

Job ID: 310-243398-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 Background MNA

Job ID: 310-243398-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-370224/1-A
Matrix: Water
Analysis Batch: 371144

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 370224

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	<610		1000	610	ug/L		10/31/22 09:45	11/04/22 19:16	1
Potassium	<150		500	150	ug/L		10/31/22 09:45	11/04/22 19:16	1
Iron	<36		100	36	ug/L		10/31/22 09:45	11/04/22 19:16	1
Magnesium	<150		500	150	ug/L		10/31/22 09:45	11/04/22 19:16	1
Manganese	<3.6		10	3.6	ug/L		10/31/22 09:45	11/04/22 19:16	1

Lab Sample ID: LCS 310-370224/2-A
Matrix: Water
Analysis Batch: 371144

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 370224

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Sodium	2000	1890		ug/L		95	80 - 120
Potassium	2000	1820		ug/L		91	80 - 120
Iron	200	175		ug/L		88	80 - 120
Magnesium	2000	1610		ug/L		81	80 - 120
Manganese	100	87.3		ug/L		87	80 - 120

Lab Sample ID: MB 310-370225/1-A
Matrix: Water
Analysis Batch: 371296

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 370225

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/31/22 09:45	11/07/22 19:17	1
Manganese	<3.6		10	3.6	ug/L		10/31/22 09:45	11/07/22 19:17	1

Lab Sample ID: LCS 310-370225/2-A
Matrix: Water
Analysis Batch: 371296

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 370225

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	200	228		ug/L		114	80 - 120
Manganese	100	106		ug/L		106	80 - 120

Method: 2320B - Alkalinity (Low Level)

Lab Sample ID: MB 310-370263/1
Matrix: Water
Analysis Batch: 370263

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/29/22 14:39	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/29/22 14:39	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/29/22 14:39	1

Lab Sample ID: LCS 310-370263/2
Matrix: Water
Analysis Batch: 370263

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Alkalinity as CaCO3	1000	1020		mg/L		102	90 - 110

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QC Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 Background MNA

Job ID: 310-243398-1

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 310-371321/1
Matrix: Water
Analysis Batch: 371321

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			11/08/22 11:10	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			11/08/22 11:10	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			11/08/22 11:10	1

Lab Sample ID: LCS 310-371321/2
Matrix: Water
Analysis Batch: 371321

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Alkalinity as CaCO3	1000	1020		mg/L		102	90 - 110

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QC Association Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Backgournd MNA

Job ID: 310-243398-1

Metals

Prep Batch: 370224

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243398-1	MW-301	Total/NA	Water	3005A	
310-243398-2	Field Blank	Total/NA	Water	3005A	
MB 310-370224/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-370224/2-A	Lab Control Sample	Total/NA	Water	3005A	

Prep Batch: 370225

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243398-1	MW-301	Dissolved	Water	3005A	
MB 310-370225/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-370225/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 371144

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243398-1	MW-301	Total/NA	Water	6020B	370224
310-243398-2	Field Blank	Total/NA	Water	6020B	370224
MB 310-370224/1-A	Method Blank	Total/NA	Water	6020B	370224
LCS 310-370224/2-A	Lab Control Sample	Total/NA	Water	6020B	370224

Analysis Batch: 371296

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243398-1	MW-301	Dissolved	Water	6020B	370225
MB 310-370225/1-A	Method Blank	Total/NA	Water	6020B	370225
LCS 310-370225/2-A	Lab Control Sample	Total/NA	Water	6020B	370225

General Chemistry

Analysis Batch: 370263

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243398-2	Field Blank	Total/NA	Water	2320B	
MB 310-370263/1	Method Blank	Total/NA	Water	2320B	
LCS 310-370263/2	Lab Control Sample	Total/NA	Water	2320B	

Analysis Batch: 371321

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243398-1	MW-301	Total/NA	Water	SM 2320B	
MB 310-371321/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-371321/2	Lab Control Sample	Total/NA	Water	SM 2320B	

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Lab Chronicle

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background MNA

Job ID: 310-243398-1

Client Sample ID: MW-301

Date Collected: 10/26/22 08:05

Date Received: 10/27/22 17:00

Lab Sample ID: 310-243398-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	3005A			370225	DHM5	EET CF	10/31/22 09:45
Dissolved	Analysis	6020B		1	371296	A6US	EET CF	11/07/22 21:34
Total/NA	Prep	3005A			370224	DHM5	EET CF	10/31/22 09:45
Total/NA	Analysis	6020B		1	371144	A6US	EET CF	11/04/22 20:34
Total/NA	Analysis	SM 2320B		1	371321	MAQ3	EET CF	11/08/22 11:10

Client Sample ID: Field Blank

Date Collected: 10/26/22 07:40

Date Received: 10/27/22 17:00

Lab Sample ID: 310-243398-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			370224	DHM5	EET CF	10/31/22 09:45
Total/NA	Analysis	6020B		1	371144	A6US	EET CF	11/04/22 20:59
Total/NA	Analysis	2320B		1	370263	MAQ3	EET CF	10/29/22 14:39

Laboratory References:

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



Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background MNA

Job ID: 310-243398-1

Laboratory: Eurofins Cedar Falls

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

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

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Method Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background MNA

Job ID: 310-243398-1

Method	Method Description	Protocol	Laboratory
6020B	Metals (ICP/MS)	SW846	EET CF
2320B	Alkalinity (Low Level)	SM	EET CF
SM 2320B	Alkalinity	SM	EET CF
3005A	Preparation, Total Metals	SW846	EET CF

Protocol References:

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

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

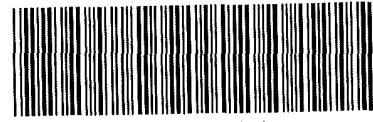
Laboratory References:

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





Environment Testing
America



310-243398 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS</u>			
City/State:	CITY <u>Madison</u>	STATE <u>WI</u>	Project:
Receipt Information			
Date/Time Received:	DATE <u>10 27-22</u>	TIME <u>1700</u>	Received By: <u>AK</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # ____ of ____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>T</u>	Correction Factor (°C):	<u>0</u>
* Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>-0.2</u>	Corrected Temp (°C):	<u>-0.2</u>
Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-243398-1

SDG Number:

Login Number: 243398

List Number: 1

Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

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



ANALYTICAL REPORT

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

Laboratory Job ID: 310-243396-1

Client Project/Site: Alliant OGS - 25222072 Background

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:

11/8/2022 4:40:21 PM

Sandie Fredrick, Project Manager II
(920)261-1660

Sandra.Fredrick@et.eurofinsus.com

LINKS

Review your project
results through



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www.eurofinsus.com/Env

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

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



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Case Narrative

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-1

Job ID: 310-243396-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-243396-1

Comments

No additional comments.

Receipt

The samples were received on 10/27/2022 5:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was -0.1°C .

HPLC/IC

Method 9056A: The following sample was diluted due to the nature of the sample matrix: MW-301 (310-243396-1). 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

Methods 6020A, 6020B: Due to sample matrix effect on the internal standard (ISTD), a dilution was required for the following samples: MW-301 (310-243396-1) and Field Blank (310-243396-2).

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

General Chemistry

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

Sample Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-243396-1	MW-301	Water	10/26/22 08:05	10/27/22 17:00
310-243396-2	Field Blank	Water	10/26/22 07:40	10/27/22 17:00

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Detection Summary

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-1

Client Sample ID: MW-301

Lab Sample ID: 310-243396-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	160		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	180		5.0	2.0	mg/L	5		9056A	Total/NA
Barium	44		2.0	0.88	ug/L	1		6020B	Total/NA
Boron	780		100	58	ug/L	1		6020B	Total/NA
Cadmium	0.055	J	0.10	0.055	ug/L	1		6020B	Total/NA
Calcium	110		0.50	0.19	mg/L	1		6020B	Total/NA
Chromium	1.2	J	5.0	1.1	ug/L	1		6020B	Total/NA
Cobalt	0.29	J	0.50	0.19	ug/L	1		6020B	Total/NA
Lithium	30	J	70	18	ug/L	7		6020B	Total/NA
Selenium	6.9		5.0	0.96	ug/L	1		6020B	Total/NA
Total Dissolved Solids	690		50	26	mg/L	1		SM 2540C	Total/NA
pH	6.7	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	680.68				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	26.9				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	4.74				mg/L	1		Field Sampling	Total/NA
pH, Field	6.29				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1036				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	14.6				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	0.62				NTU	1		Field Sampling	Total/NA

Client Sample ID: Field Blank

Lab Sample ID: 310-243396-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	0.27	J	0.50	0.19	mg/L	1		6020B	Total/NA
pH	6.4	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-1

Client Sample ID: MW-301

Lab Sample ID: 310-243396-1

Date Collected: 10/26/22 08:05

Matrix: Water

Date Received: 10/27/22 17:00

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	160		5.0	2.3	mg/L			11/07/22 16:08	5
Fluoride	<0.22		0.50	0.22	mg/L			11/07/22 16:08	5
Sulfate	180		5.0	2.0	mg/L			11/07/22 16:08	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.69		2.0	0.69	ug/L		10/31/22 09:45	11/07/22 15:20	1
Arsenic	<0.75		2.0	0.75	ug/L		10/31/22 09:45	11/03/22 20:31	1
Barium	44		2.0	0.88	ug/L		10/31/22 09:45	11/03/22 20:31	1
Beryllium	<0.27		1.0	0.27	ug/L		10/31/22 09:45	11/03/22 20:31	1
Boron	780		100	58	ug/L		10/31/22 09:45	11/03/22 20:31	1
Cadmium	0.055	J	0.10	0.055	ug/L		10/31/22 09:45	11/03/22 20:31	1
Calcium	110		0.50	0.19	mg/L		10/31/22 09:45	11/03/22 20:31	1
Chromium	1.2	J	5.0	1.1	ug/L		10/31/22 09:45	11/03/22 20:31	1
Cobalt	0.29	J	0.50	0.19	ug/L		10/31/22 09:45	11/03/22 20:31	1
Lead	<0.24		0.50	0.24	ug/L		10/31/22 09:45	11/03/22 20:31	1
Lithium	30	J	70	18	ug/L		10/31/22 09:45	11/07/22 18:55	7
Molybdenum	<8.4		14	8.4	ug/L		10/31/22 09:45	11/07/22 18:55	7
Selenium	6.9		5.0	0.96	ug/L		10/31/22 09:45	11/03/22 20:31	1
Thallium	<0.26		1.0	0.26	ug/L		10/31/22 09:45	11/03/22 20:31	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.11		0.20	0.11	ug/L		11/02/22 17:55	11/03/22 15:54	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	690		50	26	mg/L			10/30/22 05:24	1
pH (SM 4500 H+ B)	6.7	HF	0.1	0.1	SU			10/27/22 20:44	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	680.68				ft			10/26/22 08:05	1
Oxidation Reduction Potential	26.9				millivolts			10/26/22 08:05	1
Oxygen, Dissolved, Client Supplied	4.74				mg/L			10/26/22 08:05	1
pH, Field	6.29				SU			10/26/22 08:05	1
Specific Conductance, Field	1036				umhos/cm			10/26/22 08:05	1
Temperature, Field	14.6				Degrees C			10/26/22 08:05	1
Turbidity, Field	0.62				NTU			10/26/22 08:05	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-1

Client Sample ID: Field Blank

Lab Sample ID: 310-243396-2

Date Collected: 10/26/22 07:40

Matrix: Water

Date Received: 10/27/22 17:00

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.45		1.0	0.45	mg/L			11/07/22 16:20	1
Fluoride	<0.044		0.10	0.044	mg/L			11/07/22 16:20	1
Sulfate	<0.40		1.0	0.40	mg/L			11/07/22 16:20	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.69		2.0	0.69	ug/L		10/31/22 09:45	11/07/22 15:23	1
Arsenic	<0.75		2.0	0.75	ug/L		10/31/22 09:45	11/03/22 20:34	1
Barium	<0.88		2.0	0.88	ug/L		10/31/22 09:45	11/03/22 20:34	1
Beryllium	<0.27		1.0	0.27	ug/L		10/31/22 09:45	11/03/22 20:34	1
Boron	<58		100	58	ug/L		10/31/22 09:45	11/03/22 20:34	1
Cadmium	<0.055		0.10	0.055	ug/L		10/31/22 09:45	11/03/22 20:34	1
Calcium	0.27	J	0.50	0.19	mg/L		10/31/22 09:45	11/03/22 20:34	1
Chromium	<1.1		5.0	1.1	ug/L		10/31/22 09:45	11/03/22 20:34	1
Cobalt	<0.19		0.50	0.19	ug/L		10/31/22 09:45	11/03/22 20:34	1
Lead	<0.24		0.50	0.24	ug/L		10/31/22 09:45	11/03/22 20:34	1
Lithium	<18		70	18	ug/L		10/31/22 09:45	11/07/22 18:58	7
Molybdenum	<8.4		14	8.4	ug/L		10/31/22 09:45	11/07/22 18:58	7
Selenium	<0.96		5.0	0.96	ug/L		10/31/22 09:45	11/03/22 20:34	1
Thallium	<0.26		1.0	0.26	ug/L		10/31/22 09:45	11/03/22 20:34	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.11		0.20	0.11	ug/L		11/02/22 17:55	11/03/22 15:56	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	<26		50	26	mg/L			10/30/22 05:24	1
pH (SM 4500 H+ B)	6.4	HF	0.1	0.1	SU			10/27/22 20:46	1



Definitions/Glossary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

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

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-371316/3
Matrix: Water
Analysis Batch: 371316

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.45		1.0	0.45	mg/L			11/07/22 11:15	1
Fluoride	<0.044		0.10	0.044	mg/L			11/07/22 11:15	1
Sulfate	<0.40		1.0	0.40	mg/L			11/07/22 11:15	1

Lab Sample ID: LCS 310-371316/4
Matrix: Water
Analysis Batch: 371316

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	9.90		mg/L		99	90 - 110
Fluoride	2.00	2.10		mg/L		105	90 - 110
Sulfate	10.0	10.4		mg/L		104	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-370221/1-A
Matrix: Water
Analysis Batch: 370535

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 370221

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.69		2.0	0.69	ug/L		10/31/22 09:45	11/01/22 14:36	1
Arsenic	<0.75		2.0	0.75	ug/L		10/31/22 09:45	11/01/22 14:36	1
Barium	<0.88		2.0	0.88	ug/L		10/31/22 09:45	11/01/22 14:36	1
Beryllium	<0.27		1.0	0.27	ug/L		10/31/22 09:45	11/01/22 14:36	1
Boron	<58		100	58	ug/L		10/31/22 09:45	11/01/22 14:36	1
Cadmium	<0.055		0.10	0.055	ug/L		10/31/22 09:45	11/01/22 14:36	1
Calcium	<0.19		0.50	0.19	mg/L		10/31/22 09:45	11/01/22 14:36	1
Chromium	<1.1		5.0	1.1	ug/L		10/31/22 09:45	11/01/22 14:36	1
Cobalt	<0.19		0.50	0.19	ug/L		10/31/22 09:45	11/01/22 14:36	1
Lead	<0.24		0.50	0.24	ug/L		10/31/22 09:45	11/01/22 14:36	1
Lithium	<2.5		10	2.5	ug/L		10/31/22 09:45	11/01/22 14:36	1
Molybdenum	<1.2		2.0	1.2	ug/L		10/31/22 09:45	11/01/22 14:36	1
Selenium	<0.96		5.0	0.96	ug/L		10/31/22 09:45	11/01/22 14:36	1
Thallium	<0.26		1.0	0.26	ug/L		10/31/22 09:45	11/01/22 14:36	1

Lab Sample ID: LCS 310-370221/2-A
Matrix: Water
Analysis Batch: 370535

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 370221

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	200	239		ug/L		120	80 - 120
Arsenic	200	210		ug/L		105	80 - 120
Barium	100	109		ug/L		109	80 - 120
Beryllium	100	111		ug/L		111	80 - 120
Boron	200	204		ug/L		102	80 - 120
Cadmium	100	111		ug/L		111	80 - 120
Calcium	2.00	2.31		mg/L		115	80 - 120
Chromium	100	103		ug/L		103	80 - 120
Cobalt	100	111		ug/L		111	80 - 120

Eurofins Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-1

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

Lab Sample ID: LCS 310-370221/2-A
 Matrix: Water
 Analysis Batch: 370535

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 370221

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lead	200	219		ug/L		110	80 - 120
Lithium	200	222		ug/L		111	80 - 120
Molybdenum	200	221		ug/L		110	80 - 120
Selenium	400	412		ug/L		103	80 - 120
Thallium	200	229		ug/L		115	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-370680/1-A
 Matrix: Water
 Analysis Batch: 370843

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 370680

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.11		0.20	0.11	ug/L		11/02/22 17:55	11/03/22 15:30	1

Lab Sample ID: LCS 310-370680/2-A
 Matrix: Water
 Analysis Batch: 370843

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 370680

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	1.67	1.52		ug/L		91	80 - 120

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

Lab Sample ID: MB 310-370266/1
 Matrix: Water
 Analysis Batch: 370266

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	<26		50	26	mg/L			10/30/22 05:24	1

Lab Sample ID: LCS 310-370266/2
 Matrix: Water
 Analysis Batch: 370266

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		mg/L		96	90 - 110

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-370088/1
 Matrix: Water
 Analysis Batch: 370088

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

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

Eurofins Cedar Falls

QC Association Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-1

HPLC/IC

Analysis Batch: 371316

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243396-1	MW-301	Total/NA	Water	9056A	
310-243396-2	Field Blank	Total/NA	Water	9056A	
MB 310-371316/3	Method Blank	Total/NA	Water	9056A	
LCS 310-371316/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 370221

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243396-1	MW-301	Total/NA	Water	3005A	
310-243396-2	Field Blank	Total/NA	Water	3005A	
MB 310-370221/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-370221/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 370535

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-370221/1-A	Method Blank	Total/NA	Water	6020B	370221
LCS 310-370221/2-A	Lab Control Sample	Total/NA	Water	6020B	370221

Prep Batch: 370680

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243396-1	MW-301	Total/NA	Water	7470A	
310-243396-2	Field Blank	Total/NA	Water	7470A	
MB 310-370680/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-370680/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 370843

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243396-1	MW-301	Total/NA	Water	7470A	370680
310-243396-2	Field Blank	Total/NA	Water	7470A	370680
MB 310-370680/1-A	Method Blank	Total/NA	Water	7470A	370680
LCS 310-370680/2-A	Lab Control Sample	Total/NA	Water	7470A	370680

Analysis Batch: 370897

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243396-1	MW-301	Total/NA	Water	6020B	370221
310-243396-2	Field Blank	Total/NA	Water	6020B	370221

Analysis Batch: 371241

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243396-1	MW-301	Total/NA	Water	6020B	370221
310-243396-2	Field Blank	Total/NA	Water	6020B	370221

Analysis Batch: 371296

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243396-1	MW-301	Total/NA	Water	6020B	370221
310-243396-2	Field Blank	Total/NA	Water	6020B	370221

Eurofins Cedar Falls

QC Association Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-1

General Chemistry

Analysis Batch: 370088

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243396-1	MW-301	Total/NA	Water	SM 4500 H+ B	
310-243396-2	Field Blank	Total/NA	Water	SM 4500 H+ B	
LCS 310-370088/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 370266

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243396-1	MW-301	Total/NA	Water	SM 2540C	
310-243396-2	Field Blank	Total/NA	Water	SM 2540C	
MB 310-370266/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-370266/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 370344

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243396-1	MW-301	Total/NA	Water	Field Sampling	

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

Lab Chronicle

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-1

Client Sample ID: MW-301

Lab Sample ID: 310-243396-1

Date Collected: 10/26/22 08:05

Matrix: Water

Date Received: 10/27/22 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	371316	J7CK	EET CF	11/07/22 16:08
Total/NA	Prep	3005A			370221	DHM5	EET CF	10/31/22 09:45
Total/NA	Analysis	6020B		1	370897	A6US	EET CF	11/03/22 20:31
Total/NA	Prep	3005A			370221	DHM5	EET CF	10/31/22 09:45
Total/NA	Analysis	6020B		1	371241	A6US	EET CF	11/07/22 15:20
Total/NA	Prep	3005A			370221	DHM5	EET CF	10/31/22 09:45
Total/NA	Analysis	6020B		7	371296	A6US	EET CF	11/07/22 18:55
Total/NA	Prep	7470A			370680	XXW3	EET CF	11/02/22 17:55
Total/NA	Analysis	7470A		1	370843	XXW3	EET CF	11/03/22 15:54
Total/NA	Analysis	SM 2540C		1	370266	WZC8	EET CF	10/30/22 05:24
Total/NA	Analysis	SM 4500 H+ B		1	370088	DN3P	EET CF	10/27/22 20:44
Total/NA	Analysis	Field Sampling		1	370344	BJ0R	EET CF	10/26/22 08:05

Client Sample ID: Field Blank

Lab Sample ID: 310-243396-2

Date Collected: 10/26/22 07:40

Matrix: Water

Date Received: 10/27/22 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	371316	J7CK	EET CF	11/07/22 16:20
Total/NA	Prep	3005A			370221	DHM5	EET CF	10/31/22 09:45
Total/NA	Analysis	6020B		1	370897	A6US	EET CF	11/03/22 20:34
Total/NA	Prep	3005A			370221	DHM5	EET CF	10/31/22 09:45
Total/NA	Analysis	6020B		1	371241	A6US	EET CF	11/07/22 15:23
Total/NA	Prep	3005A			370221	DHM5	EET CF	10/31/22 09:45
Total/NA	Analysis	6020B		7	371296	A6US	EET CF	11/07/22 18:58
Total/NA	Prep	7470A			370680	XXW3	EET CF	11/02/22 17:55
Total/NA	Analysis	7470A		1	370843	XXW3	EET CF	11/03/22 15:56
Total/NA	Analysis	SM 2540C		1	370266	WZC8	EET CF	10/30/22 05:24
Total/NA	Analysis	SM 4500 H+ B		1	370088	DN3P	EET CF	10/27/22 20:46

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-1

Laboratory: Eurofins Cedar Falls

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

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

- 1
- 2
- 3
- 4
- 5
- 6
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- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

Method Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-1

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
Field Sampling	Field Sampling	EPA	EET CF
3005A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF

Protocol References:

EPA = US Environmental Protection Agency

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

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

Laboratory References:

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





Environment Testing
America



310-243396 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS</u>			
City/State:	CITY <u>Madison</u>	STATE <u>WI</u>	Project:
Receipt Information			
Date/Time Received:	DATE <u>10 27 22</u>	TIME <u>1700</u>	Received By: <u>[Signature]</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # ____ of ____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>T</u>	Correction Factor (°C):	<u>0</u>
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>-0.1</u>	Corrected Temp (°C):	<u>-0.1</u>
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-243396-1

Login Number: 243396

List Number: 1

Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

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



Table 1. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station / SCS Engineers Project No. 25222072.00
October 2022

Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmhos/cm)	ORP (mV)	Turbidity
MW-301	10/26/2022 805	680.68	14.6	6.29	4.74	1036	26.9	0.62
MW-307	10/25/2022 1600	643.46	12.9	6.50	0.22	1604	-36.4	7.21
MW-308	10/26/2022 1025	641.13	12.8	6.50	0.00	1507	-5.7	1.98
MW-309	10/26/2022 905	640.43	12.6	6.89	0.00	1378	4.9	0.79

Abbreviations:

mg/L = milligrams per liter

amsl = above mean sea level

NA = Not Analyzed

NM= Not Measured

Created by: MDB
 Last revision by: RM
 Checked by: DK

Date: 5/1/2017
 Date: 10/28/2022
 Date: 10/28/2022

C:\Users\hld0\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\USG3GGGC\[2210_October - OGS ZLDP_CCR_Field.xlsx]GW Field Parameters

 **ANALYTICAL REPORT****PREPARED FOR**

Attn: Meghan Blodgett
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Generated 11/30/2022 3:39:42 PM

JOB DESCRIPTION

Alliant OGS - 25222072 Background

JOB NUMBER

310-243396-2

Eurofins Cedar Falls

Job Notes

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of Eurofins Environment Testing North Central, LLC and its client. All questions regarding this report should be directed to the Eurofins Environment Testing North Central, LLC Project Manager who has signed this report.

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
11/30/2022 3:39:42 PM

Authorized for release by
Sandie Fredrick, Project Manager II
Sandra.Fredrick@et.eurofinsus.com
(920)261-1660



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Case Narrative

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-2

Job ID: 310-243396-2

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-243396-2

Comments

No additional comments.

Receipt

The samples were received on 10/27/2022 5:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was -0.1° C.

RAD

Methods 903.0, 9315: Radium-226 batch 588508

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-301 (310-243396-1), Field Blank (310-243396-2), (LCS 160-588508/2-A), (MB 160-588508/1-A), (310-243392-D-6-A), (310-243392-C-6-A MS) and (310-243392-C-6-B MSD)

Methods 904.0, 9320: Radium-228 prep batch 160-588509:

The following sample(s) did not meet the requested limit (RL) due to the reduced sample volume attributed to the presence of matrix interference. During preparation the analyst visually noted matrix effects. The data have been reported with this narrative. (310-243392-D-6-B), (310-243392-C-6-C MS) and (310-243392-C-6-D MSD)

Methods 904.0, 9320: Radium-228 prep batch 160-588509:

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-301 (310-243396-1), Field Blank (310-243396-2), (LCS 160-588509/2-A), (MB 160-588509/1-A), (310-243392-D-6-B), (310-243392-C-6-C MS) and (310-243392-C-6-D MSD)

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

Sample Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-243396-1	MW-301	Water	10/26/22 08:05	10/27/22 17:00
310-243396-2	Field Blank	Water	10/26/22 07:40	10/27/22 17:00

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Detection Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-2

Client Sample ID: MW-301

Lab Sample ID: 310-243396-1

No Detections.

Client Sample ID: Field Blank

Lab Sample ID: 310-243396-2

No Detections.

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This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-2

Client Sample ID: MW-301
 Date Collected: 10/26/22 08:05
 Date Received: 10/27/22 17:00

Lab Sample ID: 310-243396-1
 Matrix: Water

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	0.223		0.0903	0.0925	1.00	0.0904	pCi/L	11/04/22 06:23	11/30/22 07:57	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	87.2		40 - 110					11/04/22 06:23	11/30/22 07:57	1

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	0.750		0.397	0.403	1.00	0.565	pCi/L	11/04/22 06:53	11/18/22 13:54	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	87.2		40 - 110					11/04/22 06:53	11/18/22 13:54	1
Y Carrier	86.4		40 - 110					11/04/22 06:53	11/18/22 13:54	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.973		0.407	0.413	5.00	0.565	pCi/L		11/30/22 14:45	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-2

Client Sample ID: Field Blank

Lab Sample ID: 310-243396-2

Date Collected: 10/26/22 07:40

Matrix: Water

Date Received: 10/27/22 17:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	0.00296	U	0.0410	0.0410	1.00	0.0879	pCi/L	11/04/22 06:23	11/30/22 07:57	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	87.4		40 - 110					11/04/22 06:23	11/30/22 07:57	1

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	0.592		0.390	0.394	1.00	0.587	pCi/L	11/04/22 06:53	11/18/22 13:54	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	87.4		40 - 110					11/04/22 06:53	11/18/22 13:54	1
Y Carrier	85.2		40 - 110					11/04/22 06:53	11/18/22 13:54	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.595		0.392	0.396	5.00	0.587	pCi/L		11/30/22 14:45	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-2

Qualifiers

Rad

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

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-2

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-588508/1-A
Matrix: Water
Analysis Batch: 591653

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 588508

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 226	0.06780	U	0.0705	0.0708	1.00	0.112	pCi/L	11/04/22 06:23	11/30/22 08:00	1
Carrier	MB %Yield	MB Qualifier	Limits				Prepared		Analyzed	
Ba	89.6		40 - 110				11/04/22 06:23		11/30/22 08:00	

Lab Sample ID: LCS 160-588508/2-A
Matrix: Water
Analysis Batch: 591653

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 588508

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium 226	11.3	9.751		1.02	1.00	0.120	pCi/L	86	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba	91.3		40 - 110						

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-588509/1-A
Matrix: Water
Analysis Batch: 590568

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 588509

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 228	0.7488		0.450	0.455	1.00	0.674	pCi/L	11/04/22 06:53	11/18/22 13:48	1
Carrier	MB %Yield	MB Qualifier	Limits				Prepared		Analyzed	
Ba	89.6		40 - 110				11/04/22 06:53		11/18/22 13:48	
Y Carrier	81.9		40 - 110				11/04/22 06:53		11/18/22 13:48	

Lab Sample ID: LCS 160-588509/2-A
Matrix: Water
Analysis Batch: 590568

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 588509

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium 228	8.43	10.25		1.36	1.00	0.561	pCi/L	122	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba	91.3		40 - 110						
Y Carrier	82.2		40 - 110						

Eurofins Cedar Falls

QC Association Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-2

Rad

Prep Batch: 588508

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243396-1	MW-301	Total/NA	Water	PrecSep-21	
310-243396-2	Field Blank	Total/NA	Water	PrecSep-21	
MB 160-588508/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-588508/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	

Prep Batch: 588509

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243396-1	MW-301	Total/NA	Water	PrecSep_0	
310-243396-2	Field Blank	Total/NA	Water	PrecSep_0	
MB 160-588509/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-588509/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	

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Lab Chronicle

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-2

Client Sample ID: MW-301

Date Collected: 10/26/22 08:05

Date Received: 10/27/22 17:00

Lab Sample ID: 310-243396-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			588508	BMP	EET SL	11/04/22 06:23
Total/NA	Analysis	903.0		1	591652	FLC	EET SL	11/30/22 07:57
Total/NA	Prep	PrecSep_0			588509	BMP	EET SL	11/04/22 06:53
Total/NA	Analysis	904.0		1	590569	FLC	EET SL	11/18/22 13:54
Total/NA	Analysis	Ra226_Ra228 Pos		1	591701	MLK	EET SL	11/30/22 14:45

Client Sample ID: Field Blank

Date Collected: 10/26/22 07:40

Date Received: 10/27/22 17:00

Lab Sample ID: 310-243396-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			588508	BMP	EET SL	11/04/22 06:23
Total/NA	Analysis	903.0		1	591652	FLC	EET SL	11/30/22 07:57
Total/NA	Prep	PrecSep_0			588509	BMP	EET SL	11/04/22 06:53
Total/NA	Analysis	904.0		1	590569	FLC	EET SL	11/18/22 13:54
Total/NA	Analysis	Ra226_Ra228 Pos		1	591701	MLK	EET SL	11/30/22 14:45

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-2

Laboratory: Eurofins St. Louis

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

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

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

Eurofins Cedar Falls

Method Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-2

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	EET SL
904.0	Radium-228 (GFPC)	EPA	EET SL
Ra226_Ra228 Pos	Combined Radium-226 and Radium-228	TAL-STL	EET SL
PrecSep_0	Preparation, Precipitate Separation	None	EET SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	EET SL

Protocol References:

EPA = US Environmental Protection Agency

None = None

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

Laboratory References:

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

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Environment Testing
America



310-243396 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS</u>			
City/State:	CITY <u>Madison</u>	STATE <u>WI</u>	Project:
Receipt Information			
Date/Time Received:	DATE <u>10 27 22</u>	TIME <u>1700</u>	Received By: <u>[Signature]</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # ____ of ____	
Cooler Custody Seals Present? No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present? No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>-0.1</u>		Corrected Temp (°C): <u>-0.1</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Chain of Custody Record



Environmental Testing

Client Information (Sub Contract Lab)
 Client Contact: Shipping/Receiving
 Company: TestAmerica Laboratories, Inc.
 Address: 13715 Ruler Trail North, Cedar Falls, IA 50613
 City: Cedar Falls, IA 50613
 State Zip: IA, 50613
 Phone: 314-298-8666 (Tel) 314-298-8757 (Fax)
 Email: [Redacted]
 Project Name: Alliant OGS - 25222072 Background
 Site: [Redacted]

Sampler
 Lab PM: Fredrick, Sandie
 E-Mail: Sandie.Fredrick@eurofins.com
 Accreditation: State Program - Iowa

One Date Requested: 11/29/2022
TAT Requested (days): [Redacted]

PO #: 31011020
Project #: 31011020
Site: S507WA

Analysis Requested

Sample ID (Lab ID)	Sample Date	Sample Time	Sample Type (C-Grab)	Matrix (Water, Soil, etc.)	Preservation Code	Field Filtered Sample (Yes or No)	903.0 Prescp, 21 Radium-226 (GFP)	904.0 Prescp, 9 Radium-228 (GFP)	Ra226, Ra228FP, P/Combined Radium-226 and
MW-301 (310-243396-1)	10/25/22	08:05	Central	Water		X	X	X	X
Field Blank (310-243396-2)	10/26/22	07:40	Central	Water		X	X	X	X

Special Instructions/Note:
 2 DO NOT SHIP ON ICE TO ST. LOUIS
 2 DO NOT SHIP ON ICE TO ST. LOUIS

Preservation Codes:
 A - HCL
 B - NaOH
 C - Zn Acetate
 D - NaOH
 E - NaHSO4
 F - MeOH
 G - Amchlor
 H - Acetic Acid
 I - DI Water
 J - DI Water
 K - EDTA
 L - EDA
 M - Hexane
 N - None
 O - NaOAc
 P - Na2SO4
 Q - Na2SO3
 R - Na2S2O3
 S - H2SO4
 T - Acetic Acid
 U - Acetic Acid
 V - MCAA
 W - pH 4.5
 X - Thoria
 Z - other (specify)

Analysis Requested

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

Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank - 2

Empty Kit Relinquished by: [Redacted] Date: 11/29/22

Relinquished by: [Redacted] Date/Time: 11/29/22
 Relinquished by: [Redacted] Date/Time: 11/29/22
 Relinquished by: [Redacted] Date/Time: 11/29/22

Custody Seals Intact
 Yes No

Received by: [Redacted] Date/Time: 11/29/22
 Received by: [Redacted] Date/Time: 11/29/22
 Received by: [Redacted] Date/Time: 11/29/22

Method of Shipment: FEDEX
 Cooler Temperature(s): °C and Other Remains: [Redacted]



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-243396-2

Login Number: 243396

List Number: 1

Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

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



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-243396-2

Login Number: 243396

List Number: 2

Creator: Bohlmann, Jessica M

List Source: Eurofins St. Louis

List Creation: 10/31/22 12:37 PM

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



Tracer/Carrier Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 Background

Job ID: 310-243396-2

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (40-110)							
310-243396-1	MW-301	87.2							
310-243396-2	Field Blank	87.4							
LCS 160-588508/2-A	Lab Control Sample	91.3							
MB 160-588508/1-A	Method Blank	89.6							

Tracer/Carrier Legend

Ba = Ba

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)						
310-243396-1	MW-301	87.2	86.4						
310-243396-2	Field Blank	87.4	85.2						
LCS 160-588509/2-A	Lab Control Sample	91.3	82.2						
MB 160-588509/1-A	Method Blank	89.6	81.9						

Tracer/Carrier Legend

Ba = Ba

Y = Y Carrier

ANALYTICAL REPORT

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

Laboratory Job ID: 310-243417-1

Client Project/Site: Alliant OGS - 25222072 ZLDP - MNA

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:

11/10/2022 2:20:49 PM

Sandie Fredrick, Project Manager II
(920)261-1660

Sandra.Fredrick@et.eurofinsus.com

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

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

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 {0} Project Manager.



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Case Narrative

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP - MNA

Job ID: 310-243417-1

Job ID: 310-243417-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-243417-1

Comments

No additional comments.

Receipt

The samples were received on 10/27/2022 5:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.8° C.

Metals

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

General Chemistry

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

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Sample Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP - MNA

Job ID: 310-243417-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-243417-1	MW-307	Water	10/25/22 16:00	10/27/22 17:00
310-243417-2	MW-308	Water	10/26/22 10:25	10/27/22 17:00
310-243417-3	MW-309	Water	10/26/22 09:05	10/27/22 17:00

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Detection Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP - MNA

Job ID: 310-243417-1

Client Sample ID: MW-307

Lab Sample ID: 310-243417-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	2700		100	36	ug/L	1		6020B	Total/NA
Magnesium	28000		500	150	ug/L	1		6020B	Total/NA
Manganese	230		10	3.6	ug/L	1		6020B	Total/NA
Potassium	1800		500	150	ug/L	1		6020B	Total/NA
Sodium	91000		1000	610	ug/L	1		6020B	Total/NA
Cobalt	30		0.50	0.19	ug/L	1		6020B	Dissolved
Iron	3100		100	36	ug/L	1		6020B	Dissolved
Manganese	270		10	3.6	ug/L	1		6020B	Dissolved
Bicarbonate Alkalinity as CaCO3	500		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	500		10	4.6	mg/L	1		SM 2320B	Total/NA

Client Sample ID: MW-308

Lab Sample ID: 310-243417-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	4000		100	36	ug/L	1		6020B	Total/NA
Magnesium	23000		500	150	ug/L	1		6020B	Total/NA
Manganese	1300		10	3.6	ug/L	1		6020B	Total/NA
Potassium	4300		500	150	ug/L	1		6020B	Total/NA
Sodium	110000		1000	610	ug/L	1		6020B	Total/NA
Iron	3800		100	36	ug/L	1		6020B	Dissolved
Manganese	1400		10	3.6	ug/L	1		6020B	Dissolved
Bicarbonate Alkalinity as CaCO3	390		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	390		10	4.6	mg/L	1		SM 2320B	Total/NA

Client Sample ID: MW-309

Lab Sample ID: 310-243417-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	740		100	36	ug/L	1		6020B	Total/NA
Magnesium	18000		500	150	ug/L	1		6020B	Total/NA
Manganese	750		10	3.6	ug/L	1		6020B	Total/NA
Potassium	720		500	150	ug/L	1		6020B	Total/NA
Sodium	180000		1000	610	ug/L	1		6020B	Total/NA
Iron	710		100	36	ug/L	1		6020B	Dissolved
Manganese	750		10	3.6	ug/L	1		6020B	Dissolved
Bicarbonate Alkalinity as CaCO3	260		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	260		10	4.6	mg/L	1		SM 2320B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP - MNA

Job ID: 310-243417-1

Client Sample ID: MW-307

Lab Sample ID: 310-243417-1

Date Collected: 10/25/22 16:00

Matrix: Water

Date Received: 10/27/22 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	2700		100	36	ug/L		10/31/22 09:45	11/04/22 21:02	1
Magnesium	28000		500	150	ug/L		10/31/22 09:45	11/07/22 17:56	1
Manganese	230		10	3.6	ug/L		10/31/22 09:45	11/04/22 21:02	1
Potassium	1800		500	150	ug/L		10/31/22 09:45	11/04/22 21:02	1
Sodium	91000		1000	610	ug/L		10/31/22 09:45	11/04/22 21:02	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	30		0.50	0.19	ug/L		10/31/22 09:45	11/07/22 20:53	1
Iron	3100		100	36	ug/L		10/31/22 09:45	11/07/22 20:53	1
Manganese	270		10	3.6	ug/L		10/31/22 09:45	11/07/22 20:53	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	500		10	4.6	mg/L			11/05/22 08:34	1
Carbonate Alkalinity as CaCO3 (SM 2320B)	<4.6		10	4.6	mg/L			11/05/22 08:34	1
Total Alkalinity as CaCO3 (SM 2320B)	500		10	4.6	mg/L			11/05/22 08:34	1



Client Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP - MNA

Job ID: 310-243417-1

Client Sample ID: MW-308
 Date Collected: 10/26/22 10:25
 Date Received: 10/27/22 17:00

Lab Sample ID: 310-243417-2
 Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	4000		100	36	ug/L		10/31/22 09:45	11/07/22 17:59	1
Magnesium	23000		500	150	ug/L		10/31/22 09:45	11/07/22 17:59	1
Manganese	1300		10	3.6	ug/L		10/31/22 09:45	11/07/22 17:59	1
Potassium	4300		500	150	ug/L		10/31/22 09:45	11/07/22 17:59	1
Sodium	110000		1000	610	ug/L		10/31/22 09:45	11/07/22 17:59	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	3800		100	36	ug/L		10/31/22 09:45	11/07/22 20:56	1
Manganese	1400		10	3.6	ug/L		10/31/22 09:45	11/07/22 20:56	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	390		10	4.6	mg/L			11/08/22 11:10	1
Carbonate Alkalinity as CaCO3 (SM 2320B)	<4.6		10	4.6	mg/L			11/08/22 11:10	1
Total Alkalinity as CaCO3 (SM 2320B)	390		10	4.6	mg/L			11/08/22 11:10	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP - MNA

Job ID: 310-243417-1

Client Sample ID: MW-309

Lab Sample ID: 310-243417-3

Date Collected: 10/26/22 09:05

Matrix: Water

Date Received: 10/27/22 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	740		100	36	ug/L		10/31/22 09:45	11/07/22 18:03	1
Magnesium	18000		500	150	ug/L		10/31/22 09:45	11/07/22 18:03	1
Manganese	750		10	3.6	ug/L		10/31/22 09:45	11/07/22 18:03	1
Potassium	720		500	150	ug/L		10/31/22 09:45	11/07/22 18:03	1
Sodium	180000		1000	610	ug/L		10/31/22 09:45	11/07/22 18:03	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	710		100	36	ug/L		10/31/22 09:45	11/07/22 20:59	1
Manganese	750		10	3.6	ug/L		10/31/22 09:45	11/07/22 20:59	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	260		10	4.6	mg/L			11/09/22 11:52	1
Carbonate Alkalinity as CaCO3 (SM 2320B)	<4.6		10	4.6	mg/L			11/09/22 11:52	1
Total Alkalinity as CaCO3 (SM 2320B)	260		10	4.6	mg/L			11/09/22 11:52	1



Definitions/Glossary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP - MNA

Job ID: 310-243417-1

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP - MNA

Job ID: 310-243417-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-370224/1-A
Matrix: Water
Analysis Batch: 371144

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 370224

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	<36		100	36	ug/L		10/31/22 09:45	11/04/22 19:16	1
Magnesium	<150		500	150	ug/L		10/31/22 09:45	11/04/22 19:16	1
Manganese	<3.6		10	3.6	ug/L		10/31/22 09:45	11/04/22 19:16	1
Potassium	<150		500	150	ug/L		10/31/22 09:45	11/04/22 19:16	1
Sodium	<610		1000	610	ug/L		10/31/22 09:45	11/04/22 19:16	1

Lab Sample ID: LCS 310-370224/2-A
Matrix: Water
Analysis Batch: 371144

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 370224

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec	Limits
Iron	200	175		ug/L		88	80 - 120	
Magnesium	2000	1610		ug/L		81	80 - 120	
Manganese	100	87.3		ug/L		87	80 - 120	
Potassium	2000	1820		ug/L		91	80 - 120	
Sodium	2000	1890		ug/L		95	80 - 120	

Lab Sample ID: MB 310-370225/1-A
Matrix: Water
Analysis Batch: 371296

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 370225

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Cobalt	<0.19		0.50	0.19	ug/L		10/31/22 09:45	11/07/22 19:17	1
Iron	<36		100	36	ug/L		10/31/22 09:45	11/07/22 19:17	1
Manganese	<3.6		10	3.6	ug/L		10/31/22 09:45	11/07/22 19:17	1

Lab Sample ID: LCS 310-370225/2-A
Matrix: Water
Analysis Batch: 371296

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 370225

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec	Limits
Cobalt	100	103		ug/L		103	80 - 120	
Iron	200	228		ug/L		114	80 - 120	
Manganese	100	106		ug/L		106	80 - 120	

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 310-371014/1
Matrix: Water
Analysis Batch: 371014

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

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			11/05/22 08:34	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			11/05/22 08:34	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			11/05/22 08:34	1

Eurofins Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP - MNA

Job ID: 310-243417-1

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCS 310-371014/2
Matrix: Water
Analysis Batch: 371014

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Alkalinity as CaCO3	1000	1000		mg/L		100	90 - 110

Lab Sample ID: MB 310-371321/1
Matrix: Water
Analysis Batch: 371321

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			11/08/22 11:10	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			11/08/22 11:10	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			11/08/22 11:10	1

Lab Sample ID: LCS 310-371321/2
Matrix: Water
Analysis Batch: 371321

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Alkalinity as CaCO3	1000	1020		mg/L		102	90 - 110

Lab Sample ID: MB 310-371490/1
Matrix: Water
Analysis Batch: 371490

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			11/09/22 11:52	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			11/09/22 11:52	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			11/09/22 11:52	1

Lab Sample ID: LCS 310-371490/2
Matrix: Water
Analysis Batch: 371490

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Alkalinity as CaCO3	1000	950		mg/L		95	90 - 110

Lab Sample ID: 310-243417-3 MS
Matrix: Water
Analysis Batch: 371490

Client Sample ID: MW-309
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Total Alkalinity as CaCO3	260		200	447		mg/L		95	71 - 130

Lab Sample ID: 310-243417-3 MSD
Matrix: Water
Analysis Batch: 371490

Client Sample ID: MW-309
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Alkalinity as CaCO3	260		200	456		mg/L		100	71 - 130	2	10

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QC Association Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP - MNA

Job ID: 310-243417-1

Metals

Prep Batch: 370224

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243417-1	MW-307	Total/NA	Water	3005A	
310-243417-2	MW-308	Total/NA	Water	3005A	
310-243417-3	MW-309	Total/NA	Water	3005A	
MB 310-370224/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-370224/2-A	Lab Control Sample	Total/NA	Water	3005A	

Prep Batch: 370225

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243417-1	MW-307	Dissolved	Water	3005A	
310-243417-2	MW-308	Dissolved	Water	3005A	
310-243417-3	MW-309	Dissolved	Water	3005A	
MB 310-370225/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-370225/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 371144

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243417-1	MW-307	Total/NA	Water	6020B	370224
MB 310-370224/1-A	Method Blank	Total/NA	Water	6020B	370224
LCS 310-370224/2-A	Lab Control Sample	Total/NA	Water	6020B	370224

Analysis Batch: 371296

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243417-1	MW-307	Dissolved	Water	6020B	370225
310-243417-1	MW-307	Total/NA	Water	6020B	370224
310-243417-2	MW-308	Dissolved	Water	6020B	370225
310-243417-2	MW-308	Total/NA	Water	6020B	370224
310-243417-3	MW-309	Dissolved	Water	6020B	370225
310-243417-3	MW-309	Total/NA	Water	6020B	370224
MB 310-370225/1-A	Method Blank	Total/NA	Water	6020B	370225
LCS 310-370225/2-A	Lab Control Sample	Total/NA	Water	6020B	370225

General Chemistry

Analysis Batch: 371014

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243417-1	MW-307	Total/NA	Water	SM 2320B	
MB 310-371014/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-371014/2	Lab Control Sample	Total/NA	Water	SM 2320B	

Analysis Batch: 371321

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243417-2	MW-308	Total/NA	Water	SM 2320B	
MB 310-371321/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-371321/2	Lab Control Sample	Total/NA	Water	SM 2320B	

Analysis Batch: 371490

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243417-3	MW-309	Total/NA	Water	SM 2320B	
MB 310-371490/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-371490/2	Lab Control Sample	Total/NA	Water	SM 2320B	
310-243417-3 MS	MW-309	Total/NA	Water	SM 2320B	

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QC Association Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP - MNA

Job ID: 310-243417-1

General Chemistry (Continued)

Analysis Batch: 371490 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243417-3 MSD	MW-309	Total/NA	Water	SM 2320B	

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Lab Chronicle

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP - MNA

Job ID: 310-243417-1

Client Sample ID: MW-307
Date Collected: 10/25/22 16:00
Date Received: 10/27/22 17:00

Lab Sample ID: 310-243417-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	3005A			370225	DHM5	EET CF	10/31/22 09:45
Dissolved	Analysis	6020B		1	371296	A6US	EET CF	11/07/22 20:53
Total/NA	Prep	3005A			370224	DHM5	EET CF	10/31/22 09:45
Total/NA	Analysis	6020B		1	371144	A6US	EET CF	11/04/22 21:02
Total/NA	Prep	3005A			370224	DHM5	EET CF	10/31/22 09:45
Total/NA	Analysis	6020B		1	371296	A6US	EET CF	11/07/22 17:56
Total/NA	Analysis	SM 2320B		1	371014	MAQ3	EET CF	11/05/22 08:34

Client Sample ID: MW-308
Date Collected: 10/26/22 10:25
Date Received: 10/27/22 17:00

Lab Sample ID: 310-243417-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	3005A			370225	DHM5	EET CF	10/31/22 09:45
Dissolved	Analysis	6020B		1	371296	A6US	EET CF	11/07/22 20:56
Total/NA	Prep	3005A			370224	DHM5	EET CF	10/31/22 09:45
Total/NA	Analysis	6020B		1	371296	A6US	EET CF	11/07/22 17:59
Total/NA	Analysis	SM 2320B		1	371321	MAQ3	EET CF	11/08/22 11:10

Client Sample ID: MW-309
Date Collected: 10/26/22 09:05
Date Received: 10/27/22 17:00

Lab Sample ID: 310-243417-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	3005A			370225	DHM5	EET CF	10/31/22 09:45
Dissolved	Analysis	6020B		1	371296	A6US	EET CF	11/07/22 20:59
Total/NA	Prep	3005A			370224	DHM5	EET CF	10/31/22 09:45
Total/NA	Analysis	6020B		1	371296	A6US	EET CF	11/07/22 18:03
Total/NA	Analysis	SM 2320B		1	371490	HE7K	EET CF	11/09/22 11:52

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP - MNA

Job ID: 310-243417-1

Laboratory: Eurofins Cedar Falls

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

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

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Method Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP - MNA

Job ID: 310-243417-1

Method	Method Description	Protocol	Laboratory
6020B	Metals (ICP/MS)	SW846	EET CF
SM 2320B	Alkalinity	SM	EET CF
3005A	Preparation, Total Metals	SW846	EET CF

Protocol References:

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

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

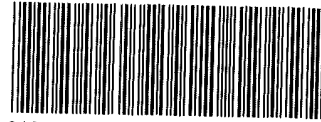
Laboratory References:

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

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Environment Testing
America



310-243417 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS Engineers</u>			
City/State:	CITY	STATE	Project:
		<u>WI</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>10-27-22</u>	<u>1700</u>	<u>ML</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>T</u>	Correction Factor (°C):	<u>0</u>
* Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>0.8</u>	Corrected Temp (°C):	<u>0.8</u>
Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-243417-1

Login Number: 243417

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Muehling, Angela C

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



ANALYTICAL REPORT

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

Laboratory Job ID: 310-243397-1

Client Project/Site: Alliant OGS - 25222072 ZLDP

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:

11/8/2022 12:03:19 PM

Sandie Fredrick, Project Manager II
(920)261-1660

Sandra.Fredrick@et.eurofinsus.com

LINKS

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results through



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

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



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Case Narrative

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

Job ID: 310-243397-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-243397-1

Comments

No additional comments.

