2023 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

25224072.00 | August 1, 2024

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

OVERVIEW OF CURRENT STATUS

Ottumwa Generating Station, Zero Liquid Discharge Pond
2023 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	(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):	

Increases (SSIs)	(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 2023, SSIs for semiannual events for compliance wells at waste boundary included the following; see **Table 5** for complete results. <u>April 2023</u> Boron: MW-309, MW-315 Calcium: MW-307, MW-308, MW-309, MW-315 Field pH: MW-309, MW-315 Sulfate: MW-308, MW-309, MW-315 Total Dissolved Solids (TDS): MW-307, MW-308, MW-309, MW-315 <u>October 2023</u> Boron: MW-309, MW-315 Calcium: MW-307, MW-308, MW-309, MW-315 Chloride: MW-307 Field pH: MW-309, MW-315 Sulfate: MW-308, MW-309, MW-315 TDS: MW-307, MW-308, MW-309, MW-315

Category	Rule Requirement	Site Status
	(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	January 13, 2020
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 2023, concentrations determined to be at SSL above the GPS as follows: <u>April 2023</u> MW-307 <u>October 2023</u> MW-307, MW-315
	(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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Table of Contents

Section Page

Tables

Figures

Appendices

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1.0 INTRODUCTION

This 2023 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 2023 Annual Groundwater Monitoring and Corrective Action Report for the CCR unit.

This report covers the period of groundwater monitoring from January 1, 2023, through December 31, 2023.

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

- OGS ZLD Pond (inactive CCR surface impoundment)

The ZLD Pond is in the process of closure in accordance with 40 CFR 257.102(c). Removal of CCR from the ZLD Pond 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 ZLD Pond as required by 40 CFR 257.91(d). The groundwater monitoring system consisted of one upgradient and four downgradient monitoring wells in 2023 (**Table 1**, **Figure 1**, and **Figure 2**). The 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 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 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, MW-308, MW-309, and MW-315 are included in **Appendix B**.

The shallow potentiometric surface and groundwater flow patterns based on April and October 2023 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 ZLD Pond 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 and ZLD Pond CCR units. 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. The groundwater elevation data for the CCR monitoring wells is provided in Table 3. Estimated horizontal gradients and flow velocities within the aquifer are provided in Table 4.

2.2 CCR RULE MONITORING SYSTEM

In 2023, the groundwater monitoring system established in accordance with the CCR Rule consisted of one upgradient (background) monitoring well and four downgradient monitoring for the OGS ZLD Pond. The fourth compliance well, MW-315, was installed in November 2022 and was added to the monitoring network certification in July 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 west of the ZLD Pond and is also used as a background well for the OGS Ash Pond CCR unit. The downgradient wells (MW-307 through MW-309 and MW-315) are located along the northeastern edge of the OGS ZLD Pond and in a line parallel to the Des Moines River.

While not part of the ZLD Pond monitoring system, delineation wells installed as part of the Ash Pond monitoring system are being used to evaluate the nature and extent of cobalt concentrations in groundwater as part of the ongoing joint selection of remedy process for both CCR units.

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 ZLD Pond 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 and the network certification was updated in July 2023 to include this well as a downgradient compliance well. The boring log and monitoring well construction documentation form is included in **Appendix B**.

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 ZLD Pond CCR unit in 2023. Two semiannual assessment monitoring events occurred in April 2023 and October 2023. Two supplemental sampling events for MW-315 occurred in February 2023 and March 2023 for select Appendix III and Appendix IV parameters.

The sampling results for Appendix III and Appendix IV parameters in 2023 are summarized in **Table 5**. Field parameter results for the 2023 sampling events are provided in **Table 6**. The analytical laboratory reports for 2023 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 2023.

Assessment monitoring for the ZLD Pond was initiated in January 2020 and continued through 2023. An ACM was initiated for the ZLD Pond in May 2022 and completed in August 2022. The ACM for the ZLD Pond 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 2023, 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 April 2023 and October 2023 events are provided in **Appendix E**.

Consistent with previous determinations, cobalt was determined to be at a Statistically Significant Level (SSL) above the GPS at monitoring well MW307 in the evaluation of the April 2023 and October 2023 assessment monitoring results. MW-315 was determined to be at a SSL above the GPS for cobalt in the evaluation of October 2023 assessment monitoring results. October 2023 was the first monitoring event where enough results were available for MW-315 to perform a SSL evaluation. The SSL above the GPS at MW-315 will be addressed by the ongoing ACM, selection of remedy, and corrective action efforts at the site.

In 2023, the monitoring results for the February, March, April, and October 2023 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 were included in the 2022 Annual Groundwater Monitoring and Corrective Action Report dated August 1, 2023. The UPLs calculated in July 2022 were applied to the evaluation of the February, March, April, and October 2023 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 2023 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 2023.

Summary of Key Actions Completed.

Because cobalt has been detected at SSLs above the GPS in compliance monitoring wells located downgradient from both the ZLD Pond and the Ash Pond, the ongoing activities to support the selection of a remedy are intended to support a holistic approach for the site. Actions to support the selection of a remedy for cobalt in groundwater for both CCR units are included in the following lists of completed and planned actions.

- Developed newly installed compliance well MW-315 (January 2023).
- Performed the initial round of groundwater sample collection at well MW-315 (February 2023).
- Completed statistical evaluation and results report for the October 2022 groundwater compliance monitoring results (February 2023, provided in previous Annual Report).
- Completed second supplemental sampling event for cobalt in new ZLD Pond compliance well MW-315 (March 2023).
- Monitoring Well Documentation Report for MW-315 (March 2023).
- Installed staff gauges SG-2 and SG-3 in Middle Avery Creek (March 2023).
- Prepared semiannual progress report for Selection of Remedy – OGS Ash Pond and Zero Liquid Discharge Pond (March 2023).
- Completed annual groundwater sampling and analysis event (April 2023).
- Completed MW-315 Groundwater Monitoring System Update Recertification for ZLD Pond MW-315 (July 2023).
- Completed statistical evaluation and results report for the February and March 2023 supplemental monitoring events for MW-315 (July 2023).
- Completed statistical evaluation and results report for the April 2023 assessment monitoring event (August 2023).
- Completed 2022 Annual Groundwater Monitoring and Corrective Action Report (August 2023).
- Completed semiannual groundwater sampling and analysis event (October 2023).
- Prepared semiannual progress reports for Selection of Remedy – OGS Ash Pond and Zero Liquid Discharge Pond (September 2023).

- Performed capture zone analysis for the design and installation of an extraction well to be used for a pumping test (December 2023).

- Designed a pumping test and an extraction well for the pumping test (December 2023).

Description of Any Problems Encountered: No problems were encountered in 2023.

Discussion of Actions to Resolve the Problems: No problems were encountered in 2023.

Projection of Key Activities for the Upcoming Year (2024):

- Complete statistical evaluation and determination of any SSLs exceeding the GPS for the October 2023 monitoring event (February 2024, and provided in Attachment E).

- Complete two semiannual groundwater sampling events (April and October 2024).

- Complete statistical evaluation and determination of any SSLs exceeding the GPS for the April 2024 monitoring event (August 2024).

- Install a 6-inch pumping test extraction well and an associated 2-inch observation well in the vicinity of existing compliance well MW-307.

- Conduct a pumping test to assist in the remedial design for a groundwater collection system.

- Continue evaluation of groundwater flow and groundwater quality.

- Update the conceptual site model based on findings of the ongoing groundwater sampling of the new compliance well and additional delineation wells.

- Perform further evaluation of groundwater pump and treat and monitored natural attenuation alternatives.

- Finalize the selection of remedy for the Ash Pond and ZLD Pond and hold a public meeting.

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 ZLD Pond 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 ZLD Pond 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 2023 assessment monitoring results, background UPLs, and GPSs established for the ZLD Pond are provided in Table 5. 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 2023 to support the selection of remedy process for the OGS Ash Pond and ZLD Pond CCR units. The results for the supplemental parameters are included in Table 5 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 ZLD Pond in 2023.

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 ZLD Pond CCR unit was initiated on May 9, 2022, and completed on August 5, 2022, within the 90-day allowable period without an extension. The ACM for the ZLD Pond

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.