Receipt

The samples were received on 10/27/2022 5:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was -1.4° C.

HPLC/IC

Method 9056A: The following samples were diluted due to the nature of the sample matrix: MW-307 (310-243397-1), MW-308 (310-243397-2) and MW-309 (310-243397-3). 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 analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

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



Sample Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-243397-1	MW-307	Water	10/25/22 16:00	10/27/22 17:00
310-243397-2	MW-308	Water	10/26/22 10:25	10/27/22 17:00
310-243397-3	MW-309	Water	10/26/22 09:05	10/27/22 17:00

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Detection Summary

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

Client Sample ID: MW-307

Lab Sample ID: 310-243397-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	260		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	130		5.0	2.0	mg/L	5		9056A	Total/NA
Barium	130		2.0	0.88	ug/L	1		6020B	Total/NA
Boron	250		100	58	ug/L	1		6020B	Total/NA
Calcium	260		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	27		0.50	0.19	ug/L	1		6020B	Total/NA
Lithium	10		10	2.5	ug/L	1		6020B	Total/NA
Total Dissolved Solids	1100		50	26	mg/L	1		SM 2540C	Total/NA
pH	6.9	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	643.46				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-36.4				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.22				mg/L	1		Field Sampling	Total/NA
pH, Field	6.50				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1604				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	12.9				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	7.21				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-308

Lab Sample ID: 310-243397-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	160		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	290		5.0	2.0	mg/L	5		9056A	Total/NA
Barium	120		2.0	0.88	ug/L	1		6020B	Total/NA
Boron	260		100	58	ug/L	1		6020B	Total/NA
Calcium	240		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	0.24	J	0.50	0.19	ug/L	1		6020B	Total/NA
Lithium	14		10	2.5	ug/L	1		6020B	Total/NA
Total Dissolved Solids	1000		50	26	mg/L	1		SM 2540C	Total/NA
pH	7.0	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	641.13				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-5.7				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.00				mg/L	1		Field Sampling	Total/NA
pH, Field	6.50				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1507				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	12.8				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	1.98				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-309

Lab Sample ID: 310-243397-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	67		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	420		5.0	2.0	mg/L	5		9056A	Total/NA
Barium	51		2.0	0.88	ug/L	1		6020B	Total/NA
Boron	1400		100	58	ug/L	1		6020B	Total/NA
Calcium	160		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	2.2		0.50	0.19	ug/L	1		6020B	Total/NA
Lithium	7.3	J	10	2.5	ug/L	1		6020B	Total/NA
Total Dissolved Solids	1100		50	26	mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	640.43				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	4.9				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.00				mg/L	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Detection Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

Client Sample ID: MW-309 (Continued)

Lab Sample ID: 310-243397-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
pH, Field	6.89				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1378				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	12.6				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	0.79				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

Client Sample ID: MW-307

Lab Sample ID: 310-243397-1

Date Collected: 10/25/22 16:00

Matrix: Water

Date Received: 10/27/22 17:00

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	260		5.0	2.3	mg/L			11/07/22 16:32	5
Fluoride	<0.22		0.50	0.22	mg/L			11/07/22 16:32	5
Sulfate	130		5.0	2.0	mg/L			11/07/22 16:32	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.69		2.0	0.69	ug/L		10/31/22 09:45	11/03/22 20:37	1
Arsenic	<0.75		2.0	0.75	ug/L		10/31/22 09:45	11/03/22 20:37	1
Barium	130		2.0	0.88	ug/L		10/31/22 09:45	11/03/22 20:37	1
Beryllium	<0.27		1.0	0.27	ug/L		10/31/22 09:45	11/03/22 20:37	1
Boron	250		100	58	ug/L		10/31/22 09:45	11/03/22 20:37	1
Cadmium	<0.055		0.10	0.055	ug/L		10/31/22 09:45	11/03/22 20:37	1
Calcium	260		0.50	0.19	mg/L		10/31/22 09:45	11/03/22 20:37	1
Chromium	<1.1		5.0	1.1	ug/L		10/31/22 09:45	11/03/22 20:37	1
Cobalt	27		0.50	0.19	ug/L		10/31/22 09:45	11/03/22 20:37	1
Lead	<0.24		0.50	0.24	ug/L		10/31/22 09:45	11/03/22 20:37	1
Lithium	10		10	2.5	ug/L		10/31/22 09:45	11/03/22 20:37	1
Molybdenum	<1.2		2.0	1.2	ug/L		10/31/22 09:45	11/03/22 20:37	1
Selenium	<0.96		5.0	0.96	ug/L		10/31/22 09:45	11/03/22 20:37	1
Thallium	<0.26		1.0	0.26	ug/L		10/31/22 09:45	11/03/22 20:37	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.11		0.20	0.11	ug/L		11/02/22 17:55	11/03/22 15:58	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	1100		50	26	mg/L			10/28/22 11:41	1
pH (SM 4500 H+ B)	6.9	HF	0.1	0.1	SU			10/27/22 20:47	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	643.46				ft			10/25/22 16:00	1
Oxidation Reduction Potential	-36.4				millivolts			10/25/22 16:00	1
Oxygen, Dissolved, Client Supplied	0.22				mg/L			10/25/22 16:00	1
pH, Field	6.50				SU			10/25/22 16:00	1
Specific Conductance, Field	1604				umhos/cm			10/25/22 16:00	1
Temperature, Field	12.9				Degrees C			10/25/22 16:00	1
Turbidity, Field	7.21				NTU			10/25/22 16:00	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

Client Sample ID: MW-308

Lab Sample ID: 310-243397-2

Date Collected: 10/26/22 10:25

Matrix: Water

Date Received: 10/27/22 17:00

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	160		5.0	2.3	mg/L			11/07/22 16:44	5
Fluoride	<0.22		0.50	0.22	mg/L			11/07/22 16:44	5
Sulfate	290		5.0	2.0	mg/L			11/07/22 16:44	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.69		2.0	0.69	ug/L		10/31/22 09:45	11/03/22 20:40	1
Arsenic	<0.75		2.0	0.75	ug/L		10/31/22 09:45	11/03/22 20:40	1
Barium	120		2.0	0.88	ug/L		10/31/22 09:45	11/03/22 20:40	1
Beryllium	<0.27		1.0	0.27	ug/L		10/31/22 09:45	11/03/22 20:40	1
Boron	260		100	58	ug/L		10/31/22 09:45	11/03/22 20:40	1
Cadmium	<0.055		0.10	0.055	ug/L		10/31/22 09:45	11/03/22 20:40	1
Calcium	240		0.50	0.19	mg/L		10/31/22 09:45	11/03/22 20:40	1
Chromium	<1.1		5.0	1.1	ug/L		10/31/22 09:45	11/03/22 20:40	1
Cobalt	0.24	J	0.50	0.19	ug/L		10/31/22 09:45	11/03/22 20:40	1
Lead	<0.24		0.50	0.24	ug/L		10/31/22 09:45	11/03/22 20:40	1
Lithium	14		10	2.5	ug/L		10/31/22 09:45	11/03/22 20:40	1
Molybdenum	<1.2		2.0	1.2	ug/L		10/31/22 09:45	11/03/22 20:40	1
Selenium	<0.96		5.0	0.96	ug/L		10/31/22 09:45	11/03/22 20:40	1
Thallium	<0.26		1.0	0.26	ug/L		10/31/22 09:45	11/03/22 20:40	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.11		0.20	0.11	ug/L		11/02/22 17:55	11/03/22 16:05	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	1000		50	26	mg/L			10/30/22 05:24	1
pH (SM 4500 H+ B)	7.0	HF	0.1	0.1	SU			10/27/22 20:49	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	641.13				ft			10/26/22 10:25	1
Oxidation Reduction Potential	-5.7				millivolts			10/26/22 10:25	1
Oxygen, Dissolved, Client Supplied	0.00				mg/L			10/26/22 10:25	1
pH, Field	6.50				SU			10/26/22 10:25	1
Specific Conductance, Field	1507				umhos/cm			10/26/22 10:25	1
Temperature, Field	12.8				Degrees C			10/26/22 10:25	1
Turbidity, Field	1.98				NTU			10/26/22 10:25	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

Client Sample ID: MW-309

Lab Sample ID: 310-243397-3

Date Collected: 10/26/22 09:05

Matrix: Water

Date Received: 10/27/22 17:00

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	67		5.0	2.3	mg/L			11/07/22 16:56	5
Fluoride	<0.22		0.50	0.22	mg/L			11/07/22 16:56	5
Sulfate	420		5.0	2.0	mg/L			11/07/22 16:56	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.69		2.0	0.69	ug/L		10/31/22 09:45	11/03/22 20:44	1
Arsenic	<0.75		2.0	0.75	ug/L		10/31/22 09:45	11/03/22 20:44	1
Barium	51		2.0	0.88	ug/L		10/31/22 09:45	11/03/22 20:44	1
Beryllium	<0.27		1.0	0.27	ug/L		10/31/22 09:45	11/03/22 20:44	1
Boron	1400		100	58	ug/L		10/31/22 09:45	11/03/22 20:44	1
Cadmium	<0.055		0.10	0.055	ug/L		10/31/22 09:45	11/03/22 20:44	1
Calcium	160		0.50	0.19	mg/L		10/31/22 09:45	11/03/22 20:44	1
Chromium	<1.1		5.0	1.1	ug/L		10/31/22 09:45	11/03/22 20:44	1
Cobalt	2.2		0.50	0.19	ug/L		10/31/22 09:45	11/03/22 20:44	1
Lead	<0.24		0.50	0.24	ug/L		10/31/22 09:45	11/03/22 20:44	1
Lithium	7.3 J		10	2.5	ug/L		10/31/22 09:45	11/03/22 20:44	1
Molybdenum	<1.2		2.0	1.2	ug/L		10/31/22 09:45	11/03/22 20:44	1
Selenium	<0.96		5.0	0.96	ug/L		10/31/22 09:45	11/03/22 20:44	1
Thallium	<0.26		1.0	0.26	ug/L		10/31/22 09:45	11/03/22 20:44	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.11		0.20	0.11	ug/L		11/02/22 17:55	11/03/22 16:07	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	1100		50	26	mg/L			10/30/22 05:24	1
pH (SM 4500 H+ B)	7.3	HF	0.1	0.1	SU			10/27/22 20:50	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	640.43				ft			10/26/22 09:05	1
Oxidation Reduction Potential	4.9				millivolts			10/26/22 09:05	1
Oxygen, Dissolved, Client Supplied	0.00				mg/L			10/26/22 09:05	1
pH, Field	6.89				SU			10/26/22 09:05	1
Specific Conductance, Field	1378				umhos/cm			10/26/22 09:05	1
Temperature, Field	12.6				Degrees C			10/26/22 09:05	1
Turbidity, Field	0.79				NTU			10/26/22 09:05	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

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

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-371316/3
Matrix: Water
Analysis Batch: 371316

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.45		1.0	0.45	mg/L			11/07/22 11:15	1
Fluoride	<0.044		0.10	0.044	mg/L			11/07/22 11:15	1
Sulfate	<0.40		1.0	0.40	mg/L			11/07/22 11:15	1

Lab Sample ID: LCS 310-371316/4
Matrix: Water
Analysis Batch: 371316

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	9.90		mg/L		99	90 - 110
Fluoride	2.00	2.10		mg/L		105	90 - 110
Sulfate	10.0	10.4		mg/L		104	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-370221/1-A
Matrix: Water
Analysis Batch: 370535

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 370221

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.69		2.0	0.69	ug/L		10/31/22 09:45	11/01/22 14:36	1
Arsenic	<0.75		2.0	0.75	ug/L		10/31/22 09:45	11/01/22 14:36	1
Barium	<0.88		2.0	0.88	ug/L		10/31/22 09:45	11/01/22 14:36	1
Beryllium	<0.27		1.0	0.27	ug/L		10/31/22 09:45	11/01/22 14:36	1
Boron	<58		100	58	ug/L		10/31/22 09:45	11/01/22 14:36	1
Cadmium	<0.055		0.10	0.055	ug/L		10/31/22 09:45	11/01/22 14:36	1
Calcium	<0.19		0.50	0.19	mg/L		10/31/22 09:45	11/01/22 14:36	1
Chromium	<1.1		5.0	1.1	ug/L		10/31/22 09:45	11/01/22 14:36	1
Cobalt	<0.19		0.50	0.19	ug/L		10/31/22 09:45	11/01/22 14:36	1
Lead	<0.24		0.50	0.24	ug/L		10/31/22 09:45	11/01/22 14:36	1
Lithium	<2.5		10	2.5	ug/L		10/31/22 09:45	11/01/22 14:36	1
Molybdenum	<1.2		2.0	1.2	ug/L		10/31/22 09:45	11/01/22 14:36	1
Selenium	<0.96		5.0	0.96	ug/L		10/31/22 09:45	11/01/22 14:36	1
Thallium	<0.26		1.0	0.26	ug/L		10/31/22 09:45	11/01/22 14:36	1

Lab Sample ID: LCS 310-370221/2-A
Matrix: Water
Analysis Batch: 370535

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 370221

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	200	239		ug/L		120	80 - 120
Arsenic	200	210		ug/L		105	80 - 120
Barium	100	109		ug/L		109	80 - 120
Beryllium	100	111		ug/L		111	80 - 120
Boron	200	204		ug/L		102	80 - 120
Cadmium	100	111		ug/L		111	80 - 120
Calcium	2.00	2.31		mg/L		115	80 - 120
Chromium	100	103		ug/L		103	80 - 120
Cobalt	100	111		ug/L		111	80 - 120

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QC Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

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

Lab Sample ID: LCS 310-370221/2-A
 Matrix: Water
 Analysis Batch: 370535

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 370221

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lead	200	219		ug/L		110	80 - 120
Lithium	200	222		ug/L		111	80 - 120
Molybdenum	200	221		ug/L		110	80 - 120
Selenium	400	412		ug/L		103	80 - 120
Thallium	200	229		ug/L		115	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-370680/1-A
 Matrix: Water
 Analysis Batch: 370843

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 370680

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.11		0.20	0.11	ug/L		11/02/22 17:55	11/03/22 15:30	1

Lab Sample ID: LCS 310-370680/2-A
 Matrix: Water
 Analysis Batch: 370843

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 370680

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	1.67	1.52		ug/L		91	80 - 120

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

Lab Sample ID: MB 310-370169/1
 Matrix: Water
 Analysis Batch: 370169

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	<26		50	26	mg/L			10/28/22 11:41	1

Lab Sample ID: LCS 310-370169/2
 Matrix: Water
 Analysis Batch: 370169

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	936		mg/L		94	90 - 110

Lab Sample ID: MB 310-370266/1
 Matrix: Water
 Analysis Batch: 370266

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	<26		50	26	mg/L			10/30/22 05:24	1

Lab Sample ID: LCS 310-370266/2
 Matrix: Water
 Analysis Batch: 370266

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		mg/L		96	90 - 110

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QC Sample Results

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-370088/1
Matrix: Water
Analysis Batch: 370088

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

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

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

QC Association Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

HPLC/IC

Analysis Batch: 371316

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243397-1	MW-307	Total/NA	Water	9056A	
310-243397-2	MW-308	Total/NA	Water	9056A	
310-243397-3	MW-309	Total/NA	Water	9056A	
MB 310-371316/3	Method Blank	Total/NA	Water	9056A	
LCS 310-371316/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 370221

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243397-1	MW-307	Total/NA	Water	3005A	
310-243397-2	MW-308	Total/NA	Water	3005A	
310-243397-3	MW-309	Total/NA	Water	3005A	
MB 310-370221/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-370221/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 370535

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-370221/1-A	Method Blank	Total/NA	Water	6020B	370221
LCS 310-370221/2-A	Lab Control Sample	Total/NA	Water	6020B	370221

Prep Batch: 370680

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243397-1	MW-307	Total/NA	Water	7470A	
310-243397-2	MW-308	Total/NA	Water	7470A	
310-243397-3	MW-309	Total/NA	Water	7470A	
MB 310-370680/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-370680/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 370843

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243397-1	MW-307	Total/NA	Water	7470A	370680
310-243397-2	MW-308	Total/NA	Water	7470A	370680
310-243397-3	MW-309	Total/NA	Water	7470A	370680
MB 310-370680/1-A	Method Blank	Total/NA	Water	7470A	370680
LCS 310-370680/2-A	Lab Control Sample	Total/NA	Water	7470A	370680

Analysis Batch: 370897

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243397-1	MW-307	Total/NA	Water	6020B	370221
310-243397-2	MW-308	Total/NA	Water	6020B	370221
310-243397-3	MW-309	Total/NA	Water	6020B	370221

General Chemistry

Analysis Batch: 370088

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243397-1	MW-307	Total/NA	Water	SM 4500 H+ B	
310-243397-2	MW-308	Total/NA	Water	SM 4500 H+ B	
310-243397-3	MW-309	Total/NA	Water	SM 4500 H+ B	
LCS 310-370088/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

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QC Association Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

General Chemistry

Analysis Batch: 370169

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243397-1	MW-307	Total/NA	Water	SM 2540C	
MB 310-370169/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-370169/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Analysis Batch: 370266

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243397-2	MW-308	Total/NA	Water	SM 2540C	
310-243397-3	MW-309	Total/NA	Water	SM 2540C	
MB 310-370266/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-370266/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 370344

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243397-1	MW-307	Total/NA	Water	Field Sampling	
310-243397-2	MW-308	Total/NA	Water	Field Sampling	
310-243397-3	MW-309	Total/NA	Water	Field Sampling	

Lab Chronicle

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

Client Sample ID: MW-307

Lab Sample ID: 310-243397-1

Date Collected: 10/25/22 16:00

Matrix: Water

Date Received: 10/27/22 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	371316	J7CK	EET CF	11/07/22 16:32
Total/NA	Prep	3005A			370221	DHM5	EET CF	10/31/22 09:45
Total/NA	Analysis	6020B		1	370897	A6US	EET CF	11/03/22 20:37
Total/NA	Prep	7470A			370680	XXW3	EET CF	11/02/22 17:55
Total/NA	Analysis	7470A		1	370843	XXW3	EET CF	11/03/22 15:58
Total/NA	Analysis	SM 2540C		1	370169	HE7K	EET CF	10/28/22 11:41
Total/NA	Analysis	SM 4500 H+ B		1	370088	DN3P	EET CF	10/27/22 20:47
Total/NA	Analysis	Field Sampling		1	370344	BJ0R	EET CF	10/25/22 16:00

Client Sample ID: MW-308

Lab Sample ID: 310-243397-2

Date Collected: 10/26/22 10:25

Matrix: Water

Date Received: 10/27/22 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	371316	J7CK	EET CF	11/07/22 16:44
Total/NA	Prep	3005A			370221	DHM5	EET CF	10/31/22 09:45
Total/NA	Analysis	6020B		1	370897	A6US	EET CF	11/03/22 20:40
Total/NA	Prep	7470A			370680	XXW3	EET CF	11/02/22 17:55
Total/NA	Analysis	7470A		1	370843	XXW3	EET CF	11/03/22 16:05
Total/NA	Analysis	SM 2540C		1	370266	WZC8	EET CF	10/30/22 05:24
Total/NA	Analysis	SM 4500 H+ B		1	370088	DN3P	EET CF	10/27/22 20:49
Total/NA	Analysis	Field Sampling		1	370344	BJ0R	EET CF	10/26/22 10:25

Client Sample ID: MW-309

Lab Sample ID: 310-243397-3

Date Collected: 10/26/22 09:05

Matrix: Water

Date Received: 10/27/22 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	371316	J7CK	EET CF	11/07/22 16:56
Total/NA	Prep	3005A			370221	DHM5	EET CF	10/31/22 09:45
Total/NA	Analysis	6020B		1	370897	A6US	EET CF	11/03/22 20:44
Total/NA	Prep	7470A			370680	XXW3	EET CF	11/02/22 17:55
Total/NA	Analysis	7470A		1	370843	XXW3	EET CF	11/03/22 16:07
Total/NA	Analysis	SM 2540C		1	370266	WZC8	EET CF	10/30/22 05:24
Total/NA	Analysis	SM 4500 H+ B		1	370088	DN3P	EET CF	10/27/22 20:50
Total/NA	Analysis	Field Sampling		1	370344	BJ0R	EET CF	10/26/22 09:05

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

Laboratory: Eurofins Cedar Falls

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

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

- 1
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Method Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-1

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
Field Sampling	Field Sampling	EPA	EET CF
3005A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF

Protocol References:

EPA = US Environmental Protection Agency

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

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

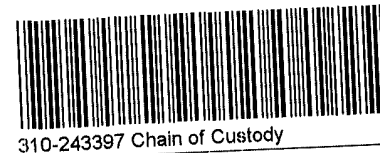
Laboratory References:

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





Environment Testing
America



310-243397 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS</u>			
City/State:	CITY <u>Madison</u>	STATE <u>WI</u>	Project:
Receipt Information			
Date/Time Received:	DATE <u>10-27-22</u>	TIME <u>1700</u>	Received By: <u>ML</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler ID: _____			
Multiple Coolers? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Cooler # ____ of ____			
Cooler Custody Seals Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Sample Custody Seals Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Trip Blank Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Which VOA samples are in cooler? ↓			
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>-1.4</u>		Corrected Temp (°C): <u>-1.4</u>	
Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-243397-1

SDG Number:

Login Number: 243397

List Number: 1

Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

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



**Table 1. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station / SCS Engineers Project No. 25222072.00
October 2022**

Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmhos/cm)	ORP (mV)	Turbidity
MW-301	10/26/2022 805	680.68	14.6	6.29	4.74	1036	26.9	0.62
MW-307	10/25/2022 1600	643.46	12.9	6.50	0.22	1604	-36.4	7.21
MW-308	10/26/2022 1025	641.13	12.8	6.50	0.00	1507	-5.7	1.98
MW-309	10/26/2022 905	640.43	12.6	6.89	0.00	1378	4.9	0.79

Abbreviations:

mg/L = milligrams per liter

amsl = above mean sea level

NA = Not Analyzed

NM= Not Measured

Created by: MDB
 Last revision by: RM
 Checked by: DK

Date: 5/1/2017
 Date: 10/28/2022
 Date: 10/28/2022

C:\Users\hld0\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\USG3GGGC\[2210_October - OGS ZLDP_CCR_Field.xlsx]GW Field Parameters



ANALYTICAL REPORT

PREPARED FOR

Attn: Meghan Blodgett
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Generated 11/30/2022 3:43:14 PM

JOB DESCRIPTION

Alliant OGS - 25222072 ZLDP

JOB NUMBER

310-243397-2

Eurofins Cedar Falls

Job Notes

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of Eurofins Environment Testing North Central, LLC and its client. All questions regarding this report should be directed to the Eurofins Environment Testing North Central, LLC Project Manager who has signed this report.

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

Authorization



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Authorized for release by
Sandie Fredrick, Project Manager II
Sandra.Fredrick@et.eurofinsus.com
(920)261-1660

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Case Narrative

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-2

Job ID: 310-243397-2

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative 310-243397-2

Comments

No additional comments.

Receipt

The samples were received on 10/27/2022 5:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was -1.4° C.

RAD

Methods 903.0, 9315: Radium-226 prep batch 160-588510:

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-307 (310-243397-1), MW-308 (310-243397-2), MW-309 (310-243397-3), (LCS 160-588510/2-A), (MB 160-588510/1-A) and (310-243397-D-1-A DU)

Methods 904.0, 9320: Radium-228 prep batch 160-588511:

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative. Radiochemistry sample results are reported with the count date/time applied as the Activity Reference Date. MW-307 (310-243397-1), MW-308 (310-243397-2), MW-309 (310-243397-3), (LCS 160-588511/2-A), (MB 160-588511/1-A) and (310-243397-D-1-B DU)

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

Sample Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-243397-1	MW-307	Water	10/25/22 16:00	10/27/22 17:00
310-243397-2	MW-308	Water	10/26/22 10:25	10/27/22 17:00
310-243397-3	MW-309	Water	10/26/22 09:05	10/27/22 17:00

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Detection Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-2

Client Sample ID: MW-307

Lab Sample ID: 310-243397-1

No Detections.

Client Sample ID: MW-308

Lab Sample ID: 310-243397-2

No Detections.

Client Sample ID: MW-309

Lab Sample ID: 310-243397-3

No Detections.

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This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-2

Client Sample ID: MW-307

Lab Sample ID: 310-243397-1

Date Collected: 10/25/22 16:00

Matrix: Water

Date Received: 10/27/22 17:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	1.51		0.213	0.252	1.00	0.109	pCi/L	11/04/22 06:57	11/30/22 07:58	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	93.0		40 - 110					11/04/22 06:57	11/30/22 07:58	1

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	1.50		0.440	0.461	1.00	0.484	pCi/L	11/04/22 07:25	11/18/22 13:34	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	93.0		40 - 110					11/04/22 07:25	11/18/22 13:34	1
Y Carrier	78.1		40 - 110					11/04/22 07:25	11/18/22 13:34	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	3.01		0.489	0.525	5.00	0.484	pCi/L		11/30/22 15:32	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-2

Client Sample ID: MW-308

Lab Sample ID: 310-243397-2

Date Collected: 10/26/22 10:25

Matrix: Water

Date Received: 10/27/22 17:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	1.13		0.189	0.215	1.00	0.111	pCi/L	11/04/22 06:57	11/30/22 08:07	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	89.1		40 - 110					11/04/22 06:57	11/30/22 08:07	1

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	1.01		0.400	0.411	1.00	0.507	pCi/L	11/04/22 07:25	11/18/22 13:34	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	89.1		40 - 110					11/04/22 07:25	11/18/22 13:34	1
Y Carrier	80.4		40 - 110					11/04/22 07:25	11/18/22 13:34	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	2.15		0.442	0.464	5.00	0.507	pCi/L		11/30/22 15:32	1

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Client Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-2

Client Sample ID: MW-309

Lab Sample ID: 310-243397-3

Date Collected: 10/26/22 09:05

Matrix: Water

Date Received: 10/27/22 17:00

Method: EPA 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	0.621		0.151	0.161	1.00	0.126	pCi/L	11/04/22 06:57	11/30/22 08:08	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	84.1		40 - 110					11/04/22 06:57	11/30/22 08:08	1

Method: EPA 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	1.54		0.450	0.472	1.00	0.485	pCi/L	11/04/22 07:25	11/18/22 13:34	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	84.1		40 - 110					11/04/22 07:25	11/18/22 13:34	1
Y Carrier	82.6		40 - 110					11/04/22 07:25	11/18/22 13:34	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	2.16		0.475	0.499	5.00	0.485	pCi/L		11/30/22 15:32	1

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Definitions/Glossary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-2

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-2

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-588510/1-A
Matrix: Water
Analysis Batch: 591652

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 588510

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 226	0.1345		0.0727	0.0737	1.00	0.0859	pCi/L	11/04/22 06:57	11/30/22 07:57	1
Carrier	MB	MB	Limits				Prepared		Analyzed	Dil Fac
Ba	%Yield	Qualifier	40 - 110				11/04/22 06:57		11/30/22 07:57	1
	92.5									

Lab Sample ID: LCS 160-588510/2-A
Matrix: Water
Analysis Batch: 591652

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 588510

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec Limits
				Uncert. (2σ+/-)					
Radium 226	11.3	9.714		1.02	1.00	0.0975	pCi/L	86	75 - 125
Carrier	LCS	LCS	Limits						
Ba	%Yield	Qualifier	40 - 110						
	91.1								

Lab Sample ID: 310-243397-1 DU
Matrix: Water
Analysis Batch: 591652

Client Sample ID: MW-307
Prep Type: Total/NA
Prep Batch: 588510

Analyte	Sample	Sample	DU	DU	Total	RL	MDC	Unit	RER	RER
	Result	Qual	Result	Qual	Uncert. (2σ+/-)					Limit
Radium 226	1.51		1.387		0.241	1.00	0.101	pCi/L	0.25	1
Carrier	DU	DU	Limits							
Ba	%Yield	Qualifier	40 - 110							
	89.1									

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-588511/1-A
Matrix: Water
Analysis Batch: 590568

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 588511

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 228	0.6649		0.372	0.377	1.00	0.537	pCi/L	11/04/22 07:25	11/18/22 13:34	1
Carrier	MB	MB	Limits				Prepared		Analyzed	Dil Fac
Ba	%Yield	Qualifier	40 - 110				11/04/22 07:25		11/18/22 13:34	1
Y Carrier	81.5		40 - 110				11/04/22 07:25		11/18/22 13:34	1

Eurofins Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-2

Method: 904.0 - Radium-228 (GFPC) (Continued)

Lab Sample ID: LCS 160-588511/2-A
Matrix: Water
Analysis Batch: 590568

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 588511

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium 228	8.43	9.353		1.27	1.00	0.516	pCi/L	111	75 - 125
LCS LCS									
Carrier	%Yield	Qualifier	Limits						
Ba	91.1		40 - 110						
Y Carrier	80.4		40 - 110						

Lab Sample ID: 310-243397-1 DU
Matrix: Water
Analysis Batch: 590568

Client Sample ID: MW-307
Prep Type: Total/NA
Prep Batch: 588511

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium 228	1.50		1.101		0.430	1.00	0.531	pCi/L	0.45	1
DU DU										
Carrier	%Yield	Qualifier	Limits							
Ba	89.1		40 - 110							
Y Carrier	81.9		40 - 110							

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QC Association Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-2

Rad

Prep Batch: 588510

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243397-1	MW-307	Total/NA	Water	PrecSep-21	
310-243397-2	MW-308	Total/NA	Water	PrecSep-21	
310-243397-3	MW-309	Total/NA	Water	PrecSep-21	
MB 160-588510/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-588510/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
310-243397-1 DU	MW-307	Total/NA	Water	PrecSep-21	

Prep Batch: 588511

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-243397-1	MW-307	Total/NA	Water	PrecSep_0	
310-243397-2	MW-308	Total/NA	Water	PrecSep_0	
310-243397-3	MW-309	Total/NA	Water	PrecSep_0	
MB 160-588511/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-588511/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
310-243397-1 DU	MW-307	Total/NA	Water	PrecSep_0	

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Lab Chronicle

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-2

Client Sample ID: MW-307

Lab Sample ID: 310-243397-1

Date Collected: 10/25/22 16:00

Matrix: Water

Date Received: 10/27/22 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			588510	BMP	EET SL	11/04/22 06:57
Total/NA	Analysis	903.0		1	591652	FLC	EET SL	11/30/22 07:58
Total/NA	Prep	PrecSep_0			588511	BMP	EET SL	11/04/22 07:25
Total/NA	Analysis	904.0		1	590568	FLC	EET SL	11/18/22 13:34
Total/NA	Analysis	Ra226_Ra228 Pos		1	591706	FLC	EET SL	11/30/22 15:32

Client Sample ID: MW-308

Lab Sample ID: 310-243397-2

Date Collected: 10/26/22 10:25

Matrix: Water

Date Received: 10/27/22 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			588510	BMP	EET SL	11/04/22 06:57
Total/NA	Analysis	903.0		1	591654	SCB	EET SL	11/30/22 08:07
Total/NA	Prep	PrecSep_0			588511	BMP	EET SL	11/04/22 07:25
Total/NA	Analysis	904.0		1	590568	FLC	EET SL	11/18/22 13:34
Total/NA	Analysis	Ra226_Ra228 Pos		1	591706	FLC	EET SL	11/30/22 15:32

Client Sample ID: MW-309

Lab Sample ID: 310-243397-3

Date Collected: 10/26/22 09:05

Matrix: Water

Date Received: 10/27/22 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			588510	BMP	EET SL	11/04/22 06:57
Total/NA	Analysis	903.0		1	591654	SCB	EET SL	11/30/22 08:08
Total/NA	Prep	PrecSep_0			588511	BMP	EET SL	11/04/22 07:25
Total/NA	Analysis	904.0		1	590568	FLC	EET SL	11/18/22 13:34
Total/NA	Analysis	Ra226_Ra228 Pos		1	591706	FLC	EET SL	11/30/22 15:32

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
 Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-2

Laboratory: Eurofins St. Louis

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

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

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

Eurofins Cedar Falls

Method Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-2

Method	Method Description	Protocol	Laboratory
903.0	Radium-226 (GFPC)	EPA	EET SL
904.0	Radium-228 (GFPC)	EPA	EET SL
Ra226_Ra228 Pos	Combined Radium-226 and Radium-228	TAL-STL	EET SL
PrecSep_0	Preparation, Precipitate Separation	None	EET SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	EET SL

Protocol References:

EPA = US Environmental Protection Agency

None = None

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

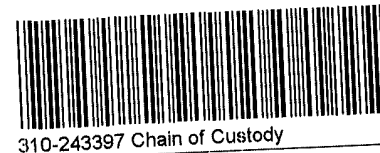
Laboratory References:

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

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Environment Testing
America



310-243397 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS</u>			
City/State:	CITY <u>Madison</u>	STATE <u>WI</u>	Project:
Receipt Information			
Date/Time Received:	DATE <u>10-27-22</u>	TIME <u>1700</u>	Received By: <u>ML</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler ID: _____			
Multiple Coolers? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Cooler # ____ of ____			
Cooler Custody Seals Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Sample Custody Seals Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Trip Blank Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes: Which VOA samples are in cooler? ↓			
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>T</u>		Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>-1.4</u>		Corrected Temp (°C): <u>-1.4</u>	
Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-243397-2

SDG Number:

Login Number: 243397

List Number: 1

Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

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



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-243397-2

SDG Number:

Login Number: 243397

List Number: 2

Creator: Bohlmann, Jessica M

List Source: Eurofins St. Louis

List Creation: 10/31/22 12:37 PM

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



Tracer/Carrier Summary

Client: SCS Engineers
Project/Site: Alliant OGS - 25222072 ZLDP

Job ID: 310-243397-2

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (40-110)
310-243397-1	MW-307	93.0
310-243397-1 DU	MW-307	89.1
310-243397-2	MW-308	89.1
310-243397-3	MW-309	84.1
LCS 160-588510/2-A	Lab Control Sample	91.1
MB 160-588510/1-A	Method Blank	92.5

Tracer/Carrier Legend

Ba = Ba

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA


Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
310-243397-1	MW-307	93.0	78.1
310-243397-1 DU	MW-307	89.1	81.9
310-243397-2	MW-308	89.1	80.4
310-243397-3	MW-309	84.1	82.6
LCS 160-588511/2-A	Lab Control Sample	91.1	80.4
MB 160-588511/1-A	Method Blank	92.5	81.5

Tracer/Carrier Legend

Ba = Ba

Y = Y Carrier



Appendix D

Historical Monitoring Results

Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-301		Number of Sampling Dates: 24																								
Parameter Name	Units	4/26/2016	6/23/2016	8/10/2016	10/26/2016	1/18/2017	4/19/2017	6/20/2017	8/23/2017	11/8/2017	4/18/2018	8/14/2018	8/29/2018	10/16/2018	1/8/2019	4/8/2019	10/24/2019	2/5/2020	3/12/2020	4/14/2020	10/8/2020	4/14/2021	10/7/2021	4/12/2022	10/26/2022	
Boron	ug/L	574	612	597	620	599	565	657	779	488	480	735	--	410	--	380	680	540	--	700	650	690	800	640	780	
Calcium	mg/L	66.9	62.5	65.6	71.9	74.1	61.5	59.3	66.8	65.2	63	72.5	--	47.2	--	43	78	68	--	84	94	96	100	92	110	
Chloride	mg/L	63.4	66.9	73.3	76.3	71.6	54.8	69.8	73.5	59.8	63.4	--	63.1	33.9	--	50	110	120	--	140	170	150	180	140	160	
Fluoride	mg/L	0.22	0.2	0.44	0.27	0.17	0.24	0.26	0.34	0.27	0.22	--	0.27	0.3	--	0.44	<0.23	--	--	<0.23	<0.23	<0.28	<0.28	<0.22	<0.22	
Field pH	Std. Units	6.54	6.06	6.08	6.26	6.47	6.64	6.31	6.16	6.41	6.41	6.26	6.31	6.27	5.68	6.61	6.33	6.39	6.48	6.58	6.22	6.26	6.26	6.37	6.29	
Sulfate	mg/L	150	157	159	169	171	190	166	162	178	186	--	181	164	--	81	130	130	--	140	140	140	180	160	180	
Total Dissolved Solids	mg/L	500	531	576	545	545	499	490	557	448	514	--	532	392	--	340	510	570	--	550	660	620	670	610	690	
Antimony	ug/L	<0.058	0.13	0.12	<0.058	0.11	<0.026	0.054	0.063	--	<0.026	0.2	--	<0.078	--	<0.53	<0.53	--	--	<0.58	<0.51	<1.1	<1.1	<0.69	<0.69	
Arsenic	ug/L	0.38	0.38	0.26	0.14	0.23	0.22	0.15	0.14	--	0.074	0.29	--	0.16	--	<0.75	<0.75	<0.88	--	<0.88	<0.88	<0.75	<0.75	<0.75	<0.75	
Barium	ug/L	51.6	55.8	52.3	53.3	42.4	35.5	39.9	44	--	31.6	44.5	--	28.1	--	25	56	43	--	54	58	52	61	40	44	
Beryllium	ug/L	<0.08	<0.08	<0.08	<0.08	<0.08	<0.012	<0.012	<0.012	--	<0.012	0.14	--	<0.089	--	<0.27	<0.27	--	--	<0.27	--	<0.27	<0.27	<0.27	<0.27	
Cadmium	ug/L	<0.029	<0.029	0.12	0.038	<0.029	0.035	0.044	0.037	--	0.023	0.16	--	<0.033	--	<0.077	0.04	<0.039	--	<0.039	0.075	<0.051	0.057	<0.055	0.055	
Chromium	ug/L	0.59	0.74	0.64	<0.34	0.59	0.49	0.25	0.39	--	<0.054	0.25	--	0.11	--	<0.98	<0.98	<1.1	--	<1.1	<1.1	<1.1	<1.1	<1.1	1.2	
Cobalt	ug/L	4.1	3.1	1.8	1.8	1.3	0.97	1	0.96	--	0.46	1.4	--	0.36	--	0.44	0.6	1.1	0.43	0.52	0.41	0.29	0.48	0.23	0.29	
Lead	ug/L	<0.19	<0.19	<0.19	<0.19	<0.19	0.06	0.1	0.049	--	0.041	0.18	--	<0.13	--	<0.27	<0.27	<0.27	--	<0.27	<0.11	<0.21	<0.21	<0.24	<0.24	
Lithium	ug/L	22.8	28.7	27.6	25.5	20.1	21.8	24.9	27.9	--	19.1	26.5	--	19.4	--	15	24	17	21	24	23	23	26	19	30	
Mercury	ug/L	<0.039	<0.039	<0.039	<0.039	<0.039	<0.046	<0.046	<0.046	--	<0.09	<0.083	--	--	<0.09	<0.1	<0.1	--	--	<0.1	--	<0.15	<0.15	<0.11	<0.11	
Molybdenum	ug/L	1.2	1.2	0.89	1	0.76	0.54	0.79	1.3	--	0.67	1.3	--	0.72	--	<1.1	1.1	--	--	1.2	<1.1	<1.3	<1.3	<1.2	<8.4	
Selenium	ug/L	4.7	5.4	6.1	6.5	5.9	4.2	5.5	7.2	--	4.3	6.3	--	3.4	--	3.1	6.2	--	--	6.8	7.7	6.5	7.5	6	6.9	
Thallium	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	0.14	<0.036	0.067	--	<0.036	0.16	--	<0.099	--	<0.27	<0.27	--	--	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	
Total Radium	pCi/L	0.51	0.614	1.56	1.24	0.143	0.631	1.06	0.725	--	0.513	1.19	--	1.16	--	0.0956	0.956	0.228	--	0.315	0.407	0.598	1.04	0.378	0.973	
Radium-226	pCi/L	0.084	0	0.831	-0.13	0.143	0.139	0.501	0.123	--	0.145	0.417	--	0.529	--	0.0726	0.15	0.049	--	0.0921	0.324	0.133	<0.339	0.149	0.223	
Radium-228	pCi/L	0.426	0.614	0.732	1.24	-0.403	0.492	0.562	0.602	--	0.368	0.773	--	0.627	--	0.023	0.753	0.179	--	0.223	0.0831	0.465	0.744	0.229	0.75	
Field Specific Conductance	umhos/cm	572	777	807	853	834	742	758	1107	743	770	867	781	599	310	501	902	966	962	939	1035	1062	1062	976	1036	
Field Temperature	deg C	10.5	17.1	19.9	16.3	6.8	10.8	17.3	19.7	13.9	7.2	20.4	20.6	16.6	7.88	7.27	13.71	5.38	6.9	8.7	15.4	9.1	17.9	7.4	14.6	
Groundwater Elevation	feet	682.8	682.58	682.27	682.04	681.67	682.15	681.91	681.28	681.54	681.53	680.91	681.09	682.5	682.22	682.69	683.07	683.3	682.82	683.25	682.34	682.94	681.95	682.08	680.68	
Oxygen, Dissolved	mg/L	4.04	2.55	3.43	3.72	4.87	5.74	4.34	2.88	4.16	6.52	3.18	4.71	4.12	5.68	8.32	4.94	7.28	5.31	5.14	4.2	5.99	4.17	3.26	4.74	
Turbidity	NTU	1.82	1.51	0.52	0.9	0.6	0.47	0.38	0.79	1.03	0.66	0.52	0.63	2.91	0.77	1.87	1.6	1.43	1.33	0.87	0.02	1.61	8.9	5.03	0.62	
pH at 25 Degrees C	Std. Units	6.5	6.4	6.5	6.7	6.8	6.7	6.5	6.4	6.4	6.6	--	6.5	6.6	--	7.1	7.1	6.7	--	6.6	6.4	6.8	6.5	6.6	6.7	
Field Oxidation Potential	millivolts	244.1	74.6	58.6	91.3	30.2	148	67.2	41.4	200.7	105.5	-55.5	--	119.7	118.3	37.6	9.9	68	258.5	176.3	163.6	232.5	207.3	117.6	26.9	
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	150	160	170	210	190	250	
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1.9	<3.8	<4.6	<4.6	<4.6	<4.6	
Total Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	150	160	170	210	190	250	
Iron, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	50	<50	49	<36	<36	<36	
Magnesium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	33000	38000	34000	36000	36000	28000	
Manganese, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17	16	13	10	15	5	7.9	
Potassium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1500	1500	1200	1300	1100	980
Sodium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	77000	87000	78000	88000	89000	73000	
Cobalt, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.32	0.44	--	--	--	--	--	
Iron, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<50	<50	<50	<36	<36	<36	
Manganese, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16	19	14	14	18	8.1	8
Lithium, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22	--	--	--	--	--	--	

Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-307		Number of Sampling Dates: 24																							
Parameter Name	Units	1/19/2017	4/20/2017	6/21/2017	8/21/2017	11/8/2017	4/16/2018	5/30/2018	6/28/2018	7/18/2018	10/16/2018	4/8/2019	10/23/2019	12/11/2019	2/5/2020	4/14/2020	10/7/2020	2/23/2021	4/14/2021	7/6/2021	10/7/2021	2/14/2022	4/11/2022	8/25/2022	10/25/2022
Boron	ug/L	207	205	197	197	214	200	--	210	--	195	240	200	190	200	240	260	--	200	--	230	--	250	--	250
Calcium	mg/L	230	241	229	221	227	220	--	239	--	222	240	230	230	210	240	240	--	250	--	240	--	260	--	260
Chloride	mg/L	210	201	213	219	217	224	--	--	223	293	220	220	200	220	230	230	--	210	--	240	--	330	--	260
Fluoride	mg/L	0.12	0.13	0.16	0.2	0.12	0.11	--	--	0.13	<0.19	0.28	<0.23	<0.23	--	<0.23	<0.23	--	<0.28	--	<0.28	--	<0.22	--	<0.22
Field pH	Std. Units	6.7	6.51	6.82	6.4	6.61	7.04	6.44	6.87	6.62	6.54	6.76	6.68	6.37	6.67	6.76	6.97	6.5	6.59	7.05	6.71	7.03	6.63	6.71	6.5
Sulfate	mg/L	105	105	110	102	102	103	--	--	105	104	100	95	92	100	99	100	--	92	--	110	--	140	--	130
Total Dissolved Solids	mg/L	1050	1100	1070	1050	1030	--	1100	--	1070	1070	1000	1000	1000	970	980	1000	--	1000	--	1000	--	1100	--	1100
Antimony	ug/L	0.1	<0.026	<0.026	<0.026	<0.026	<0.026	--	<0.15	--	<0.078	--	--	<0.53	--	<0.58	--	--	<1.1	--	<1.1	--	0.69	--	<0.69
Arsenic	ug/L	1.1	0.96	0.62	0.52	0.54	0.41	--	0.86	--	0.66	--	--	<0.75	<0.88	<0.88	<0.88	--	<0.75	--	<0.75	--	0.77	--	<0.75
Barium	ug/L	127	139	132	128	131	126	--	147	--	145	--	--	140	130	140	140	--	160	--	140	--	150	--	130
Beryllium	ug/L	<0.08	0.029	0.016	<0.012	<0.012	<0.012	--	<0.12	--	<0.089	--	--	<0.27	--	<0.27	--	--	<0.27	--	<0.27	--	<0.27	--	<0.27
Cadmium	ug/L	<0.029	0.025	<0.018	<0.018	0.018	<0.018	--	<0.07	--	<0.033	--	--	<0.039	<0.039	<0.039	--	--	<0.051	--	<0.051	--	<0.055	--	<0.055
Chromium	ug/L	0.59	1.6	1	0.38	0.38	0.28	--	1.4	--	0.59	--	--	<0.98	<1.1	<1.1	<1.1	--	<1.1	--	<1.1	--	<1.1	--	<1.1
Cobalt	ug/L	0.62	1.6	1.1	1.1	1.3	1.3	--	2.9	--	4.8	--	--	11	13	20	18	64	46	60	48	24	31	25	27
Lead	ug/L	<0.19	0.49	0.26	0.085	0.075	0.13	--	0.48	--	0.13	--	--	0.71	<0.27	0.31	<0.11	--	<0.21	--	<0.21	--	<0.24	--	<0.24
Lithium	ug/L	10	9.4	11.2	15.2	12.9	9.3	--	13.2	--	11.6	--	--	12	9.1	13	11	--	14	--	14	--	14	--	10
Mercury	ug/L	<0.039	<0.046	<0.046	<0.046	<0.046	<0.09	--	<0.037	--	<0.09	--	--	<0.1	--	<0.1	--	--	<0.15	--	<0.15	--	<0.11	--	<0.11
Molybdenum	ug/L	0.5	0.56	0.31	0.31	0.37	0.3	--	0.39	--	<0.57	--	--	<1.1	--	<1.1	<1.1	--	<1.3	--	<1.3	--	<1.2	--	<1.2
Selenium	ug/L	<0.18	0.12	0.11	0.11	0.13	<0.086	--	0.25	--	0.13	--	--	<1	--	<1	<1	--	<0.96	--	<0.96	--	<0.96	--	<0.96
Thallium	ug/L	<0.5	<0.036	<0.036	<0.036	0.065	<0.036	--	<0.14	--	<0.099	--	--	<0.27	--	<0.26	--	--	<0.26	--	<0.26	--	<0.26	--	<0.26
Total Radium	pCi/L	2.66	2.77	2.83	3.07	2.88	2.96	--	2.47	--	3.1	--	--	2.46	2.23	2.06	2.36	--	3.08	--	3.9	--	2.84	--	3.01
Radium-226	pCi/L	1.55	1.72	1.87	1.69	1.76	1.31	--	1.84	--	2.11	--	--	1.65	1.51	1.5	1.47	--	1.99	--	2.52	--	1.51	--	1.51
Radium-228	pCi/L	1.11	1.05	0.96	1.38	1.12	1.65	--	0.629	--	0.991	--	--	0.81	0.718	0.562	0.885	--	1.09	--	1.38	--	1.34	--	1.5
Field Specific Conductance	umhos/cm	1640	1648	1557	2193	1656	1674	1710	1686	1718	1697	1599	1684	1576	1681	1554	1637	1632	1675	1705	1552	1810	1718	1727	1604
Field Temperature	deg C	12.9	12	12.7	13	13.2	11.6	12.7	13.4	12.9	14.3	12.47	13.38	11.5	11.65	10.6	13.2	12.2	11.5	13.2	14.4	12.25	11.8	13	12.9
Groundwater Elevation	feet	648.81	653.62	649.85	645.78	647.37	649.66	652.45	652.87	652.27	654.13	654.9	651.89	649.59	649.88	650.66	646.18	646.8	649.53	647.03	644.49	645.82	648.4	644.25	643.46
Oxygen, Dissolved	mg/L	0.16	0.2	0.08	0.08	0.17	0.29	0.18	0.21	0.21	0.08	0.51	0.25	0.18	0.9	0.69	0.08	0.2	0.41	0.21	0.19	0.97	0.13	0.56	0.22
Turbidity	NTU	9.01	66.67	34.94	4.89	11.16	11.93	18.58	53.34	14.94	14.08	26	12.5	43.13	9.74	28.9	4.56	2.41	21.2	17.91	10	0	4.09	2.17	7.21
pH at 25 Degrees C	Std. Units	7	6.9	6.8	6.9	7	7.1	--	--	6.7	6.8	6.7	7.5	6.7	6.7	6.8	6.9	--	6.8	--	6.8	--	6.9	--	6.9
Field Oxidation Potential	millivolts	-42	-16	-23.1	23.7	176.7	-105.9	-45.8	-43.4	-416.3	-65.7	-3.7	-24.8	-45.8	-15.6	-52.9	-62.2	0.8	-39.9	14.7	-23.8	-51	46.3	67.5	-36.4
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	520	480	--	490	--	550	--	470	--	500
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1.9	<3.8	--	<4.6	--	<4.6	--	<4.6	--	<4.6
Total Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	520	480	--	490	--	550	--	470	--	500
Iron, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3800	3500	--	3700	--	3900	--	2600	--	2700
Magnesium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28000	27000	--	30000	--	28000	--	26000	--	28000
Manganese, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	350	--	360	--	410	--	260	--	270
Potassium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1900	1900	--	2000	--	2000	--	1900	--	1800
Sodium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	97000	100000	--	98000	--	100000	--	110000	--	91000
Cobalt, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19	19	--	49	--	59	--	29	--	30
Iron, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3100	3600	--	3400	--	3400	--	2500	--	3100
Manganese, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	290	--	330	--	440	--	260	--	230

Single Location


Name: IPL - Ottumwa Generating Station

Location ID: MW-308																					
Number of Sampling Dates: 20																					
Parameter Name	Units	1/19/2017	4/20/2017	6/21/2017	8/21/2017	11/8/2017	4/16/2018	5/30/2018	6/28/2018	7/18/2018	10/16/2018	4/8/2019	10/23/2019	12/11/2019	2/5/2020	4/14/2020	10/7/2020	4/14/2021	10/7/2021	4/12/2022	10/26/2022
Boron	ug/L	218	146	182	214	240	210	--	153	--	162	190	220	160	220	210	270	220	200	300	260
Calcium	mg/L	212	222	209	218	212	229	--	215	--	209	240	240	220	210	240	220	230	230	240	240
Chloride	mg/L	151	149	146	151	156	153	--	--	158	158	160	160	150	160	170	160	150	170	180	160
Fluoride	mg/L	0.11	0.12	0.12	0.23	0.12	0.1	--	--	0.12	<0.19	<0.23	<0.23	<0.23	--	<0.23	<0.23	<0.28	<0.28	<0.22	<0.22
Field pH	Std. Units	6.85	6.7	6.93	6.52	6.76	7.14	6.61	7.08	6.73	6.68	6.9	6.78	6.55	6.78	6.9	7.24	6.7	6.83	6.7	6.5
Sulfate	mg/L	296	283	303	294	297	305	--	--	310	311	300	300	280	300	290	290	270	290	320	290
Total Dissolved Solids	mg/L	1060	1100	1050	1020	1120	--	1090	--	1080	1110	1200	1100	1100	1100	1000	1000	1100	1000	1000	1000
Antimony	ug/L	0.11	<0.026	0.039	<0.026	<0.026	<0.026	--	<0.15	--	<0.078	--	--	<0.53	--	<0.58	--	<1.1	<1.1	<0.69	<0.69
Arsenic	ug/L	0.44	0.34	0.14	0.32	0.32	0.29	--	0.39	--	0.44	--	--	<0.75	<0.88	<0.88	<0.88	<0.75	<0.75	<0.75	<0.75
Barium	ug/L	118	118	125	132	133	123	--	134	--	143	--	--	130	130	140	130	140	130	140	120
Beryllium	ug/L	<0.08	<0.012	<0.012	<0.012	<0.012	<0.012	--	<0.12	--	<0.089	--	--	<0.27	--	<0.27	--	<0.27	<0.27	<0.27	<0.27
Cadmium	ug/L	<0.029	<0.018	<0.018	<0.018	<0.018	<0.018	--	<0.07	--	<0.033	--	--	<0.039	<0.039	<0.039	--	<0.051	<0.051	<0.055	<0.055
Chromium	ug/L	0.57	0.44	0.34	0.49	0.45	0.17	--	0.42	--	0.27	--	--	5.9	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Cobalt	ug/L	0.52	0.43	0.25	0.26	0.23	0.18	--	0.19	--	0.15	--	--	0.26	0.14	0.14	0.14	0.16	0.22	0.24	0.24
Lead	ug/L	<0.19	0.066	<0.033	<0.033	<0.033	0.043	--	<0.12	--	<0.13	--	--	0.52	<0.27	<0.27	<0.11	<0.21	<0.21	<0.24	<0.24
Lithium	ug/L	10.3	13.3	12.7	19.1	12.6	12.3	--	17.6	--	13.7	--	--	16	12	17	14	16	16	17	14
Mercury	ug/L	<0.039	<0.046	<0.046	<0.046	<0.046	<0.09	--	<0.037	--	<0.09	--	--	<0.1	--	<0.1	--	<0.15	<0.15	<0.11	<0.11
Molybdenum	ug/L	0.95	0.53	0.5	0.61	0.75	0.6	--	0.46	--	<0.57	--	--	<1.1	--	<1.1	<1.1	<1.3	<1.3	1.4	<1.2
Selenium	ug/L	<0.18	<0.086	<0.086	<0.086	<0.086	<0.086	--	<0.16	--	<0.085	--	--	<1	--	<1	<1	<0.96	<0.96	<0.96	<0.96
Thallium	ug/L	<0.5	<0.036	<0.036	<0.036	<0.036	<0.036	--	<0.14	--	<0.099	--	--	<0.27	--	<0.26	--	<0.26	<0.26	<0.26	<0.26
Total Radium	pCi/L	1.45	0.496	3.3	2.17	1.47	1.63	--	1.88	--	2.85	--	--	2.73	2.13	1.69	2.67	2.87	3.22	2.29	2.15
Radium-226	pCi/L	0.282	-0.173	2	1.42	1.18	0.532	--	1.5	--	1.44	--	--	1.54	1.42	1.24	1.53	1.36	1.78	1.19	1.13
Radium-228	pCi/L	1.17	0.496	1.3	0.745	0.286	1.1	--	0.379	--	1.41	--	--	1.19	0.705	0.454	1.14	1.51	1.43	1.1	1.01
Field Specific Conductance	umhos/cm	1559	1509	1467	2042	1577	1577	1611	1584	1628	1594	1539	1637	1532	1630	1502	1575	1598	1453	1491	1507
Field Temperature	deg C	12.6	11.9	12.2	12.6	13	11.8	12.1	13.1	12.6	13.1	12.54	13.16	10.5	11.35	10.9	13.2	11.5	13	12.7	12.8
Groundwater Elevation	feet	647.42	651.09	648.26	643.12	644.99	647.91	651.05	651.43	650.67	--	653.7	651.31	647.39	650.12	650.09	642.85	647.66	641.81	645.75	641.13
Oxygen, Dissolved	mg/L	0.15	0.21	0.03	0.12	0.12	0.35	0.14	0.19	0.13	0.08	0.66	4.42	0.43	1.48	0.28	0.11	0.44	0.17	0.26	0
Turbidity	NTU	1.65	4.6	0.84	1.15	0.73	0.93	3.34	5.87	1.54	5.49	6.87	7.42	15.72	3.49	5.12	1.15	4.47	12.8	6	1.98
pH at 25 Degrees C	Std. Units	7.2	7.2	7	6.9	7	7.1	--	--	6.8	7	6.8	7.9	6.8	6.8	6.9	7.1	7.1	6.9	7	7
Field Oxidation Potential	millivolts	-44.4	1.7	-29.1	24.4	169.7	-47.2	-48.2	-60.3	-415.4	-80.8	-23	-38.7	-56.6	-35.9	-69.1	-56.5	-49.3	-26.1	-30.9	-5.7
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	380	390	370	410	380	390
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1.9	<3.8	<4.6	<4.6	<4.6	<4.6
Total Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	380	390	370	410	380	390
Iron, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5100	3800	3900	4700	3400	4000
Magnesium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	25000	23000	26000	24000	22000	23000
Manganese, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	770	1400	1300	950	1500	1400
Potassium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3900	4000	4400	4300	4100	4300
Sodium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	110000	100000	100000	110000	110000	110000
Cobalt, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.11	--	--	--	--	--
Iron, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4400	4000	3900	300	3200	3800
Manganese, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	800	1200	1300	1100	1500	1300

Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-309																					
Number of Sampling Dates: 20																					
Parameter Name	Units	1/19/2017	4/20/2017	6/21/2017	8/21/2017	11/8/2017	4/16/2018	5/30/2018	6/28/2018	7/18/2018	10/16/2018	4/8/2019	10/23/2019	12/11/2019	2/5/2020	4/14/2020	10/7/2020	4/14/2021	10/7/2021	4/14/2022	10/26/2022
Boron	ug/L	1300	1280	1250	1320	1360	1340	--	1360	--	1280	1500	1300	1100	1300	1400	1200	1400	1300	1600	1400
Calcium	mg/L	134	152	136	135	135	150	--	181	--	139	160	150	150	130	150	120	130	120	150	160
Chloride	mg/L	73.1	73.7	75.5	78.4	78.1	78.9	--	--	76.4	80.6	72	74	66	68	69	68	57	67	61	67
Fluoride	mg/L	0.12	0.13	0.16	0.19	0.14	0.094	--	--	0.13	<0.19	0.27	<0.23	<0.23	--	0.36	<0.23	<0.28	<0.28	<0.22	<0.22
Field pH	Std. Units	7.18	7.01	7.17	6.9	7.11	7.52	6.92	7.36	7.02	6.95	7.18	6.98	6.67	7.09	7.21	7.57	7	7.18	7.16	6.89
Sulfate	mg/L	406	393	415	395	402	373	--	--	417	453	410	400	370	370	390	380	360	400	420	420
Total Dissolved Solids	mg/L	1030	1030	1020	1010	1010	--	1050	--	1030	1040	1100	1100	980	990	1000	930	940	950	940	1100
Antimony	ug/L	0.095	<0.026	0.041	0.029	<0.026	0.079	--	<0.15	--	<0.078	--	--	<0.53	--	<0.58	--	<1.1	<1.1	<0.69	<0.69
Arsenic	ug/L	0.66	1.1	0.52	0.44	0.45	0.62	--	2	--	0.74	--	--	1.1	<0.88	0.88	<0.88	<0.75	<0.75	<0.75	<0.75
Barium	ug/L	48.7	62.4	48.7	46.1	46	53.7	--	82.1	--	54.5	--	--	54	46	50	42	52	47	55	51
Beryllium	ug/L	<0.08	0.073	0.025	<0.012	0.016	0.056	--	0.28	--	<0.089	--	--	<0.27	--	<0.27	--	<0.27	<0.27	<0.27	<0.27
Cadmium	ug/L	<0.029	0.042	0.033	0.018	<0.018	0.052	--	0.15	--	<0.033	--	--	0.09	<0.039	<0.039	--	<0.051	<0.051	<0.055	<0.055
Chromium	ug/L	1.4	3.2	1.8	1.2	1.2	2.7	--	5.4	--	1.6	--	--	1.7	<1.1	1.3	<1.1	<1.1	1.3	<1.1	<1.1
Cobalt	ug/L	2	3.1	2.4	2.1	2	2.4	--	4.7	--	2.7	--	--	3.7	2.3	3.2	2	2.3	2	2	2.2
Lead	ug/L	<0.19	1	0.5	0.096	0.057	0.95	--	3.1	--	0.46	--	--	2.8	0.63	1.6	<0.11	<0.21	<0.21	<0.24	<0.24
Lithium	ug/L	5.8	9.3	7.3	9.4	6.9	8	--	16.2	--	8.8	--	--	8.2	6.3	9.6	6.9	8.9	7.5	9.2	7.3
Mercury	ug/L	<0.039	<0.046	<0.046	<0.046	<0.046	<0.09	--	<0.037	--	<0.09	--	--	<0.1	--	<0.1	--	<0.15	<0.15	<0.11	<0.11
Molybdenum	ug/L	0.57	0.32	0.28	0.28	0.37	0.29	--	0.33	--	<0.57	--	--	<1.1	--	<1.1	<1.1	<1.3	<1.3	<1.2	<1.2
Selenium	ug/L	<0.18	0.22	<0.086	<0.086	<0.086	<0.086	--	1	--	0.24	--	--	<1	--	<1	<1	<0.96	<0.96	<0.96	<0.96
Thallium	ug/L	<0.5	<0.036	<0.036	<0.036	<0.036	<0.036	--	<0.14	--	<0.099	--	--	<0.27	--	<0.26	--	<0.26	<0.26	<0.26	<0.26
Total Radium	pCi/L	0.606	2.23	1.63	1.65	1.11	1.59	--	2.36	--	2.2	--	--	1.77	1.02	0.957	1.77	1.05	1.6	0.922	2.16
Radium-226	pCi/L	0.143	0.968	1.37	0.783	0.284	0.974	--	1.83	--	1.09	--	--	1.08	0.771	0.868	0.863	0.604	1.14	0.576	0.621
Radium-228	pCi/L	0.463	1.26	0.259	0.866	0.825	0.614	--	0.534	--	1.11	--	--	0.683	0.251	0.0894	0.906	0.448	<0.525	0.346	1.54
Field Specific Conductance	umhos/cm	1426	1430	1363	1821	1431	1445	1484	1477	1501	1464	1396	1461	1350	1433	1322	1371	1411	1297	1305	1378
Field Temperature	deg C	12.7	12.1	12.4	12.6	13.1	11.2	12.4	13.8	12.6	13.5	12.4	12.83	11.5	11.42	11.2	13.3	11.7	13.1	11.7	12.6
Groundwater Elevation	feet	646.66	650.16	647.6	641.82	644.2	647.65	650.98	651.47	650.69	651.61	653.55	651.28	647.24	648.34	649.19	641.5	646.46	640.71	644.32	640.43
Oxygen, Dissolved	mg/L	0.09	0.16	0.06	0.08	0.13	0.37	0.12	0.17	0.11	0.03	0.66	0.36	0.26	1.07	0.16	0.09	0.36	0.21	0.7	0
Turbidity	NTU	8.56	77.74	20.33	2.34	3.71	36.7	40.55	241.4	40.38	28.27	72.1	42.6	413.6	18.1	100.1	7.7	9.32	19.6	14	0.79
pH at 25 Degrees C	Std. Units	7.4	7.4	7.2	7.2	7.4	7.3	--	--	7.3	7.2	7.2	7.2	7.1	7.2	7.1	7.4	7.3	7.3	7.3	7.3
Field Oxidation Potential	millivolts	-42.1	0.2	-34.8	-5	149.7	-58.5	-38	-45.5	-432.6	-81.6	-3.3	-27.5	-37.8	-7.8	-51.5	-71.1	-40.6	-8.1	28.1	4.9
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	290	280	300	250	260
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1.9	<1.9	<4.6	<4.6	<4.6	<4.6
Total Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	290	280	300	250	260
Iron, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1900	890	900	950	680	740
Magnesium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19000	18000	19000	18000	16000	18000
Manganese, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	660	660	640	600	610	750
Potassium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	670	670	750	740	690	720
Sodium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	170000	180000	180000	180000	180000	180000
Cobalt, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.2	--	--	--	--	--
Iron, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	590	690	660	680	590	710
Manganese, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	740	620	630	650	600	750



Appendix E

Statistical Evaluation

E1 LCL Evaluation for February 2022

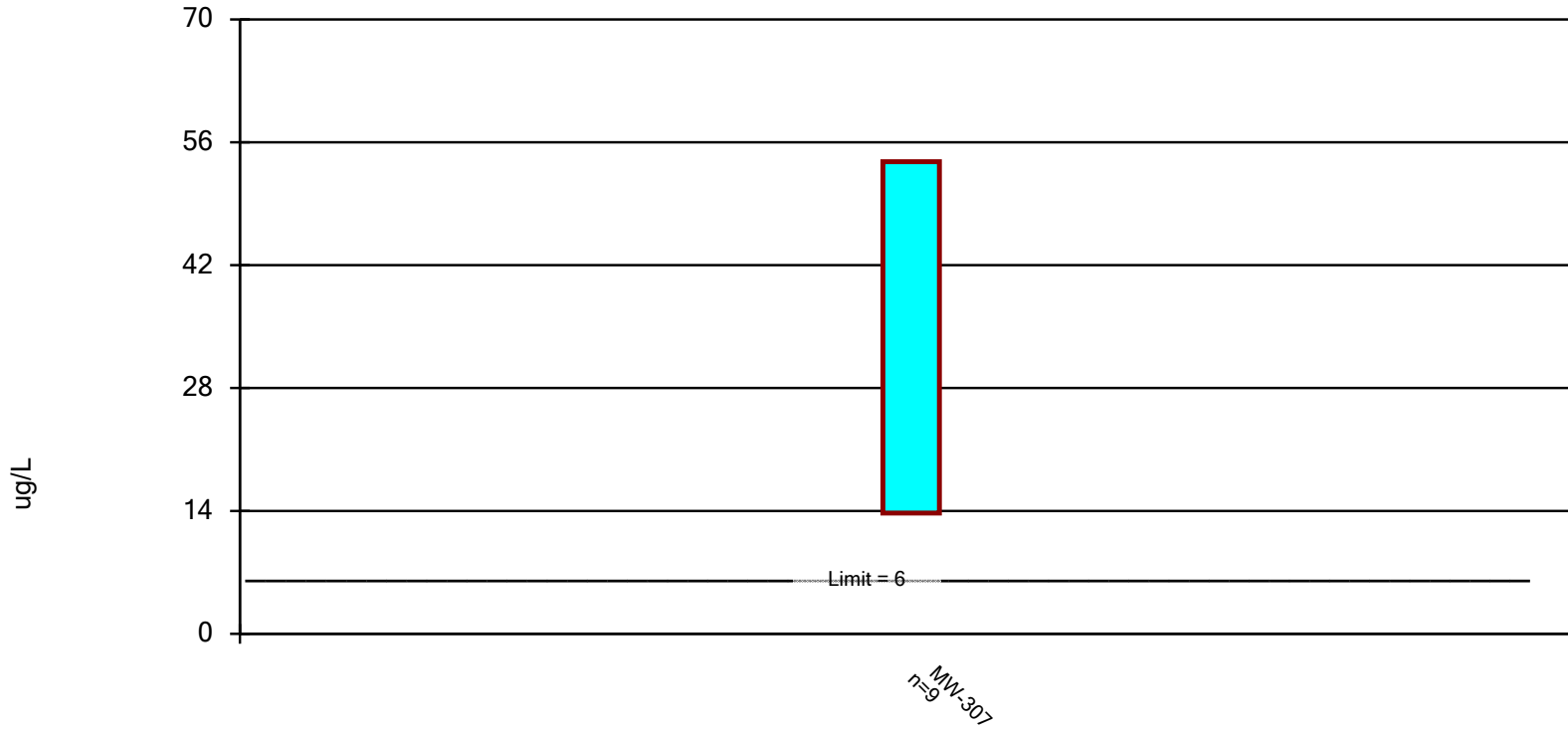
Confidence Interval

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122 Printed 4/29/2022, 11:15 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Cobalt (ug/L)	MW-307	53.79	13.76	6	Yes	9	0	None	No	0.01	Param.

Parametric Confidence Interval

Compliance limit is exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt Analysis Run 4/29/2022 11:14 AM View: OGS - ZLDP
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Confidence Interval

Constituent: Cobalt (ug/L) Analysis Run 4/29/2022 11:15 AM View: OGS - ZLDP
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-307
12/11/2019	11
2/5/2020	13
4/14/2020	20
10/7/2020	18
2/23/2021	64
4/14/2021	46
7/6/2021	60
10/7/2021	48
2/14/2022	24
Mean	33.78
Std. Dev.	20.73
Upper Lim.	53.79
Lower Lim.	13.76

E2 LCL Evaluation for April 2022

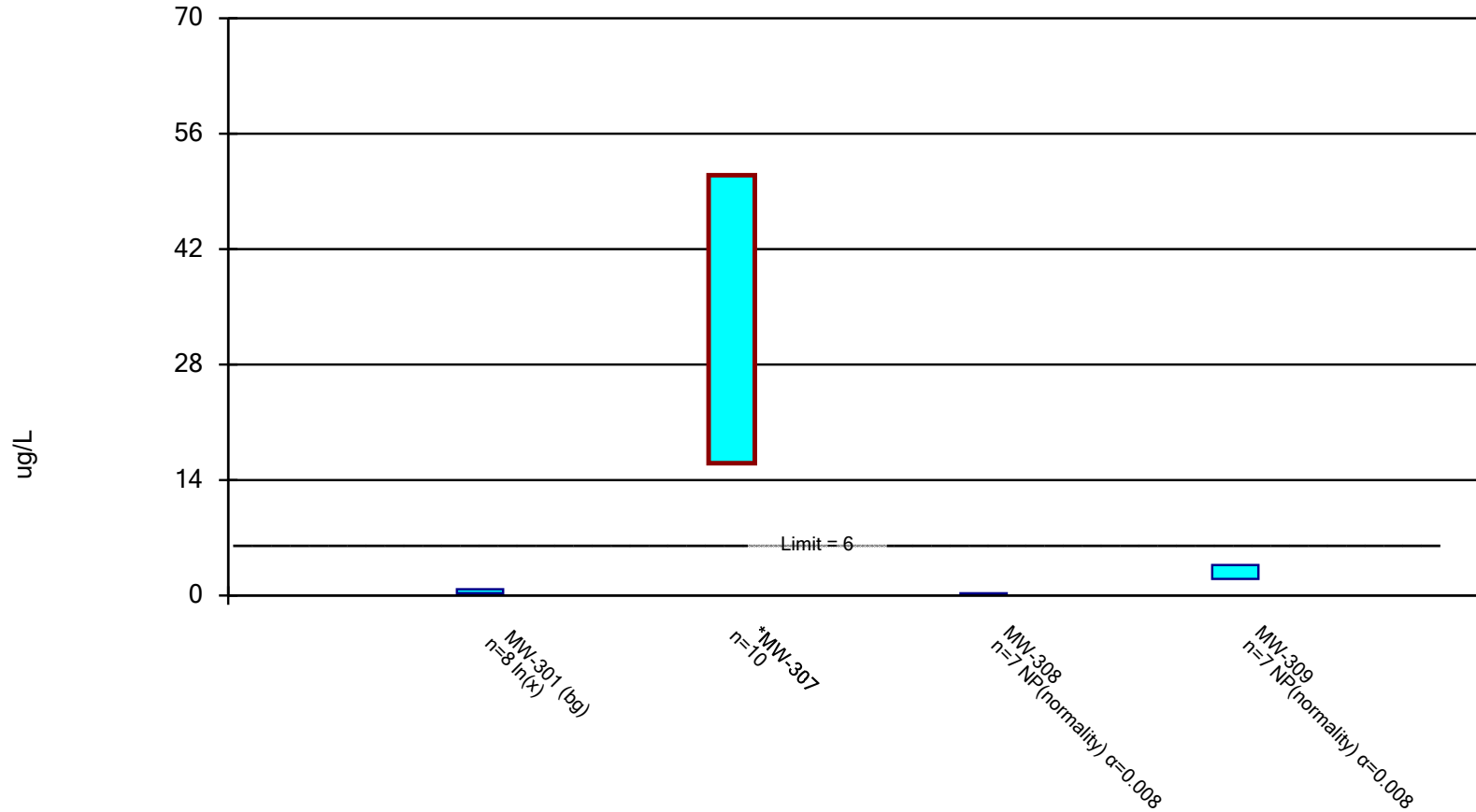
Confidence Interval

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122 Printed 7/18/2022, 10:32 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Cobalt (ug/L)	MW-301 (bg)	0.7553	0.2778	6	No	8	0	ln(x)	0.01	Param.
Cobalt (ug/L)	MW-307	50.95	16.05	6	Yes	10	0	No	0.01	Param.
Cobalt (ug/L)	MW-308	0.26	0.14	6	No	7	0	No	0.008	NP (normality)
Cobalt (ug/L)	MW-309	3.7	2	6	No	7	0	No	0.008	NP (normality)

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt Analysis Run 7/18/2022 10:31 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Confidence Interval

Constituent: Cobalt (ug/L) Analysis Run 7/18/2022 10:32 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-307	MW-308	MW-309
10/24/2019	0.6			
12/11/2019		11	0.26 (J)	3.7
2/5/2020	1.1	13	0.14 (J)	2.3
3/12/2020	0.43 (J)			
4/14/2020	0.52	20	0.14 (J)	3.2
10/7/2020		18	0.14 (J)	2
10/8/2020	0.41 (J)			
2/23/2021		64		
4/14/2021	0.29 (J)	46	0.16 (J)	2.3
7/6/2021		60		
10/7/2021	0.48 (J)	48	0.22 (J)	2
2/14/2022		24		
4/11/2022		31		
4/12/2022	0.23 (J)		0.24 (J)	
4/14/2022				2
Mean	0.5075	33.5	0.1857	2.5
Std. Dev.	0.2674	19.56	0.05255	0.6782
Upper Lim.	0.7553	50.95	0.26	3.7
Lower Lim.	0.2778	16.05	0.14	2

E3 LCL Evaluation for October 2022

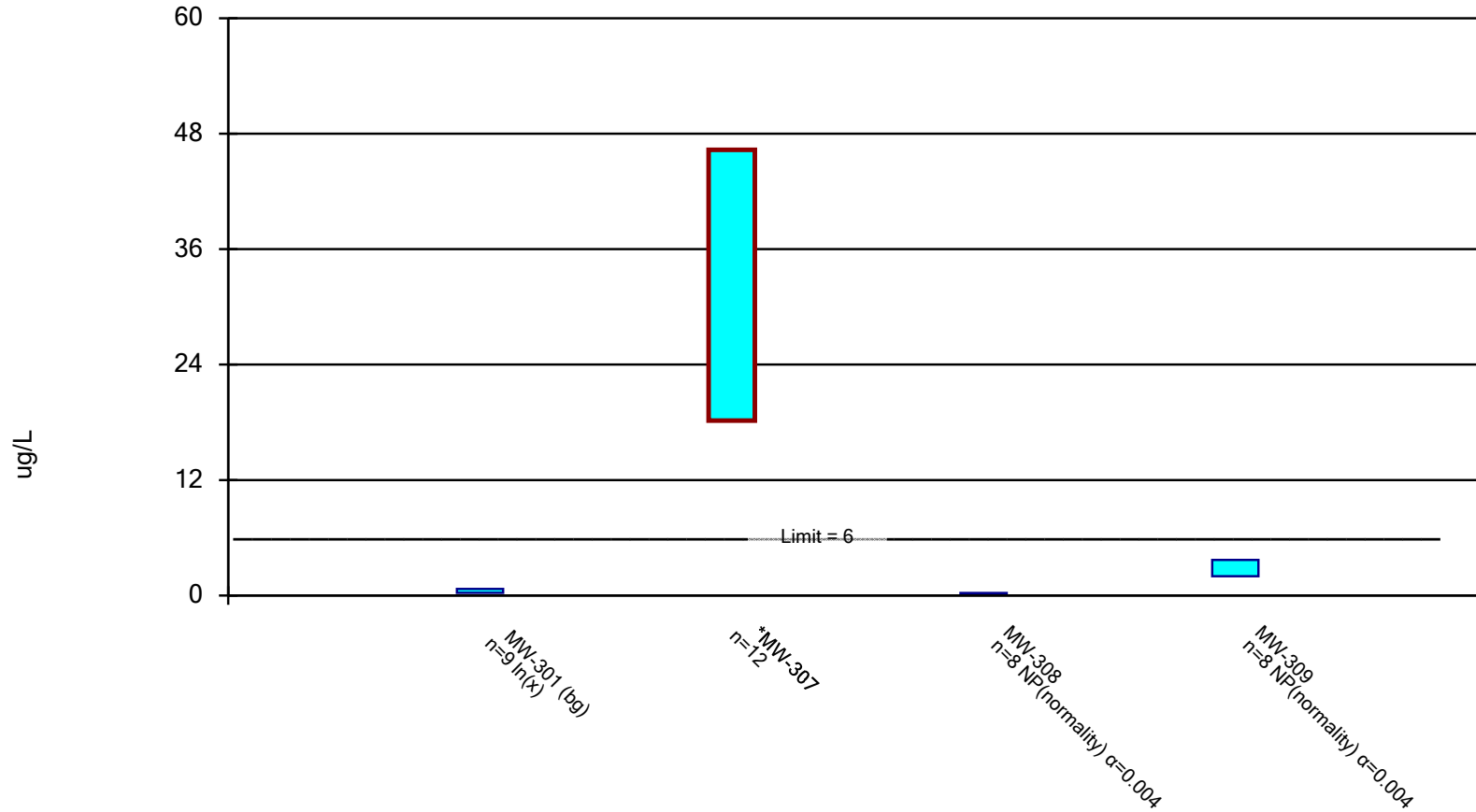
Confidence Interval

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122 Printed 11/21/2022, 12:20 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Cobalt (ug/L)	MW-301 (bg)	0.6833	0.2774	6	No	9	0	None	ln(x)	0.01	Param.
Cobalt (ug/L)	MW-307	46.33	18.17	6	Yes	12	0	None	No	0.01	Param.
Cobalt (ug/L)	MW-308	0.26	0.14	6	No	8	0	None	No	0.004	NP (normality)
Cobalt (ug/L)	MW-309	3.7	2	6	No	8	0	None	No	0.004	NP (normality)

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt Analysis Run 11/21/2022 12:19 PM View: OGS - ZLDP

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Confidence Interval

Constituent: Cobalt (ug/L) Analysis Run 11/21/2022 12:20 PM View: OGS - ZLDP
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-307	MW-308	MW-309
10/24/2019	0.6			
12/11/2019		11	0.26 (J)	3.7
2/5/2020	1.1	13	0.14 (J)	2.3
3/12/2020	0.43 (J)			
4/14/2020	0.52	20	0.14 (J)	3.2
10/7/2020		18	0.14 (J)	2
10/8/2020	0.41 (J)			
2/23/2021		64		
4/14/2021	0.29 (J)	46	0.16 (J)	2.3
7/6/2021		60		
10/7/2021	0.48 (J)	48	0.22 (J)	2
2/14/2022		24		
4/11/2022		31		
4/12/2022	0.23 (J)		0.24 (J)	
4/14/2022				2
8/25/2022		25		
10/25/2022		27		
10/26/2022	0.29 (J)		0.24 (J)	2.2
Mean	0.4833	32.25	0.1925	2.463
Std. Dev.	0.2604	17.94	0.0523	0.6368
Upper Lim.	0.6833	46.33	0.26	3.7
Lower Lim.	0.2774	18.17	0.14	2

E4 Background Update – UPL Update and Tolerance Limit Calculation

August 10, 2022
File No. 25222072.00

TECHNICAL MEMORANDUM

SUBJECT: Statistical Evaluation of Groundwater Monitoring Results – UPL Update and Tolerance Limit Calculation - Ottumwa Generating Station Zero Liquid Discharge Pond

PREPARED BY: Nicole Kron

CHECKED BY: Sherren Clark

STATISTICAL METHOD

For comparison to background, groundwater monitoring data for the Zero Liquid Discharge Pond (ZLDP) monitoring system at the Ottumwa Generating Station (OGS) are evaluated in accordance with 40 CFR 257.93(f)(3), using a prediction interval or tolerance interval procedure, in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each compliance well is compared to the upper prediction limit (UPL) or upper tolerance limit (UTL).

For assessment monitoring parameters, groundwater monitoring data is also evaluated by comparing the lower confidence limit (LCL) for the arithmetic mean of the monitoring results to the Groundwater Protection Standard (GPS) established in accordance with 40 CFR 257.95(h).

Statistical evaluation is performed using commercially available software (*Sanitas for Groundwater*® or similar) in general accordance with the USEPA's *Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities* dated March 2009 (Unified Guidance) (USEPA, 2009) and generally accepted procedures.

The OGS ZLDP monitoring data include one upgradient/background monitoring well, MW-301, and three compliance monitoring wells.

The initial UPLs were calculated based on eight rounds of background monitoring performed prior to the initiation of compliance monitoring for the OGS Ash Pond, from April 2016 through August 2017. Since then, additional rounds of monitoring for Appendix III and IV parameters have been performed at the background well. As part of the evaluation of the 2022 monitoring results, the background data set for the UPL/UTL calculations is being updated to include data from the background well collected through April 2022. This memo addresses updated UPLs for Appendix III and UTLs for Appendix IV parameters.

Because the site is already in assessment monitoring and in the process of selecting a remedy, the purposes of the UPL/UTL analysis are to provide a basis for comparison of downgradient water quality to background and to establish a GPS for any parameter where background water quality exceeds the GPS values in 40 CFR 257.95(h)(1) and (2).



TIME SERIES PLOTS

Time series plots are prepared for the monitoring parameters to show concentration variations over time. Time series graphs for background well MW-301 are included in **Attachment 1**. In the graphs, non-detect values are shown with hollow symbols, while detected values have solid symbols. For some Appendix IV parameters, many or all background results are non-detect, but detection limits may have increased or decreased since the earliest data were collected.

OUTLIER ANALYSIS - INTERWELL

For interwell analysis, an outlier evaluation is performed for background monitoring results at the upgradient well(s). A statistical outlier is a value that is extremely different from the other values in the data set. The Sanitas outlier tests identify data points that do not appear to fit the distribution of the rest of the data set and determine if they differ significantly from the rest of the data. The outlier analysis performed in Sanitas includes the following steps:

1. Run normality test (Shapiro Wilk/Francia).
2. If normally distributed, run USEPA's 1989 Outlier Test to identify suspected outliers.
 - a) If number of background samples is less than or equal to 25, run Dixon's test for suspected outliers.
 - b) If number of background samples is more than 25, run Rosner's test for suspected outliers.
3. If not normally distributed, run Tukey's test for outliers.
4. Review data flagged as possible outliers to evaluate whether they should be removed from the background data set. Also review time series plots for possible outliers that were not picked up in the statistical evaluation (e.g., outlier test may not identify outliers when two values are similar to each other, but very different from all other data).

Results identified as statistical outliers are checked for possible lab instrument failure, field collection problems, or data entry errors; however, outliers may exist naturally in the data if there is an extremely wide inherent or temporal variability in the data. The Unified Guidance states that unless a likely error can be identified, the outlier should not be removed.

For the evaluation of interwell background data collected through the April 2022 sampling event, the following background values were identified by Sanitas as potential outliers and handled as described:

- **Field pH, MW-301, January 8, 2019.** One low result from the January 2019 event was flagged as a statistical outlier. This result was not removed from the dataset because it appears to be within the range of potential natural variability for background. The other field pH results obtained on the same day were not similarly low; therefore, the low result for MW-301 does not appear to represent a low bias due to instrument or calibration error.
- **Sulfate, MW-301, April 8, 2019.** One low result from the April 2019 event was flagged as a statistical outlier. This result was not removed from the dataset because it appears to be within the range of potential natural variability for background.

Outlier analysis results are included in **Attachment 2**.

BACKGROUND UPDATE

The background data pool was updated in accordance with the Unified Guidance, which recommends updating background every 2 to 3 years for semiannual sampling. Prior to expanding the data pool, the original background data set (April 2016 through August 2017) and the data to be added (November 2017 through April 2022) were compared. The Unified Guidance states that recently collected measurements from the background wells can be added to the existing pool if a Student's t-test or Wilcoxon rank-sum test finds no significant difference between the two groups at the 1 percent level of significance.

The Sanitas background group comparison for the OGS background data sets, included in **Attachment 3**, indicated no significant difference at the 1 percent level, except for antimony, arsenic, beryllium, and mercury, where most results were non-detect and the shift reflected a change in detection limits. Based on these results, the more recent data can be added to the background pool. The comparison uses Welch's t-test for normally distributed data and the Mann-Whitney test for non-normal data.

INTERWELL PREDICTION LIMITS

Interwell prediction limits for Appendix III parameters are calculated using background data from the upgradient monitoring well (MW-301) for each monitored constituent, with outliers removed as noted above. During this evaluation of compliance monitoring, groundwater results from April 2016 through April 2022 were included to calculate the interwell prediction limits. The prediction limit analysis performed in Sanitas includes the following steps:

1. If 100 percent of the background values are non-detect, the Double Quantification rule applies and no prediction limit is calculated.
2. If more than 50 percent of results are non-detect, then a non-parametric prediction limit is calculated.
3. If 50 percent or fewer of the results are non-detect, run normality test (Shapiro Wilk/Francia) to assess whether the data fit a normal distribution or can be transformed to fit a normal distribution (e.g., lognormal).
4. If normal or transformed normal, calculate parametric prediction limit.
5. If not normal or transformed normal, calculate non-parametric prediction limit.

Consistent with the Unified Guidance, parametric prediction limits are calculated based on a 1-of-2 retesting protocol and a 10 percent site-wide false positive rate. Sanitas establishes the per-test significance level based on user inputs of the number of events per year, number of constituents being evaluated, and number of compliance wells. For this update, the following values were used:

Parameter	Value	Comments
Evaluations per year	2	Spring and Fall events
Constituents analyzed	7	Total of seven Appendix III constituents analyzed, all constituents detected at least once
Compliance wells	3	Three compliance wells at waste boundary

Non-parametric prediction limits are also based on a 1-of-2 retesting protocol.

For results with 100 percent non-detects in the background data, evaluation under the Double Quantification Rule means that a statistically significant increase (SSI) has not occurred for a compliance well unless two sample results from the well exceed the laboratory’s reporting limit or quantification limit. All of the constituents were detected at least one in the background wells; therefore, UPLs were calculated for all. Although UPLs were calculated for constituents with a high proportion of non-detects, a future result will not be identified as an SSI unless two sample results exceed both the UPL and the reporting limit or quantification limit.

For evaluation of parameters with less than 100 percent non-detects in the background sampling, the non-detects were adjusted using the Kaplan-Meier technique, unless the non-detects represent less than 15 percent of the total samples, in which case one-half of the detection limit was used.

Interwell prediction limit analysis results are included in **Attachment 4**.

INTERWELL TOLERANCE LIMITS

Interwell tolerance limits for Appendix IV parameters are calculated using background data from the upgradient monitoring well (MW-301) for each monitored constituent, with outliers removed as noted above. During this evaluation of compliance monitoring, groundwater results from April 2016 through April 2022 were included to calculate the interwell tolerance limits. The tolerance limit analysis was performed in Sanitas, including the same five steps listed above. Management of non-detect results in the background data was also the same as described above for prediction limits. As recommended in the Unified Guidance, the UTL was calculated with 95 percent confidence and 95 percent coverage.

Interwell tolerance limits analysis results are included in **Attachment 5**.