Tables

Table 1. Groundwater Monitoring Well Network
Ottumwa Generating Station Zero Liquid Discharge Pond
SCS Engineers Project #25224072.00

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

Created by:	RM	Date:	12/14/2020
Last revision by:	NLB	Date:	3/22/2024
Checked by:	RM	Date:	4/1/2024

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Table 2. Groundwater Samples Summary
Ottumwa Generating Station - Zero Liquid Discharge Pond
SCS Engineers Project #25224072.00

Sample Dates	Background Well	Compliance Wells			
	MW-301	MW-307	MW-308	MW-309	MW-315
2/2/2023	--	--	--	--	A-S
3/6/2024	--	--	--	--	A-S
4/5-6/2023	A	A	A	A	A
10/10-13/2023	A	A	A	A	A
Total Samples	2	2	2	2	4

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:	NLB	Date:	6/6/2024
Checked by:	RM	Date:	6/12/2024

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Table 3. Groundwater Elevations - CCR Rule Monitoring Well Networks
IPL - Ottumwa Generating Station / SCS Engineers Project #25224072.00

	Groundwater or Surface Water Elevation in feet above mean sea level (amsl)											
Well Number	**MW-301**	**MW-302**	**MW-302WT**	**MW-303**	**MW-304**	**MW-304WT**	**MW-305**	**MW-305A**	**MW-306**	**MW-306WT**	**MW-307**	**MW-308**
Top of Well Casing Elevation / Surface Water Reference Elevation (feet amsl)	686.47	673.90	674.53	661.07	682.84	682.20	683.91	684.03	683.47	684.05	657.56	655.39
Screen Length (ft)	10.0	5.0	10.0	5.0	5.0	10.0	5.0	5.0	5.0	10.0	5.0	5.0
Total Depth (ft from top of casing)	17.0	25.8	19.23	17.5	52.3	37.7	51.5	81.91	36.6	24.05	28.0	25.0
Top of Well Screen Elevation (ft)	679.47	653.10	665.3	648.57	635.54	654.5	637.41	607.12	651.87	670.0	634.56	635.39
Measurement Date												
April 26, 2016	682.80	655.63	NI	652.42	655.37	NI	661.67	NI	670.86	NI	NI	NI
June 23, 2016	682.58	655.65	NI	652.89	656.53	NI	662.36	NI	670.64	NI	NI	NI
August 9, 2016	682.27	655.52	NI	651.76	653.79	NI	660.78	NI	670.35	NI	NI	NI
October 26-27, 2016	682.04	655.67	NI	652.17	655.03	NI	661.37	NI	670.21	NI	NI	NI
January 18-19, 2017	681.67	655.46	NI	651.74	654.50	NI	660.87	NI	669.89	NI	648.81	647.42
April 19-20, 2017	682.15	656.35	NI	654.57	657.48	NI	663.27	NI	670.69	NI	653.62	651.09
June 20-21, 2017	681.91	655.65	NI	652.42	654.75	NI	661.26	NI	669.94	NI	649.85	648.26
August 21-23, 2017	681.28	655.13	NI	650.58	652.39	NI	659.00	NI	668.77	NI	645.78	643.12
November 8, 2017	681.54	655.40	NI	651.34	653.03	NI	659.76	NI	669.04	NI	647.37	644.99
April 18, 2018	681.53	655.71	NI	652.47	655.55	NI	660.99	NI	668.92	NI	649.66	647.91
May 30, 2018	NM	NM	NI	NM	NM	NI	NM	NI	NM	NI	652.45	651.05
June 28, 2018	NM	NM	NI	NM	NM	NI	NM	NI	NM	NI	652.87	651.43
July 18, 2018	NM	NM	NI	NM	NM	NI	NM	NI	NM	NI	652.27	650.67
August 14-15, 2018	680.91	656.05	NI	652.57	656.35	NI	661.56	NI	668.66	NI	NM	NM
August 29, 2018	681.09	655.89	NI	655.07	657.82	NI	NM	NI	NM	NI	NM	NM
October 16, 2018	682.50	656.91	NI	656.17	658.20	NI	663.37	NI	670.24	NI	654.13	NM
January 8, 2019	682.22	656.03	NI	654.65	656.28	NI	662.13	NI	669.84	NI	NM	NM
April 8, 2019	682.69	657.23	NI	655.55	659.33	NI	664.01	NI	670.96	NI	654.90	653.70
August 28, 2019	NM	NM	NI	NM	NM	NI	NM	NI	NM	NI	NM	NM
October 23-24, 2019	683.07	660.14	NI	653.86	657.71	NI	663.21	NI	671.28	NI	651.89	651.31
December 11, 2019	NM	NM	NI	NM	NM	NI	NM	NI	NM	NI	649.59	647.39
February 5, 2020	683.30	NM	NI	NM	NM	NI	NM	NI	NM	NI	649.88	650.12
March 12-13, 2020	682.82	NM	NI	NM	NM	NI	661.41	651.64	NM	NI	NM	NM
April 1, 2020	683.27	657.00	NI	655.89	658.57	NI	660.59	655.05	671.13	NI	653.76	651.88
April 13-14, 2020	683.25	656.45	NI	654.08	656.42	NI	662.44	653.69	670.71	NI	650.66	650.09
May 4, 2020	NM	NM	NI	NM	NM	NI	NM	NM	NM	NI	NM	NM
June 30, 2020	NM	NM	NI	NM	NM	NI	NM	NM	NM	NI	NM	NM
October 5-12, 2020	682.34	655.80	NI	650.37	652.95	NI	659.81	648.01	670.18	NI	646.18	642.85
February 23, 2021	NM	NM	NI	NM	NM	NI	NM	NM	669.86	NI	646.80	NM
April 12 - 16, 2021	682.94	656.05	NI	653.82	654.34	NI	661.15	651.16	670.27	NI	649.53	647.66
July 6, 2021	NM	NM	NI	NM	NM	NI	NM	NM	661.87	NI	647.03	NM
October 6-8, 2021	681.95	654.86	NI	649.80	649.53	NI	654.83	645.57	662.27	NI	644.49	641.81
January 11-12, 2022	681.58	NM	NI	NM	NM	NI	656.55	NM	NM	NI	646.24	NM
January 31, 2022	681.56	654.56	NI	650.07	650.51	NI	656.67	647.01	664.14	NI	646.05	643.44
February 14-15, 2022	681.43	654.42	NI	650.03	650.42	NI	656.35	646.84	663.66	NI	645.82	643.25
April 11-14, 2022	682.08	654.77	NI	652.95	652.14	NI	657.62	649.24	664.61	NI	648.40	645.75
May 3, 2022	682.27	654.51	<655.3	652.14	653.51	645.38	657.70	650.04	663.60	<660	649.14	647.41
May 5, 2022	682.07	654.78	656.03	652.48	654.46	645.80	658.07	650.47	663.77	<660	649.86	648.16
May 10, 2022	NM	654.70	655.71	NM	654.09	646.85	NM	NM	663.71	<660	NM	NM
May 17, 2022	681.75	654.56	655.69	652.47	653.60	648.16	657.78	650.77	663.45	<660	649.70	648.06
May 20, 2022	NM	654.63	655.66	NM	653.50	648.68	NM	NM	663.49	<660	NM	NM
May 23, 2022	NM	NM	NM	NM	652.66	648.40	NM	NM	NM	<660	NM	NM
June 2, 2022	681.69	654.22	655.68	651.53	652.37	650.38	656.18	649.53	661.42	<660	648.33	646.68
June 9, 2022	681.80	654.24	655.70	651.44	654.18	650.89	656.34	649.80	661.25	<660	648.90	647.05
June 10, 2022	NM	NM	NM	NM	652.97	650.97	NM	NM	NM	NM	NM	NM
June 21, 2022	681.60	654.29	655.69	651.35	652.89	651.48	656.25	650.52	660.87	<660	649.54	648.47
June 27, 2022	681.60	654.06	655.68	651.14	652.16	651.55	656.15	649.70	661.41	<660	648.61	647.13
July 5, 2022	681.47	653.92	655.68	650.70	651.03	651.73	655.33	648.51	660.86	<660	647.34	645.41
July 12, 2022	681.46	653.78	655.66	651.39	650.62	651.68	655.03	647.95	660.62	660.77	646.83	644.85
July 27, 2022	681.19	653.60	655.66	649.74	649.56	651.48	654.03	646.85	660.76	662.38	645.67	643.58
August 25, 2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	644.25	NM
October 26-28, 2022	680.68	652.95	655.65	648.22	647.26	650.81	651.48	644.38	657.11	672.92	643.46	641.13
February 2, 2023	NM	NM	655.72	NM	NM	651.25	NM	NM	NM	670.66	NM	NM
March 6, 2024	NM	646.90	658.24	NM	NM	648.33	NM	NM	NM	670.08	NM	NM
April 4-6, 2023	681.89	653.30	655.39	652.57	650.29	647.77	655.02	647.70	659.12	662.18	647.28	645.16
October 10-13, 2023	680.20	652.32	DRY	648.07	646.02	648.68	650.21	643.60	655.40	673.91	642.85	640.79
Bottom of Well Elevation (ft)	669.5	648.1	655.3	643.6	630.5	644.5	632.4	602.1	646.9	660.0	629.6	630.4