NDK/AJR/SCC

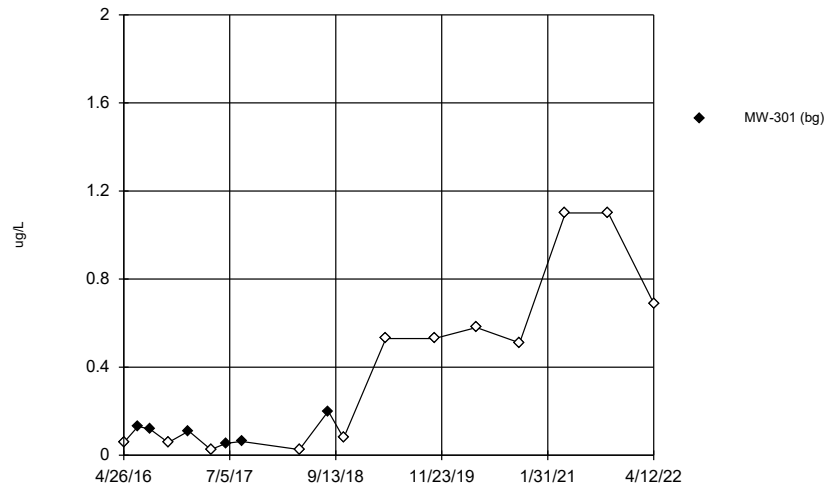
Encl. Attachments 1 through 5

I:\25222072.00\Data and Calculations\Sanitas\2021 OGS ZLDP UPLs and TLs\220810_OGS ZLDP - CCR Stats Memo.docx

Attachment 1

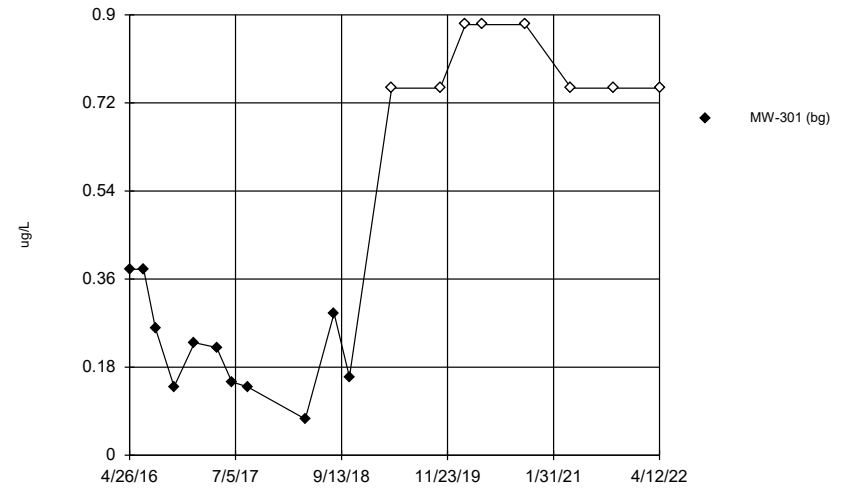
Times Series Graphs

Antimony



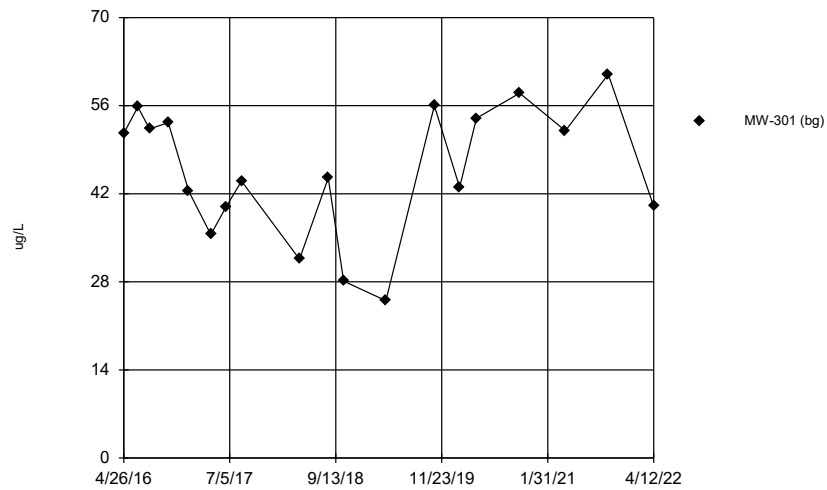
Time Series Analysis Run 6/27/2022 11:47 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Arsenic



Time Series Analysis Run 6/27/2022 11:47 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Barium



Time Series

Constituent: Antimony (ug/L) Analysis Run 6/27/2022 11:48 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	<0.058 (U)
6/23/2016	0.13 (J)
8/10/2016	0.12 (J)
10/26/2016	<0.058 (U)
1/18/2017	0.11 (J)
4/19/2017	<0.026 (U)
6/20/2017	0.054 (J)
8/23/2017	0.063 (J)
4/18/2018	<0.026 (U)
8/14/2018	0.2 (J)
10/16/2018	<0.078 (U)
4/8/2019	<0.53 (U)
10/24/2019	<0.53 (U)
4/14/2020	<0.58 (U)
10/8/2020	<0.51 (U)
4/14/2021	<1.1 (U)
10/7/2021	<1.1 (U)
4/12/2022	<0.69 (U)

Time Series

Constituent: Arsenic (ug/L) Analysis Run 6/27/2022 11:48 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	0.38 (J)
6/23/2016	0.38 (J)
8/10/2016	0.26 (J)
10/26/2016	0.14 (J)
1/18/2017	0.23 (J)
4/19/2017	0.22 (J)
6/20/2017	0.15 (J)
8/23/2017	0.14 (J)
4/18/2018	0.074 (J)
8/14/2018	0.29 (J)
10/16/2018	0.16 (J)
4/8/2019	<0.75 (U)
10/24/2019	<0.75 (U)
2/5/2020	<0.88 (U)
4/14/2020	<0.88 (U)
10/8/2020	<0.88 (U)
4/14/2021	<0.75 (U)
10/7/2021	<0.75 (U)
4/12/2022	<0.75 (U)

Time Series

Constituent: Barium (ug/L) Analysis Run 6/27/2022 11:48 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

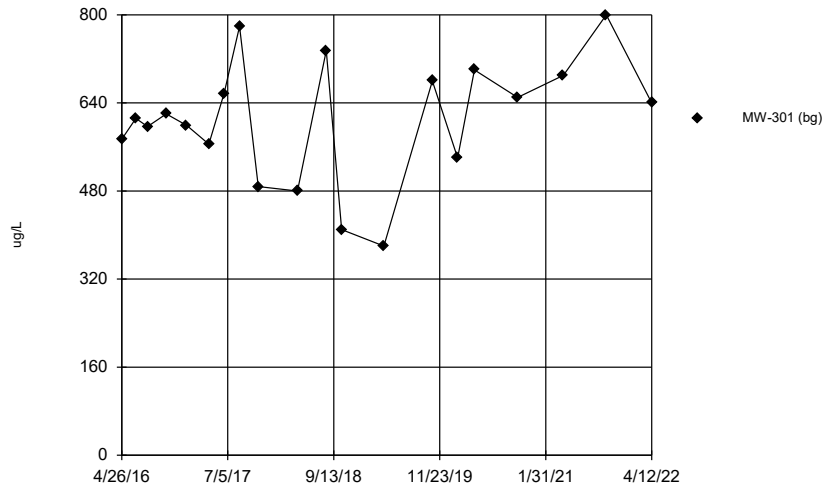
	MW-301 (bg)
4/26/2016	51.6
6/23/2016	55.8
8/10/2016	52.3
10/26/2016	53.3
1/18/2017	42.4
4/19/2017	35.5
6/20/2017	39.9
8/23/2017	44
4/18/2018	31.6
8/14/2018	44.5
10/16/2018	28.1
4/8/2019	25
10/24/2019	56
2/5/2020	43
4/14/2020	54
10/8/2020	58
4/14/2021	52
10/7/2021	61
4/12/2022	40

Time Series

Constituent: Beryllium (ug/L) Analysis Run 6/27/2022 11:48 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	<0.08 (U)
6/23/2016	<0.08 (U)
8/10/2016	<0.08 (U)
10/26/2016	<0.08 (U)
1/18/2017	<0.08 (U)
4/19/2017	<0.012 (U)
6/20/2017	<0.012 (U)
8/23/2017	<0.012 (U)
4/18/2018	<0.012 (U)
8/14/2018	0.14 (J)
10/16/2018	<0.089 (U)
4/8/2019	<0.27 (U)
10/24/2019	<0.27 (U)
4/14/2020	<0.27 (U)
4/14/2021	<0.27 (U)
10/7/2021	<0.27 (U)
4/12/2022	<0.27 (U)

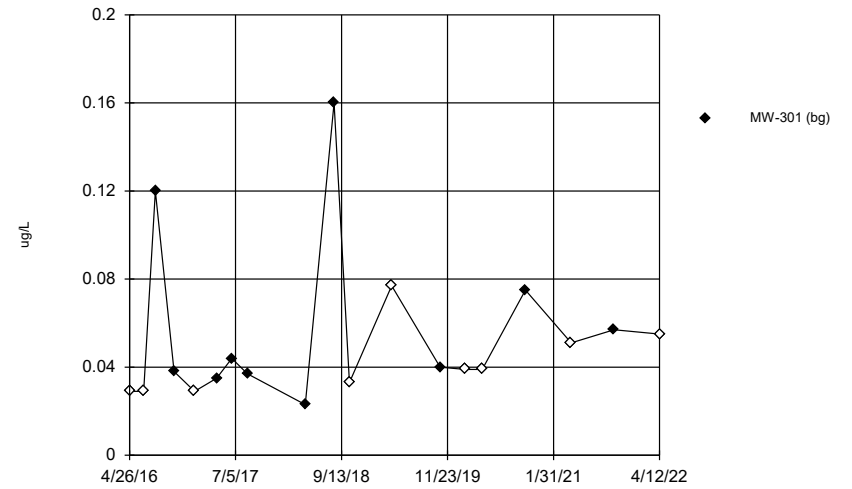
Boron



Time Series Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

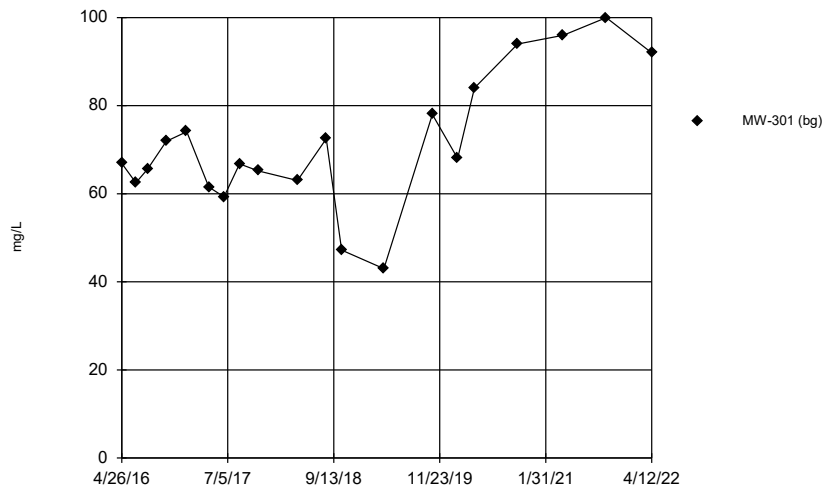
Cadmium



Time Series Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

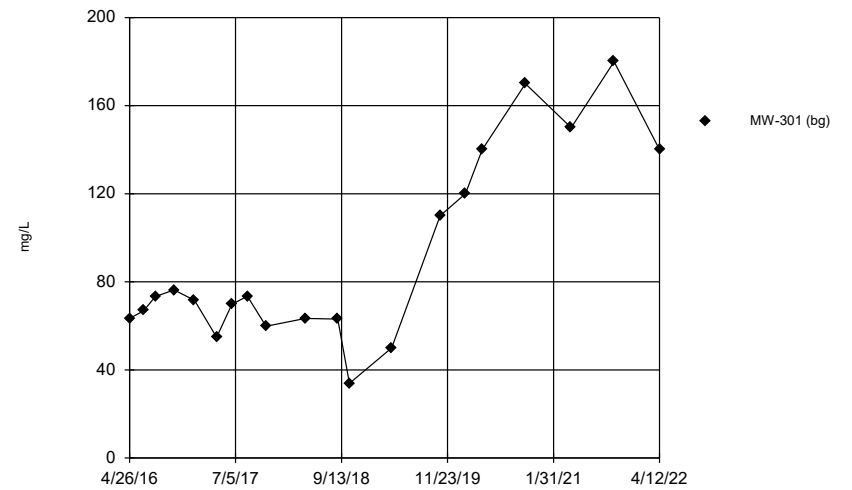
Calcium



Time Series Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Chloride



Time Series Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Time Series

Constituent: Boron (ug/L) Analysis Run 6/27/2022 11:48 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	574
6/23/2016	612
8/10/2016	597
10/26/2016	620
1/18/2017	599
4/19/2017	565
6/20/2017	657
8/23/2017	779
11/8/2017	488
4/18/2018	480
8/14/2018	735
10/16/2018	410
4/8/2019	380
10/24/2019	680
2/5/2020	540
4/14/2020	700
10/8/2020	650
4/14/2021	690
10/7/2021	800
4/12/2022	640

Time Series

Constituent: Cadmium (ug/L) Analysis Run 6/27/2022 11:48 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	<0.029 (U)
6/23/2016	<0.029 (U)
8/10/2016	0.12 (J)
10/26/2016	0.038 (J)
1/18/2017	<0.029 (U)
4/19/2017	0.035 (J)
6/20/2017	0.044 (J)
8/23/2017	0.037 (J)
4/18/2018	0.023 (J)
8/14/2018	0.16 (J)
10/16/2018	<0.033 (U)
4/8/2019	<0.077 (U)
10/24/2019	0.04 (J)
2/5/2020	<0.039 (U)
4/14/2020	<0.039 (U)
10/8/2020	0.075 (J)
4/14/2021	<0.051 (U)
10/7/2021	0.057 (J)
4/12/2022	<0.055 (U)

Time Series

Constituent: Calcium (mg/L) Analysis Run 6/27/2022 11:48 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	66.9
6/23/2016	62.5
8/10/2016	65.6
10/26/2016	71.9
1/18/2017	74.1
4/19/2017	61.5
6/20/2017	59.3
8/23/2017	66.8
11/8/2017	65.2
4/18/2018	63
8/14/2018	72.5
10/16/2018	47.2
4/8/2019	43
10/24/2019	78
2/5/2020	68
4/14/2020	84
10/8/2020	94
4/14/2021	96
10/7/2021	100
4/12/2022	92

Time Series

Constituent: Chloride (mg/L) Analysis Run 6/27/2022 11:48 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	63.4
6/23/2016	66.9
8/10/2016	73.3
10/26/2016	76.3
1/18/2017	71.6
4/19/2017	54.8
6/20/2017	69.8
8/23/2017	73.5
11/8/2017	59.8
4/18/2018	63.4
8/29/2018	63.1
10/16/2018	33.9
4/8/2019	50
10/24/2019	110
2/5/2020	120
4/14/2020	140
10/8/2020	170
4/14/2021	150
10/7/2021	180
4/12/2022	140

Time Series

Constituent: Chromium (ug/L) Analysis Run 6/27/2022 11:48 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	0.59 (J)
6/23/2016	0.74 (J)
8/10/2016	0.64 (J)
10/26/2016	<0.34 (U)
1/18/2017	0.59 (J)
4/19/2017	0.49 (J)
6/20/2017	0.25 (J)
8/23/2017	0.39 (J)
4/18/2018	<0.054 (U)
8/14/2018	0.25 (J)
10/16/2018	0.11 (J)
4/8/2019	<0.98 (U)
10/24/2019	<0.98 (U)
2/5/2020	<1.1 (U)
4/14/2020	<1.1 (U)
10/8/2020	<1.1 (U)
4/14/2021	<1.1 (U)
10/7/2021	<1.1 (U)
4/12/2022	<1.1 (U)

Time Series

Constituent: Cobalt (ug/L) Analysis Run 6/27/2022 11:48 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	4.1
6/23/2016	3.1
8/10/2016	1.8
10/26/2016	1.8
1/18/2017	1.3
4/19/2017	0.97 (J)
6/20/2017	1 (J)
8/23/2017	0.96 (J)
4/18/2018	0.46 (J)
8/14/2018	1.4
10/16/2018	0.36 (J)
4/8/2019	0.44 (J)
10/24/2019	0.6
2/5/2020	1.1
3/12/2020	0.43 (J)
4/14/2020	0.52
10/8/2020	0.41 (J)
4/14/2021	0.29 (J)
10/7/2021	0.48 (J)
4/12/2022	0.23 (J)

Time Series

Constituent: Field pH (Std. Units) Analysis Run 6/27/2022 11:48 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	6.54
6/23/2016	6.06
8/10/2016	6.08
10/26/2016	6.26
1/18/2017	6.47
4/19/2017	6.64
6/20/2017	6.31
8/23/2017	6.16
11/8/2017	6.41
4/18/2018	6.41
8/14/2018	6.26
8/29/2018	6.31
10/16/2018	6.27
1/8/2019	5.68
4/8/2019	6.61
10/24/2019	6.33
2/5/2020	6.39
3/12/2020	6.48
4/14/2020	6.58
10/8/2020	6.22
4/14/2021	6.26
10/7/2021	6.26
4/12/2022	6.37

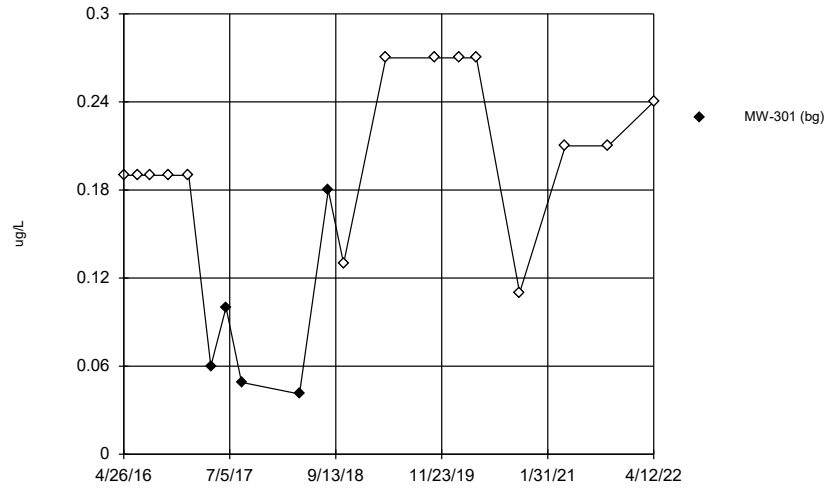
Time Series

Constituent: Fluoride (mg/L) Analysis Run 6/27/2022 11:48 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

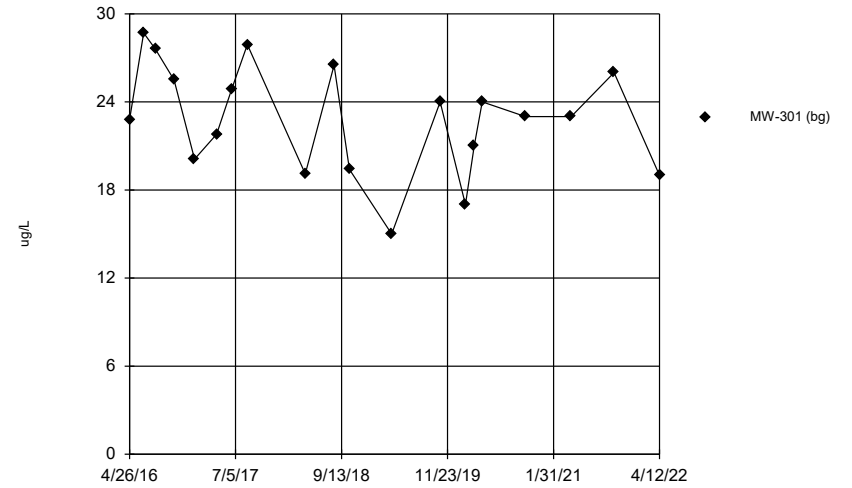
	MW-301 (bg)
4/26/2016	0.22
6/23/2016	0.2 (J)
8/10/2016	0.44
10/26/2016	0.27
1/18/2017	0.17 (J)
4/19/2017	0.24
6/20/2017	0.26
8/23/2017	0.34
11/8/2017	0.27
4/18/2018	0.22
8/29/2018	0.27
10/16/2018	0.3
4/8/2019	0.44 (J)
10/24/2019	<0.23 (U)
4/14/2020	<0.23 (U)
10/8/2020	<0.23 (U)
4/14/2021	<0.28 (U)
10/7/2021	<0.28 (U)
4/12/2022	<0.22 (U)

Lead



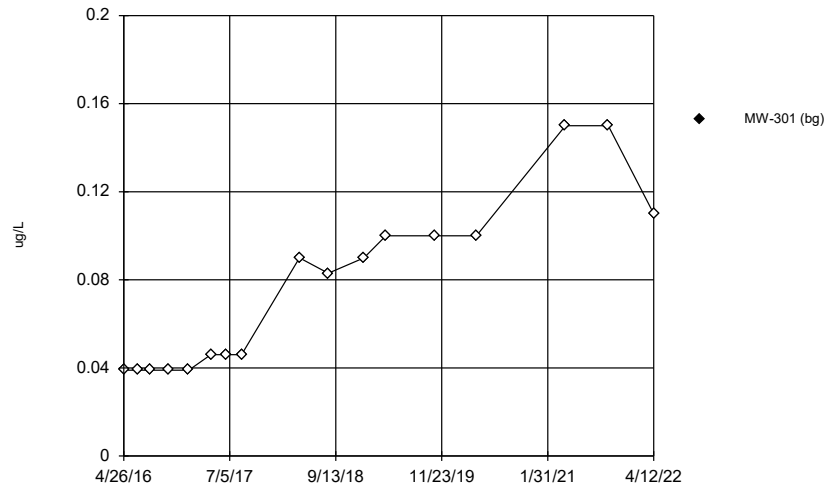
Time Series Analysis Run 6/27/2022 11:48 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Lithium



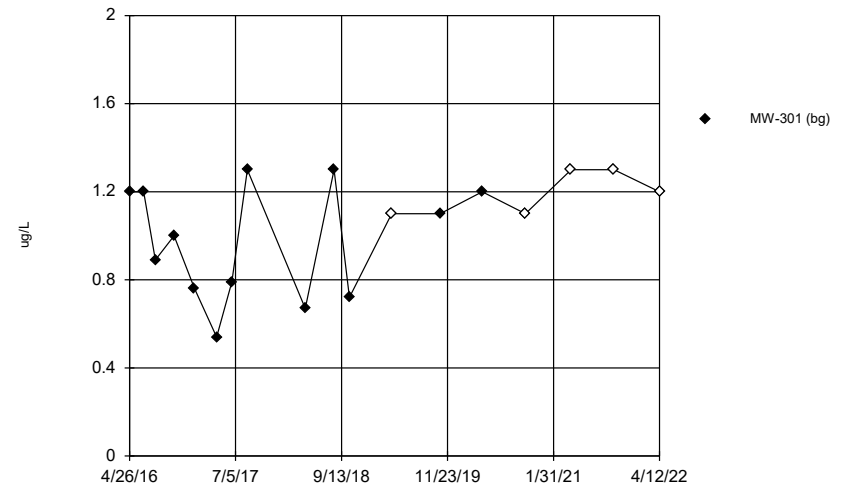
Time Series Analysis Run 6/27/2022 11:48 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Mercury



Time Series Analysis Run 6/27/2022 11:48 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Molybdenum



Time Series Analysis Run 6/27/2022 11:48 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Time Series

Constituent: Lead (ug/L) Analysis Run 6/27/2022 11:48 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	<0.19 (U)
6/23/2016	<0.19 (U)
8/10/2016	<0.19 (U)
10/26/2016	<0.19 (U)
1/18/2017	<0.19 (U)
4/19/2017	0.06 (J)
6/20/2017	0.1 (J)
8/23/2017	0.049 (J)
4/18/2018	0.041 (J)
8/14/2018	0.18 (J)
10/16/2018	<0.13 (U)
4/8/2019	<0.27 (U)
10/24/2019	<0.27 (U)
2/5/2020	<0.27 (U)
4/14/2020	<0.27 (U)
10/8/2020	<0.11 (U)
4/14/2021	<0.21 (U)
10/7/2021	<0.21 (U)
4/12/2022	<0.24 (U)

Time Series

Constituent: Lithium (ug/L) Analysis Run 6/27/2022 11:48 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	22.8
6/23/2016	28.7
8/10/2016	27.6
10/26/2016	25.5
1/18/2017	20.1
4/19/2017	21.8
6/20/2017	24.9
8/23/2017	27.9
4/18/2018	19.1
8/14/2018	26.5
10/16/2018	19.4
4/8/2019	15
10/24/2019	24
2/5/2020	17
3/12/2020	21
4/14/2020	24
10/8/2020	23
4/14/2021	23
10/7/2021	26
4/12/2022	19

Time Series

Constituent: Mercury (ug/L) Analysis Run 6/27/2022 11:48 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

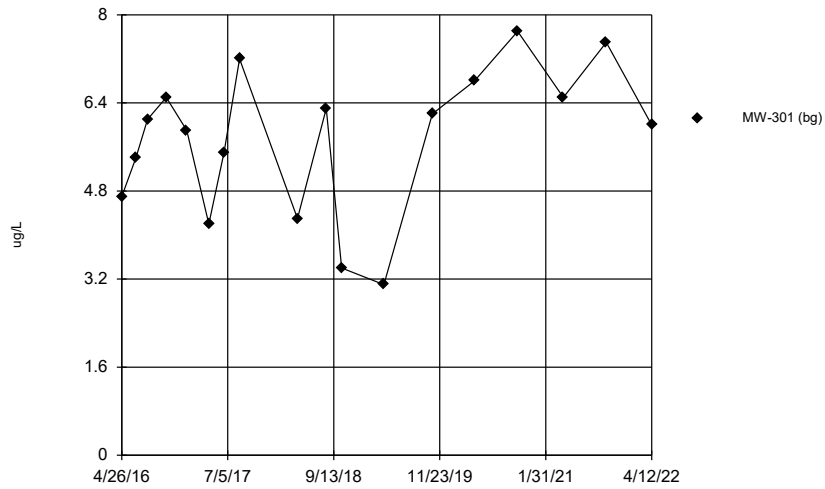
	MW-301 (bg)
4/26/2016	<0.039 (U)
6/23/2016	<0.039 (U)
8/10/2016	<0.039 (U)
10/26/2016	<0.039 (U)
1/18/2017	<0.039 (U)
4/19/2017	<0.046 (U)
6/20/2017	<0.046 (U)
8/23/2017	<0.046 (U)
4/18/2018	<0.09 (U)
8/14/2018	<0.083 (U)
1/8/2019	<0.09 (U)
4/8/2019	<0.1 (U)
10/24/2019	<0.1 (U)
4/14/2020	<0.1 (U)
4/14/2021	<0.15 (U)
10/7/2021	<0.15 (U)
4/12/2022	<0.11 (U)

Time Series

Constituent: Molybdenum (ug/L) Analysis Run 6/27/2022 11:48 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

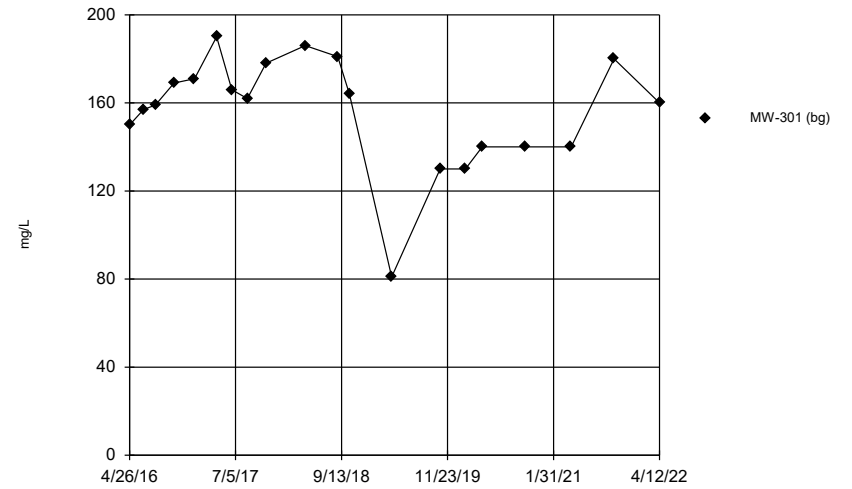
	MW-301 (bg)
4/26/2016	1.2
6/23/2016	1.2
8/10/2016	0.89 (J)
10/26/2016	1
1/18/2017	0.76 (J)
4/19/2017	0.54 (J)
6/20/2017	0.79 (J)
8/23/2017	1.3
4/18/2018	0.67 (J)
8/14/2018	1.3
10/16/2018	0.72 (J)
4/8/2019	<1.1 (U)
10/24/2019	1.1 (J)
4/14/2020	1.2 (J)
10/8/2020	<1.1 (U)
4/14/2021	<1.3 (U)
10/7/2021	<1.3 (U)
4/12/2022	<1.2 (U)

Selenium



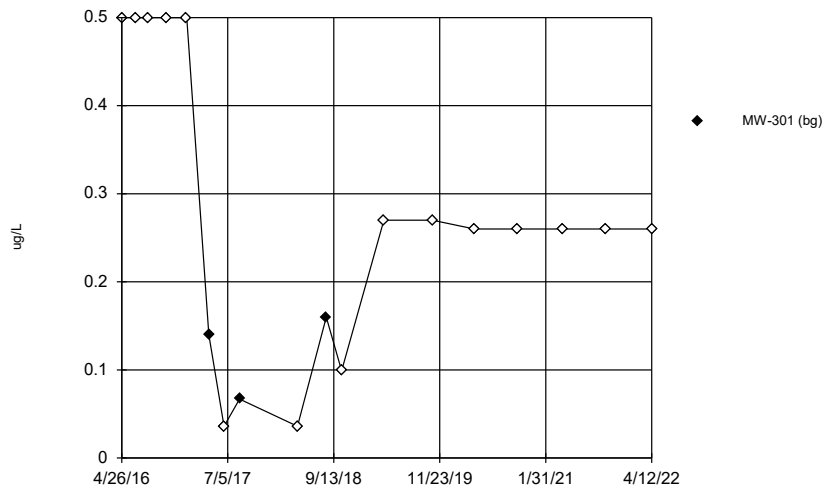
Time Series Analysis Run 6/27/2022 11:48 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Sulfate



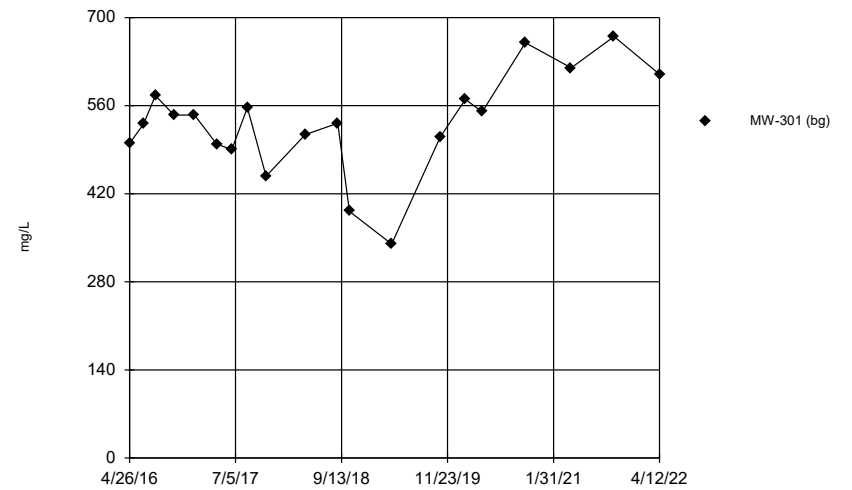
Time Series Analysis Run 6/27/2022 11:48 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Thallium



Time Series Analysis Run 6/27/2022 11:48 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Total Dissolved Solids



Time Series

Constituent: Selenium (ug/L) Analysis Run 6/27/2022 11:48 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	4.7
6/23/2016	5.4
8/10/2016	6.1
10/26/2016	6.5
1/18/2017	5.9
4/19/2017	4.2
6/20/2017	5.5
8/23/2017	7.2
4/18/2018	4.3
8/14/2018	6.3
10/16/2018	3.4
4/8/2019	3.1 (J)
10/24/2019	6.2
4/14/2020	6.8
10/8/2020	7.7
4/14/2021	6.5
10/7/2021	7.5
4/12/2022	6

Time Series

Constituent: Sulfate (mg/L) Analysis Run 6/27/2022 11:48 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	150
6/23/2016	157
8/10/2016	159
10/26/2016	169
1/18/2017	171
4/19/2017	190
6/20/2017	166
8/23/2017	162
11/8/2017	178
4/18/2018	186
8/29/2018	181
10/16/2018	164
4/8/2019	81
10/24/2019	130
2/5/2020	130
4/14/2020	140
10/8/2020	140
4/14/2021	140
10/7/2021	180
4/12/2022	160

Time Series

Constituent: Thallium (ug/L) Analysis Run 6/27/2022 11:48 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

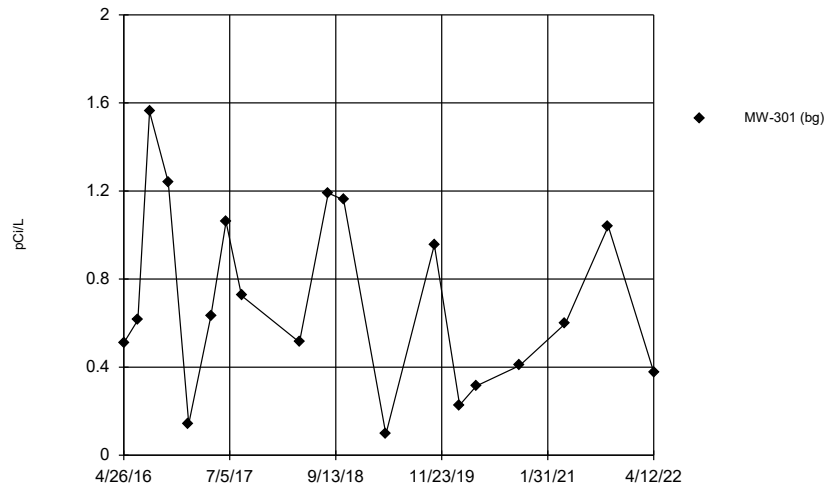
	MW-301 (bg)
4/26/2016	<0.5 (U)
6/23/2016	<0.5 (U)
8/10/2016	<0.5 (U)
10/26/2016	<0.5 (U)
1/18/2017	<0.5 (U)
4/19/2017	0.14 (J)
6/20/2017	<0.036 (U)
8/23/2017	0.067 (J)
4/18/2018	<0.036 (U)
8/14/2018	0.16 (J)
10/16/2018	<0.099 (U)
4/8/2019	<0.27 (U)
10/24/2019	<0.27 (U)
4/14/2020	<0.26 (U)
10/8/2020	<0.26 (U)
4/14/2021	<0.26 (U)
10/7/2021	<0.26 (U)
4/12/2022	<0.26 (U)

Time Series

Constituent: Total Dissolved Solids (mg/L) Analysis Run 6/27/2022 11:48 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	500
6/23/2016	531
8/10/2016	576
10/26/2016	545
1/18/2017	545
4/19/2017	499
6/20/2017	490
8/23/2017	557
11/8/2017	448
4/18/2018	514
8/29/2018	532
10/16/2018	392
4/8/2019	340
10/24/2019	510
2/5/2020	570
4/14/2020	550
10/8/2020	660
4/14/2021	620
10/7/2021	670
4/12/2022	610

Total Radium



Time Series Analysis Run 6/27/2022 11:48 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Time Series

Constituent: Total Radium (pCi/L) Analysis Run 6/27/2022 11:48 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	0.51
6/23/2016	0.614
8/10/2016	1.56
10/26/2016	1.24
1/18/2017	0.143
4/19/2017	0.631
6/20/2017	1.06
8/23/2017	0.725
4/18/2018	0.513
8/14/2018	1.19
10/16/2018	1.16
4/8/2019	0.0956
10/24/2019	0.956
2/5/2020	0.228
4/14/2020	0.315
10/8/2020	0.407
4/14/2021	0.598
10/7/2021	1.04
4/12/2022	0.378

Attachment 2

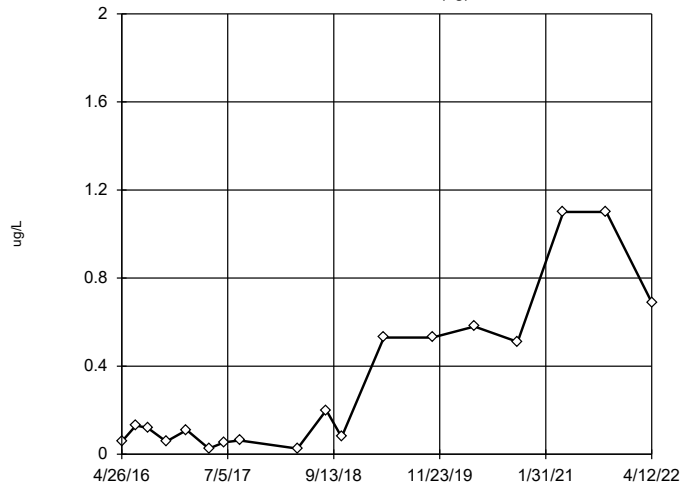
Outlier Analysis

Outlier Analysis

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122 Printed 6/27/2022, 11:47 AM

<u>Constituent</u>	<u>Well</u>	<u>Outlier</u>	<u>Value(s)</u>	<u>Date(s)</u>	<u>Method</u>	<u>Alpha</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
Antimony (ug/L)	MW-301 (bg)	No	n/a	n/a	NP (nrm)	NaN	18	0.3313	0.3584	unknown	ShapiroWilk
Arsenic (ug/L)	MW-301 (bg)	No	n/a	n/a	NP (nrm)	NaN	19	0.4639	0.3056	unknown	ShapiroWilk
Barium (ug/L)	MW-301 (bg)	No	n/a	n/a	EPA 1989	0.05	19	45.68	10.46	normal	ShapiroWilk
Beryllium (ug/L)	MW-301 (bg)	No	n/a	n/a	NP (nrm)	NaN	17	0.1351	0.1081	unknown	ShapiroWilk
Boron (ug/L)	MW-301 (bg)	No	n/a	n/a	EPA 1989	0.05	20	609.8	111.8	normal	ShapiroWilk
Cadmium (ug/L)	MW-301 (bg)	No	n/a	n/a	NP (nrm)	NaN	19	0.05316	0.03456	unknown	ShapiroWilk
Calcium (mg/L)	MW-301 (bg)	No	n/a	n/a	EPA 1989	0.05	20	71.58	15.36	normal	ShapiroWilk
Chloride (mg/L)	MW-301 (bg)	No	n/a	n/a	EPA 1989	0.05	20	91.49	43.17	ln(x)	ShapiroWilk
Chromium (ug/L)	MW-301 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	19	0.6844	0.3787	unknown	ShapiroWilk
Cobalt (ug/L)	MW-301 (bg)	No	n/a	n/a	EPA 1989	0.05	20	1.088	0.9962	ln(x)	ShapiroWilk
Field pH (Std. Units)	MW-301 (bg)	Yes	5.68	1/8/2019	Dixon`s	0.05	23	6.32	0.2091	normal	ShapiroWilk
Fluoride (mg/L)	MW-301 (bg)	No	n/a	n/a	EPA 1989	0.05	19	0.2689	0.07148	ln(x)	ShapiroWilk
Lead (ug/L)	MW-301 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	19	0.1768	0.07557	unknown	ShapiroWilk
Lithium (ug/L)	MW-301 (bg)	No	n/a	n/a	EPA 1989	0.05	20	22.82	3.757	normal	ShapiroWilk
Mercury (ug/L)	MW-301 (bg)	n/a	n/a	n/a	NP (nrm)	NaN	17	0.07682	0.03858	unknown	ShapiroWilk
Molybdenum (ug/L)	MW-301 (bg)	No	n/a	n/a	NP (nrm)	NaN	18	1.037	0.2471	unknown	ShapiroWilk
Selenium (ug/L)	MW-301 (bg)	No	n/a	n/a	EPA 1989	0.05	18	5.739	1.334	normal	ShapiroWilk
Sulfate (mg/L)	MW-301 (bg)	Yes	81	4/8/2019	Dixon`s	0.05	20	156.7	25.27	normal	ShapiroWilk
Thallium (ug/L)	MW-301 (bg)	No	n/a	n/a	NP (nrm)	NaN	18	0.271	0.167	unknown	ShapiroWilk
Total Dissolved Solids (mg/L)	MW-301 (bg)	No	n/a	n/a	Dixon`s	0.05	20	533	80.17	normal	ShapiroWilk
Total Radium (pCi/L)	MW-301 (bg)	No	n/a	n/a	EPA 1989	0.05	19	0.7033	0.4166	normal	ShapiroWilk

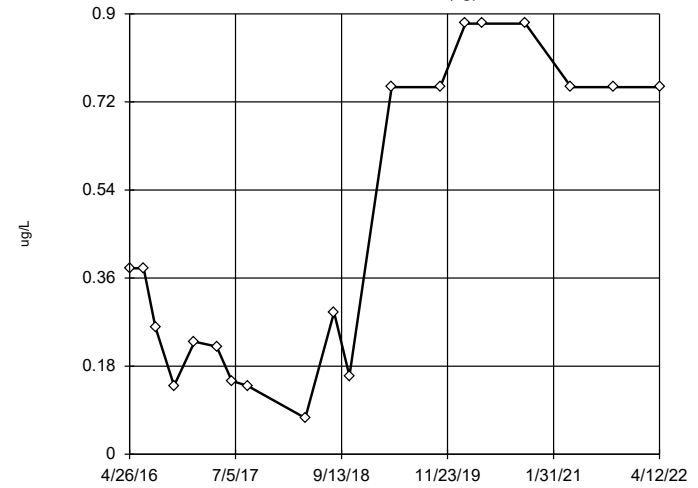
Antimony
MW-301 (bg)



n = 18
No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 484.3, low cutoff = 0.0000664, based on IQR multiplier of 3.

Tukey's Outlier Screening Analysis Run 6/27/2022 11:45 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

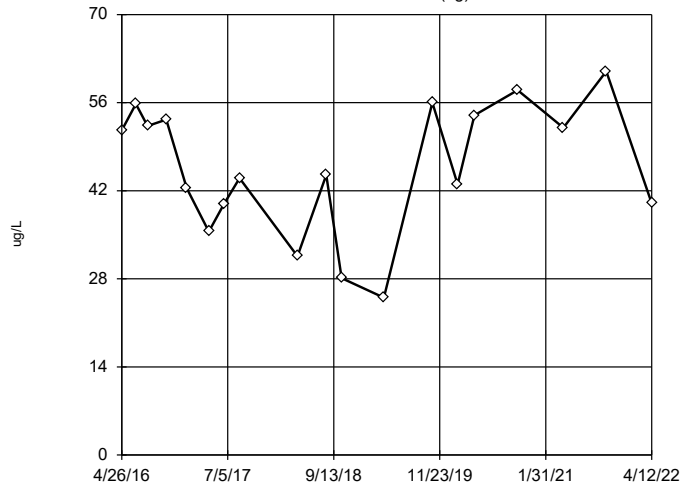
Arsenic
MW-301 (bg)



n = 19
No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 77.25, low cutoff = 0.001553, based on IQR multiplier of 3.

Tukey's Outlier Screening Analysis Run 6/27/2022 11:45 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

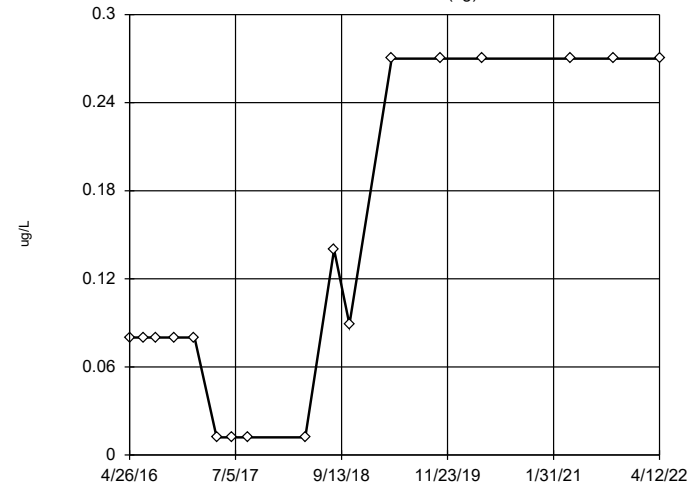
Barium
MW-301 (bg)



n = 19
Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 45.68, std. dev. 10.46, critical Tn 2.532
Normality test used: Shapiro Wilk@alpha = 0.1 Calculated = 0.9443 Critical = 0.917 The distribution was found to be normally distributed.

EPA 1989 Outlier Screening Analysis Run 6/27/2022 11:45 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Beryllium
MW-301 (bg)



n = 17
No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.
Data were square root transformed to achieve best W statistic (graph shown in original units).
High cutoff = 2.22, low cutoff = -0.5992, based on IQR multiplier of 3.

Tukey's Outlier Screening Analysis Run 6/27/2022 11:45 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Tukey's Outlier Screening

Constituent: Antimony (ug/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	<0.058 (U)
6/23/2016	0.13 (J)
8/10/2016	0.12 (J)
10/26/2016	<0.058 (U)
1/18/2017	0.11 (J)
4/19/2017	<0.026 (U)
6/20/2017	0.054 (J)
8/23/2017	0.063 (J)
4/18/2018	<0.026 (U)
8/14/2018	0.2 (J)
10/16/2018	<0.078 (U)
4/8/2019	<0.53 (U)
10/24/2019	<0.53 (U)
4/14/2020	<0.58 (U)
10/8/2020	<0.51 (U)
4/14/2021	<1.1 (U)
10/7/2021	<1.1 (U)
4/12/2022	<0.69 (U)

Tukey's Outlier Screening

Constituent: Arsenic (ug/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	0.38 (J)
6/23/2016	0.38 (J)
8/10/2016	0.26 (J)
10/26/2016	0.14 (J)
1/18/2017	0.23 (J)
4/19/2017	0.22 (J)
6/20/2017	0.15 (J)
8/23/2017	0.14 (J)
4/18/2018	0.074 (J)
8/14/2018	0.29 (J)
10/16/2018	0.16 (J)
4/8/2019	<0.75 (U)
10/24/2019	<0.75 (U)
2/5/2020	<0.88 (U)
4/14/2020	<0.88 (U)
10/8/2020	<0.88 (U)
4/14/2021	<0.75 (U)
10/7/2021	<0.75 (U)
4/12/2022	<0.75 (U)

EPA 1989 Outlier Screening

Constituent: Barium (ug/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

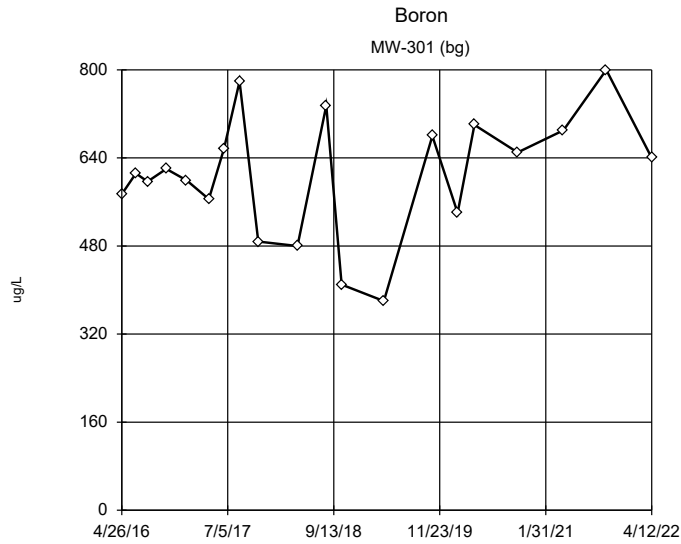
	MW-301 (bg)
4/26/2016	51.6
6/23/2016	55.8
8/10/2016	52.3
10/26/2016	53.3
1/18/2017	42.4
4/19/2017	35.5
6/20/2017	39.9
8/23/2017	44
4/18/2018	31.6
8/14/2018	44.5
10/16/2018	28.1
4/8/2019	25
10/24/2019	56
2/5/2020	43
4/14/2020	54
10/8/2020	58
4/14/2021	52
10/7/2021	61
4/12/2022	40

Tukey's Outlier Screening

Constituent: Beryllium (ug/L) Analysis Run 6/27/2022 11:47 AM

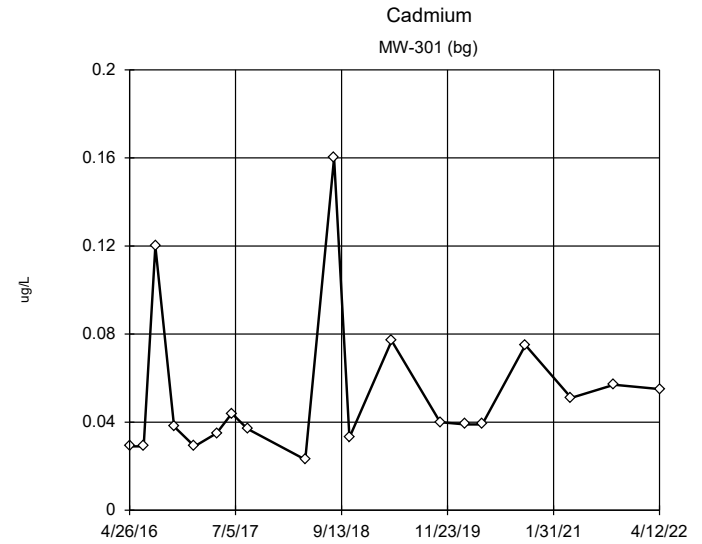
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	<0.08 (U)
6/23/2016	<0.08 (U)
8/10/2016	<0.08 (U)
10/26/2016	<0.08 (U)
1/18/2017	<0.08 (U)
4/19/2017	<0.012 (U)
6/20/2017	<0.012 (U)
8/23/2017	<0.012 (U)
4/18/2018	<0.012 (U)
8/14/2018	0.14 (J)
10/16/2018	<0.089 (U)
4/8/2019	<0.27 (U)
10/24/2019	<0.27 (U)
4/14/2020	<0.27 (U)
4/14/2021	<0.27 (U)
10/7/2021	<0.27 (U)
4/12/2022	<0.27 (U)



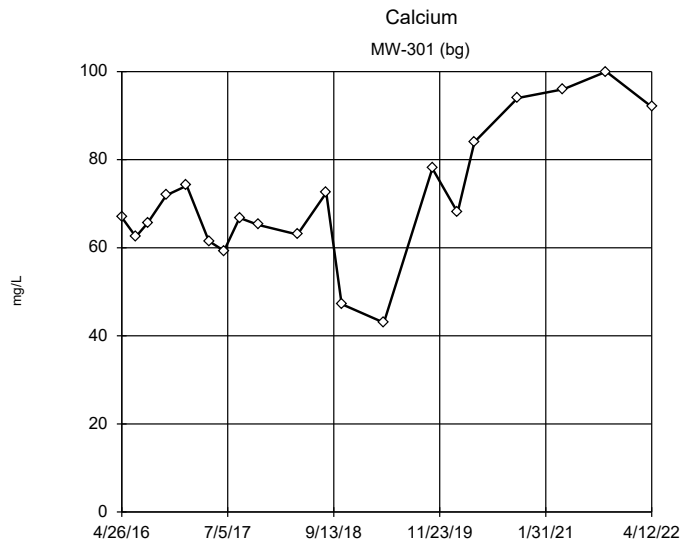
n = 20
 Dixon's will not be run.
 No suspect values identified or unable to establish suspect values.
 Mean 509.8, std. dev. 111.8, critical Tn 2.557
 Normality test used:
 Shapiro Wilk@alpha = 0.1
 Calculated = 0.9757
 Critical = 0.92
 The distribution was found to be normally distributed.

EPA 1989 Outlier Screening Analysis Run 6/27/2022 11:46 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



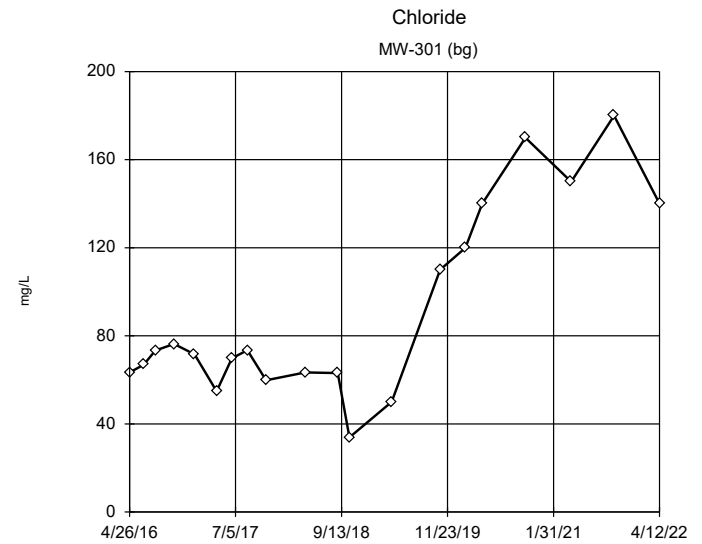
n = 19
 No outliers found.
 Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.2937, low cutoff = 0.006404, based on IQR multiplier of 3.

Tukey's Outlier Screening Analysis Run 6/27/2022 11:46 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



n = 20
 Dixon's will not be run.
 No suspect values identified or unable to establish suspect values.
 Mean 71.58, std. dev. 15.36, critical Tn 2.557
 Normality test used:
 Shapiro Wilk@alpha = 0.1
 Calculated = 0.9478
 Critical = 0.92
 The distribution was found to be normally distributed.

EPA 1989 Outlier Screening Analysis Run 6/27/2022 11:46 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



n = 20
 Dixon's will not be run.
 No suspect values identified or unable to establish suspect values.
 Mean 91.49, std. dev. 43.17, critical Tn 2.557
 Normality test used:
 Shapiro Wilk@alpha = 0.1
 Calculated = 0.5269
 Critical = 0.92 (after natural log transformation)
 The distribution was found to be log-normal.

EPA 1989 Outlier Screening Analysis Run 6/27/2022 11:46 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

EPA 1989 Outlier Screening

Constituent: Boron (ug/L) Analysis Run 6/27/2022 11:47 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	574
6/23/2016	612
8/10/2016	597
10/26/2016	620
1/18/2017	599
4/19/2017	565
6/20/2017	657
8/23/2017	779
11/8/2017	488
4/18/2018	480
8/14/2018	735
10/16/2018	410
4/8/2019	380
10/24/2019	680
2/5/2020	540
4/14/2020	700
10/8/2020	650
4/14/2021	690
10/7/2021	800
4/12/2022	640

Tukey's Outlier Screening

Constituent: Cadmium (ug/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	<0.029 (U)
6/23/2016	<0.029 (U)
8/10/2016	0.12 (J)
10/26/2016	0.038 (J)
1/18/2017	<0.029 (U)
4/19/2017	0.035 (J)
6/20/2017	0.044 (J)
8/23/2017	0.037 (J)
4/18/2018	0.023 (J)
8/14/2018	0.16 (J)
10/16/2018	<0.033 (U)
4/8/2019	<0.077 (U)
10/24/2019	0.04 (J)
2/5/2020	<0.039 (U)
4/14/2020	<0.039 (U)
10/8/2020	0.075 (J)
4/14/2021	<0.051 (U)
10/7/2021	0.057 (J)
4/12/2022	<0.055 (U)

EPA 1989 Outlier Screening

Constituent: Calcium (mg/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	66.9
6/23/2016	62.5
8/10/2016	65.6
10/26/2016	71.9
1/18/2017	74.1
4/19/2017	61.5
6/20/2017	59.3
8/23/2017	66.8
11/8/2017	65.2
4/18/2018	63
8/14/2018	72.5
10/16/2018	47.2
4/8/2019	43
10/24/2019	78
2/5/2020	68
4/14/2020	84
10/8/2020	94
4/14/2021	96
10/7/2021	100
4/12/2022	92

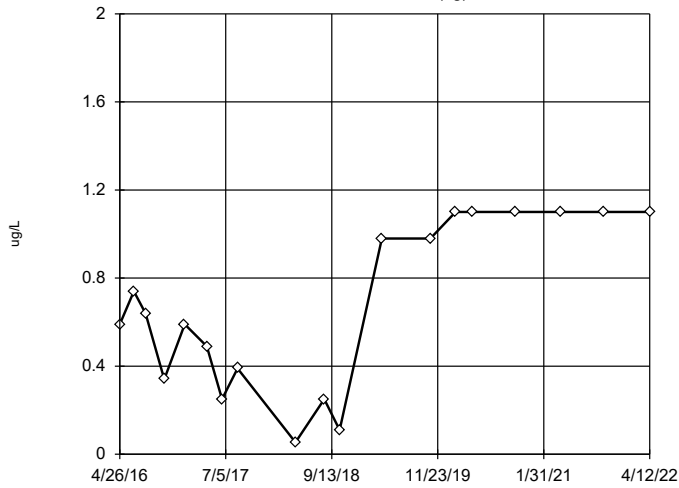
EPA 1989 Outlier Screening

Constituent: Chloride (mg/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	63.4
6/23/2016	66.9
8/10/2016	73.3
10/26/2016	76.3
1/18/2017	71.6
4/19/2017	54.8
6/20/2017	69.8
8/23/2017	73.5
11/8/2017	59.8
4/18/2018	63.4
8/29/2018	63.1
10/16/2018	33.9
4/8/2019	50
10/24/2019	110
2/5/2020	120
4/14/2020	140
10/8/2020	170
4/14/2021	150
10/7/2021	180
4/12/2022	140

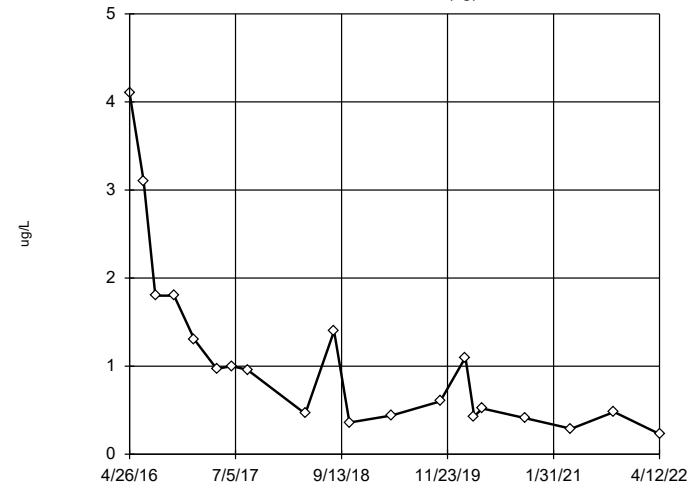
Chromium
MW-301 (bg)



n = 19
No outliers found. Tukey's method used in lieu of parametric test because the Shapiro Wilk normality test failed at the 0.1 alpha level.
Data were square root transformed to achieve best W statistic (graph shown in original units).
The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Tukey's Outlier Screening Analysis Run 6/27/2022 11:46 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

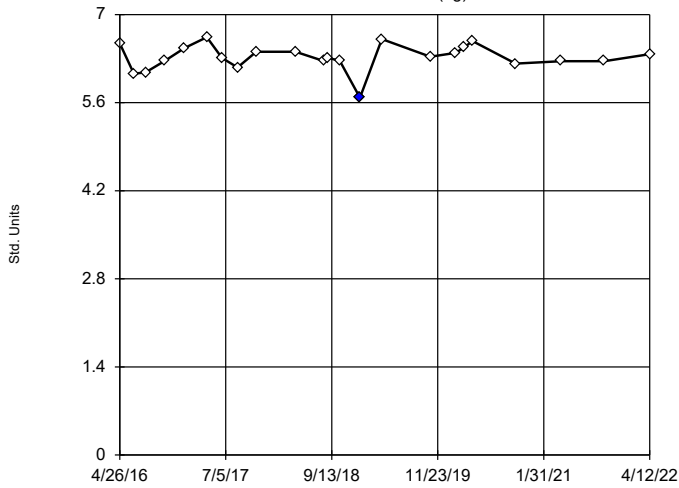
Cobalt
MW-301 (bg)



n = 20
Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 1.089, std. dev. 0.9962, critical Tr 2.557
Normality test used: Shapiro Wilk@alpha = 0.1 Calculated = 0.9554 Critical = 0.92 (after natural log transformation) The distribution was found to be log-normal.

EPA 1989 Outlier Screening Analysis Run 6/27/2022 11:46 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

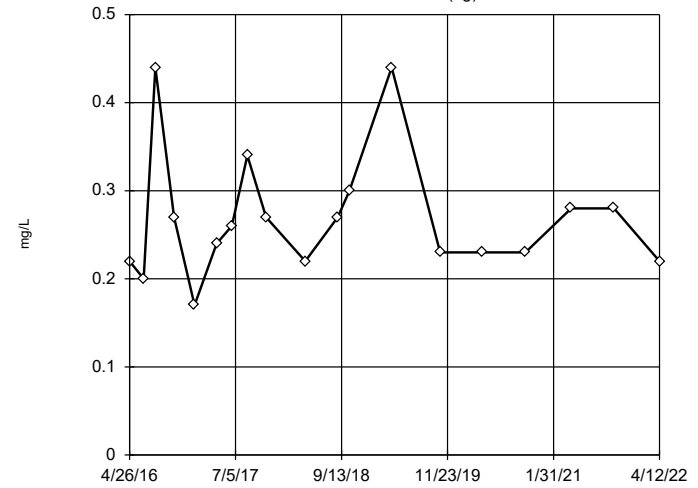
Field pH
MW-301 (bg)



n = 23
Statistical outlier is drawn as solid. Testing for 1 low outlier. Mean = 6.32. Std. Dev. = 0.2091. 5.68; c = 0.4444 tab1 = 0.421. Alpha = 0.05.
Normality test used: Shapiro Wilk@alpha = 0.1 Calculated = 0.969 Critical = 0.926 The distribution, after removal of suspect value, was found to be normally distributed.

Dixon's Outlier Test Analysis Run 6/27/2022 11:46 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Fluoride
MW-301 (bg)



n = 19
Dixon's will not be run. No suspect values identified or unable to establish suspect values. Mean 0.2689, std. dev. 0.07148, critical Tr 2.532
Normality test used: Shapiro Wilk@alpha = 0.1 Calculated = 0.9193 Critical = 0.917 (after natural log transformation) The distribution was found to be log-normal.

EPA 1989 Outlier Screening Analysis Run 6/27/2022 11:46 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Tukey's Outlier Screening

Constituent: Chromium (ug/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	0.59 (J)
6/23/2016	0.74 (J)
8/10/2016	0.64 (J)
10/26/2016	<0.34 (U)
1/18/2017	0.59 (J)
4/19/2017	0.49 (J)
6/20/2017	0.25 (J)
8/23/2017	0.39 (J)
4/18/2018	<0.054 (U)
8/14/2018	0.25 (J)
10/16/2018	0.11 (J)
4/8/2019	<0.98 (U)
10/24/2019	<0.98 (U)
2/5/2020	<1.1 (U)
4/14/2020	<1.1 (U)
10/8/2020	<1.1 (U)
4/14/2021	<1.1 (U)
10/7/2021	<1.1 (U)
4/12/2022	<1.1 (U)

EPA 1989 Outlier Screening

Constituent: Cobalt (ug/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	4.1
6/23/2016	3.1
8/10/2016	1.8
10/26/2016	1.8
1/18/2017	1.3
4/19/2017	0.97 (J)
6/20/2017	1 (J)
8/23/2017	0.96 (J)
4/18/2018	0.46 (J)
8/14/2018	1.4
10/16/2018	0.36 (J)
4/8/2019	0.44 (J)
10/24/2019	0.6
2/5/2020	1.1
3/12/2020	0.43 (J)
4/14/2020	0.52
10/8/2020	0.41 (J)
4/14/2021	0.29 (J)
10/7/2021	0.48 (J)
4/12/2022	0.23 (J)

Dixon's Outlier Test

Constituent: Field pH (Std. Units) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	6.54
6/23/2016	6.06
8/10/2016	6.08
10/26/2016	6.26
1/18/2017	6.47
4/19/2017	6.64
6/20/2017	6.31
8/23/2017	6.16
11/8/2017	6.41
4/18/2018	6.41
8/14/2018	6.26
8/29/2018	6.31
10/16/2018	6.27
1/8/2019	5.68 (O)
4/8/2019	6.61
10/24/2019	6.33
2/5/2020	6.39
3/12/2020	6.48
4/14/2020	6.58
10/8/2020	6.22
4/14/2021	6.26
10/7/2021	6.26
4/12/2022	6.37

EPA 1989 Outlier Screening

Constituent: Fluoride (mg/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	0.22
6/23/2016	0.2 (J)
8/10/2016	0.44
10/26/2016	0.27
1/18/2017	0.17 (J)
4/19/2017	0.24
6/20/2017	0.26
8/23/2017	0.34
11/8/2017	0.27
4/18/2018	0.22
8/29/2018	0.27
10/16/2018	0.3
4/8/2019	0.44 (J)
10/24/2019	<0.23 (U)
4/14/2020	<0.23 (U)
10/8/2020	<0.23 (U)
4/14/2021	<0.28 (U)
10/7/2021	<0.28 (U)
4/12/2022	<0.22 (U)

Tukey's Outlier Screening

Constituent: Lead (ug/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	<0.19 (U)
6/23/2016	<0.19 (U)
8/10/2016	<0.19 (U)
10/26/2016	<0.19 (U)
1/18/2017	<0.19 (U)
4/19/2017	0.06 (J)
6/20/2017	0.1 (J)
8/23/2017	0.049 (J)
4/18/2018	0.041 (J)
8/14/2018	0.18 (J)
10/16/2018	<0.13 (U)
4/8/2019	<0.27 (U)
10/24/2019	<0.27 (U)
2/5/2020	<0.27 (U)
4/14/2020	<0.27 (U)
10/8/2020	<0.11 (U)
4/14/2021	<0.21 (U)
10/7/2021	<0.21 (U)
4/12/2022	<0.24 (U)

EPA 1989 Outlier Screening

Constituent: Lithium (ug/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	22.8
6/23/2016	28.7
8/10/2016	27.6
10/26/2016	25.5
1/18/2017	20.1
4/19/2017	21.8
6/20/2017	24.9
8/23/2017	27.9
4/18/2018	19.1
8/14/2018	26.5
10/16/2018	19.4
4/8/2019	15
10/24/2019	24
2/5/2020	17
3/12/2020	21
4/14/2020	24
10/8/2020	23
4/14/2021	23
10/7/2021	26
4/12/2022	19

Tukey's Outlier Screening

Constituent: Mercury (ug/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

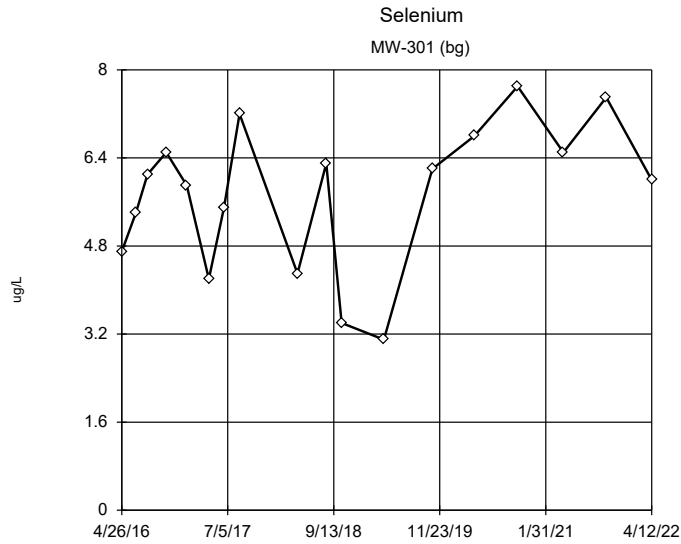
	MW-301 (bg)
4/26/2016	<0.039 (U)
6/23/2016	<0.039 (U)
8/10/2016	<0.039 (U)
10/26/2016	<0.039 (U)
1/18/2017	<0.039 (U)
4/19/2017	<0.046 (U)
6/20/2017	<0.046 (U)
8/23/2017	<0.046 (U)
4/18/2018	<0.09 (U)
8/14/2018	<0.083 (U)
1/8/2019	<0.09 (U)
4/8/2019	<0.1 (U)
10/24/2019	<0.1 (U)
4/14/2020	<0.1 (U)
4/14/2021	<0.15 (U)
10/7/2021	<0.15 (U)
4/12/2022	<0.11 (U)

Tukey's Outlier Screening

Constituent: Molybdenum (ug/L) Analysis Run 6/27/2022 11:47 AM

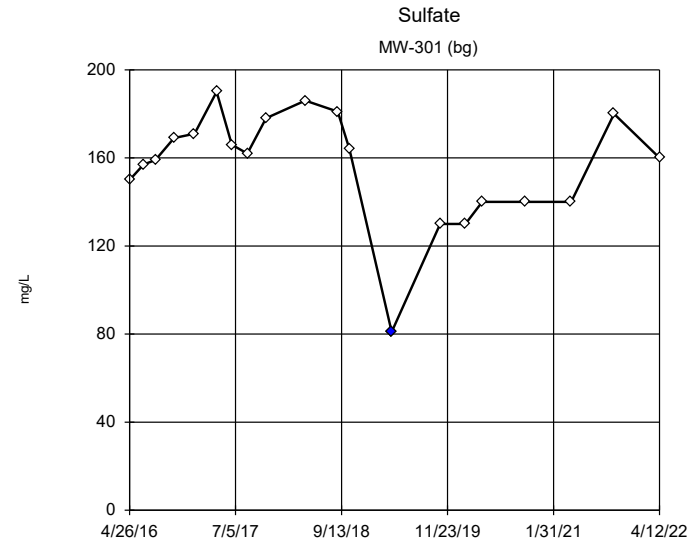
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	1.2
6/23/2016	1.2
8/10/2016	0.89 (J)
10/26/2016	1
1/18/2017	0.76 (J)
4/19/2017	0.54 (J)
6/20/2017	0.79 (J)
8/23/2017	1.3
4/18/2018	0.67 (J)
8/14/2018	1.3
10/16/2018	0.72 (J)
4/8/2019	<1.1 (U)
10/24/2019	1.1 (J)
4/14/2020	1.2 (J)
10/8/2020	<1.1 (U)
4/14/2021	<1.3 (U)
10/7/2021	<1.3 (U)
4/12/2022	<1.2 (U)



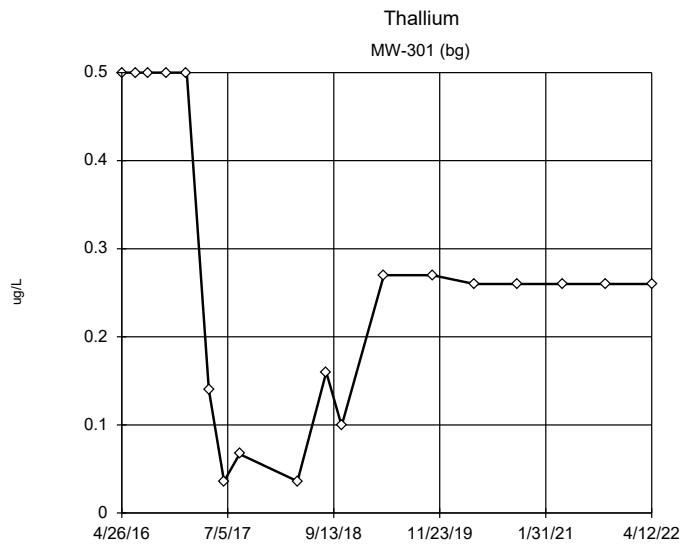
n = 18
 Dixon's will not be run.
 No suspect values identified
 or unable to establish
 suspect values.
 Mean = 5.739, std. dev.
 1.334, critical Tr = 2.504
 Normality test used:
 Shapiro Wilk@alpha = 0.1
 Calculated = 0.9481
 Critical = 0.914
 The distribution was found
 to be normally distrib-
 uted.

EPA 1989 Outlier Screening Analysis Run 6/27/2022 11:46 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



n = 20
 Statistical outlier is
 drawn as solid.
 Testing for 1 low outlier.
 Mean = 156.7
 Std. Dev. = 25.27
 81: c = 0.49
 tab1 = 0.45,
 Alpha = 0.05.
 Normality test used:
 Shapiro Wilk@alpha = 0.1
 Calculated = 0.9533
 Critical = 0.917
 The distribution, after
 removal of suspect val-
 ue, was found to be nor-
 mally distributed.

Dixon's Outlier Test Analysis Run 6/27/2022 11:46 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



EPA 1989 Outlier Screening

Constituent: Selenium (ug/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	4.7
6/23/2016	5.4
8/10/2016	6.1
10/26/2016	6.5
1/18/2017	5.9
4/19/2017	4.2
6/20/2017	5.5
8/23/2017	7.2
4/18/2018	4.3
8/14/2018	6.3
10/16/2018	3.4
4/8/2019	3.1 (J)
10/24/2019	6.2
4/14/2020	6.8
10/8/2020	7.7
4/14/2021	6.5
10/7/2021	7.5
4/12/2022	6

Dixon's Outlier Test

Constituent: Sulfate (mg/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	150
6/23/2016	157
8/10/2016	159
10/26/2016	169
1/18/2017	171
4/19/2017	190
6/20/2017	166
8/23/2017	162
11/8/2017	178
4/18/2018	186
8/29/2018	181
10/16/2018	164
4/8/2019	81 (O)
10/24/2019	130
2/5/2020	130
4/14/2020	140
10/8/2020	140
4/14/2021	140
10/7/2021	180
4/12/2022	160

Tukey's Outlier Screening

Constituent: Thallium (ug/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	<0.5 (U)
6/23/2016	<0.5 (U)
8/10/2016	<0.5 (U)
10/26/2016	<0.5 (U)
1/18/2017	<0.5 (U)
4/19/2017	0.14 (J)
6/20/2017	<0.036 (U)
8/23/2017	0.067 (J)
4/18/2018	<0.036 (U)
8/14/2018	0.16 (J)
10/16/2018	<0.099 (U)
4/8/2019	<0.27 (U)
10/24/2019	<0.27 (U)
4/14/2020	<0.26 (U)
10/8/2020	<0.26 (U)
4/14/2021	<0.26 (U)
10/7/2021	<0.26 (U)
4/12/2022	<0.26 (U)

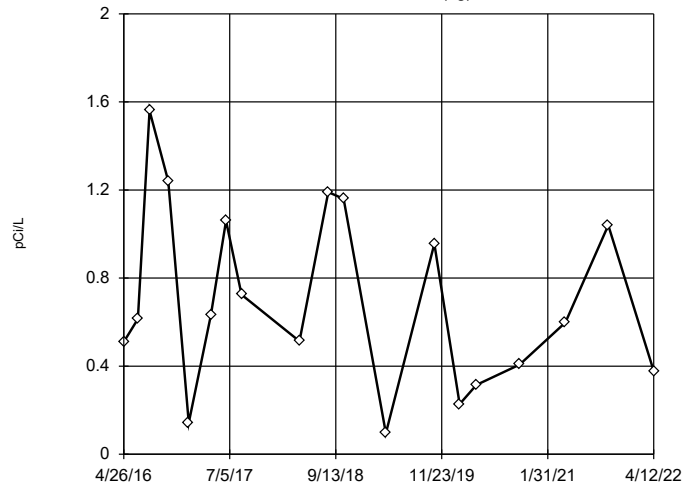
Dixon's Outlier Test

Constituent: Total Dissolved Solids (mg/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	500
6/23/2016	531
8/10/2016	576
10/26/2016	545
1/18/2017	545
4/19/2017	499
6/20/2017	490
8/23/2017	557
11/8/2017	448
4/18/2018	514
8/29/2018	532
10/16/2018	392
4/8/2019	340
10/24/2019	510
2/5/2020	570
4/14/2020	550
10/8/2020	660
4/14/2021	620
10/7/2021	670
4/12/2022	610

Total Radium MW-301 (bg)



n = 19
Dixon's will not be run.
No suspect values identified
or unable to establish
suspect values.
Mean 0.7033, std. dev.
0.4166, critical Tn 2.532
Normality test used:
Shapiro Wilk@alpha = 0.1
Calculated = 0.9547
Critical = 0.917
The distribution was found
to be normally distrib-
uted.

EPA 1989 Outlier Screening Analysis Run 6/27/2022 11:46 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

EPA 1989 Outlier Screening

Constituent: Total Radium (pCi/L) Analysis Run 6/27/2022 11:47 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)
4/26/2016	0.51
6/23/2016	0.614
8/10/2016	1.56
10/26/2016	1.24
1/18/2017	0.143
4/19/2017	0.631
6/20/2017	1.06
8/23/2017	0.725
4/18/2018	0.513
8/14/2018	1.19
10/16/2018	1.16
4/8/2019	0.0956
10/24/2019	0.956
2/5/2020	0.228
4/14/2020	0.315
10/8/2020	0.407
4/14/2021	0.598
10/7/2021	1.04
4/12/2022	0.378

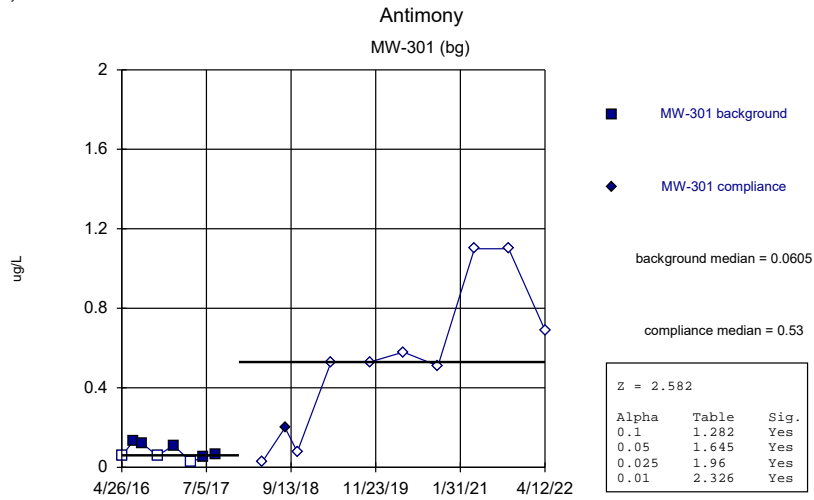
Attachment 3

Welch's/Mann-Whitney Comparison

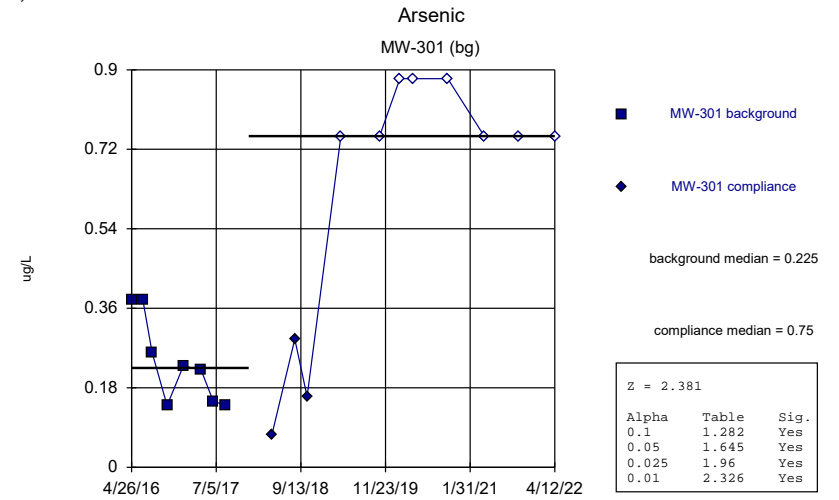
Welch's t-test/Mann-Whitney

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122 Printed 6/27/2022, 11:52 AM

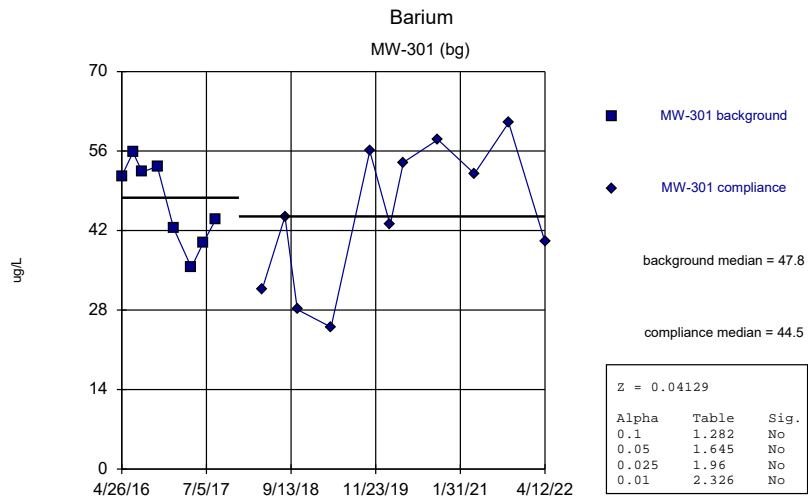
<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.1</u>	<u>0.05</u>	<u>0.025</u>	<u>0.01</u>	<u>Alpha</u>	<u>Sig.</u>	<u>Bg. Wells</u>	<u>Method</u>
Antimony (ug/L)	MW-301 (bg)	2.582	Yes	Yes	Yes	Yes	0.01	Yes	(inrawell)	Mann-W
Arsenic (ug/L)	MW-301 (bg)	2.381	Yes	Yes	Yes	Yes	0.01	Yes	(inrawell)	Mann-W
Barium (ug/L)	MW-301 (bg)	0.04129	No	No	No	No	0.01	No	(inrawell)	Mann-W
Beryllium (ug/L)	MW-301 (bg)	2.909	Yes	Yes	Yes	Yes	0.01	Yes	(inrawell)	Mann-W
Boron (ug/L)	MW-301 (bg)	-0.0...	No	No	No	No	0.01	No	(inrawell)	Mann-W
Cadmium (ug/L)	MW-301 (bg)	1.614	Yes	No	No	No	0.01	No	(inrawell)	Mann-W
Calcium (mg/L)	MW-301 (bg)	1.427	Yes	No	No	No	0.01	No	(inrawell)	Mann-W
Chloride (mg/L)	MW-301 (bg)	0.8493	No	No	No	No	0.01	No	(inrawell)	Mann-W
Chromium (ug/L)	MW-301 (bg)	1.68	Yes	Yes	No	No	0.01	No	(inrawell)	Mann-W
Cobalt (ug/L)	MW-301 (bg)	-3.203	No	No	No	No	0.01	No	(inrawell)	Mann-W
Field pH (Std. Units)	MW-301 (bg)	0.4208	No	No	No	No	0.01	No	(inrawell)	Mann-W
Fluoride (mg/L)	MW-301 (bg)	0.4564	No	No	No	No	0.01	No	(inrawell)	Mann-W
Lead (ug/L)	MW-301 (bg)	1.716	Yes	Yes	No	No	0.01	No	(inrawell)	Mann-W
Lithium (ug/L)	MW-301 (bg)	-1.969	No	No	No	No	0.01	No	(inrawell)	Mann-W
Mercury (ug/L)	MW-301 (bg)	3.481	Yes	Yes	Yes	Yes	0.01	Yes	(inrawell)	Mann-W
Molybdenum (ug/L)	MW-301 (bg)	0.9809	No	No	No	No	0.01	No	(inrawell)	Mann-W
Selenium (ug/L)	MW-301 (bg)	0.6223	No	No	No	No	0.01	No	(inrawell)	Mann-W
Sulfate (mg/L)	MW-301 (bg)	-1.044	No	No	No	No	0.01	No	(inrawell)	Mann-W
Thallium (ug/L)	MW-301 (bg)	-1.272	No	No	No	No	0.01	No	(inrawell)	Mann-W
Total Dissolved Solids (mg/L)	MW-301 (bg)	0.5017	No	No	No	No	0.01	No	(inrawell)	Mann-W
Total Radium (pCi/L)	MW-301 (bg)	-1.197	No	No	No	No	0.01	No	(inrawell)	Mann-W



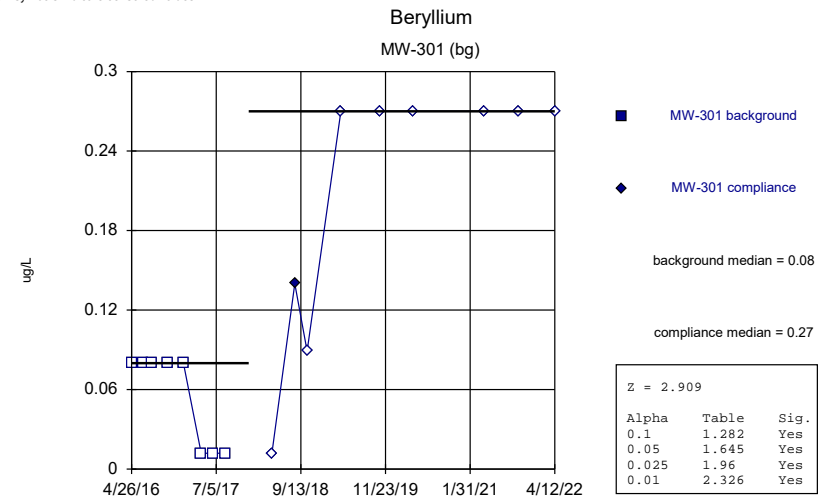
Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:49 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:49 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:49 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:49 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Antimony (ug/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301	MW-301
4/26/2016	<0.058 (U)	
6/23/2016	0.13 (J)	
8/10/2016	0.12 (J)	
10/26/2016	<0.058 (U)	
1/18/2017	0.11 (J)	
4/19/2017	<0.026 (U)	
6/20/2017	0.054 (J)	
8/23/2017	0.063 (J)	
4/18/2018		<0.026 (U)
8/14/2018		0.2 (J)
10/16/2018		<0.078 (U)
4/8/2019		<0.53 (U)
10/24/2019		<0.53 (U)
4/14/2020		<0.58 (U)
10/8/2020		<0.51 (U)
4/14/2021		<1.1 (U)
10/7/2021		<1.1 (U)
4/12/2022		<0.69 (U)

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Arsenic (ug/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301	MW-301
4/26/2016	0.38 (J)	
6/23/2016	0.38 (J)	
8/10/2016	0.26 (J)	
10/26/2016	0.14 (J)	
1/18/2017	0.23 (J)	
4/19/2017	0.22 (J)	
6/20/2017	0.15 (J)	
8/23/2017	0.14 (J)	
4/18/2018		0.074 (J)
8/14/2018		0.29 (J)
10/16/2018		0.16 (J)
4/8/2019		<0.75 (U)
10/24/2019		<0.75 (U)
2/5/2020		<0.88 (U)
4/14/2020		<0.88 (U)
10/8/2020		<0.88 (U)
4/14/2021		<0.75 (U)
10/7/2021		<0.75 (U)
4/12/2022		<0.75 (U)

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Barium (ug/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

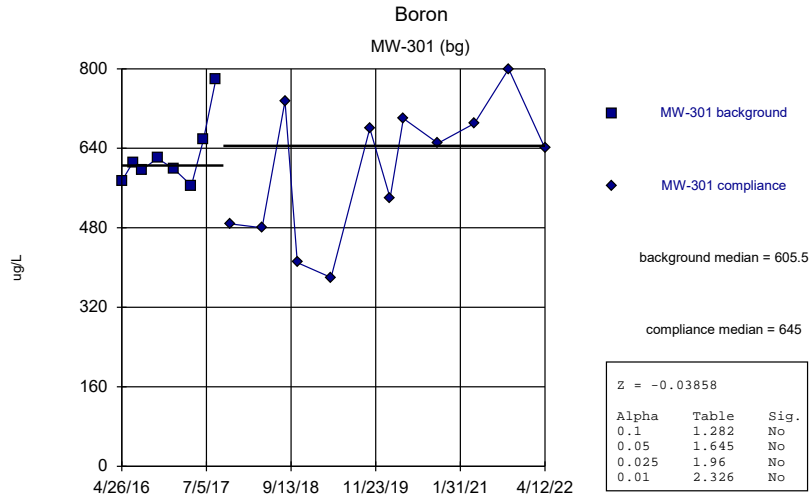
	MW-301	MW-301
4/26/2016	51.6	
6/23/2016	55.8	
8/10/2016	52.3	
10/26/2016	53.3	
1/18/2017	42.4	
4/19/2017	35.5	
6/20/2017	39.9	
8/23/2017	44	
4/18/2018		31.6
8/14/2018		44.5
10/16/2018		28.1
4/8/2019		25
10/24/2019		56
2/5/2020		43
4/14/2020		54
10/8/2020		58
4/14/2021		52
10/7/2021		61
4/12/2022		40

Mann-Whitney (Wilcoxon Rank Sum)

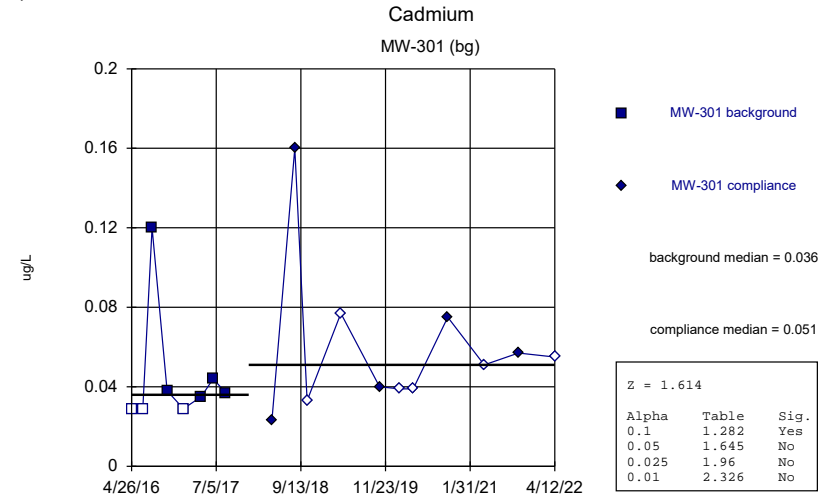
Constituent: Beryllium (ug/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

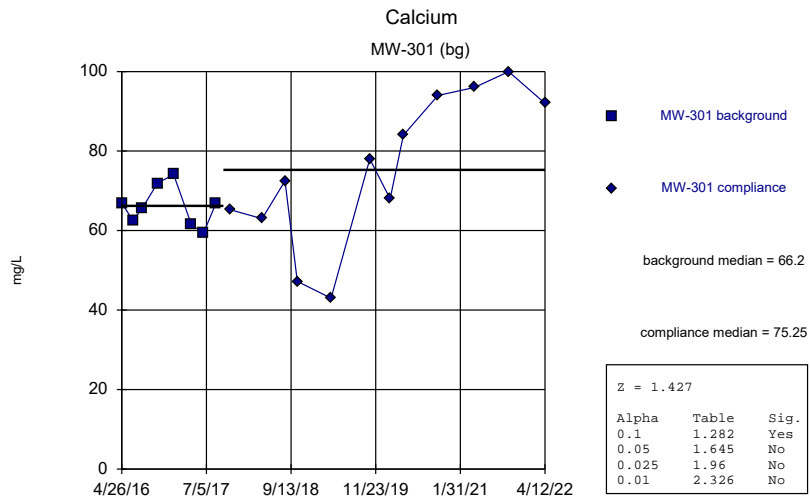
	MW-301	MW-301
4/26/2016	<0.08 (U)	
6/23/2016	<0.08 (U)	
8/10/2016	<0.08 (U)	
10/26/2016	<0.08 (U)	
1/18/2017	<0.08 (U)	
4/19/2017	<0.012 (U)	
6/20/2017	<0.012 (U)	
8/23/2017	<0.012 (U)	
4/18/2018		<0.012 (U)
8/14/2018		0.14 (J)
10/16/2018		<0.089 (U)
4/8/2019		<0.27 (U)
10/24/2019		<0.27 (U)
4/14/2020		<0.27 (U)
4/14/2021		<0.27 (U)
10/7/2021		<0.27 (U)
4/12/2022		<0.27 (U)



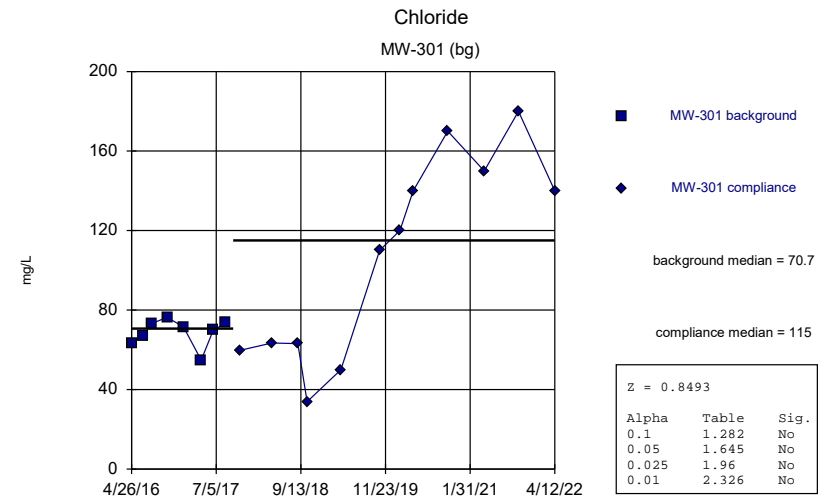
Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:49 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Boron (ug/L) Analysis Run 6/27/2022 11:52 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301	MW-301
4/26/2016	574	
6/23/2016	612	
8/10/2016	597	
10/26/2016	620	
1/18/2017	599	
4/19/2017	565	
6/20/2017	657	
8/23/2017	779	
11/8/2017		488
4/18/2018		480
8/14/2018		735
10/16/2018		410
4/8/2019		380
10/24/2019		680
2/5/2020		540
4/14/2020		700
10/8/2020		650
4/14/2021		690
10/7/2021		800
4/12/2022		640

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Cadmium (ug/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301	MW-301
4/26/2016	<0.029 (U)	
6/23/2016	<0.029 (U)	
8/10/2016	0.12 (J)	
10/26/2016	0.038 (J)	
1/18/2017	<0.029 (U)	
4/19/2017	0.035 (J)	
6/20/2017	0.044 (J)	
8/23/2017	0.037 (J)	
4/18/2018		0.023 (J)
8/14/2018		0.16 (J)
10/16/2018		<0.033 (U)
4/8/2019		<0.077 (U)
10/24/2019		0.04 (J)
2/5/2020		<0.039 (U)
4/14/2020		<0.039 (U)
10/8/2020		0.075 (J)
4/14/2021		<0.051 (U)
10/7/2021		0.057 (J)
4/12/2022		<0.055 (U)

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Calcium (mg/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

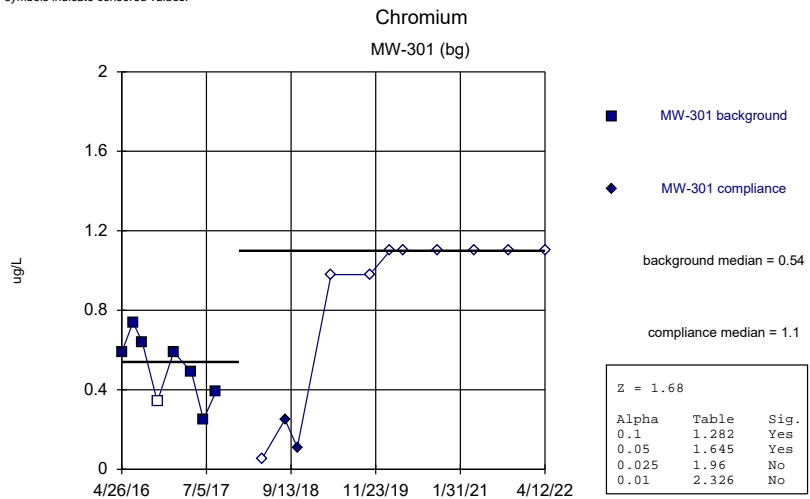
	MW-301	MW-301
4/26/2016	66.9	
6/23/2016	62.5	
8/10/2016	65.6	
10/26/2016	71.9	
1/18/2017	74.1	
4/19/2017	61.5	
6/20/2017	59.3	
8/23/2017	66.8	
11/8/2017		65.2
4/18/2018		63
8/14/2018		72.5
10/16/2018		47.2
4/8/2019		43
10/24/2019		78
2/5/2020		68
4/14/2020		84
10/8/2020		94
4/14/2021		96
10/7/2021		100
4/12/2022		92