Notes:
NM = not measured
NI = not installed
ND = Not surveyed

Table 3. Groundwater Elevations - CCR Rule Monitoring Well Networks
IPL - Ottumwa Generating Station / SCS Engineers Project #25224072.00

	Groundwater or Surface Water Elevation in feet above mean sea level (amsl)													Surface Water Elevations (ft amsl)		
Well Number	**MW-309**	**MW-310**	**MW-310A**	**MW-311**	**MW-311A**	**MW-312**	**MW-313**	**MW-314**	**MW-314WT**	**MW-315**	**MW-316**	**MW-316A**	**MW-317**	**SG-1**	**SG-2**	**SG-3**
Top of Well Casing Elevation / Surface Water Reference Elevation (feet amsl)	654.94	658.63	657.93	654.18	653.54	655.36	655.84	684.71	684.61	655.65	657.30	657.74	656.33	656.31	642.84	643.50
Screen Length (ft)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	10.0	5.0	10.0	5.0	10.0	NA	NA	NA
Total Depth (ft from top of casing)	27.5	25.9	55.55	17.9	47.68	29.87	23.82	33.24	24.81	26.6	24.94	54.81	27.91	NA	NA	NA
Top of Well Screen Elevation (ft)	632.44	637.76	607.38	641.24	610.86	NS	NS	656.47	669.8	634.1	642.4	607.9	638.4	NA	NA	NA
Measurement Date																
April 26, 2016	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
June 23, 2016	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
August 9, 2016	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
October 26-27, 2016	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
January 18-19, 2017	646.66	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
April 19-20, 2017	650.16	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
June 20-21, 2017	647.60	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
August 21-23, 2017	641.82	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
November 8, 2017	644.20	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
April 18, 2018	647.65	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
May 30, 2018	650.98	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
June 28, 2018	651.47	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
July 18, 2018	650.69	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
August 14-15, 2018	NM	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
August 29, 2018	NM	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
October 16, 2018	651.61	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
January 8, 2019	NM	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
April 8, 2019	653.55	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
August 28, 2019	NM	640.98	NI	642.10	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
October 23-24, 2019	651.28	649.31	NI	647.80	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
December 11, 2019	647.24	NM	NI	NM	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
February 5, 2020	648.34	644.71	NI	645.00	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
March 12-13, 2020	NM	645.45	617.84	644.18	624.11	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
April 1, 2020	651.23	651.09	649.16	649.35	648.27	NI	NI	NI	NI	NI	NI	NI	NI	649.71	NI	NI
April 13-14, 2020	649.19	645.91	647.50	646.79	648.42	NI	NI	NI	NI	NI	NI	NI	NI	645.71	NI	NI
May 4, 2020	NM	NM	NM	NM	NM	NI	NI	NI	NI	NI	NI	NI	NI	NM	NI	NI
June 30, 2020	NM	NM	NM	NM	647.73	NI	NI	NI	NI	NI	NI	NI	NI	NM	NI	NI
October 5-12, 2020	641.50	638.46	640.20	638.73	641.09	NI	NI	NI	NI	NI	NI	NI	NI	638.16	NI	NI
February 23, 2021	NM	638.77	NM	NM	641.16	NI	NI	NI	NI	NI	NI	NI	NI	NM	NI	NI
April 12 - 16, 2021	646.46	642.70	644.88	643.02	644.16	NI	NI	NI	NI	NI	NI	NI	NI	640.91	NI	NI
July 6, 2021	NM	639.32	NM	NM	642.38	NI	NI	NI	NI	NI	NI	NI	NI	NM	NI	NI
October 6-8, 2021	640.71	638.19	639.57	Dry	640.58	NI	NI	NI	NI	NI	NI	NI	NI	NM	NI	NI
January 11-12, 2022	NM	NM	NM	NM	NM	642.17	641.22	NI	NI	NI	NI	NI	NI	NM	NI	NI
January 31, 2022	642.42	639.69	640.63	639.47	641.79	641.67	640.39	NI	NI	NI	NI	NI	NI	642.96	NI	NI
February 14-15, 2022	642.32	639.64	640.68	Below Pump	641.50	641.86	640.58	NI	NI	NI	NI	NI	NI	642.01	NI	NI
April 11-14, 2022	644.32	640.79	640.83	641.44	643.23	644.62	642.06	NI	NI	NI	NI	NI	NI	643.21	NI	NI
May 3, 2022	647.07	644.83	645.24	642.98	643.94	647.34	645.83	667.41	667.58	NI	NI	NI	NI	647.16	NI	NI
May 5, 2022	648.46	648.11	646.51	644.02	644.13	648.77	648.24	667.57	667.50	NI	NI	NI	NI	NM	NI	NI
May 10, 2022	NM	NM	NM	NM	NM	NM	NM	667.01	667.05	NI	NI	NI	NI	NM	NI	NI
May 17, 2022	647.45	644.67	650.07	644.22	645.13	647.57	646.08	667.07	667.19	NI	NI	NI	NI	NM	NI	NI
May 20, 2022	NM	NM	NM	NM	NM	NM	NM	667.44	667.46	NI	NI	NI	NI	NM	NI	NI
May 23, 2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI	NM	NI	NI
June 2, 2022	646.38	644.61	645.23	643.36	644.93	646.43	645.48	666.15	666.21	NI	NI	NI	NI	NM	NI	NI
June 9, 2022	647.32	648.23	646.20	644.14	644.61	647.78	648.65	665.82	665.91	NI	NI	NI	NI	NM	NI	NI
June 10, 2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NI	NI	NM	NI	NI
June 21, 2022	648.34	646.29	647.63	644.88	645.60	647.87	647.17	665.61	665.68	NI	NI	NI	NI	NM	NI	NI
June 27, 2022	646.34	643.87	644.85	643.64	645.37	646.42	644.80	665.16	665.27	NI	NI	NI	NI	NM	NI	NI
July 5, 2022	644.14	641.58	642.91	644.16	644.30	644.50	642.44	665.14	665.24	NI	NI	NI	NI	NM	NI	NI
July 12, 2022	644.17	641.75	642.89	644.26	641.00	644.17	642.65	664.69	664.85	NI	NI	NI	NI	NM	NI	NI
July 27, 2022	642.46	639.61	641.24	638.41	642.41	643.14	640.83	663.93	664.07	NI	NI	NI	NI	639.23	NI	NI
August 25, 2022	NM	NM	NM	NM	NM	640.80	639.38	NM	NM	NI	NI	NI	NI	NM	NI	NI
October 26-28, 2022	640.43	638.55	639.49	638.46	640.27	639.64	639.16	661.58	661.64	NI	NI	NI	NI	638.41	NI	NI
February 2, 2023	NM	NM	NM	NM	NM	NM	NM	662.71	662.79	642.40	NI	NI	NI	NM	NI	NI
March 6, 2024	NM	NM	NM	NM	NM	NM	NM	663.63	663.63	648.55	NI	NI	NI	NM	NI	NI
April 4-6, 2023	644.41	641.71	643.11	641.88	643.59	644.08	642.02	663.84	664.37	645.12	642.78	643.49	642.84	643.06	640.89	642.99
October 10-13, 2023	640.18	638.32	640.13	638.31	639.84	639.45	639.04	660.35	660.40	641.10	639.15	639.79	639.08	DRY	DRY	DRY
Bottom of Well Elevation (ft)	627.4	632.8	602.4	636.2	605.9	625.5	632.0	651.5	659.8	629.1	632.4	602.9	628.4	--	--	--

Notes:
NM = not measured
NI = not installed
ND = Not surveyed

Created by: NDK Date: 1/15/2018
Last rev. by: NLB Date: 10/25/2023
Checked by: RM Date: 10/25/2023
Proj Mgr QA/QC: TK Date: 7/2/2024

Table 4. Groundwater Gradients and Average Linear Velocity
Ottumwa Generating Station Zero Liquid Discharge Pond
SCS Engineers Project #25224072.00
January - December 2023

	Northeast				
Sampling Dates	**h1 (ft)**	**h2 (ft)**	**Δl (ft)**	**Δh/Δl (ft/ft)**	**V (ft/d)**
4/4-6/2023	655.00	645.12	780.00	0.013	0.1
10/10-13/2023	650.00	641.10	690.00	0.013	0.1

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
MW-315	4.1E-03	11.6
Geometric Mean	1.6E-03	4.5

Assumed Porosity, n
0.40

Groundwater flow velocity equation: V = [K*(Δh/Δl)] / 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	Date:	12/29/2020
Last revision by:	RM	Date:	6/17/2024
Checked by:	NLB	Date:	6/17/2024

I:\25224072.00\Deliverables\2023 OGS ZLDP Federal Annual Report\Tables\[Table 4 - Horizontal Gradients and Flow Velocity Table.xlsx]Sheet1