Mann-Whitney (Wilcoxon Rank Sum)

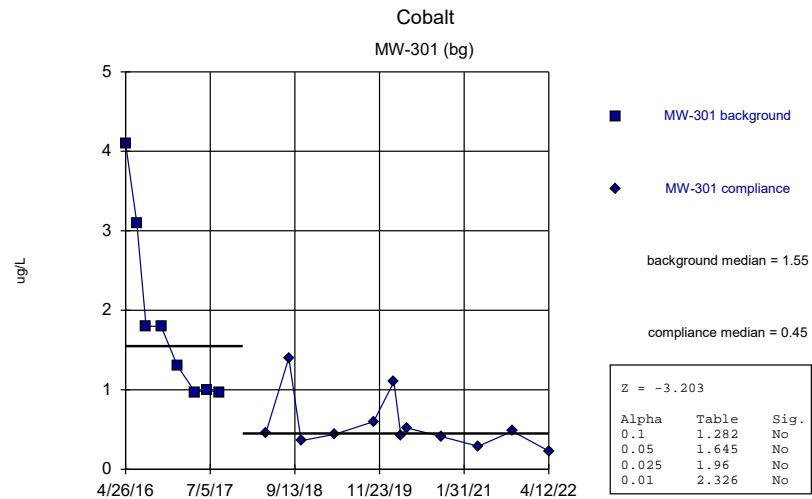
Constituent: Chloride (mg/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

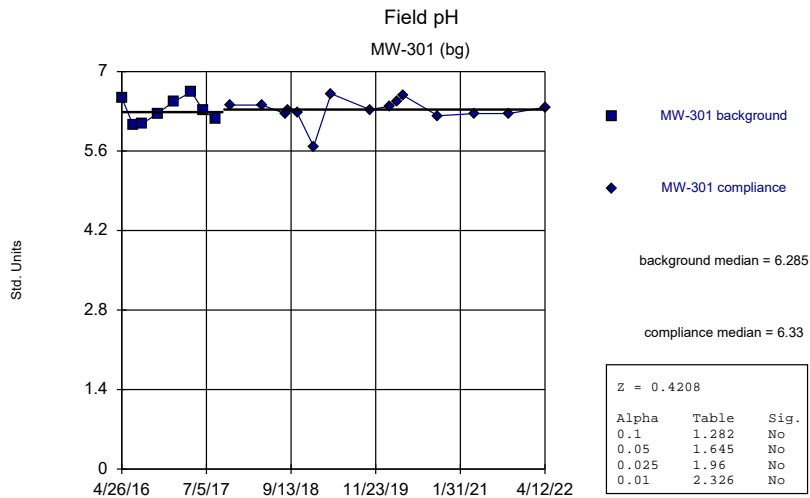
	MW-301	MW-301
4/26/2016	63.4	
6/23/2016	66.9	
8/10/2016	73.3	
10/26/2016	76.3	
1/18/2017	71.6	
4/19/2017	54.8	
6/20/2017	69.8	
8/23/2017	73.5	
11/8/2017		59.8
4/18/2018		63.4
8/29/2018		63.1
10/16/2018		33.9
4/8/2019		50
10/24/2019		110
2/5/2020		120
4/14/2020		140
10/8/2020		170
4/14/2021		150
10/7/2021		180
4/12/2022		140



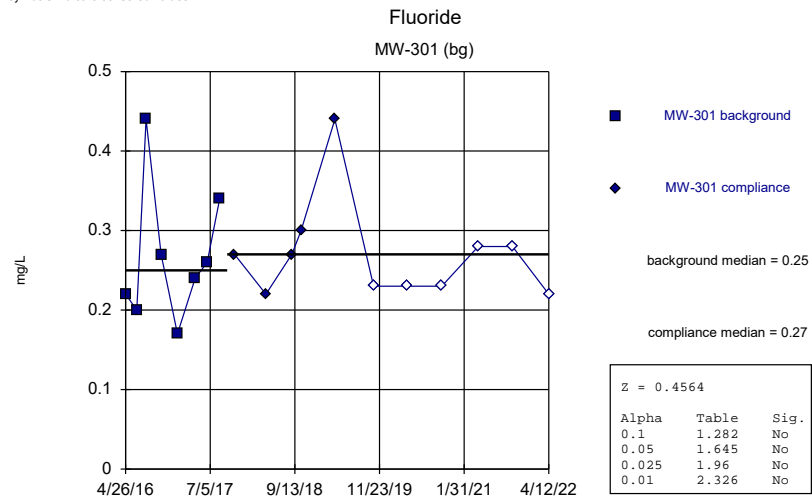
Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Chromium (ug/L) Analysis Run 6/27/2022 11:52 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301	MW-301
4/26/2016	0.59 (J)	
6/23/2016	0.74 (J)	
8/10/2016	0.64 (J)	
10/26/2016	<0.34 (U)	
1/18/2017	0.59 (J)	
4/19/2017	0.49 (J)	
6/20/2017	0.25 (J)	
8/23/2017	0.39 (J)	
4/18/2018		<0.054 (U)
8/14/2018		0.25 (J)
10/16/2018		0.11 (J)
4/8/2019		<0.98 (U)
10/24/2019		<0.98 (U)
2/5/2020		<1.1 (U)
4/14/2020		<1.1 (U)
10/8/2020		<1.1 (U)
4/14/2021		<1.1 (U)
10/7/2021		<1.1 (U)
4/12/2022		<1.1 (U)

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Cobalt (ug/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301	MW-301
4/26/2016	4.1	
6/23/2016	3.1	
8/10/2016	1.8	
10/26/2016	1.8	
1/18/2017	1.3	
4/19/2017	0.97 (J)	
6/20/2017	1 (J)	
8/23/2017	0.96 (J)	
4/18/2018		0.46 (J)
8/14/2018		1.4
10/16/2018		0.36 (J)
4/8/2019		0.44 (J)
10/24/2019		0.6
2/5/2020		1.1
3/12/2020		0.43 (J)
4/14/2020		0.52
10/8/2020		0.41 (J)
4/14/2021		0.29 (J)
10/7/2021		0.48 (J)
4/12/2022		0.23 (J)

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Field pH (Std. Units) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

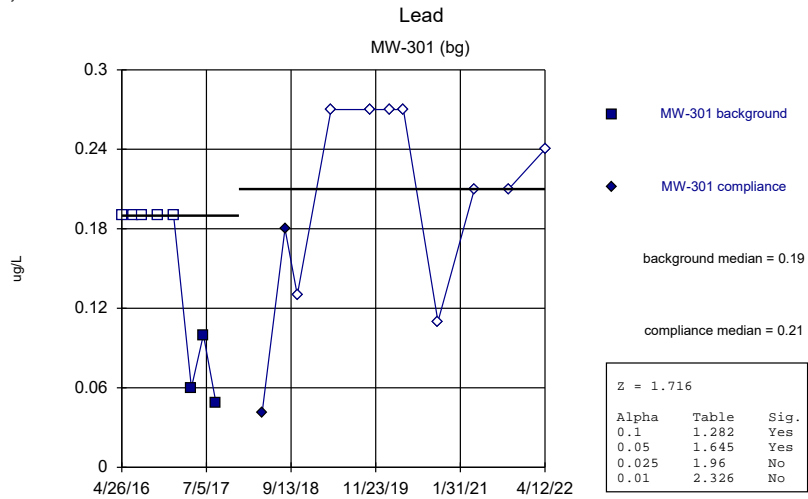
	MW-301	MW-301
4/26/2016	6.54	
6/23/2016	6.06	
8/10/2016	6.08	
10/26/2016	6.26	
1/18/2017	6.47	
4/19/2017	6.64	
6/20/2017	6.31	
8/23/2017	6.16	
11/8/2017		6.41
4/18/2018		6.41
8/14/2018		6.26
8/29/2018		6.31
10/16/2018		6.27
1/8/2019		5.68
4/8/2019		6.61
10/24/2019		6.33
2/5/2020		6.39
3/12/2020		6.48
4/14/2020		6.58
10/8/2020		6.22
4/14/2021		6.26
10/7/2021		6.26
4/12/2022		6.37

Mann-Whitney (Wilcoxon Rank Sum)

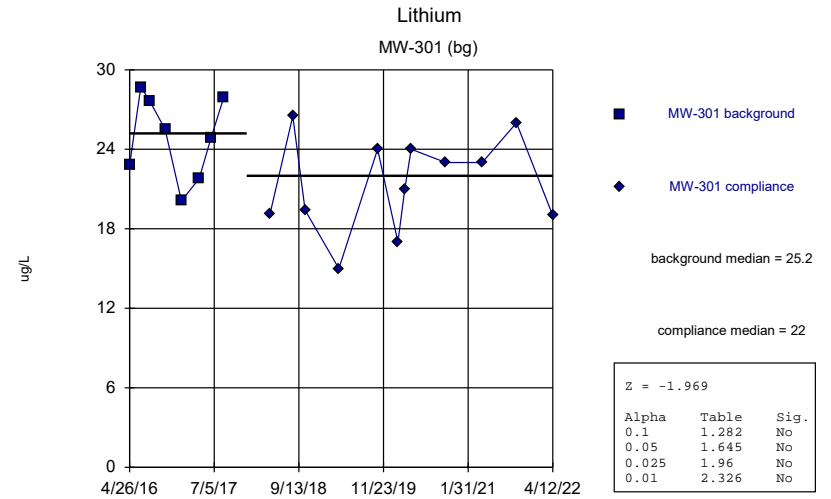
Constituent: Fluoride (mg/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

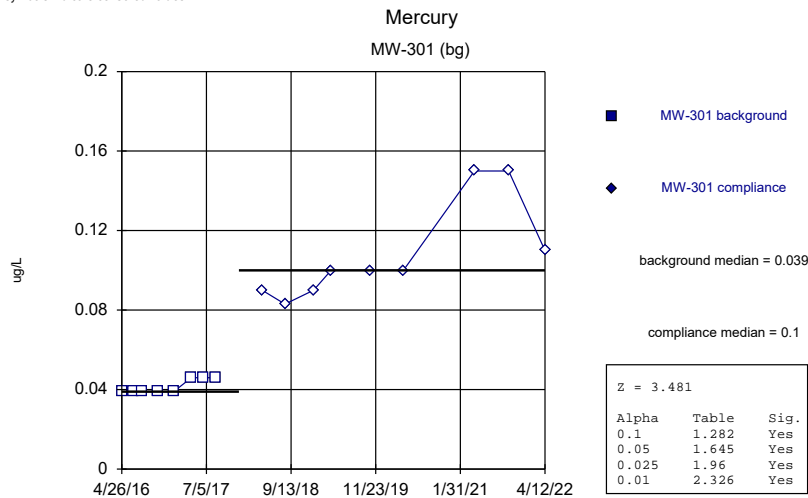
	MW-301	MW-301
4/26/2016	0.22	
6/23/2016	0.2 (J)	
8/10/2016	0.44	
10/26/2016	0.27	
1/18/2017	0.17 (J)	
4/19/2017	0.24	
6/20/2017	0.26	
8/23/2017	0.34	
11/8/2017		0.27
4/18/2018		0.22
8/29/2018		0.27
10/16/2018		0.3
4/8/2019		0.44 (J)
10/24/2019		<0.23 (U)
4/14/2020		<0.23 (U)
10/8/2020		<0.23 (U)
4/14/2021		<0.28 (U)
10/7/2021		<0.28 (U)
4/12/2022		<0.22 (U)



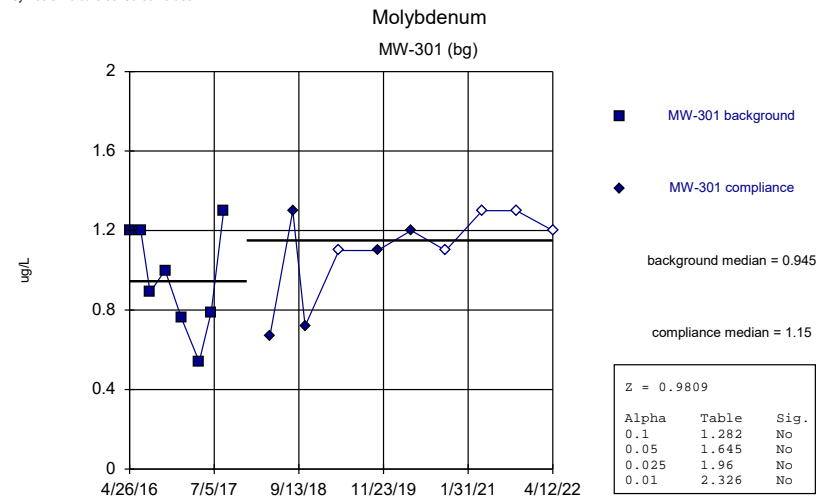
Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Lead (ug/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301	MW-301
4/26/2016	<0.19 (U)	
6/23/2016	<0.19 (U)	
8/10/2016	<0.19 (U)	
10/26/2016	<0.19 (U)	
1/18/2017	<0.19 (U)	
4/19/2017	0.06 (J)	
6/20/2017	0.1 (J)	
8/23/2017	0.049 (J)	
4/18/2018		0.041 (J)
8/14/2018		0.18 (J)
10/16/2018		<0.13 (U)
4/8/2019		<0.27 (U)
10/24/2019		<0.27 (U)
2/5/2020		<0.27 (U)
4/14/2020		<0.27 (U)
10/8/2020		<0.11 (U)
4/14/2021		<0.21 (U)
10/7/2021		<0.21 (U)
4/12/2022		<0.24 (U)

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Lithium (ug/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301	MW-301
4/26/2016	22.8	
6/23/2016	28.7	
8/10/2016	27.6	
10/26/2016	25.5	
1/18/2017	20.1	
4/19/2017	21.8	
6/20/2017	24.9	
8/23/2017	27.9	
4/18/2018		19.1
8/14/2018		26.5
10/16/2018		19.4
4/8/2019		15
10/24/2019		24
2/5/2020		17
3/12/2020		21
4/14/2020		24
10/8/2020		23
4/14/2021		23
10/7/2021		26
4/12/2022		19

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Mercury (ug/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

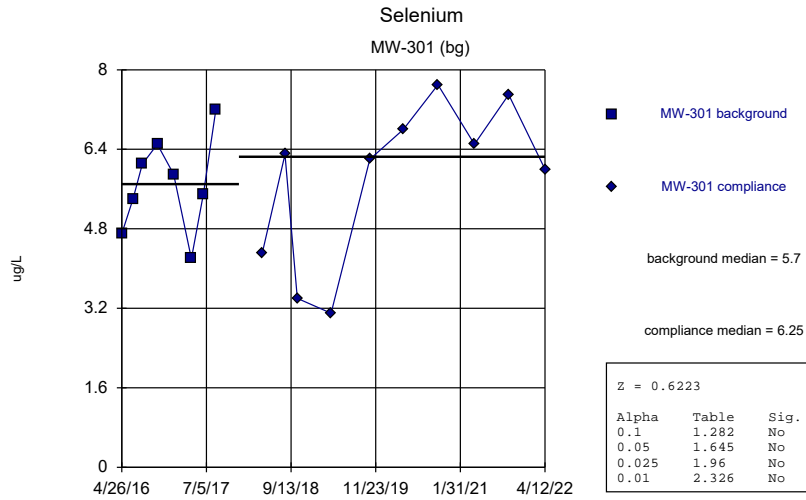
	MW-301	MW-301
4/26/2016	<0.039 (U)	
6/23/2016	<0.039 (U)	
8/10/2016	<0.039 (U)	
10/26/2016	<0.039 (U)	
1/18/2017	<0.039 (U)	
4/19/2017	<0.046 (U)	
6/20/2017	<0.046 (U)	
8/23/2017	<0.046 (U)	
4/18/2018		<0.09 (U)
8/14/2018		<0.083 (U)
1/8/2019		<0.09 (U)
4/8/2019		<0.1 (U)
10/24/2019		<0.1 (U)
4/14/2020		<0.1 (U)
4/14/2021		<0.15 (U)
10/7/2021		<0.15 (U)
4/12/2022		<0.11 (U)

Mann-Whitney (Wilcoxon Rank Sum)

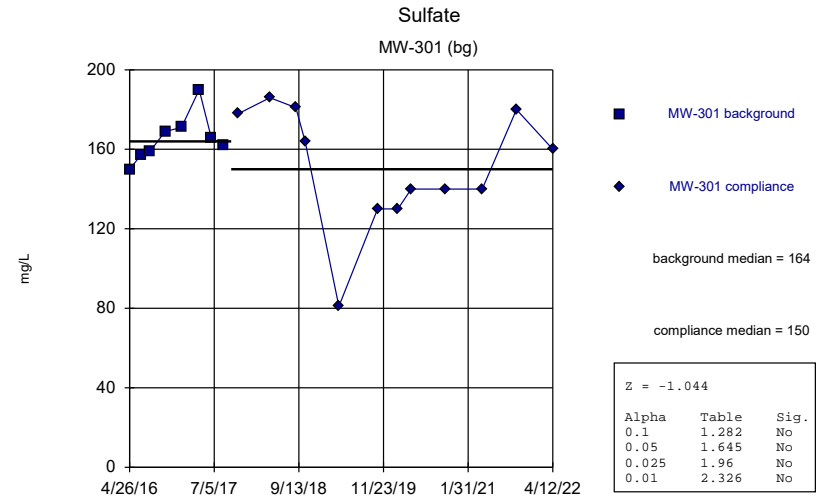
Constituent: Molybdenum (ug/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

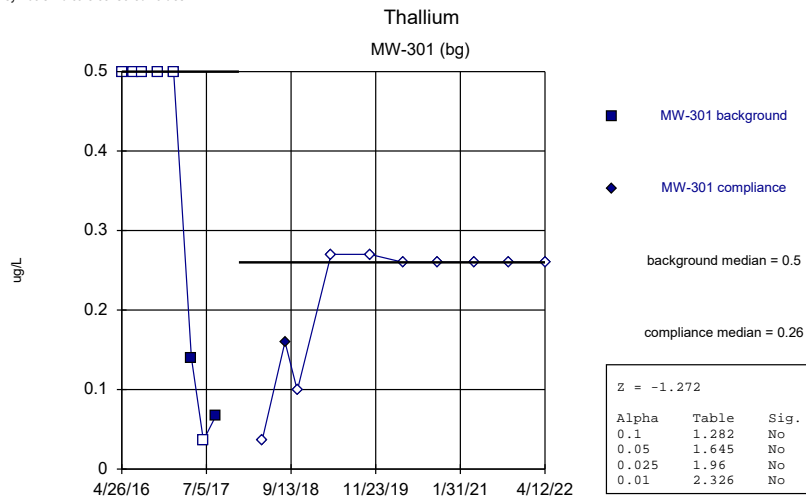
	MW-301	MW-301
4/26/2016	1.2	
6/23/2016	1.2	
8/10/2016	0.89 (J)	
10/26/2016	1	
1/18/2017	0.76 (J)	
4/19/2017	0.54 (J)	
6/20/2017	0.79 (J)	
8/23/2017	1.3	
4/18/2018		0.67 (J)
8/14/2018		1.3
10/16/2018		0.72 (J)
4/8/2019		<1.1 (U)
10/24/2019		1.1 (J)
4/14/2020		1.2 (J)
10/8/2020		<1.1 (U)
4/14/2021		<1.3 (U)
10/7/2021		<1.3 (U)
4/12/2022		<1.2 (U)



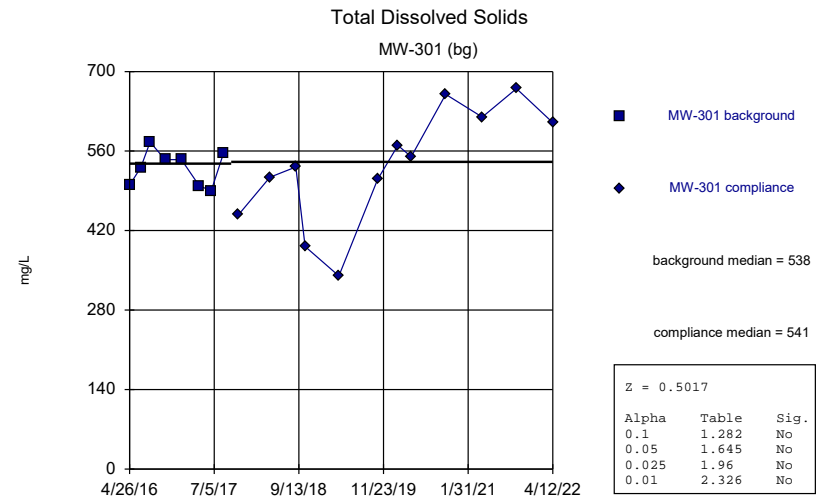
Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Selenium (ug/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301	MW-301
4/26/2016	4.7	
6/23/2016	5.4	
8/10/2016	6.1	
10/26/2016	6.5	
1/18/2017	5.9	
4/19/2017	4.2	
6/20/2017	5.5	
8/23/2017	7.2	
4/18/2018		4.3
8/14/2018		6.3
10/16/2018		3.4
4/8/2019		3.1 (J)
10/24/2019		6.2
4/14/2020		6.8
10/8/2020		7.7
4/14/2021		6.5
10/7/2021		7.5
4/12/2022		6

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Sulfate (mg/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301	MW-301
4/26/2016	150	
6/23/2016	157	
8/10/2016	159	
10/26/2016	169	
1/18/2017	171	
4/19/2017	190	
6/20/2017	166	
8/23/2017	162	
11/8/2017		178
4/18/2018		186
8/29/2018		181
10/16/2018		164
4/8/2019		81
10/24/2019		130
2/5/2020		130
4/14/2020		140
10/8/2020		140
4/14/2021		140
10/7/2021		180
4/12/2022		160

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Thallium (ug/L) Analysis Run 6/27/2022 11:52 AM

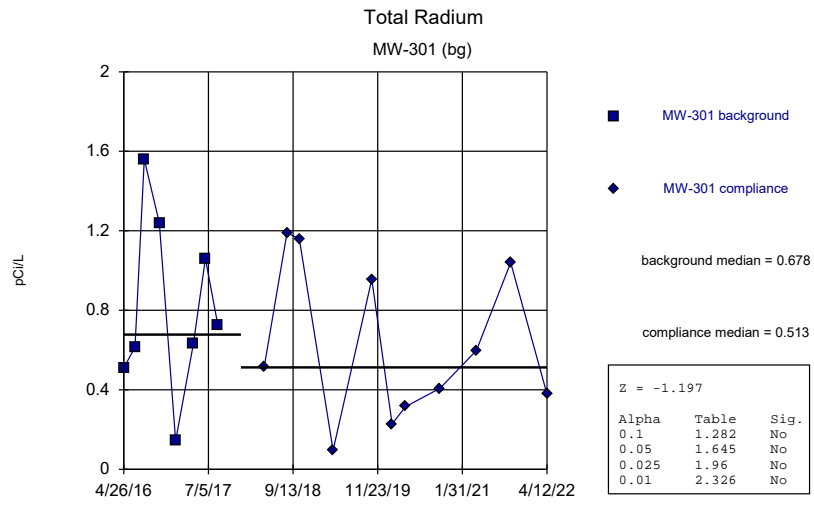
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301	MW-301
4/26/2016	<0.5 (U)	
6/23/2016	<0.5 (U)	
8/10/2016	<0.5 (U)	
10/26/2016	<0.5 (U)	
1/18/2017	<0.5 (U)	
4/19/2017	0.14 (J)	
6/20/2017	<0.036 (U)	
8/23/2017	0.067 (J)	
4/18/2018		<0.036 (U)
8/14/2018		0.16 (J)
10/16/2018		<0.099 (U)
4/8/2019		<0.27 (U)
10/24/2019		<0.27 (U)
4/14/2020		<0.26 (U)
10/8/2020		<0.26 (U)
4/14/2021		<0.26 (U)
10/7/2021		<0.26 (U)
4/12/2022		<0.26 (U)

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Total Dissolved Solids (mg/L) Analysis Run 6/27/2022 11:52 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301	MW-301
4/26/2016	500	
6/23/2016	531	
8/10/2016	576	
10/26/2016	545	
1/18/2017	545	
4/19/2017	499	
6/20/2017	490	
8/23/2017	557	
11/8/2017		448
4/18/2018		514
8/29/2018		532
10/16/2018		392
4/8/2019		340
10/24/2019		510
2/5/2020		570
4/14/2020		550
10/8/2020		660
4/14/2021		620
10/7/2021		670
4/12/2022		610



Mann-Whitney (Wilcoxon Rank Sum) Analysis Run 6/27/2022 11:50 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Mann-Whitney (Wilcoxon Rank Sum)

Constituent: Total Radium (pCi/L) Analysis Run 6/27/2022 11:52 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301	MW-301
4/26/2016	0.51	
6/23/2016	0.614	
8/10/2016	1.56	
10/26/2016	1.24	
1/18/2017	0.143	
4/19/2017	0.631	
6/20/2017	1.06	
8/23/2017	0.725	
4/18/2018		0.513
8/14/2018		1.19
10/16/2018		1.16
4/8/2019		0.0956
10/24/2019		0.956
2/5/2020		0.228
4/14/2020		0.315
10/8/2020		0.407
4/14/2021		0.598
10/7/2021		1.04
4/12/2022		0.378

Attachment 4

Interwell Prediction Limit Analysis

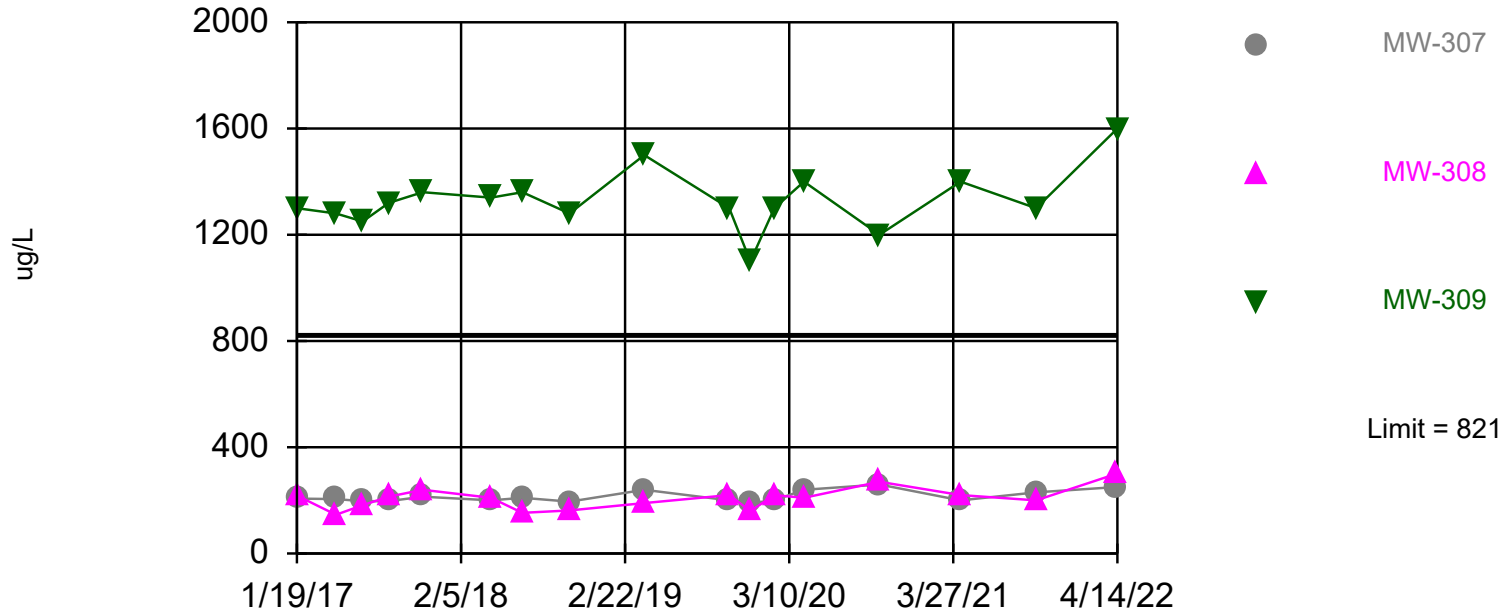
Prediction Limit

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122 Printed 8/10/2022, 10:20 AM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	Bg Wells	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (ug/L)	MW-307	821	4/11/2022	250	No	20	MW-301	609.8	111.8	0	None	No	0.002505	Param Inter 1 of 2
Boron (ug/L)	MW-308	821	4/12/2022	300	No	20	MW-301	609.8	111.8	0	None	No	0.002505	Param Inter 1 of 2
Boron (ug/L)	MW-309	821	4/14/2022	1600	Yes	20	MW-301	609.8	111.8	0	None	No	0.002505	Param Inter 1 of 2
Calcium (mg/L)	MW-307	101	4/11/2022	260	Yes	20	MW-301	71.58	15.36	0	None	No	0.002505	Param Inter 1 of 2
Calcium (mg/L)	MW-308	101	4/12/2022	240	Yes	20	MW-301	71.58	15.36	0	None	No	0.002505	Param Inter 1 of 2
Calcium (mg/L)	MW-309	101	4/14/2022	150	Yes	20	MW-301	71.58	15.36	0	None	No	0.002505	Param Inter 1 of 2
Chloride (mg/L)	MW-307	195	4/11/2022	330	Yes	20	MW-301	4.417	0.4542	0	None	In(x)	0.002505	Param Inter 1 of 2
Chloride (mg/L)	MW-308	195	4/12/2022	180	No	20	MW-301	4.417	0.4542	0	None	In(x)	0.002505	Param Inter 1 of 2
Chloride (mg/L)	MW-309	195	4/14/2022	61	No	20	MW-301	4.417	0.4542	0	None	In(x)	0.002505	Param Inter 1 of 2
Field pH (Std. Units)	MW-307	6.71	4/11/2022	6.63	No	23	MW-301	6.32	0.2091	0	None	No	0.002505	Param Inter 1 of 2
Field pH (Std. Units)	MW-308	6.71	4/12/2022	6.7	No	23	MW-301	6.32	0.2091	0	None	No	0.002505	Param Inter 1 of 2
Field pH (Std. Units)	MW-309	6.71	4/14/2022	7.16	Yes	23	MW-301	6.32	0.2091	0	None	No	0.002505	Param Inter 1 of 2
Fluoride (mg/L)	MW-307	0.366	4/11/2022	0.22ND	No	19	MW-301	-1.491	0.2544	31.58	Kapla...	In(x)	0.002505	Param Inter 1 of 2
Fluoride (mg/L)	MW-308	0.366	4/12/2022	0.22ND	No	19	MW-301	-1.491	0.2544	31.58	Kapla...	In(x)	0.002505	Param Inter 1 of 2
Fluoride (mg/L)	MW-309	0.366	4/14/2022	0.22ND	No	19	MW-301	-1.491	0.2544	31.58	Kapla...	In(x)	0.002505	Param Inter 1 of 2
Sulfate (mg/L)	MW-307	204	4/11/2022	140	No	20	MW-301	156.7	25.27	0	None	No	0.002505	Param Inter 1 of 2
Sulfate (mg/L)	MW-308	204	4/12/2022	320	Yes	20	MW-301	156.7	25.27	0	None	No	0.002505	Param Inter 1 of 2
Sulfate (mg/L)	MW-309	204	4/14/2022	420	Yes	20	MW-301	156.7	25.27	0	None	No	0.002505	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-307	684	4/11/2022	1100	Yes	20	MW-301	533	80.17	0	None	No	0.002505	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-308	684	4/12/2022	1000	Yes	20	MW-301	533	80.17	0	None	No	0.002505	Param Inter 1 of 2
Total Dissolved Solids (mg/L)	MW-309	684	4/14/2022	940	Yes	20	MW-301	533	80.17	0	None	No	0.002505	Param Inter 1 of 2

Exceeds Limit: MW-309

Boron Interwell Parametric



Background Data Summary: Mean=609.8, Std. Dev.=111.8, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9757, critical = 0.868. Kappa = 1.888 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.002505. Comparing 3 points to limit.

Prediction Limit Analysis Run 8/10/2022 10:15 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

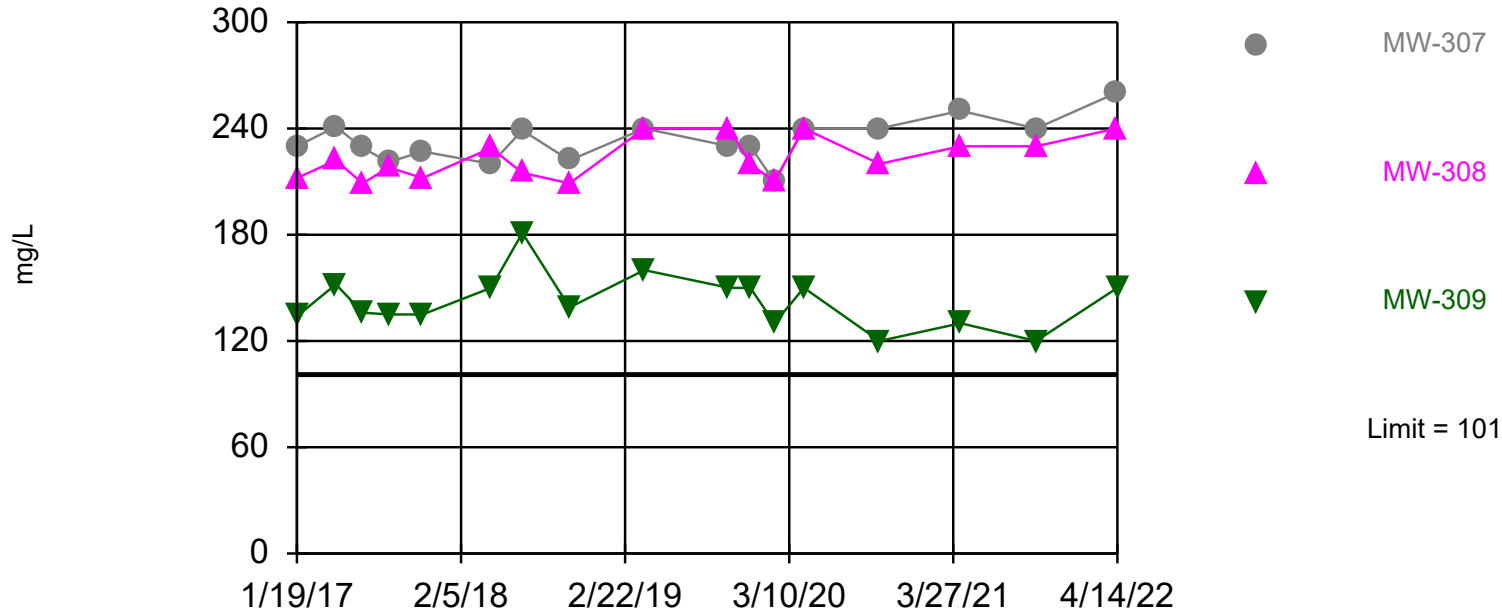
Prediction Limit

Constituent: Boron (ug/L) Analysis Run 8/10/2022 10:20 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-307	MW-309	MW-308
4/26/2016	574			
6/23/2016	612			
8/10/2016	597			
10/26/2016	620			
1/18/2017	599			
1/19/2017		207	1300	218
4/19/2017	565			
4/20/2017		205	1280	146
6/20/2017	657			
6/21/2017		197	1250	182
8/21/2017		197	1320	214
8/23/2017	779			
11/8/2017	488	214	1360	240
4/16/2018		200	1340	210
4/18/2018	480			
6/28/2018		210	1360	153
8/14/2018	735			
10/16/2018	410	195	1280	162
4/8/2019	380	240	1500	190 (J)
10/23/2019		200	1300	220
10/24/2019	680			
12/11/2019		190 (J)	1100	160 (J)
2/5/2020	540	200	1300	220
4/14/2020	700	240	1400	210
10/7/2020		260	1200	270
10/8/2020	650			
4/14/2021	690	200	1400	220
10/7/2021	800	230	1300	200
4/11/2022		250		
4/12/2022	640			300
4/14/2022			1600	

Exceeds Limit: MW-307, MW-308, MW-309

Calcium Interwell Parametric



Background Data Summary: Mean=71.58, Std. Dev.=15.36, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9478, critical = 0.868. Kappa = 1.888 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.002505. Comparing 3 points to limit.

Prediction Limit Analysis Run 8/10/2022 10:15 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Prediction Limit

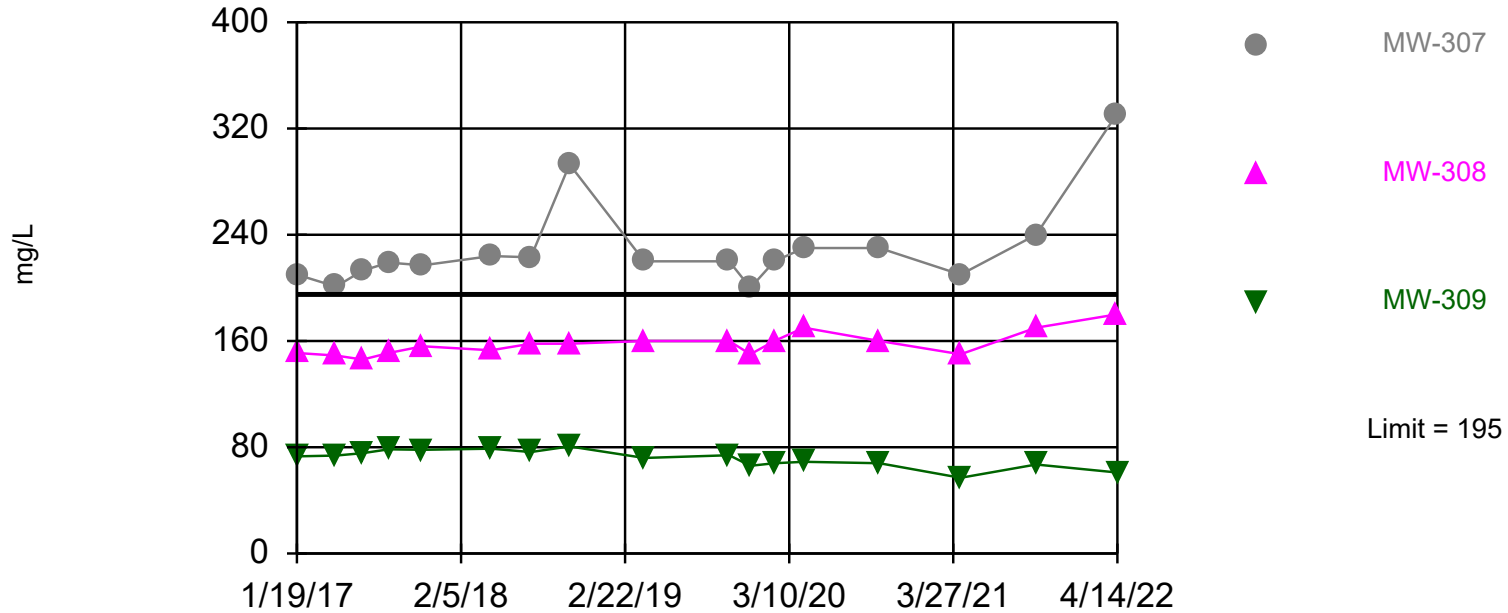
Constituent: Calcium (mg/L) Analysis Run 8/10/2022 10:20 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-307	MW-309	MW-308
4/26/2016	66.9			
6/23/2016	62.5			
8/10/2016	65.6			
10/26/2016	71.9			
1/18/2017	74.1			
1/19/2017		230	134	212
4/19/2017	61.5			
4/20/2017		241	152	222
6/20/2017	59.3			
6/21/2017		229	136	209
8/21/2017		221	135	218
8/23/2017	66.8			
11/8/2017	65.2	227	135	212
4/16/2018		220	150	229
4/18/2018	63			
6/28/2018		239	181	215
8/14/2018	72.5			
10/16/2018	47.2	222	139	209
4/8/2019	43	240	160	240
10/23/2019		230	150	240
10/24/2019	78			
12/11/2019		230	150	220
2/5/2020	68	210	130	210
4/14/2020	84	240	150	240
10/7/2020		240	120	220
10/8/2020	94			
4/14/2021	96	250	130	230
10/7/2021	100	240	120	230
4/11/2022		260		
4/12/2022	92			240
4/14/2022			150	

Exceeds Limit: MW-307

Chloride Interwell Parametric



Background Data Summary (based on natural log transformation): Mean=4.417, Std. Dev.=0.4542, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9269, critical = 0.868. Kappa = 1.888 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.002505. Comparing 3 points to limit.

Prediction Limit Analysis Run 8/10/2022 10:15 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Prediction Limit

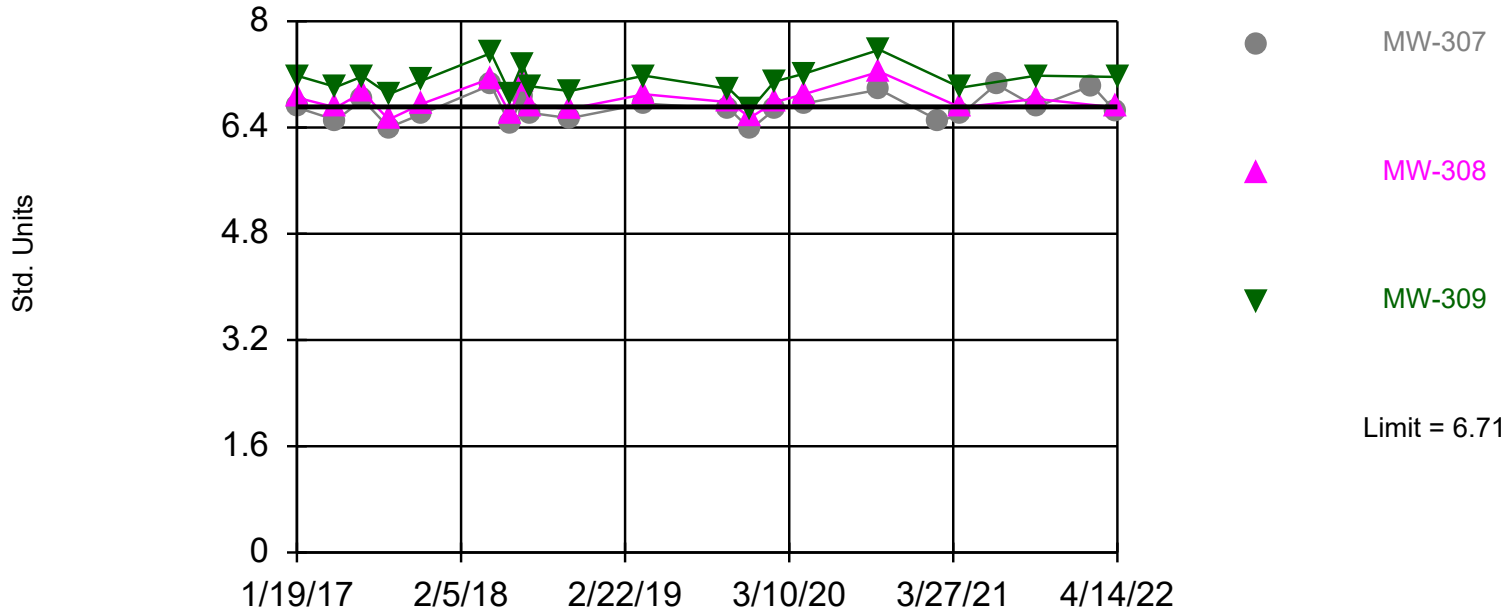
Constituent: Chloride (mg/L) Analysis Run 8/10/2022 10:20 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-307	MW-309	MW-308
4/26/2016	63.4			
6/23/2016	66.9			
8/10/2016	73.3			
10/26/2016	76.3			
1/18/2017	71.6			
1/19/2017		210	73.1	151
4/19/2017	54.8			
4/20/2017		201	73.7	149
6/20/2017	69.8			
6/21/2017		213	75.5	146
8/21/2017		219	78.4	151
8/23/2017	73.5			
11/8/2017	59.8	217	78.1	156
4/16/2018		224	78.9	153
4/18/2018	63.4			
7/18/2018		223	76.4	158
8/29/2018	63.1			
10/16/2018	33.9	293	80.6	158
4/8/2019	50	220	72	160
10/23/2019		220	74	160
10/24/2019	110			
12/11/2019		200	66	150
2/5/2020	120	220	68	160
4/14/2020	140	230	69	170
10/7/2020		230	68	160
10/8/2020	170			
4/14/2021	150	210	57	150
10/7/2021	180	240	67	170
4/11/2022		330		
4/12/2022	140			180
4/14/2022			61	

Exceeds Limit: MW-309

Field pH Interwell Parametric



Background Data Summary: Mean=6.32, Std. Dev.=0.2091, n=23. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.921, critical = 0.881. Kappa = 1.856 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.002505. Comparing 3 points to limit.