Table 5. Groundwater Analytical Results Summary - 2023
Ottumwa Generating Station - Zero Liquid Discharge Pond / SCS Engineers Project #25224072.00

Parameter Name	UPL/UTL Method	UPL	GPS	Background Well		Compliance Wells									
				MW-301		MW-307		MW-308		MW-309		MW-315			
				4/6/2023	10/13/2023	4/5/2023	10/10/2023	4/5/2023	10/10/2023	4/5/2023	10/10/2023	2/2/2023	3/6/2024	4/5/2023	10/10/2023
Groundwater Elevation (ft amsl)				682.05	680.20	647.28	642.85	645.16	640.79	644.41	640.18	642.40	648.55	645.12	641.10
Appendix III															
Boron, ug/L	P	821		530	760	250	210	280	230	1400	1300	1300	--	1,100	1,100
Calcium, mg/L	P	101		76	94	230	220	210	210	140	140	140	--	120	120
Chloride, mg/L	P	195		120	150	<2.3	270	150	170	65	68	45 B	--	45	55
Fluoride, mg/L	P	0.366		<0.22	<0.38	<0.22	<0.38	<0.22	<0.38	<0.22	<0.38	<0.22	--	0.22 J	<0.38
Field pH, Std. Units	P	6.71		6.25	6.24	6.62	6.56	6.70	6.66	7.10	7.01	6.94	6.86	6.96	6.93
Sulfate, mg/L	P	204		160	190	130	140	300	300	450	480	450	--	460	500
Total Dissolved Solids, mg/L	P	684		580	680	1,200	1,100	1,100	1,100	1000	1100	940	--	1100	1000
Appendix IV		**UTL**													
Antimony, ug/L	NP	1.10	6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.69	--	<1.0	<1.0
Arsenic, ug/L	NP	0.880	10	<0.53	<0.53	<0.53	0.62 J	<0.53	0.53 J	<0.53	0.59 J	1.3 J	--	1.3 J	1.6 J
Barium, ug/L	P	71.0	2,000	31	48	130	120	110	120	51	55	36	--	35	35
Beryllium, ug/L	NP	0.270	4	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.27	--	<0.33	<0.33
Cadmium, ug/L	P	0.149	5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.055	--	<0.10	<0.10
Chromium, ug/L	NP	1.10	100	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	--	<1.1	<1.1
Cobalt, ug/L	P	5.26	6	0.21 J	0.20 J	30	36	0.45 J	0.17 J	2.0	2.3	7.0	6.4	7.0	6.6
Fluoride, mg/L	P	0.417	4	<0.22	<0.38	<0.22	<0.38	<0.22	<0.38	<0.22	<0.38	<0.22	--	0.22 J	<0.38
Lead, ug/L	NP	0.270	15	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	<0.24	--	<0.24	<0.24
Lithium, ug/L	P	31.8	40	17	25	11	12	14	15	7.8 J	8.3 J	6.2 J	--	5.3 J	5.4 J
Mercury, ug/L	DQ	DQ	2	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.11	--	<0.14	<0.14
Molybdenum, ug/L	NP	1.30	100	<0.91	1.1 J	<0.91	<0.91	<0.91	<0.91	<0.91	<0.91	1.5 J	--	1.4 J	1.3 J
Selenium, ug/L	P	9.01	50	4.7 J	5.8	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<0.96	--	<1.4	<1.4
Thallium, ug/L	NP	0.500	2	<0.26	<0.26	<0.26	<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	0.0491	0.681	1.51	1.83	1.81	2.29	0.882	1.27	1.46	--	1.42	1.29
Additional Parameters Collected for Selection of Remedy															
Cobalt, dissolved, ug/L	UPL and GPS not applicable			--	--	32	36	--	--	--	--	7.0	6.5	6.9	7.3
Iron, dissolved, ug/L				--	--	--	--	--	--	--	--	3,000 B	--	2,700	2,400
Iron, ug/L				58 J	<36	2,700	2,900	3,200	3,600	720	990	3,000	--	2,800	2,900
Magnesium, ug/L				--	--	--	--	--	--	--	--	22,000	--	19,000	21,000
Manganese, dissolved, ug/L				--	--	--	--	--	--	--	--	6,400	--	6,800	6,800
Manganese, ug/L				--	--	--	--	--	--	--	--	6,300	--	6,700	12,000
Potassium, ug/L				--	--	--	--	--	--	--	--	2,000	--	1,400	1,800
Sodium, ug/L				--	--	--	--	--	--	--	--	220,000	--	200,000	200,000
Bicarbonate Alkalinity, mg/L				--	--	--	--	--	--	--	--	300	--	320	280
Carbonate Alkalinity, mg/L				--	--	--	--	--	--	--	--	<2.3	--	<2.5	<2.5
Total Alkalinity, mg/L				--	--	--	--	--	--	--	--	300	--	320	280

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

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

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.
4. For compliance wells, only results confirmed above the LOQ are evaluated as potential SSIs above background or statistically significant level above GPS.

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I:\25224072.00\Deliverables\2023 OGS ZLDP Federal Annual Report\Tables\[Table 5 - GW Screening Summary_OGS ZLDP.xlsx]Table 5 - Samples Summary

Table 6. 2023 Groundwater Field Data Summary
Ottumwa Generating Station - Zero Liquid Discharge Pond
SCS Engineers Project #25224072.00

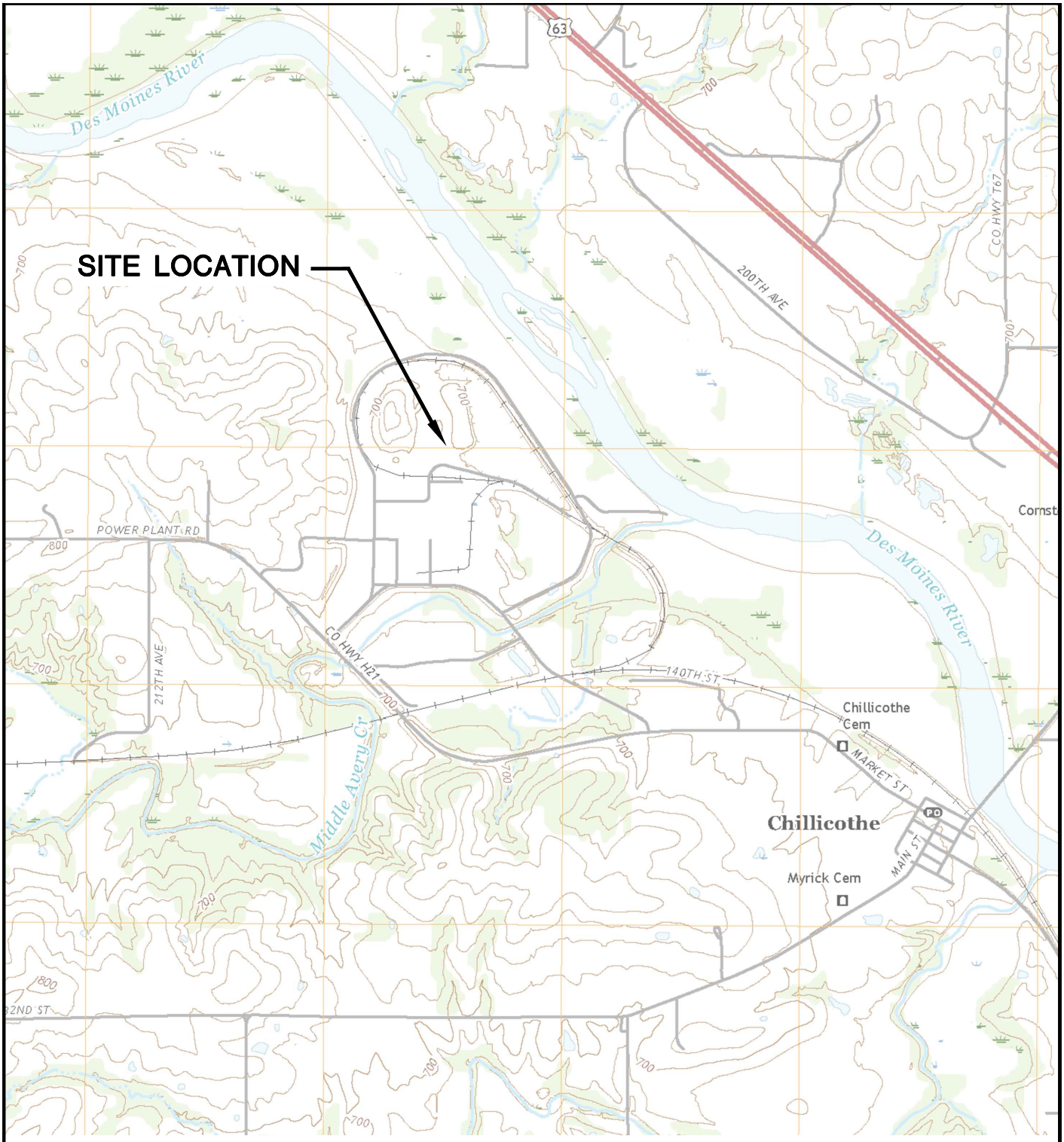
Well	Sample Date	Groundwater Elevation (feet)	Field Temperature (deg C)	Field pH (Std. Units)	Oxygen, Dissolved (mg/L)	Field Specific Conductance (umhos/cm)	Field Oxidation Potential (mV)	Turbidity (NTU)
MW-301	4/6/2023	682.05	7.1	6.25	5.05	832	124.5	2.37
	10/13/2023	680.20	17.6	6.24	3.20	1,158	104.7	1.75
MW-307	4/5/2023	647.28	11.9	6.62	0.00	1,776	31.9	0.02
	10/10/2023	642.85	12.6	6.56	0.20	1,856	-35.0	6.40
MW-308	4/5/2023	645.16	11.7	6.70	0.18	1,634	7.3	1.55
	10/10/2023	640.79	12.7	6.66	0.22	1,704	-54.0	6.31
MW-309	4/5/2023	644.41	11.7	7.10	0.42	1,511	-7.0	0.02
	10/10/2023	640.18	13.3	7.01	0.25	1,598	-54.3	8.35
MW-315	2/2/2023	642.40	12.7	6.94	1.44	1,293	-6.3	1.53
	3/6/2023	648.55	12.4	6.86	0.86	1,539	-60.9	2.25
	4/6/2023	645.12	11.8	6.96	0.32	1,523	-45.7	0.02
	10/10/2023	641.10	13.1	6.93	0.29	1,615	-79.7	9.42

Abbreviations:
mg/L = milligrams per liter
µmhos/cm = micromhos per centimeter
ft amsl = feet above mean sea level
mV = millivolts

Created by: RM Date: 3/22/2024
Last revision by: NLB Date: 6/12/2024
Checked by: RM Date: 6/12/2024

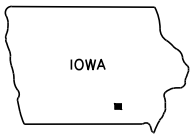
I:\25224072.00\Deliverables\2023 OGS ZLDP Federal Annual Report\Tables\[Table 6 - 2023 Field Parameters_OGS ZLDP.xlsx]Table 6

Figures



N

CHILLICOTHE 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

SITE LOCATION MAP

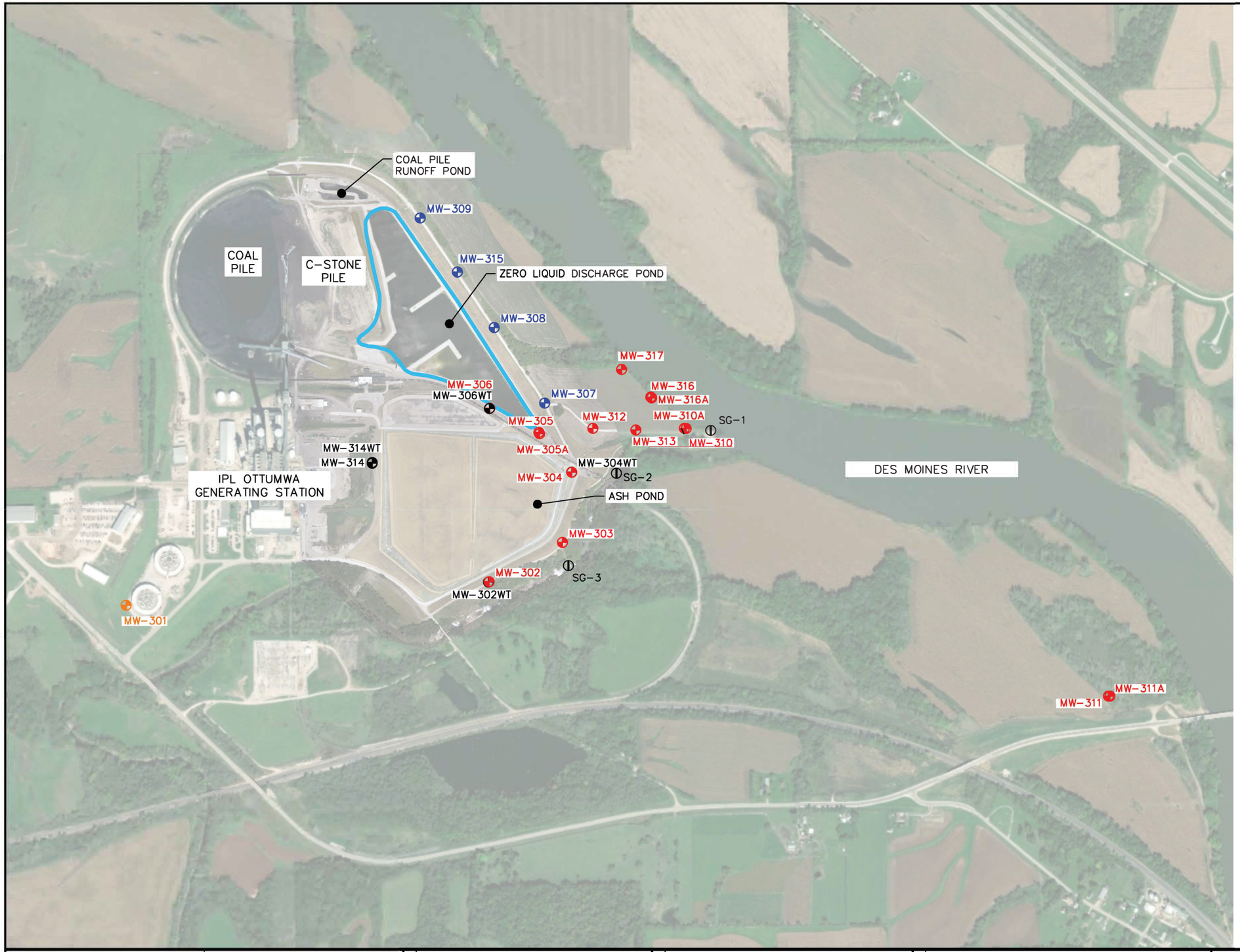
PROJECT NO.	25219072.00	DRAWN BY:	BSS
DRAWN:	11/15/2019	CHECKED BY:	MDB
REVISED:	01/10/2020	APPROVED BY:	TK 01/30/2020

ENGINEER

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

FIGURE
1

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



LEGEND

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

NOTE:

1. BACKGROUND AERIAL IMAGE IS A COMPOSITE OF A PHOTOGRAPH FROM ESRI DATED 2014 AND DRONE PHOTO BY RYAN INCORPORATED CENTRAL INC. DATED JUNE 19, 2023.

N

800 0 800

SCALE: 1" = 800'