Prediction Limit Analysis Run 8/10/2022 10:15 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

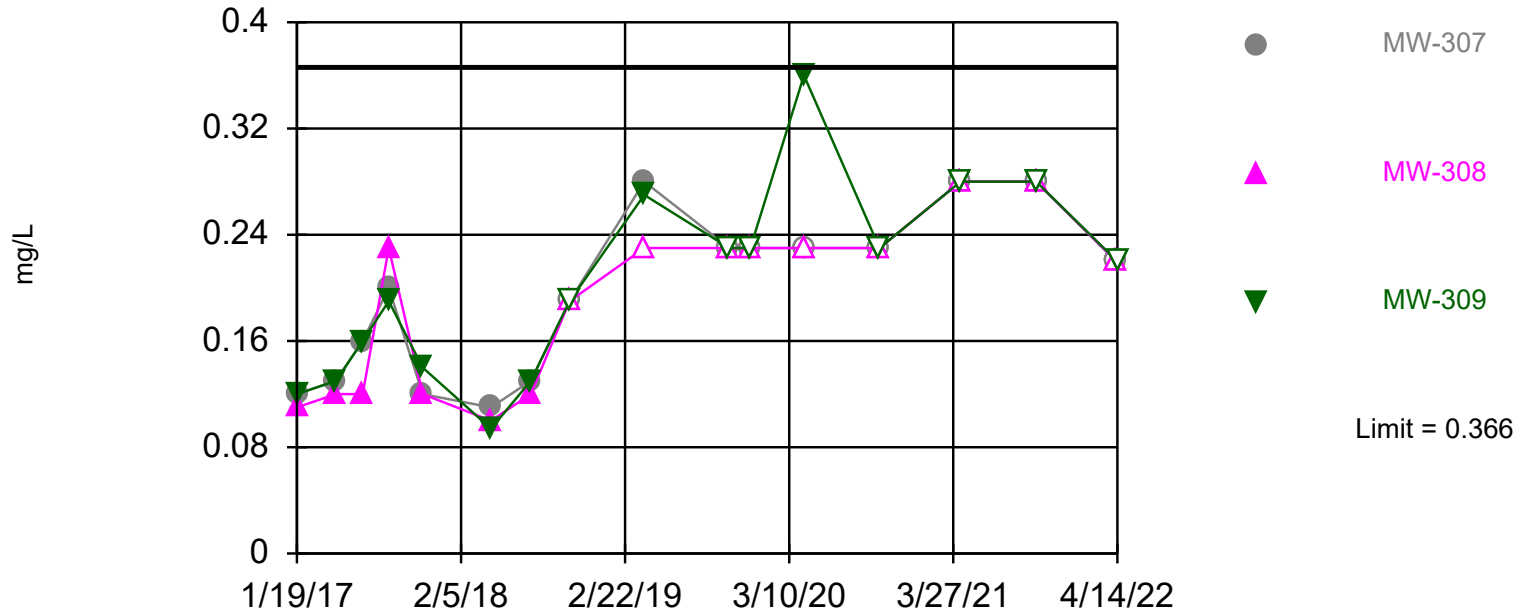
Prediction Limit

Constituent: Field pH (Std. Units) Analysis Run 8/10/2022 10:20 AM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-307	MW-308	MW-309
4/26/2016	6.54			
6/23/2016	6.06			
8/10/2016	6.08			
10/26/2016	6.26			
1/18/2017	6.47			
1/19/2017		6.7	6.85	7.18
4/19/2017	6.64			
4/20/2017		6.51	6.7	7.01
6/20/2017	6.31			
6/21/2017		6.82	6.93	7.17
8/21/2017		6.4	6.52	6.9
8/23/2017	6.16			
11/8/2017	6.41	6.61	6.76	7.11
4/16/2018		7.04	7.14	7.52
4/18/2018	6.41			
5/30/2018		6.44	6.61	6.92
6/28/2018		6.87	7.08	7.36
7/18/2018		6.62	6.73	7.02
8/14/2018	6.26			
8/29/2018	6.31			
10/16/2018	6.27	6.54	6.68	6.95
1/8/2019	5.68			
4/8/2019	6.61	6.76	6.9	7.18
10/23/2019		6.68	6.78	6.98
10/24/2019	6.33			
12/11/2019		6.37	6.55	6.67
2/5/2020	6.39	6.67	6.78	7.09
3/12/2020	6.48			
4/14/2020	6.58	6.76	6.9	7.21
10/7/2020		6.97	7.24	7.57
10/8/2020	6.22			
2/23/2021		6.5		
4/14/2021	6.26	6.59	6.7	7
7/6/2021		7.05		
10/7/2021	6.26	6.71	6.83	7.18
2/14/2022		7.03		
4/11/2022		6.63		
4/12/2022	6.37		6.7	
4/14/2022				7.16

Within Limit

Fluoride Interwell Parametric



Background Data Summary (based on natural log transformation) (after Kaplan-Meier Adjustment): Mean=-1.491, Std. Dev.=0.2544, n=19, 31.58% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9193, critical = 0.863. Kappa = 1.906 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.002505. Comparing 3 points to limit.

Prediction Limit Analysis Run 8/10/2022 10:15 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 8/10/2022 10:20 AM

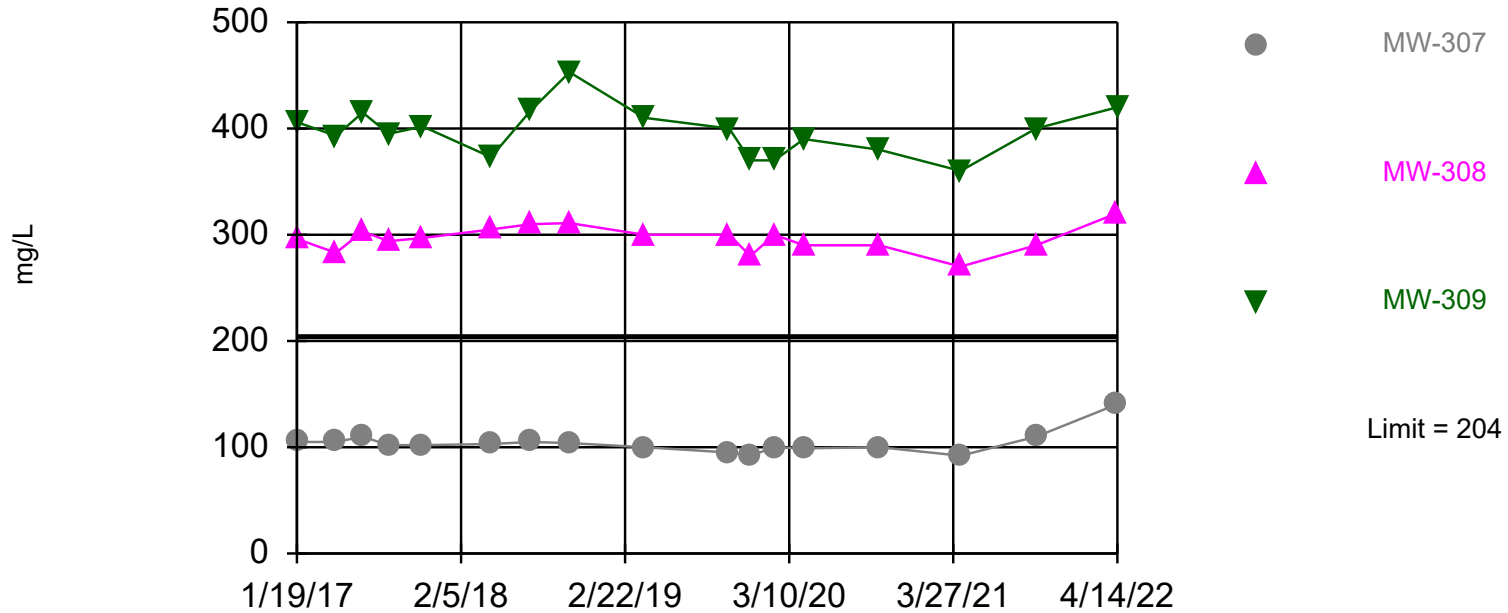
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-307	MW-309	MW-308
4/26/2016	0.22			
6/23/2016	0.2 (J)			
8/10/2016	0.44			
10/26/2016	0.27			
1/18/2017	0.17 (J)			
1/19/2017		0.12 (J)	0.12 (J)	0.11 (J)
4/19/2017	0.24			
4/20/2017		0.13 (J)	0.13 (J)	0.12 (J)
6/20/2017	0.26			
6/21/2017		0.16 (J)	0.16 (J)	0.12 (J)
8/21/2017		0.2	0.19 (J)	0.23
8/23/2017	0.34			
11/8/2017	0.27	0.12 (J)	0.14 (J)	0.12 (J)
4/16/2018		0.11 (J)	0.094 (J)	0.1 (J)
4/18/2018	0.22			
7/18/2018		0.13 (J)	0.13 (J)	0.12 (J)
8/29/2018	0.27			
10/16/2018	0.3	<0.19 (U)	<0.19 (U)	<0.19 (U)
4/8/2019	0.44 (J)	0.28 (J)	0.27 (J)	<0.23 (U)
10/23/2019		<0.23 (U)	<0.23 (U)	<0.23 (U)
10/24/2019	<0.23 (U)			
12/11/2019		<0.23 (U)	<0.23 (U)	<0.23 (U)
4/14/2020	<0.23 (U)	<0.23 (U)	0.36 (J)	<0.23 (U)
10/7/2020		<0.23 (U)	<0.23 (U)	<0.23 (U)
10/8/2020	<0.23 (U)			
4/14/2021	<0.28 (U)	<0.28 (U)	<0.28 (U)	<0.28 (U)
10/7/2021	<0.28 (U)	<0.28 (U)	<0.28 (U)	<0.28 (U)
4/11/2022		<0.22 (U)		
4/12/2022	<0.22 (U)			<0.22 (U)
4/14/2022			<0.22 (U)	

Exceeds Limit: MW-308, MW-309

Sulfate

Interwell Parametric



Background Data Summary: Mean=156.7, Std. Dev.=25.27, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8975, critical = 0.868. Kappa = 1.888 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.002505. Comparing 3 points to limit.

Prediction Limit Analysis Run 8/10/2022 10:15 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Prediction Limit

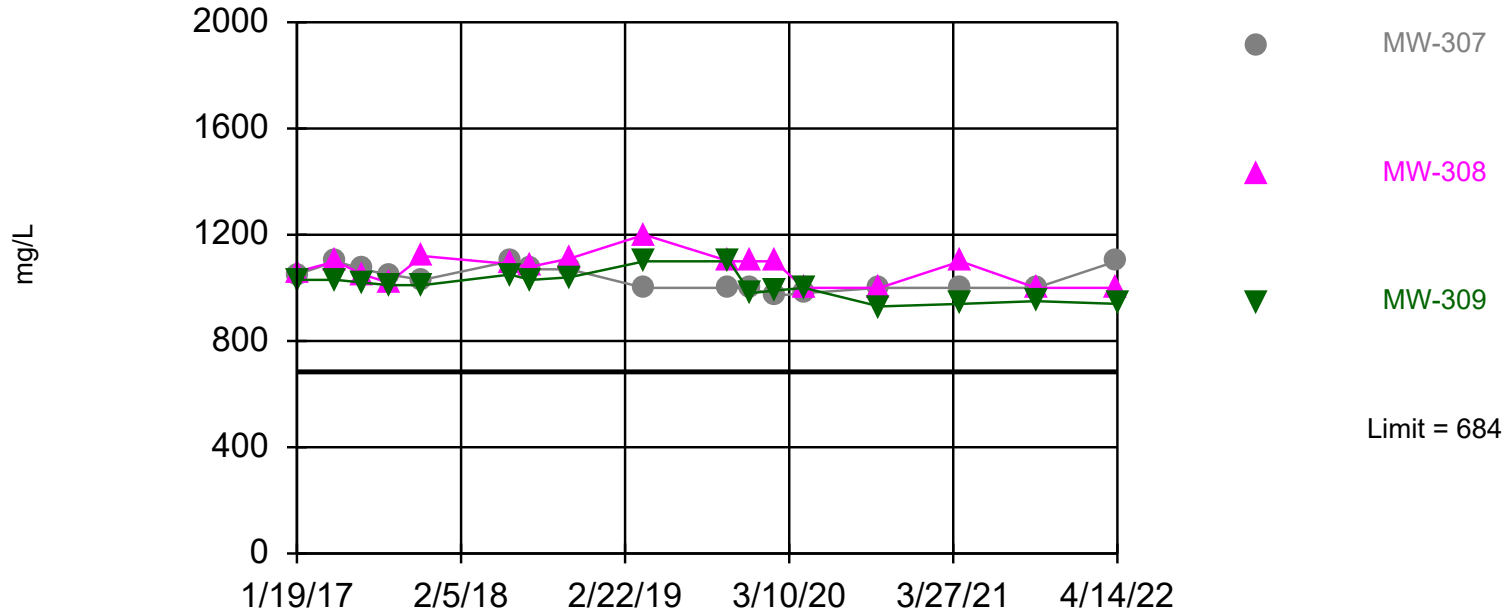
Constituent: Sulfate (mg/L) Analysis Run 8/10/2022 10:20 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-307	MW-309	MW-308
4/26/2016	150			
6/23/2016	157			
8/10/2016	159			
10/26/2016	169			
1/18/2017	171			
1/19/2017		105	406	296
4/19/2017	190			
4/20/2017		105	393	283
6/20/2017	166			
6/21/2017		110	415	303
8/21/2017		102	395	294
8/23/2017	162			
11/8/2017	178	102	402	297
4/16/2018		103	373	305
4/18/2018	186			
7/18/2018		105	417	310
8/29/2018	181			
10/16/2018	164	104	453	311
4/8/2019	81	100	410	300
10/23/2019		95	400	300
10/24/2019	130			
12/11/2019		92	370	280
2/5/2020	130	100	370	300
4/14/2020	140	99	390	290
10/7/2020		100	380	290
10/8/2020	140			
4/14/2021	140	92	360	270
10/7/2021	180	110	400	290
4/11/2022		140		
4/12/2022	160			320
4/14/2022			420	

Exceeds Limit: MW-307, MW-308, MW-309

Total Dissolved Solids Interwell Parametric



Background Data Summary: Mean=533, Std. Dev.=80.17, n=20. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9569, critical = 0.868. Kappa = 1.888 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.002505. Comparing 3 points to limit.

Prediction Limit Analysis Run 8/10/2022 10:15 AM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Prediction Limit

Constituent: Total Dissolved Solids (mg/L) Analysis Run 8/10/2022 10:20 AM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-307	MW-309	MW-308
4/26/2016	500			
6/23/2016	531			
8/10/2016	576			
10/26/2016	545			
1/18/2017	545			
1/19/2017		1050	1030	1060
4/19/2017	499			
4/20/2017		1100	1030	1100
6/20/2017	490			
6/21/2017		1070	1020	1050
8/21/2017		1050	1010	1020
8/23/2017	557			
11/8/2017	448	1030	1010	1120
4/18/2018	514			
5/30/2018		1100	1050	1090
7/18/2018		1070	1030	1080
8/29/2018	532			
10/16/2018	392	1070	1040	1110
4/8/2019	340	1000	1100	1200
10/23/2019		1000	1100	1100
10/24/2019	510			
12/11/2019		1000	980	1100
2/5/2020	570	970	990	1100
4/14/2020	550	980	1000	1000
10/7/2020		1000	930	1000
10/8/2020	660			
4/14/2021	620	1000	940	1100
10/7/2021	670	1000	950	1000
4/11/2022		1100		
4/12/2022	610			1000
4/14/2022			940	

Attachment 5

Interwell Tolerance Limit Analysis

Tolerance Limit

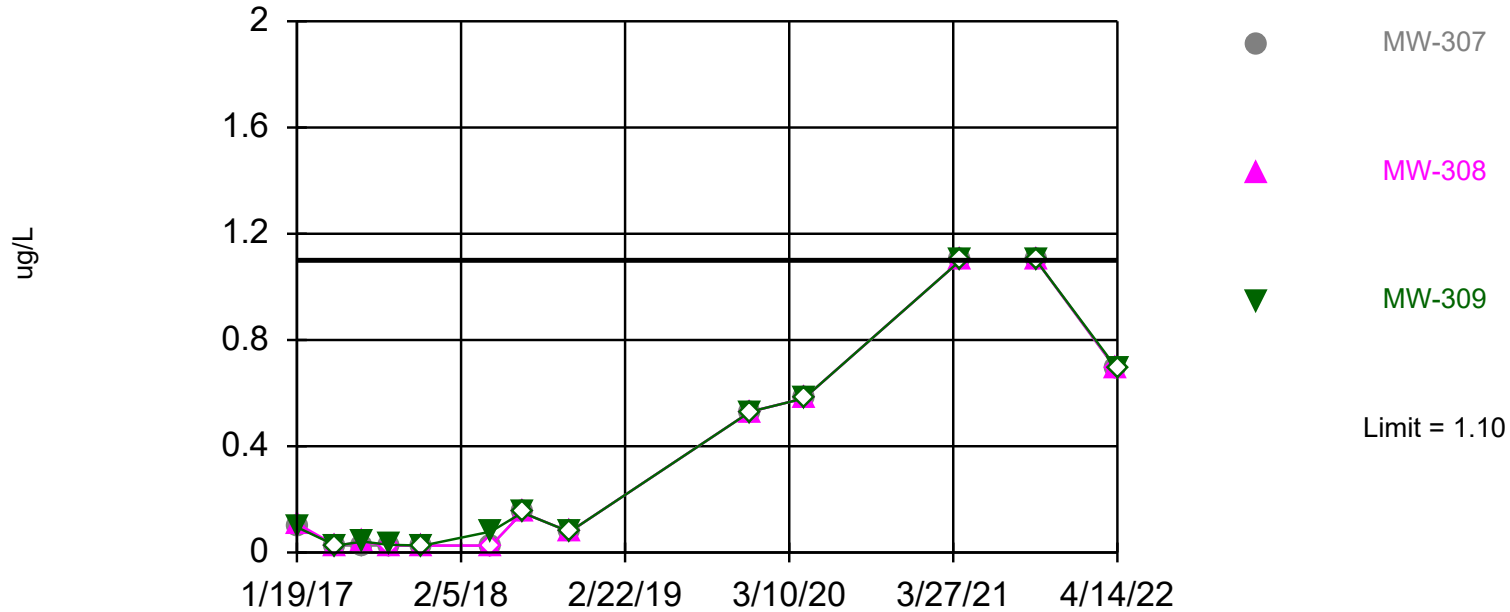
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122 Printed 8/10/2022, 2:23 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</u>	<u>Bg N</u>	<u>Bg Wells</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Antimony (ug/L)	MW-307	1.10	4/11/2022	0.69	No	18	MW-301	66.67	n/a	n/a	0.1553	NP Inter(NDs)
Antimony (ug/L)	MW-308	1.10	4/12/2022	<0.69 (U)	No	18	MW-301	66.67	n/a	n/a	0.1553	NP Inter(NDs)
Antimony (ug/L)	MW-309	1.10	4/14/2022	<0.69 (U)	No	18	MW-301	66.67	n/a	n/a	0.1553	NP Inter(NDs)
Arsenic (ug/L)	MW-307	0.880	4/11/2022	0.77	No	19	MW-301	42.11	n/a	n/a	0.1461	NP Inter(normal...
Arsenic (ug/L)	MW-308	0.880	4/12/2022	<0.75 (U)	No	19	MW-301	42.11	n/a	n/a	0.1461	NP Inter(normal...
Arsenic (ug/L)	MW-309	0.880	4/14/2022	<0.75 (U)	No	19	MW-301	42.11	n/a	n/a	0.1461	NP Inter(normal...
Barium (ug/L)	MW-307	71	4/11/2022	150	Yes	19	MW-301	0	None	No	0.01695	Inter
Barium (ug/L)	MW-308	71	4/12/2022	140	Yes	19	MW-301	0	None	No	0.01695	Inter
Barium (ug/L)	MW-309	71	4/14/2022	55	No	19	MW-301	0	None	No	0.01695	Inter
Beryllium (ug/L)	MW-307	0.270	4/11/2022	<0.27 (U)	No	17	MW-301	94.12	n/a	n/a	0.1651	NP Inter(NDs)
Beryllium (ug/L)	MW-308	0.270	4/12/2022	<0.27 (U)	No	17	MW-301	94.12	n/a	n/a	0.1651	NP Inter(NDs)
Beryllium (ug/L)	MW-309	0.270	4/14/2022	<0.27 (U)	No	17	MW-301	94.12	n/a	n/a	0.1651	NP Inter(NDs)
Cadmium (ug/L)	MW-307	0.149	4/11/2022	<0.055 (U)	No	19	MW-301	47.37	Kapla...	ln(x)	0.01695	Inter
Cadmium (ug/L)	MW-308	0.149	4/12/2022	<0.055 (U)	No	19	MW-301	47.37	Kapla...	ln(x)	0.01695	Inter
Cadmium (ug/L)	MW-309	0.149	4/14/2022	<0.055 (U)	No	19	MW-301	47.37	Kapla...	ln(x)	0.01695	Inter
Chromium (ug/L)	MW-307	1.10	4/11/2022	<1.1 (U)	No	19	MW-301	52.63	n/a	n/a	0.1461	NP Inter(NDs)
Chromium (ug/L)	MW-308	1.10	4/12/2022	<1.1 (U)	No	19	MW-301	52.63	n/a	n/a	0.1461	NP Inter(NDs)
Chromium (ug/L)	MW-309	1.10	4/14/2022	<1.1 (U)	No	19	MW-301	52.63	n/a	n/a	0.1461	NP Inter(NDs)
Cobalt (ug/L)	MW-307	5.26	4/11/2022	31	Yes	20	MW-301	0	None	ln(x)	0.01695	Inter
Cobalt (ug/L)	MW-308	5.26	4/12/2022	0.24	No	20	MW-301	0	None	ln(x)	0.01695	Inter
Cobalt (ug/L)	MW-309	5.26	4/14/2022	2	No	20	MW-301	0	None	ln(x)	0.01695	Inter
Fluoride (mg/L)	MW-307	0.417	4/11/2022	<0.22 (U)	No	19	MW-301	31.58	Kapla...	ln(x)	0.01695	Inter
Fluoride (mg/L)	MW-308	0.417	4/12/2022	<0.22 (U)	No	19	MW-301	31.58	Kapla...	ln(x)	0.01695	Inter
Fluoride (mg/L)	MW-309	0.417	4/14/2022	<0.22 (U)	No	19	MW-301	31.58	Kapla...	ln(x)	0.01695	Inter
Lead (ug/L)	MW-307	0.270	4/11/2022	<0.24 (U)	No	19	MW-301	73.68	n/a	n/a	0.1461	NP Inter(NDs)
Lead (ug/L)	MW-308	0.270	4/12/2022	<0.24 (U)	No	19	MW-301	73.68	n/a	n/a	0.1461	NP Inter(NDs)
Lead (ug/L)	MW-309	0.270	4/14/2022	<0.24 (U)	No	19	MW-301	73.68	n/a	n/a	0.1461	NP Inter(NDs)
Lithium (ug/L)	MW-307	31.8	4/11/2022	14	No	20	MW-301	0	None	No	0.01695	Inter
Lithium (ug/L)	MW-308	31.8	4/12/2022	17	No	20	MW-301	0	None	No	0.01695	Inter
Lithium (ug/L)	MW-309	31.8	4/14/2022	9.2	No	20	MW-301	0	None	No	0.01695	Inter
Mercury (ug/L)	MW-307	0.110	4/11/2022	<0.11 (U)	No	17	MW-301	100	n/a	n/a	0.1651	NP Inter(NDs)
Mercury (ug/L)	MW-308	0.110	4/12/2022	<0.11 (U)	No	17	MW-301	100	n/a	n/a	0.1651	NP Inter(NDs)
Mercury (ug/L)	MW-309	0.110	4/14/2022	<0.11 (U)	No	17	MW-301	100	n/a	n/a	0.1651	NP Inter(NDs)
Molybdenum (ug/L)	MW-307	1.30	4/11/2022	<1.2 (U)	No	18	MW-301	27.78	n/a	n/a	0.1553	NP Inter(normal...
Molybdenum (ug/L)	MW-308	1.30	4/12/2022	1.4	No	18	MW-301	27.78	n/a	n/a	0.1553	NP Inter(normal...
Molybdenum (ug/L)	MW-309	1.30	4/14/2022	<1.2 (U)	No	18	MW-301	27.78	n/a	n/a	0.1553	NP Inter(normal...
Selenium (ug/L)	MW-307	9.01	4/11/2022	<0.96 (U)	No	18	MW-301	0	None	No	0.01695	Inter
Selenium (ug/L)	MW-308	9.01	4/12/2022	<0.96 (U)	No	18	MW-301	0	None	No	0.01695	Inter
Selenium (ug/L)	MW-309	9.01	4/14/2022	<0.96 (U)	No	18	MW-301	0	None	No	0.01695	Inter
Thallium (ug/L)	MW-307	0.500	4/11/2022	<0.26 (U)	No	18	MW-301	83.33	n/a	n/a	0.1553	NP Inter(NDs)
Thallium (ug/L)	MW-308	0.500	4/12/2022	<0.26 (U)	No	18	MW-301	83.33	n/a	n/a	0.1553	NP Inter(NDs)
Thallium (ug/L)	MW-309	0.500	4/14/2022	<0.26 (U)	No	18	MW-301	83.33	n/a	n/a	0.1553	NP Inter(NDs)
Total Radium (pCi/L)	MW-307	1.71	4/11/2022	2.84	Yes	19	MW-301	0	None	No	0.01695	Inter
Total Radium (pCi/L)	MW-308	1.71	4/12/2022	2.29	Yes	19	MW-301	0	None	No	0.01695	Inter
Total Radium (pCi/L)	MW-309	1.71	4/14/2022	0.922	No	19	MW-301	0	None	No	0.01695	Inter

Within Limit

Antimony

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Most recent observation is compared with limit. Limit is highest of 18 background values. 66.67% NDs. 77.54% coverage at alpha=0.01; 84.57% coverage at alpha=0.05; 96.29% coverage at alpha=0.5. Report alpha = 0.3972.

Tolerance Limit Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Tolerance Limit

Constituent: Antimony (ug/L) Analysis Run 8/10/2022 2:22 PM

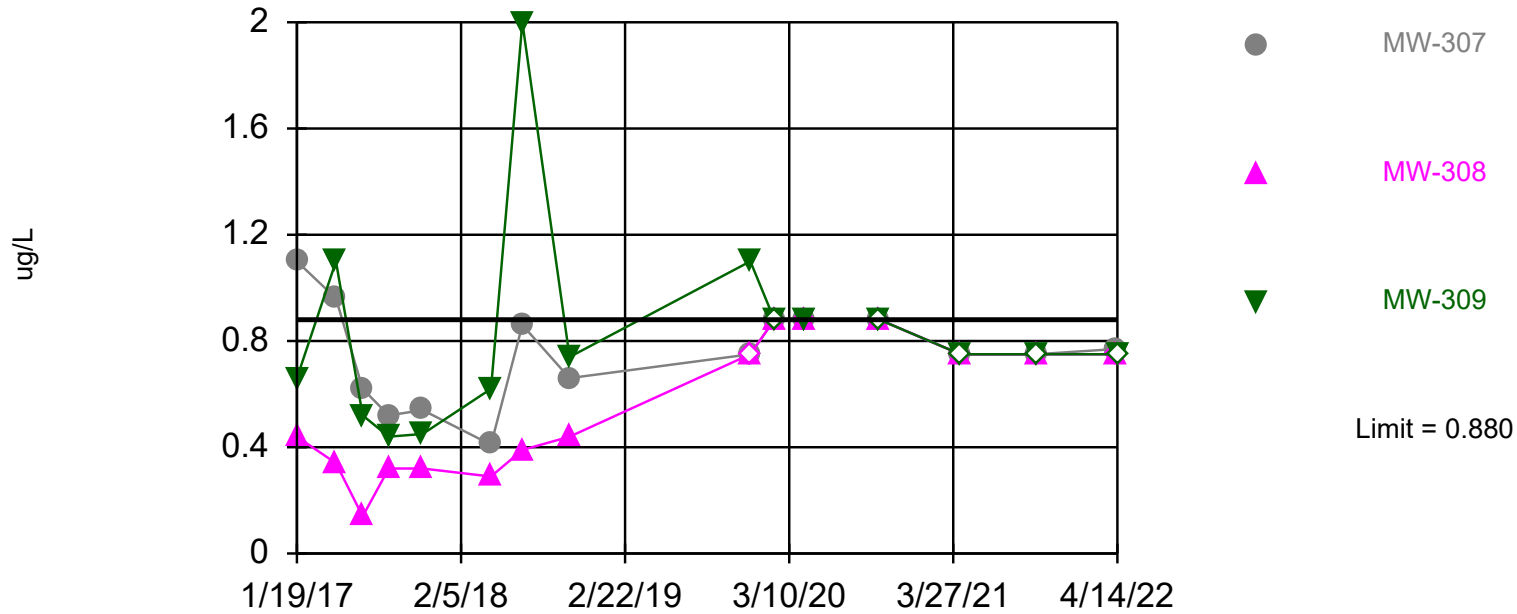
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-308	MW-309	MW-307
4/26/2016	<0.058 (U)			
6/23/2016	0.13 (J)			
8/10/2016	0.12 (J)			
10/26/2016	<0.058 (U)			
1/18/2017	0.11 (J)			
1/19/2017		0.11 (J)	0.095 (J)	0.1 (J)
4/19/2017	<0.026 (U)			
4/20/2017		<0.026 (U)	<0.026 (U)	<0.026 (U)
6/20/2017	0.054 (J)			
6/21/2017		0.039 (J)	0.041 (J)	<0.026 (U)
8/21/2017		<0.026 (U)	0.029 (J)	<0.026 (U)
8/23/2017	0.063 (J)			
11/8/2017		<0.026 (U)	<0.026 (U)	<0.026 (U)
4/16/2018		<0.026 (U)	0.079 (J)	<0.026 (U)
4/18/2018	<0.026 (U)			
6/28/2018		<0.15 (U)	<0.15 (U)	<0.15 (U)
8/14/2018	0.2 (J)			
10/16/2018	<0.078 (U)	<0.078 (U)	<0.078 (U)	<0.078 (U)
4/8/2019	<0.53 (U)			
10/24/2019	<0.53 (U)			
12/11/2019		<0.53 (U)	<0.53 (U)	<0.53 (U)
4/14/2020	<0.58 (U)	<0.58 (U)	<0.58 (U)	<0.58 (U)
10/8/2020	<0.51 (U)			
4/14/2021	<1.1 (U)	<1.1 (U)	<1.1 (U)	<1.1 (U)
10/7/2021	<1.1 (U)	<1.1 (U)	<1.1 (U)	<1.1 (U)
4/11/2022				0.69 (J)
4/12/2022	<0.69 (U)	<0.69 (U)		
4/14/2022			<0.69 (U)	

Within Limit

Arsenic

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Most recent observation is compared with limit. Limit is highest of 19 background values. 42.11% NDs. 78.32% coverage at alpha=0.01; 85.35% coverage at alpha=0.05; 96.29% coverage at alpha=0.5. Report alpha = 0.3774.

Tolerance Limit Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

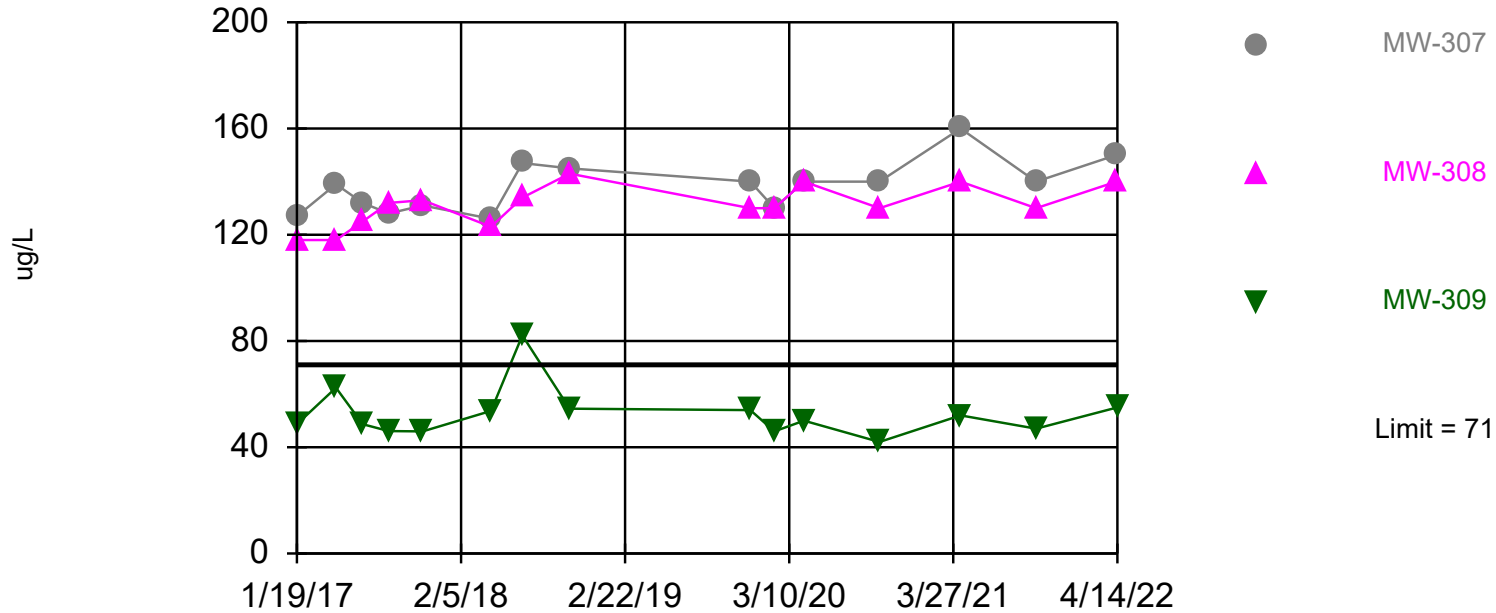
Tolerance Limit

Constituent: Arsenic (ug/L) Analysis Run 8/10/2022 2:22 PM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-308	MW-309	MW-307
4/26/2016	0.38 (J)			
6/23/2016	0.38 (J)			
8/10/2016	0.26 (J)			
10/26/2016	0.14 (J)			
1/18/2017	0.23 (J)			
1/19/2017		0.44 (J)	0.66 (J)	1.1
4/19/2017	0.22 (J)			
4/20/2017		0.34 (J)	1.1	0.96 (J)
6/20/2017	0.15 (J)			
6/21/2017		0.14 (J)	0.52 (J)	0.62 (J)
8/21/2017		0.32 (J)	0.44 (J)	0.52 (J)
8/23/2017	0.14 (J)			
11/8/2017		0.32 (J)	0.45 (J)	0.54 (J)
4/16/2018		0.29 (J)	0.62 (J)	0.41 (J)
4/18/2018	0.074 (J)			
6/28/2018		0.39 (J)	2	0.86 (J)
8/14/2018	0.29 (J)			
10/16/2018	0.16 (J)	0.44 (J)	0.74 (J)	0.66 (J)
4/8/2019	<0.75 (U)			
10/24/2019	<0.75 (U)			
12/11/2019		<0.75 (U)	1.1 (J)	<0.75 (U)
2/5/2020	<0.88 (U)	<0.88 (U)	<0.88 (U)	<0.88 (U)
4/14/2020	<0.88 (U)	<0.88 (U)	0.88 (J)	<0.88 (U)
10/7/2020		<0.88 (U)	<0.88 (U)	<0.88 (U)
10/8/2020	<0.88 (U)			
4/14/2021	<0.75 (U)	<0.75 (U)	<0.75 (U)	<0.75 (U)
10/7/2021	<0.75 (U)	<0.75 (U)	<0.75 (U)	<0.75 (U)
4/11/2022				0.77 (J)
4/12/2022	<0.75 (U)	<0.75 (U)		
4/14/2022			<0.75 (U)	

Exceeds Limit: MW-307, MW-308

Barium Interwell Parametric



95% coverage. Most recent observation is compared with limit. Background Data Summary: Mean=45.68, Std. Dev.=10.46, n=19. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9443, critical = 0.901. Report alpha = 0.05.

Tolerance Limit Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Tolerance Limit

Constituent: Barium (ug/L) Analysis Run 8/10/2022 2:22 PM

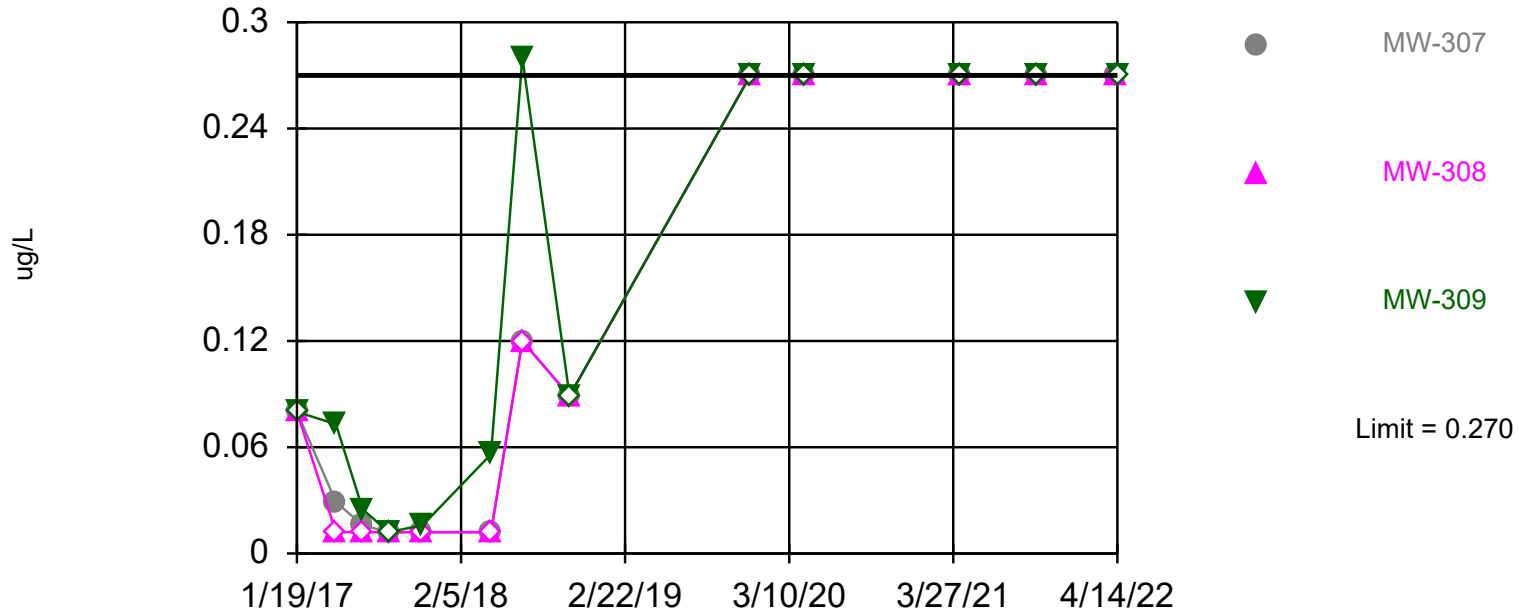
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-308	MW-309	MW-307
4/26/2016	51.6			
6/23/2016	55.8			
8/10/2016	52.3			
10/26/2016	53.3			
1/18/2017	42.4			
1/19/2017		118	48.7	127
4/19/2017	35.5			
4/20/2017		118	62.4	139
6/20/2017	39.9			
6/21/2017		125	48.7	132
8/21/2017		132	46.1	128
8/23/2017	44			
11/8/2017		133	46	131
4/16/2018		123	53.7	126
4/18/2018	31.6			
6/28/2018		134	82.1	147
8/14/2018	44.5			
10/16/2018	28.1	143	54.5	145
4/8/2019	25			
10/24/2019	56			
12/11/2019		130	54	140
2/5/2020	43	130	46	130
4/14/2020	54	140	50	140
10/7/2020		130	42	140
10/8/2020	58			
4/14/2021	52	140	52	160
10/7/2021	61	130	47	140
4/11/2022				150
4/12/2022	40	140		
4/14/2022			55	

Within Limit

Beryllium

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Most recent observation is compared with limit. Limit is highest of 17 background values. 94.12% NDs. 76.37% coverage at alpha=0.01; 83.79% coverage at alpha=0.05; 95.9% coverage at alpha=0.5. Report alpha = 0.4181.

Tolerance Limit Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Tolerance Limit

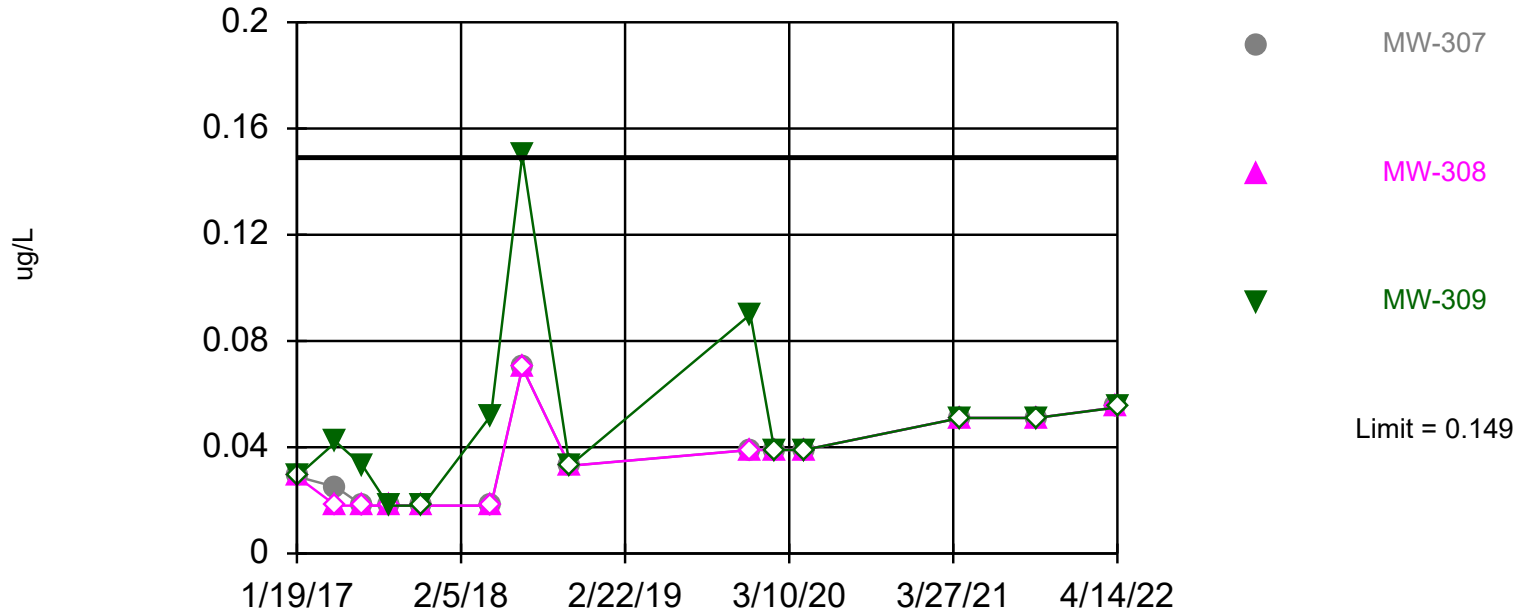
Constituent: Beryllium (ug/L) Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-308	MW-309	MW-307
4/26/2016	<0.08 (U)			
6/23/2016	<0.08 (U)			
8/10/2016	<0.08 (U)			
10/26/2016	<0.08 (U)			
1/18/2017	<0.08 (U)			
1/19/2017		<0.08 (U)	<0.08 (U)	<0.08 (U)
4/19/2017	<0.012 (U)			
4/20/2017		<0.012 (U)	0.073 (J)	0.029 (J)
6/20/2017	<0.012 (U)			
6/21/2017		<0.012 (U)	0.025 (J)	0.016 (J)
8/21/2017		<0.012 (U)	<0.012 (U)	<0.012 (U)
8/23/2017	<0.012 (U)			
11/8/2017		<0.012 (U)	0.016 (J)	<0.012 (U)
4/16/2018		<0.012 (U)	0.056 (J)	<0.012 (U)
4/18/2018	<0.012 (U)			
6/28/2018		<0.12 (U)	0.28 (J)	<0.12 (U)
8/14/2018	0.14 (J)			
10/16/2018	<0.089 (U)	<0.089 (U)	<0.089 (U)	<0.089 (U)
4/8/2019	<0.27 (U)			
10/24/2019	<0.27 (U)			
12/11/2019		<0.27 (U)	<0.27 (U)	<0.27 (U)
4/14/2020	<0.27 (U)	<0.27 (U)	<0.27 (U)	<0.27 (U)
4/14/2021	<0.27 (U)	<0.27 (U)	<0.27 (U)	<0.27 (U)
10/7/2021	<0.27 (U)	<0.27 (U)	<0.27 (U)	<0.27 (U)
4/11/2022				<0.27 (U)
4/12/2022	<0.27 (U)	<0.27 (U)		
4/14/2022			<0.27 (U)	

Within Limit

Cadmium Interwell Parametric



95% coverage. Most recent observation is compared with limit. Background Data Summary (based on natural log transformation) (after Kaplan-Meier Adjustment): Mean=-3.274, Std. Dev.=0.5642, n=19, 47.37% NDs. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9045, critical = 0.901. Report alpha = 0.05.

Tolerance Limit Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Tolerance Limit

Constituent: Cadmium (ug/L) Analysis Run 8/10/2022 2:22 PM

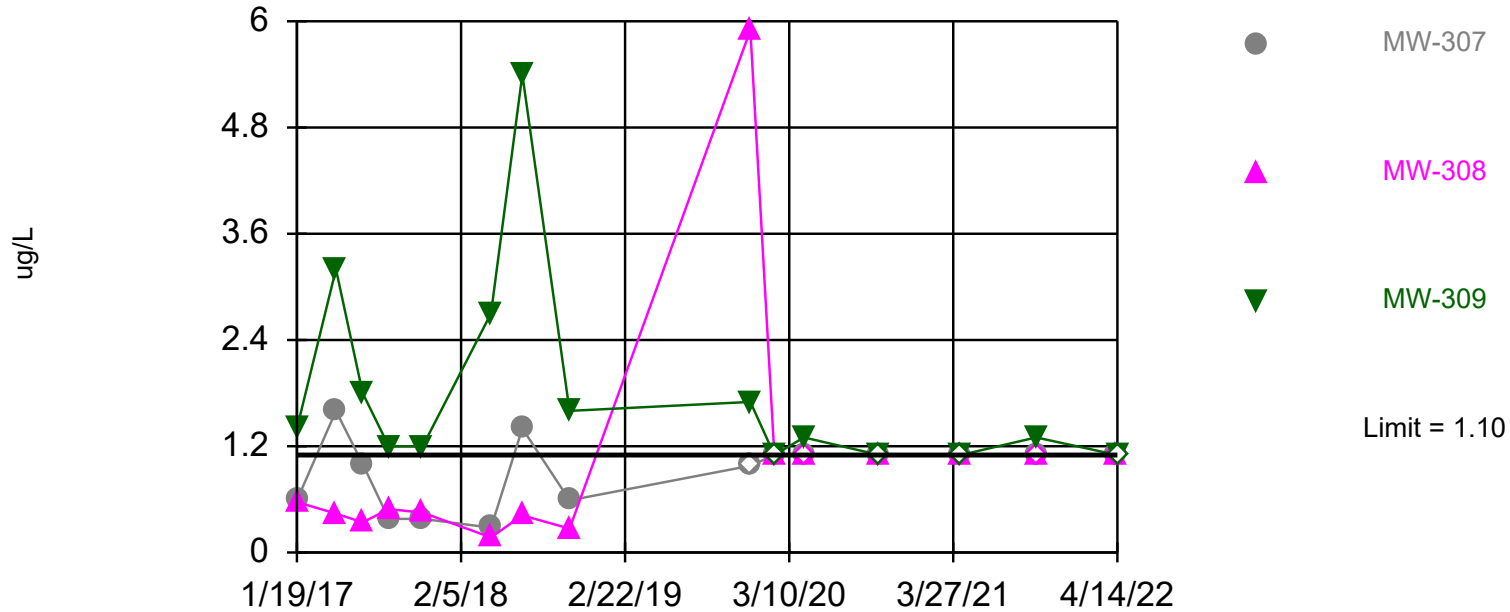
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-309	MW-308	MW-307
4/26/2016	<0.029 (U)			
6/23/2016	<0.029 (U)			
8/10/2016	0.12 (J)			
10/26/2016	0.038 (J)			
1/18/2017	<0.029 (U)			
1/19/2017		<0.029 (U)	<0.029 (U)	<0.029 (U)
4/19/2017	0.035 (J)			
4/20/2017		0.042 (J)	<0.018 (U)	0.025 (J)
6/20/2017	0.044 (J)			
6/21/2017		0.033 (J)	<0.018 (U)	<0.018 (U)
8/21/2017		0.018 (J)	<0.018 (U)	<0.018 (U)
8/23/2017	0.037 (J)			
11/8/2017		<0.018 (U)	<0.018 (U)	0.018 (J)
4/16/2018		0.052 (J)	<0.018 (U)	<0.018 (U)
4/18/2018	0.023 (J)			
6/28/2018		0.15 (J)	<0.07 (U)	<0.07 (U)
8/14/2018	0.16 (J)			
10/16/2018	<0.033 (U)	<0.033 (U)	<0.033 (U)	<0.033 (U)
4/8/2019	<0.077 (U)			
10/24/2019	0.04 (J)			
12/11/2019		0.09 (J)	<0.039 (U)	<0.039 (U)
2/5/2020	<0.039 (U)	<0.039 (U)	<0.039 (U)	<0.039 (U)
4/14/2020	<0.039 (U)	<0.039 (U)	<0.039 (U)	<0.039 (U)
10/8/2020	0.075 (J)			
4/14/2021	<0.051 (U)	<0.051 (U)	<0.051 (U)	<0.051 (U)
10/7/2021	0.057 (J)	<0.051 (U)	<0.051 (U)	<0.051 (U)
4/11/2022				<0.055 (U)
4/12/2022	<0.055 (U)		<0.055 (U)	
4/14/2022		<0.055 (U)		

Within Limit

Chromium

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Most recent observation is compared with limit. Limit is highest of 19 background values. 52.63% NDs. 78.32% coverage at alpha=0.01; 85.35% coverage at alpha=0.05; 96.29% coverage at alpha=0.5. Report alpha = 0.3774.