PROJECT NO.	25224072.00	DRAWN BY:	KP/SB
DRAWN:	12/05/2023	CHECKED BY:	NLB
REVISED:	06/13/2024	APPROVED BY:	TK, 7/16/2024

ENGINEER: SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830

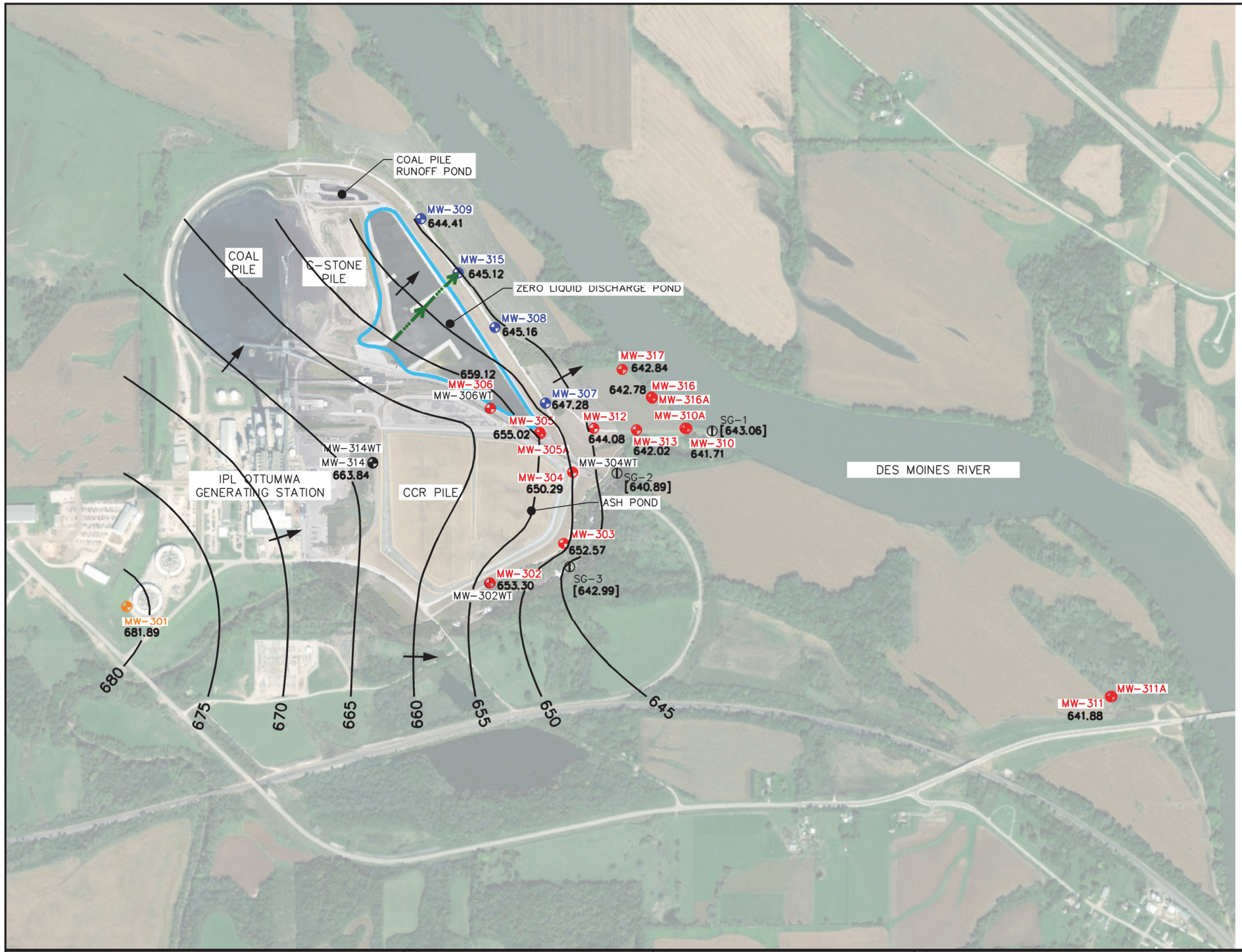
CLIENT: INTERSTATE POWER AND LIGHT CO.
20775 POWER PLANT ROAD
OTTUMWA, IA 52501

SITE: ALLIANT ENERGY
OTTUMWA GENERATING STATION
OTTUMWA, IOWA

SITE PLAN AND MONITORING WELL LOCATIONS

FIGURE 2

\\Mad-fs01\data\Projects\25224072.00\Drawings\Site Plan.dwg, 6/13/2024 1:35:03 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)
- SURFACE WATER ELEVATION MEASUREMENT LOCATION
- **[638.41]** SURFACE WATER ELEVATION (APRIL 4, 2023)
- **651.09** POTENTIOMETRIC ELEVATION AT WELL (APRIL 4–6, 2023)
- POTENTIOMETRIC SURFACE CONTOUR
- FLOW PATH FOR VELOCITY CALCULATION (SEE TABLE 4)
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES:

1. THE BACKGROUND MONITORING WELL FOR THE OGS ZERO LIQUID DISCHARGE POND IS MW-301.
2. BACKGROUND AERIAL IMAGE IS A COMPOSITE OF A PHOTOGRAPH FROM ESRI DATED 2014 AND DRONE PHOTO BY RYAN INCORPORATED CENTRAL INC. DATED JUNE 19, 2023.

N

800 0 800

SCALE: 1" = 800'

PROJECT NO.	25224072.00	DRAWN BY:	KP
DRAWN:	05/05/2023	CHECKED BY:	NLB
REVISED:	06/13/2024	APPROVED BY:	TK, 7/16/2024

ENGINEER: 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 2023

FIGURE 3

\\Mad-fs01\data\Projects\25224072.00\Drawings\Potentiometric Surface 2023 Ash Pond.dwg, 6/13/2024 1:57:55 PM

COAL PILE RUNOFF POND

MW-309
640.18

COAL PILE

C-STONE PILE

MW-315
641.10

ZERO LIQUID DISCHARGE POND

MW-308
640.79

MW-317
639.08

655.40
MW-306
MW-306WT

639.15
MW-316
MW-316A

MW-307
642.85

MW-310A

SG-1
[DRY]

MW-312
639.45

MW-305
650.21

MW-313
639.04

MW-310
638.32

MW-305A

MW-314WT
MW-314
660.35

MW-304WT

SG-2
[DRY]

MW-304
646.02

IPL OTTUMWA GENERATING STATION

CCR PILE

ASH POND

DES MOINES RIVER

MW-303
648.07

SG-3
[DRY]

MW-302
652.32
MW-302WT

MW-301
680.20

675
670
665
660
655
650
645
640

MW-311A
MW-311
638.31

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)
- SURFACE WATER ELEVATION MEASUREMENT LOCATION
- [638.41] SURFACE WATER ELEVATION (OCTOBER 10–13, 2023)
- 651.09 POTENTIOMETRIC ELEVATION AT WELL (OCTOBER 10–13, 2023)
- 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. BACKGROUND AERIAL IMAGE IS A COMPOSITE OF A PHOTOGRAPH FROM ESRI DATED 2014 AND DRONE PHOTO BY RYAN INCORPORATED CENTRAL INC. DATED JUNE 19, 2023.

N

800 0 800

SCALE: 1" = 800'

PROJECT NO.	25224072.00	DRAWN BY:	KP/SB
DRAWN:	12/05/2023	CHECKED BY:	NLB
REVISED:	06/13/2024	APPROVED BY:	TK, 7/16/2024

ENGINEER

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
OCTOBER 2023

FIGURE
4

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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	• 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	• Shale, sandstone, limestone, and coal
Mississippian (310 to 345 million years old	Mississippian Aquifer • Upper	0 to 600	St. Louis Spergen	• Limestone and sandstone • Limestone
	• Lower		Warsaw Keokuk Burlington Hampton Starrs Cave	• Shale and dolomite • Dolomite, limestone, and shale • Dolomite and limestone • Limestone and dolomite • Limestone
	Aquiclude	0 to 425	Prospect Hill McCraney	• Siltstone • Limestone
Devonian (345 to 400 million years old)			Yellow Spring Lime Creek	• Shale, dolomite, and siltstone • Dolomite and shale
	Devonian Aquifer	110 to 420	Cedar Valley Wapsipinicon	• Limestone and dolomite • Dolomite, limestone, shale, and gypsum
Silurian (400 to 425 million years old)		0 to 105	Undifferentiated	• Dolomite
Ordovician (425 to 500 million years old)	Aquiclude	150 to 600	Maquoketa Galena Decorah Platteville	• 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	• Sandstone • Dolomite and sandstone
Cambrian (500 to 600 million years old)			Jordan St. Lawrence	• Sandstone • Dolomite
	Not considered an aquifer in southeast Iowa	450 to 750+	Franconia Galesville Eau Claire Mt. Simon	• Shale, siltstone, and sandstone • Sandstone • Sandstone, shale, and dolomite • Sandstone
Precambrian (600 million to 2 billion + years old)				• 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.

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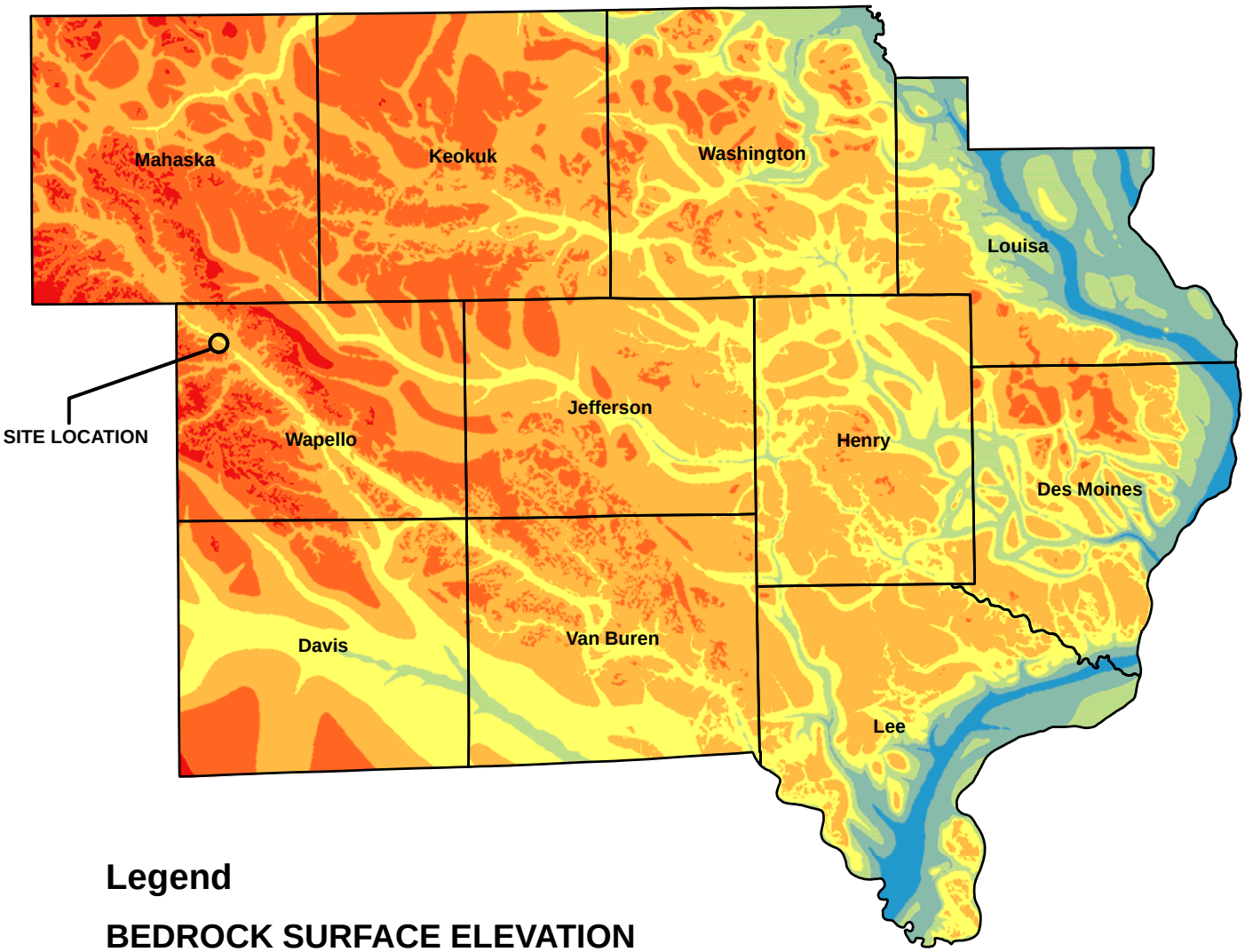


Legend

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

N

0 5 10 20 Miles

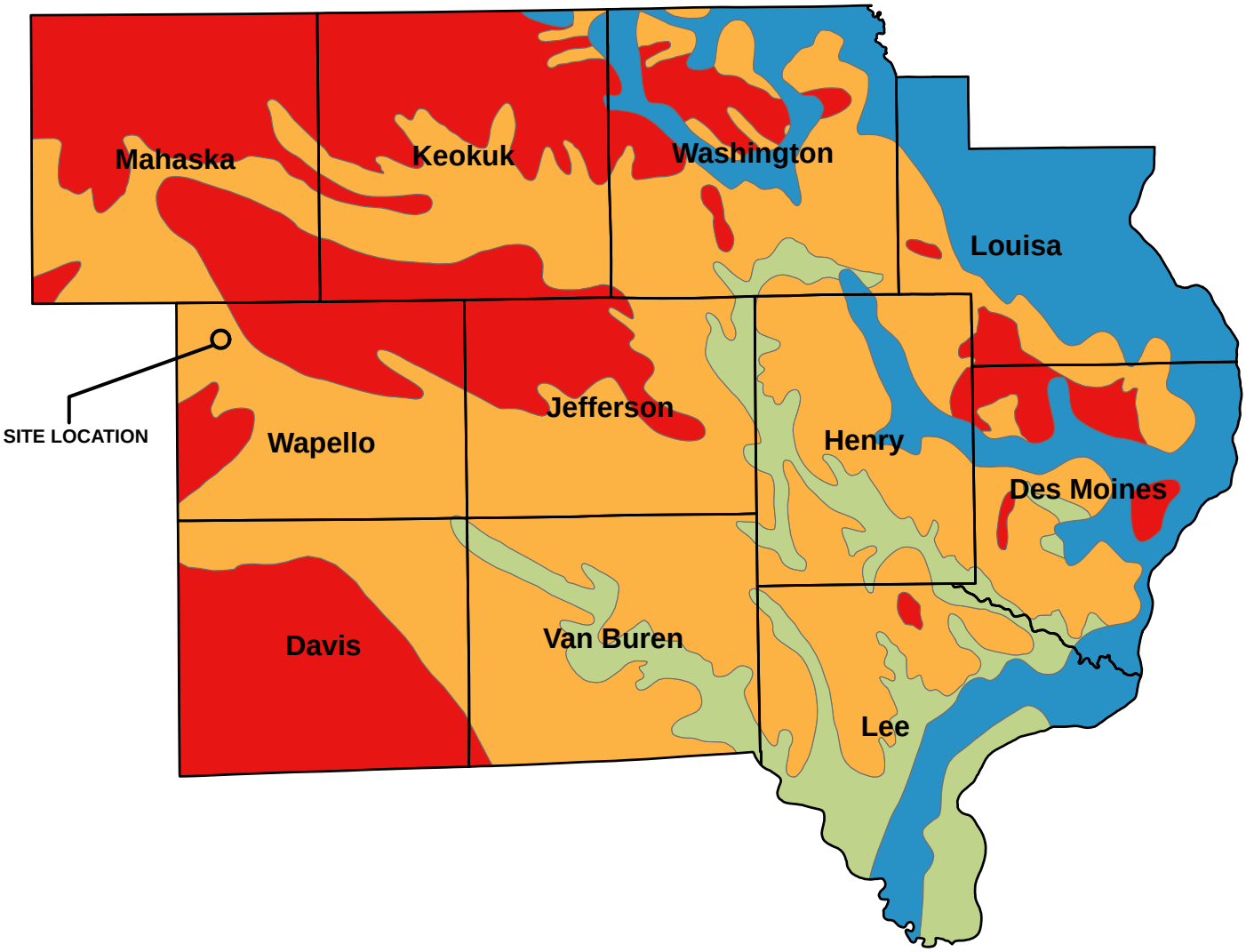
MAP DATA DERIVED FROM IOWA GEOLOGICAL AND WATER SURVEY
IOWA BEDROCK SURFACE ELEVATION AS OBTAINED
FROM IOWA NATURAL RESOURCES
GEOGRAPHIC INFORMATION SYSTEMS LIBRARY

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	ENGINEER	FIGURE
DRAWN:	07/29/13	CHECKED BY:	MDB		
REVISED:	05/29/15	APPROVED BY:			

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830 FAX: (608) 224-2839

I:\25215053\Drawings\OGS\ArcMAP\OML-BEDROCK TOPO 8.5X11 portrait.mxd



Legend

MISSISSIPIAN AQUIFER POTENTIOMETRIC SURFACE

ELEVATION ABOVE MEAN SEA LEVEL IN FEET

- MISSISSIPPIAN NOT PRESENT
- 550
- 650
- 750

N

0 5 10 20 Miles

MAP DATA DERIVED FROM IOWA GEOLOGICAL AND WATER SURVEY
MISSISSIPIAN 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 MISSISSIPIAN AQUIFER
POTENTIOMETRIC SURFACE ELEVATION