Tolerance Limit Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

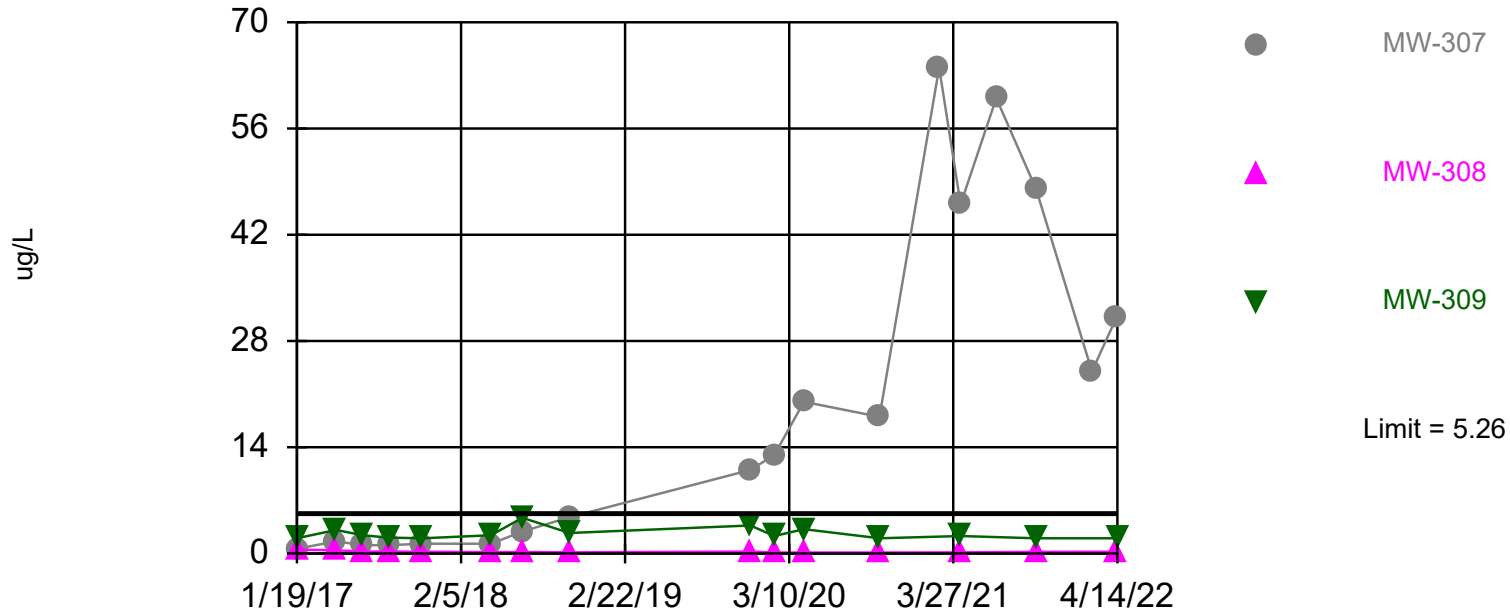
Tolerance Limit

Constituent: Chromium (ug/L) Analysis Run 8/10/2022 2:22 PM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-308	MW-309	MW-307
4/26/2016	0.59 (J)			
6/23/2016	0.74 (J)			
8/10/2016	0.64 (J)			
10/26/2016	<0.34 (U)			
1/18/2017	0.59 (J)			
1/19/2017		0.57 (J)	1.4	0.59 (J)
4/19/2017	0.49 (J)			
4/20/2017		0.44 (J)	3.2	1.6
6/20/2017	0.25 (J)			
6/21/2017		0.34 (J)	1.8	1
8/21/2017		0.49 (J)	1.2	0.38 (J)
8/23/2017	0.39 (J)			
11/8/2017		0.45 (J)	1.2	0.38 (J)
4/16/2018		0.17 (J)	2.7	0.28 (J)
4/18/2018	<0.054 (U)			
6/28/2018		0.42 (J)	5.4	1.4
8/14/2018	0.25 (J)			
10/16/2018	0.11 (J)	0.27 (J)	1.6	0.59 (J)
4/8/2019	<0.98 (U)			
10/24/2019	<0.98 (U)			
12/11/2019		5.9	1.7 (J)	<0.98 (U)
2/5/2020	<1.1 (U)	<1.1 (U)	<1.1 (U)	<1.1 (U)
4/14/2020	<1.1 (U)	<1.1 (U)	1.3 (J)	<1.1 (U)
10/7/2020		<1.1 (U)	<1.1 (U)	<1.1 (U)
10/8/2020	<1.1 (U)			
4/14/2021	<1.1 (U)	<1.1 (U)	<1.1 (U)	<1.1 (U)
10/7/2021	<1.1 (U)	<1.1 (U)	1.3 (J)	<1.1 (U)
4/11/2022				<1.1 (U)
4/12/2022	<1.1 (U)	<1.1 (U)		
4/14/2022			<1.1 (U)	

Exceeds Limit: MW-307

Cobalt Interwell Parametric



95% coverage. Most recent observation is compared with limit. Background Data Summary (based on natural log transformation): Mean=-0.231, Std. Dev.=0.7893, n=20. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9554, critical = 0.905. Report alpha = 0.05.

Tolerance Limit Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Tolerance Limit

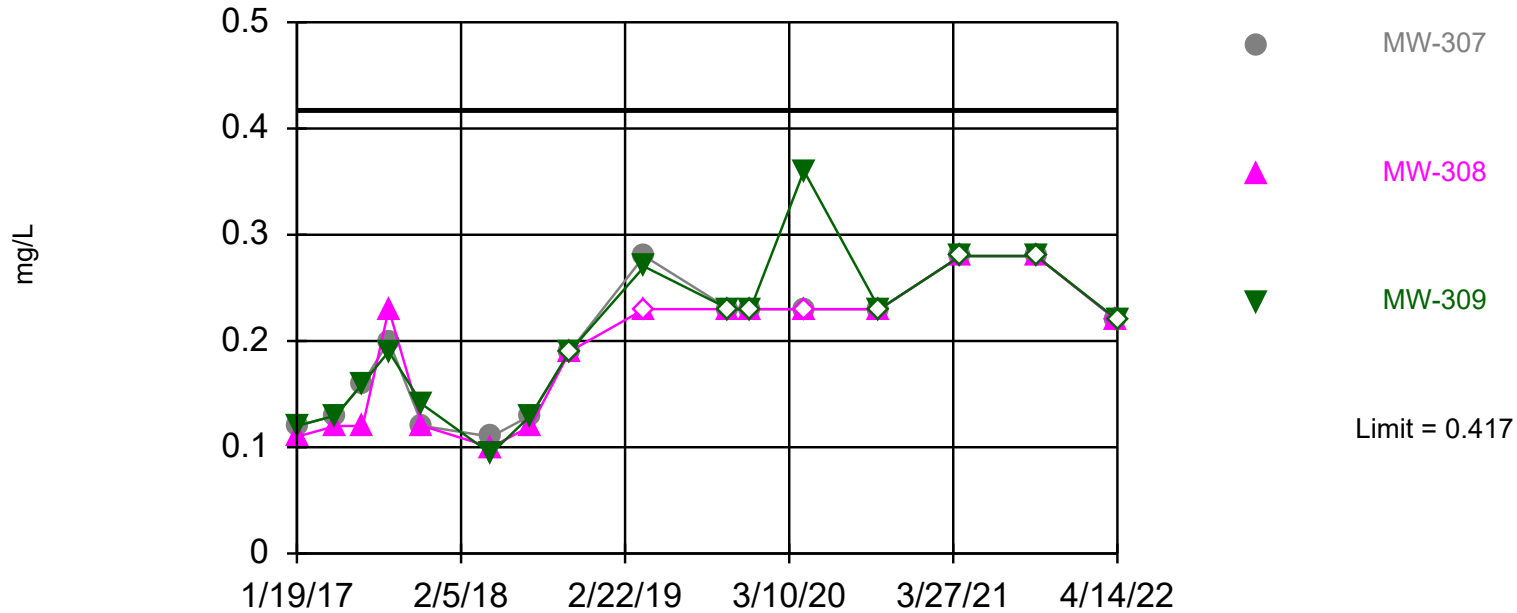
Constituent: Cobalt (ug/L) Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-308	MW-309	MW-307
4/26/2016	4.1			
6/23/2016	3.1			
8/10/2016	1.8			
10/26/2016	1.8			
1/18/2017	1.3			
1/19/2017		0.52 (J)	2	0.62 (J)
4/19/2017	0.97 (J)			
4/20/2017		0.43 (J)	3.1	1.6
6/20/2017	1 (J)			
6/21/2017		0.25 (J)	2.4	1.1
8/21/2017		0.26 (J)	2.1	1.1
8/23/2017	0.96 (J)			
11/8/2017		0.23 (J)	2	1.3
4/16/2018		0.18 (J)	2.4	1.3
4/18/2018	0.46 (J)			
6/28/2018		0.19 (J)	4.7	2.9
8/14/2018	1.4			
10/16/2018	0.36 (J)	0.15 (J)	2.7	4.8
4/8/2019	0.44 (J)			
10/24/2019	0.6			
12/11/2019		0.26 (J)	3.7	11
2/5/2020	1.1	0.14 (J)	2.3	13
3/12/2020	0.43 (J)			
4/14/2020	0.52	0.14 (J)	3.2	20
10/7/2020		0.14 (J)	2	18
10/8/2020	0.41 (J)			
2/23/2021				64
4/14/2021	0.29 (J)	0.16 (J)	2.3	46
7/6/2021				60
10/7/2021	0.48 (J)	0.22 (J)	2	48
2/14/2022				24
4/11/2022				31
4/12/2022	0.23 (J)	0.24 (J)		
4/14/2022			2	

Within Limit

Fluoride Interwell Parametric



95% coverage. Most recent observation is compared with limit. Background Data Summary (based on natural log transformation) (after Kaplan-Meier Adjustment): Mean=-1.491, Std. Dev.=0.2544, n=19, 31.58% NDs. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9193, critical = 0.901. Report alpha = 0.05.

Tolerance Limit Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Tolerance Limit

Constituent: Fluoride (mg/L) Analysis Run 8/10/2022 2:22 PM

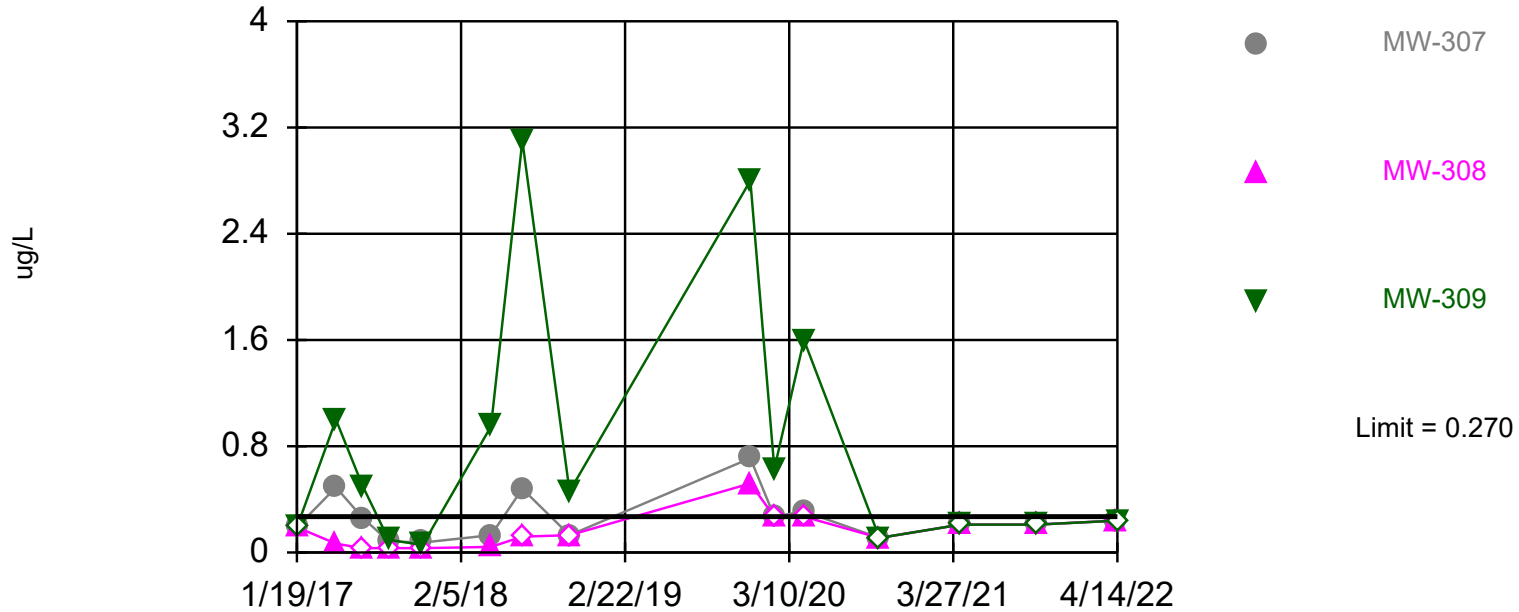
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-307	MW-309	MW-308
4/26/2016	0.22			
6/23/2016	0.2 (J)			
8/10/2016	0.44			
10/26/2016	0.27			
1/18/2017	0.17 (J)			
1/19/2017		0.12 (J)	0.12 (J)	0.11 (J)
4/19/2017	0.24			
4/20/2017		0.13 (J)	0.13 (J)	0.12 (J)
6/20/2017	0.26			
6/21/2017		0.16 (J)	0.16 (J)	0.12 (J)
8/21/2017		0.2	0.19 (J)	0.23
8/23/2017	0.34			
11/8/2017	0.27	0.12 (J)	0.14 (J)	0.12 (J)
4/16/2018		0.11 (J)	0.094 (J)	0.1 (J)
4/18/2018	0.22			
7/18/2018		0.13 (J)	0.13 (J)	0.12 (J)
8/29/2018	0.27			
10/16/2018	0.3	<0.19 (U)	<0.19 (U)	<0.19 (U)
4/8/2019	0.44 (J)	0.28 (J)	0.27 (J)	<0.23 (U)
10/23/2019		<0.23 (U)	<0.23 (U)	<0.23 (U)
10/24/2019	<0.23 (U)			
12/11/2019		<0.23 (U)	<0.23 (U)	<0.23 (U)
4/14/2020	<0.23 (U)	<0.23 (U)	0.36 (J)	<0.23 (U)
10/7/2020		<0.23 (U)	<0.23 (U)	<0.23 (U)
10/8/2020	<0.23 (U)			
4/14/2021	<0.28 (U)	<0.28 (U)	<0.28 (U)	<0.28 (U)
10/7/2021	<0.28 (U)	<0.28 (U)	<0.28 (U)	<0.28 (U)
4/11/2022		<0.22 (U)		
4/12/2022	<0.22 (U)			<0.22 (U)
4/14/2022			<0.22 (U)	

Within Limit

Lead

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Most recent observation is compared with limit. Limit is highest of 19 background values. 73.68% NDs. 78.32% coverage at alpha=0.01; 85.35% coverage at alpha=0.05; 96.29% coverage at alpha=0.5. Report alpha = 0.3774.

Tolerance Limit Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Tolerance Limit

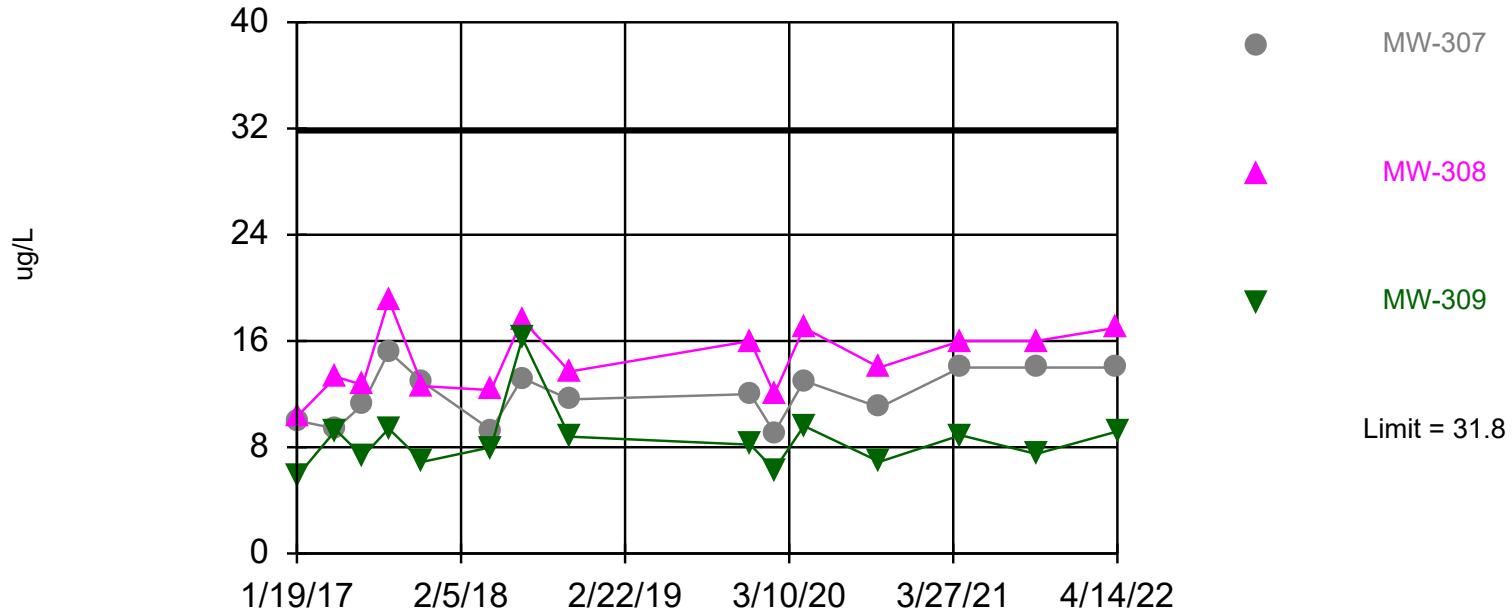
Constituent: Lead (ug/L) Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-308	MW-309	MW-307
4/26/2016	<0.19 (U)			
6/23/2016	<0.19 (U)			
8/10/2016	<0.19 (U)			
10/26/2016	<0.19 (U)			
1/18/2017	<0.19 (U)			
1/19/2017		<0.19 (U)	<0.19 (U)	<0.19 (U)
4/19/2017	0.06 (J)			
4/20/2017		0.066 (J)	1	0.49 (J)
6/20/2017	0.1 (J)			
6/21/2017		<0.033 (U)	0.5 (J)	0.26 (J)
8/21/2017		<0.033 (U)	0.096 (J)	0.085 (J)
8/23/2017	0.049 (J)			
11/8/2017		<0.033 (U)	0.057 (J)	0.075 (J)
4/16/2018		0.043 (J)	0.95 (J)	0.13 (J)
4/18/2018	0.041 (J)			
6/28/2018		<0.12 (U)	3.1	0.48 (J)
8/14/2018	0.18 (J)			
10/16/2018	<0.13 (U)	<0.13 (U)	0.46 (J)	0.13 (J)
4/8/2019	<0.27 (U)			
10/24/2019	<0.27 (U)			
12/11/2019		0.52	2.8	0.71
2/5/2020	<0.27 (U)	<0.27 (U)	0.63	<0.27 (U)
4/14/2020	<0.27 (U)	<0.27 (U)	1.6	0.31 (J)
10/7/2020		<0.11 (U)	<0.11 (U)	<0.11 (U)
10/8/2020	<0.11 (U)			
4/14/2021	<0.21 (U)	<0.21 (U)	<0.21 (U)	<0.21 (U)
10/7/2021	<0.21 (U)	<0.21 (U)	<0.21 (U)	<0.21 (U)
4/11/2022				<0.24 (U)
4/12/2022	<0.24 (U)	<0.24 (U)		
4/14/2022			<0.24 (U)	

Within Limit

Lithium Interwell Parametric



95% coverage. Most recent observation is compared with limit. Background Data Summary: Mean=22.82, Std. Dev.=3.757, n=20. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9751, critical = 0.905. Report alpha = 0.05.

Tolerance Limit Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Tolerance Limit

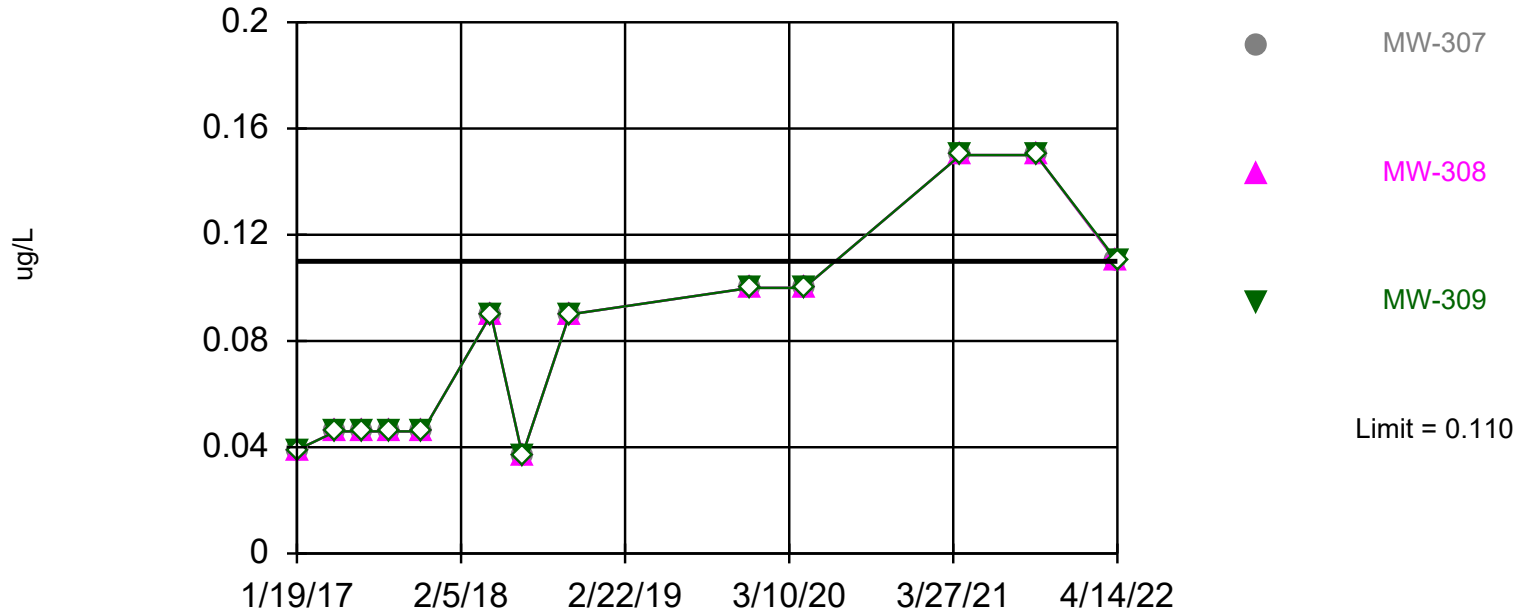
Constituent: Lithium (ug/L) Analysis Run 8/10/2022 2:22 PM
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-308	MW-309	MW-307
4/26/2016	22.8			
6/23/2016	28.7			
8/10/2016	27.6			
10/26/2016	25.5			
1/18/2017	20.1			
1/19/2017		10.3	5.8 (J)	10
4/19/2017	21.8			
4/20/2017		13.3	9.3 (J)	9.4 (J)
6/20/2017	24.9			
6/21/2017		12.7	7.3 (J)	11.2
8/21/2017		19.1	9.4 (J)	15.2
8/23/2017	27.9			
11/8/2017		12.6	6.9 (J)	12.9
4/16/2018		12.3	8 (J)	9.3 (J)
4/18/2018	19.1			
6/28/2018		17.6	16.2	13.2
8/14/2018	26.5			
10/16/2018	19.4	13.7	8.8 (J)	11.6
4/8/2019	15			
10/24/2019	24			
12/11/2019		16	8.2 (J)	12
2/5/2020	17	12	6.3 (J)	9.1 (J)
3/12/2020	21			
4/14/2020	24	17	9.6 (J)	13
10/7/2020		14	6.9 (J)	11
10/8/2020	23			
4/14/2021	23	16	8.9 (J)	14
10/7/2021	26	16	7.5 (J)	14
4/11/2022				14
4/12/2022	19	17		
4/14/2022			9.2 (J)	

Within Limit

Mercury

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Most recent observation is compared with limit. All background values were censored; limit is most recent reporting limit. 76.37% coverage at alpha=0.01; 83.79% coverage at alpha=0.05; 95.9% coverage at alpha=0.5. Report alpha = 0.4181.

Tolerance Limit Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Tolerance Limit

Constituent: Mercury (ug/L) Analysis Run 8/10/2022 2:22 PM

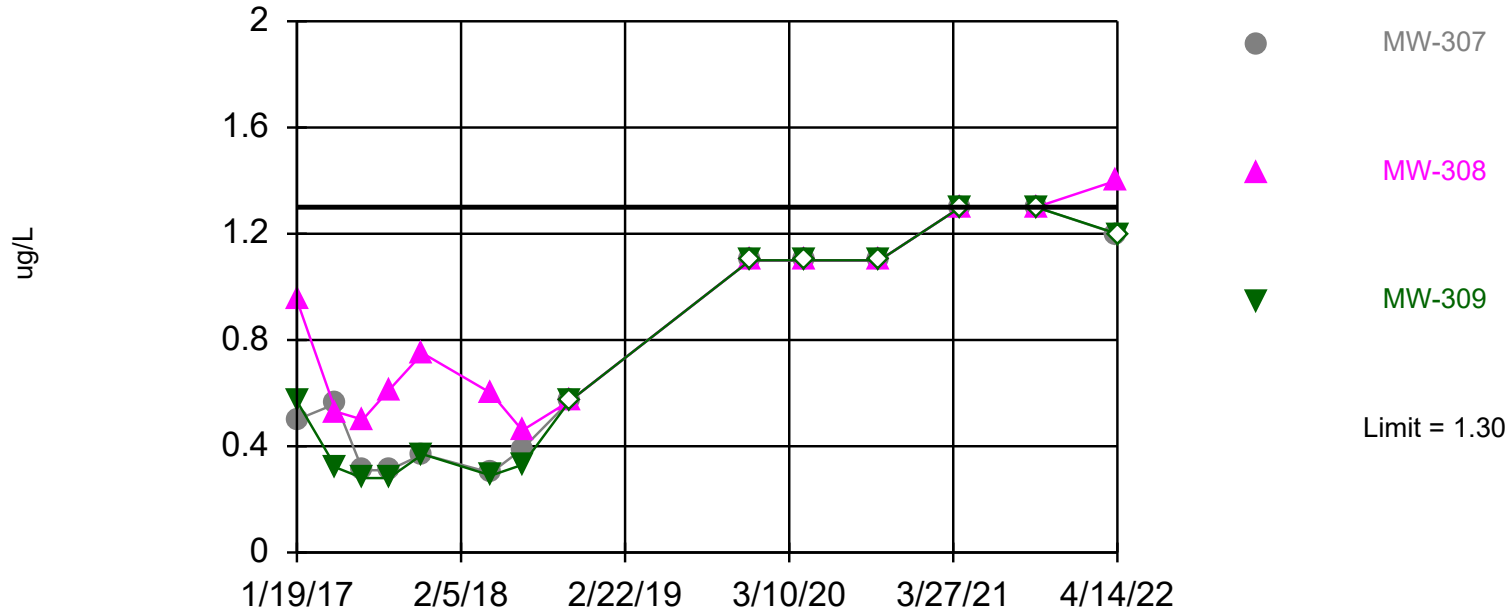
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-308	MW-309	MW-307
4/26/2016	<0.039 (U)			
6/23/2016	<0.039 (U)			
8/10/2016	<0.039 (U)			
10/26/2016	<0.039 (U)			
1/18/2017	<0.039 (U)			
1/19/2017		<0.039 (U)	<0.039 (U)	<0.039 (U)
4/19/2017	<0.046 (U)			
4/20/2017		<0.046 (U)	<0.046 (U)	<0.046 (U)
6/20/2017	<0.046 (U)			
6/21/2017		<0.046 (U)	<0.046 (U)	<0.046 (U)
8/21/2017		<0.046 (U)	<0.046 (U)	<0.046 (U)
8/23/2017	<0.046 (U)			
11/8/2017		<0.046 (U)	<0.046 (U)	<0.046 (U)
4/16/2018		<0.09 (U)	<0.09 (U)	<0.09 (U)
4/18/2018	<0.09 (U)			
6/28/2018		<0.037 (U)	<0.037 (U)	<0.037 (U)
8/14/2018	<0.083 (U)			
10/16/2018		<0.09 (U)	<0.09 (U)	<0.09 (U)
1/8/2019	<0.09 (U)			
4/8/2019	<0.1 (U)			
10/24/2019	<0.1 (U)			
12/11/2019		<0.1 (U)	<0.1 (U)	<0.1 (U)
4/14/2020	<0.1 (U)	<0.1 (U)	<0.1 (U)	<0.1 (U)
4/14/2021	<0.15 (U)	<0.15 (U)	<0.15 (U)	<0.15 (U)
10/7/2021	<0.15 (U)	<0.15 (U)	<0.15 (U)	<0.15 (U)
4/11/2022				<0.11 (U)
4/12/2022	<0.11 (U)	<0.11 (U)		
4/14/2022			<0.11 (U)	

Within Limit

Molybdenum

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.05 alpha level. Most recent observation is compared with limit. Limit is highest of 18 background values. 27.78% NDs. 77.54% coverage at alpha=0.01; 84.57% coverage at alpha=0.05; 96.29% coverage at alpha=0.5. Report alpha = 0.3972.

Tolerance Limit Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

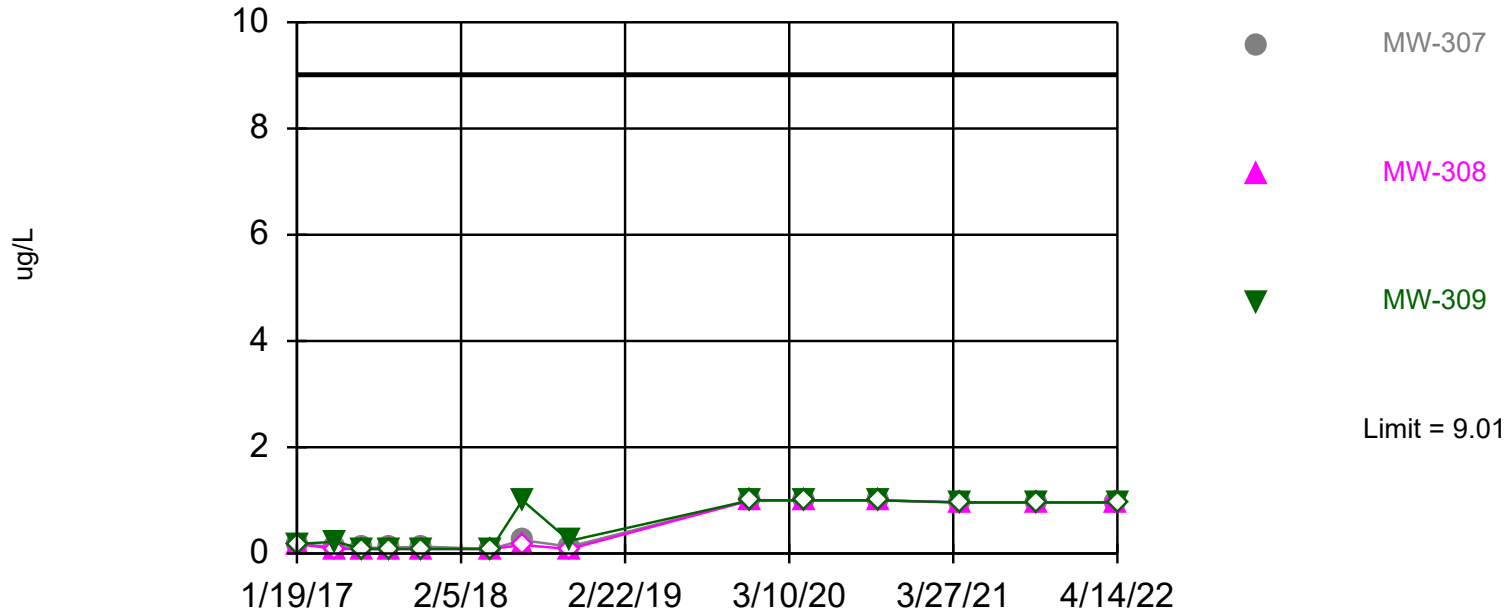
Tolerance Limit

Constituent: Molybdenum (ug/L) Analysis Run 8/10/2022 2:22 PM
 Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-309	MW-308	MW-307
4/26/2016	1.2			
6/23/2016	1.2			
8/10/2016	0.89 (J)			
10/26/2016	1			
1/18/2017	0.76 (J)			
1/19/2017		0.57 (J)	0.95 (J)	0.5 (J)
4/19/2017	0.54 (J)			
4/20/2017		0.32 (J)	0.53 (J)	0.56 (J)
6/20/2017	0.79 (J)			
6/21/2017		0.28 (J)	0.5 (J)	0.31 (J)
8/21/2017		0.28 (J)	0.61 (J)	0.31 (J)
8/23/2017	1.3			
11/8/2017		0.37 (J)	0.75 (J)	0.37 (J)
4/16/2018		0.29 (J)	0.6 (J)	0.3 (J)
4/18/2018	0.67 (J)			
6/28/2018		0.33 (J)	0.46 (J)	0.39 (J)
8/14/2018	1.3			
10/16/2018	0.72 (J)	<0.57 (U)	<0.57 (U)	<0.57 (U)
4/8/2019	<1.1 (U)			
10/24/2019	1.1 (J)			
12/11/2019		<1.1 (U)	<1.1 (U)	<1.1 (U)
4/14/2020	1.2 (J)	<1.1 (U)	<1.1 (U)	<1.1 (U)
10/7/2020		<1.1 (U)	<1.1 (U)	<1.1 (U)
10/8/2020	<1.1 (U)			
4/14/2021	<1.3 (U)	<1.3 (U)	<1.3 (U)	<1.3 (U)
10/7/2021	<1.3 (U)	<1.3 (U)	<1.3 (U)	<1.3 (U)
4/11/2022				<1.2 (U)
4/12/2022	<1.2 (U)		1.4 (J)	
4/14/2022		<1.2 (U)		

Within Limit

Selenium Interwell Parametric



95% coverage. Most recent observation is compared with limit. Background Data Summary: Mean=5.739, Std. Dev.=1.334, n=18. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9481, critical = 0.897. Report alpha = 0.05.

Tolerance Limit Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Tolerance Limit

Constituent: Selenium (ug/L) Analysis Run 8/10/2022 2:23 PM

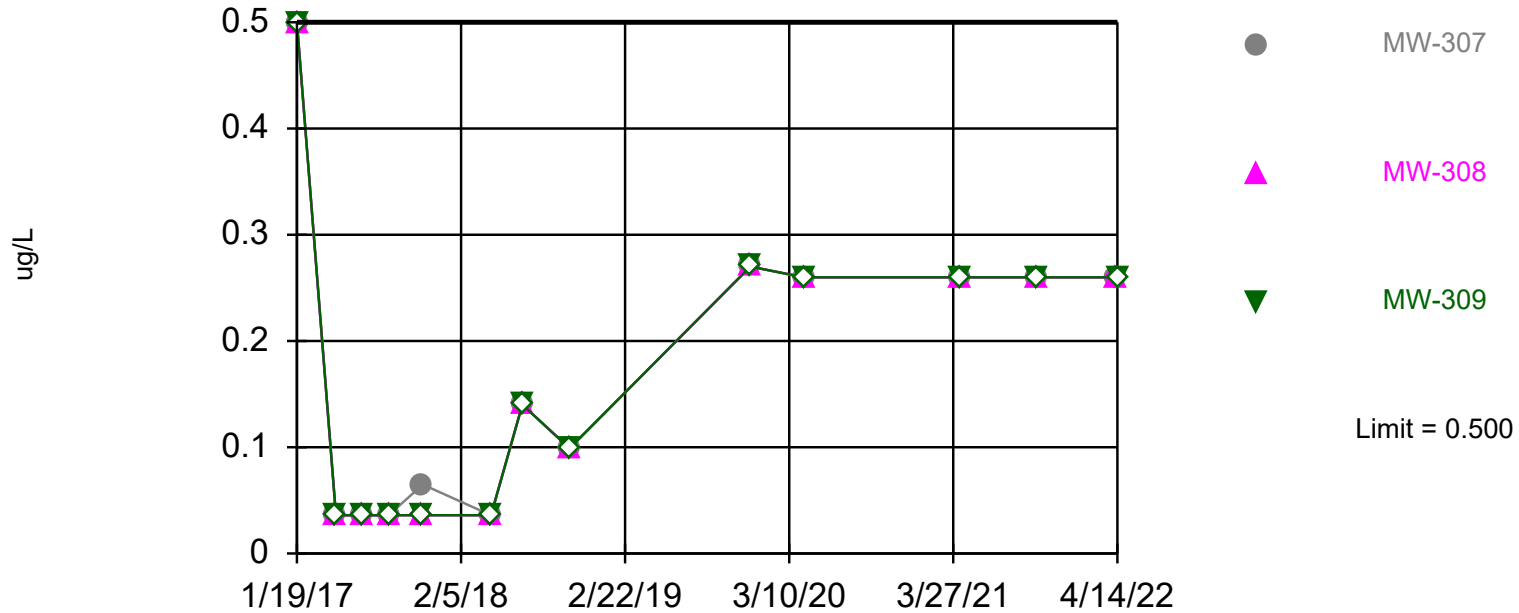
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-309	MW-308	MW-307
4/26/2016	4.7			
6/23/2016	5.4			
8/10/2016	6.1			
10/26/2016	6.5			
1/18/2017	5.9			
1/19/2017		<0.18 (U)	<0.18 (U)	<0.18 (U)
4/19/2017	4.2			
4/20/2017		0.22 (J)	<0.086 (U)	0.12 (J)
6/20/2017	5.5			
6/21/2017		<0.086 (U)	<0.086 (U)	0.11 (J)
8/21/2017		<0.086 (U)	<0.086 (U)	0.11 (J)
8/23/2017	7.2			
11/8/2017		<0.086 (U)	<0.086 (U)	0.13 (J)
4/16/2018		<0.086 (U)	<0.086 (U)	<0.086 (U)
4/18/2018	4.3			
6/28/2018		1	<0.16 (U)	0.25 (J)
8/14/2018	6.3			
10/16/2018	3.4	0.24 (J)	<0.085 (U)	0.13 (J)
4/8/2019	3.1 (J)			
10/24/2019	6.2			
12/11/2019		<1 (U)	<1 (U)	<1 (U)
4/14/2020	6.8	<1 (U)	<1 (U)	<1 (U)
10/7/2020		<1 (U)	<1 (U)	<1 (U)
10/8/2020	7.7			
4/14/2021	6.5	<0.96 (U)	<0.96 (U)	<0.96 (U)
10/7/2021	7.5	<0.96 (U)	<0.96 (U)	<0.96 (U)
4/11/2022				<0.96 (U)
4/12/2022	6		<0.96 (U)	
4/14/2022		<0.96 (U)		

Within Limit

Thallium

Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Most recent observation is compared with limit. Limit is highest of 18 background values. 83.

Tolerance Limit

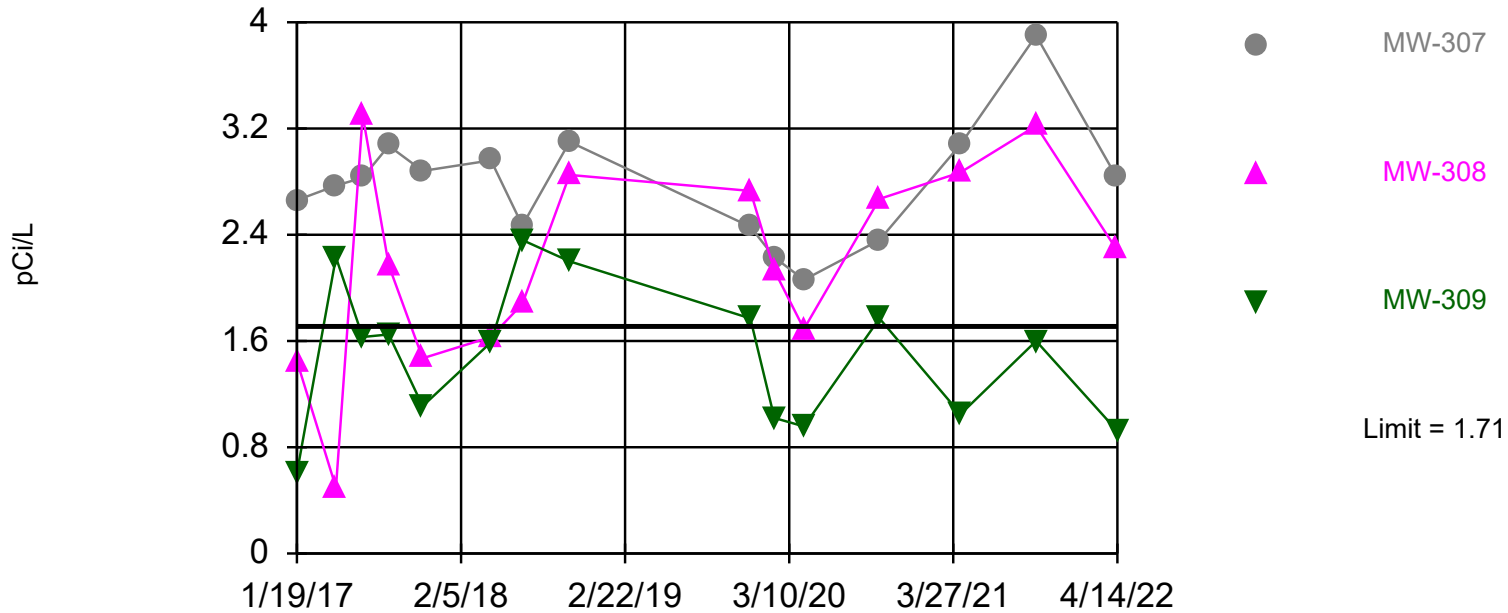
Constituent: Thallium (ug/L) Analysis Run 8/10/2022 2:23 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-308	MW-309	MW-307
4/26/2016	<0.5 (U)			
6/23/2016	<0.5 (U)			
8/10/2016	<0.5 (U)			
10/26/2016	<0.5 (U)			
1/18/2017	<0.5 (U)			
1/19/2017		<0.5 (U)	<0.5 (U)	<0.5 (U)
4/19/2017	0.14 (J)			
4/20/2017		<0.036 (U)	<0.036 (U)	<0.036 (U)
6/20/2017	<0.036 (U)			
6/21/2017		<0.036 (U)	<0.036 (U)	<0.036 (U)
8/21/2017		<0.036 (U)	<0.036 (U)	<0.036 (U)
8/23/2017	0.067 (J)			
11/8/2017		<0.036 (U)	<0.036 (U)	0.065 (J)
4/16/2018		<0.036 (U)	<0.036 (U)	<0.036 (U)
4/18/2018	<0.036 (U)			
6/28/2018		<0.14 (U)	<0.14 (U)	<0.14 (U)
8/14/2018	0.16 (J)			
10/16/2018	<0.099 (U)	<0.099 (U)	<0.099 (U)	<0.099 (U)
4/8/2019	<0.27 (U)			
10/24/2019	<0.27 (U)			
12/11/2019		<0.27 (U)	<0.27 (U)	<0.27 (U)
4/14/2020	<0.26 (U)	<0.26 (U)	<0.26 (U)	<0.26 (U)
10/8/2020	<0.26 (U)			
4/14/2021	<0.26 (U)	<0.26 (U)	<0.26 (U)	<0.26 (U)
10/7/2021	<0.26 (U)	<0.26 (U)	<0.26 (U)	<0.26 (U)
4/11/2022				<0.26 (U)
4/12/2022	<0.26 (U)	<0.26 (U)		
4/14/2022			<0.26 (U)	

Exceeds Limit: MW-307, MW-308

Total Radium Interwell Parametric



95% coverage. Most recent observation is compared with limit. Background Data Summary: Mean=0.7033, Std. Dev.=0.4166, n=19. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.9547, critical = 0.901. Report alpha = 0.05.

Tolerance Limit Analysis Run 8/10/2022 2:22 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Tolerance Limit

Constituent: Total Radium (pCi/L) Analysis Run 8/10/2022 2:23 PM

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-308	MW-309	MW-307
4/26/2016	0.51			
6/23/2016	0.614			
8/10/2016	1.56			
10/26/2016	1.24			
1/18/2017	0.143			
1/19/2017		1.45	0.606	2.66
4/19/2017	0.631			
4/20/2017		0.496	2.23	2.77
6/20/2017	1.06			
6/21/2017		3.3	1.63	2.83
8/21/2017		2.17	1.65	3.07
8/23/2017	0.725			
11/8/2017		1.47	1.11	2.88
4/16/2018		1.63	1.59	2.96
4/18/2018	0.513			
6/28/2018		1.88	2.36	2.47
8/14/2018	1.19			
10/16/2018	1.16	2.85	2.2	3.1
4/8/2019	0.0956			
10/24/2019	0.956			
12/11/2019		2.73	1.77	2.46
2/5/2020	0.228	2.13	1.02	2.23
4/14/2020	0.315	1.69	0.957	2.06
10/7/2020		2.67	1.77	2.36
10/8/2020	0.407			
4/14/2021	0.598	2.87	1.05	3.08
10/7/2021	1.04	3.22	1.6	3.9
4/11/2022				2.84
4/12/2022	0.378	2.29		
4/14/2022			0.922	