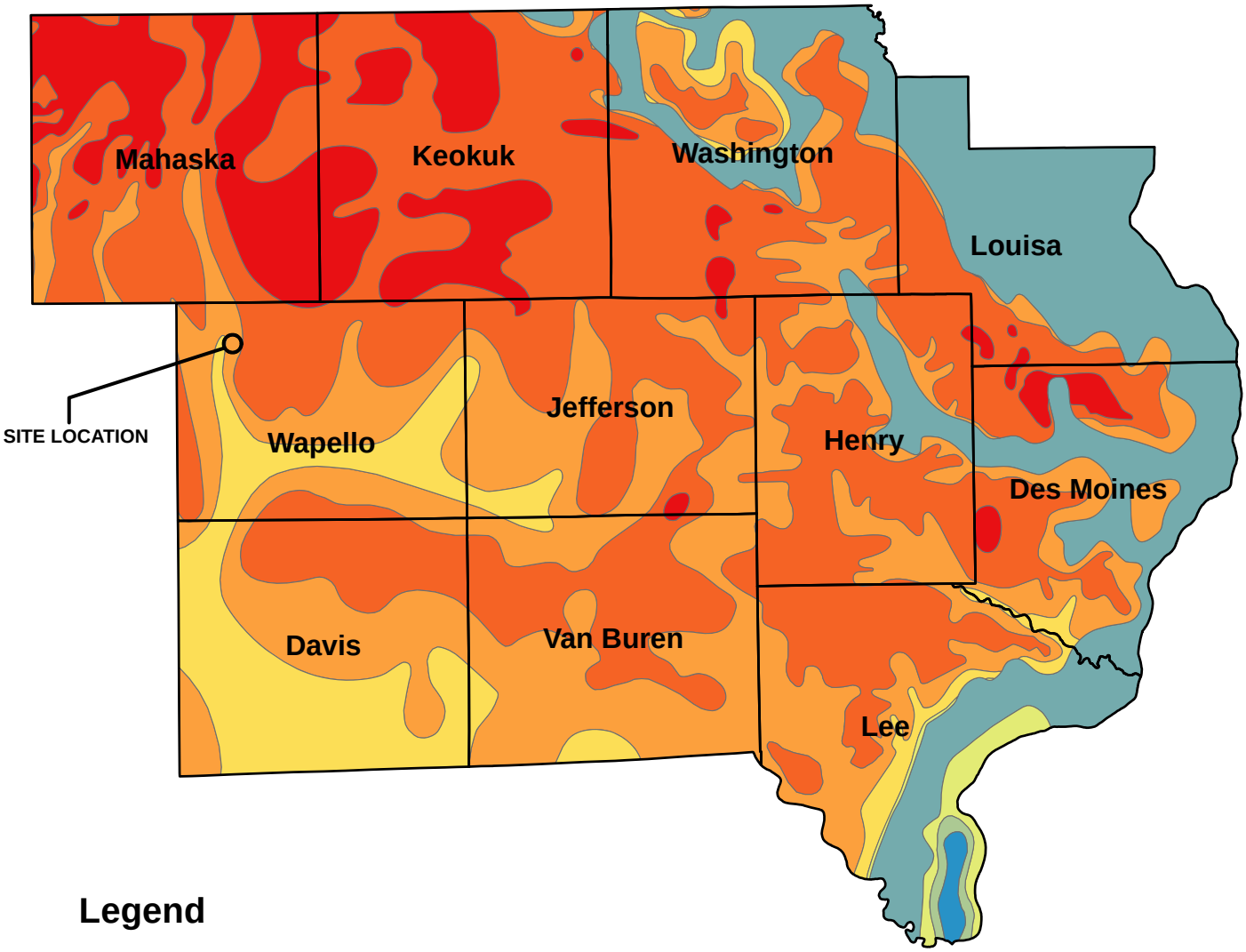
PROJECT NO.	25215053.03	DRAWN BY:	JB
DRAWN:	07/29/13	CHECKED BY:	MDB
REVISED:	05/29/15	APPROVED BY:	

ENGINEER

SCS ENGINEERS
2830 DAIRY DRIVE MADISON, WI 53718-6751
PHONE: (608) 224-2830 FAX: (608) 224-2839

FIGURE

I:\25215053\Drawings\OGS\ArcMAP\OML-MISSISS POTENT 8.5X11 portrait.mxd



Legend

MISSISSIPIAN AQUIFER ELEVATION

ELEVATION ABOVE MEAN SEA LEVEL IN FEET

- MISSISSIPPIAN NOT PRESENT
- 150
- 250
- 350
- 450
- 550
- 650
- 750

N

0 5 10 20 Miles

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	SE IOWA REGIONAL MISSISSIPIAN AQUIFER SURFACE ELEVATION

PROJECT NO. 25215053.03	DRAWN BY: JB	ENGINEER	SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830 FAX: (608) 224-2839	FIGURE
DRAWN: 07/29/13	CHECKED BY: MDB			
REVISED: 05/29/15	APPROVED BY:			

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Appendix B

Boring Logs and Well Construction Documentation

SCS ENGINEERS
Environmental Consultants and Contractors

SOIL BORING LOG INFORMATION

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

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
IPL- Ottumwa Generating Station SCS#: 25215135.40		MW-301

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Todd Schmalfeld Cascade Drilling	11/10/2015	11/10/2015	4-1/4 hollow stem auger

Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
		MW-301	Feet	684.3 Feet	8.5 in

Local Grid Origin ☐ (cstimatcd: ☐) or Boring Location ☒
State Plane 400,077 N, 1,899,709 E S/C/N
NW 1/4 of SW 1/4 of Section 26, T 73 N, R 15 W

Lat ° ' "
Long ° ' "

Local Grid Location
☐ N ☐ E
Feet ☐ S Feet ☐ W

Facility ID	County	Civil Town/City/ or Village
	Wapello	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: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			0	TOPSOIL.	TOPSOIL									
			1	SANDY SILT WITH GRAVEL, gray (7.5YR 6/1), gravel is fine.										
			2											
			3											
			4		ML									
S1	10	woh 1 3 9	5							W				
			6											
			7	WEATHERED SANDSTONE, very weak, light gray matrix (10YR 7/1), scondary color very dark gray 910YR 3/1), massive.										
S2	13	24 50	8							W				
			9											
			10											
S3	5	50	11		SANDSTONE					W				
			12											
S4	6	50	13							W				
			14											
S5	4	50	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 for Kyle Kramer

Firm SCS Engineers
2830 Dairy Drive Madison, WI 53718

Tel: (608) 224-2830
Fax:

SCS ENGINEERS
Environmental Consultants and Contractors

SOIL BORING LOG INFORMATION

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

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
IPL-Ottumwa Generating Station SCS#: 25216148.00		MW-307

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Mike Mueller Cascade Drilling	10/25/2016	10/25/2016	HSA

Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
		MW-307	Feet	655.1 Feet	8.5 in

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 401,707 N, 1,903,070 E S/C/N
NE 1/4 of SE 1/4 of Section 26, T 73 N, R 15 W
Lat ° ' "
Long ° ' "
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

Facility ID	County	Civil Town/City/ or Village
	Wapello	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: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			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											
			3											
			4											
			5											
			6											
			7											water level 6.5 ft bgs.
			8											
			9											
S1	24	2 2 3 2	10							W				
			11	LEAN CLAY, dark yellowish brown (10YR 4/4), slightly dense.	CL									
			12											
			13											
S2	14	4 1 4 4	14							W				
			15											

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 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: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			16	LEAN CLAY, dark yellowish brown (10YR 4/4), slightly dense. *(continued)*	CL									
S3	24	1 2 2 4	16	SILT, dark yellowish brown (10YR 3/4), fine to medium sand.						W				
			17											
			18		ML									
S4	17	3 3 3	19							W				Bedrock @19.5 ft bgs.
			20	SANDSTONE, dark brown (10YR 3/3),										
S5	5	50/0.5	21							W				More competent @20.5' -24.5' bgs.
			22											
			23											
			24											
			25	more weathered.										
			26											
			27											
S6	1	100	28	Same as above except, gray (10YR 6/1).										
				End of boring at 28 ft bgs.										

SCS ENGINEERS
Environmental Consultants and Contractors

SOIL BORING LOG INFORMATION

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

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
IPL-Ottumwa Generating Station SCS#: 25216148.00		MW-308

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Mike Mueller Cascade Drilling	10/25/2016	10/25/2016	HSA

Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
		MW-308	Feet	652.9 Feet	8.5 in

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 402,312 N, 1,902,665 E S/C/N
NE 1/4 of SE 1/4 of Section 26, T 73 N, R 15 W
Lat ___ ° ___ ' ___ "
Long ___ ° ___ ' ___ "
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

Facility ID	County	Civil Town/City/ or Village
	Wapello	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: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			1–9	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									water @ 6.5 ft bgs.
S1	24	19 4 2 2	10–12	LEAN CLAY, brown (10YR 4/3), dense.	CL					W				
S2	13	1 2 2 2	13–15	SILT, brown (10YR 4/3), some clay.	ML					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-308 Page 2 of 2

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: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			16	SILT, brown (10YR 4/3), some clay. *(continued)*	ML									
S3	18	1 2 1 3		SILTY SAND, brown (10YR 4/3).	SM					W				
			17	POORLY GRADED SAND, brown (10YR 4/3), fine grained.	SP									
			18											
S4	13	4 12 13 3		WELL GRADED SAND AND GRAVEL, dark grayish brown (10YR 3/2), fine to coarse grained, (weathered bedrock).	SW					W				
			19	SANDSTONE, dark grayish brown (10YR 4/2), weathered bedrock.										
S5	6	12 26 50/0.4	20	Same as above except, brown (10YR 4/3).						W				
			21											
			22											
			23											
			24	Same as above except, dark grayish brown (10YR 4/2).										
S6	4	50/0.4	25							W				
				End of boring at 25 ft bgs.										

SCS ENGINEERS
Environmental Consultants and Contractors

SOIL BORING LOG INFORMATION

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

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
IPL-Ottumwa Generating Station SCS#: 25216148.00		MW-309

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Mike Mueller Cascade Drilling	10/27/2016	10/27/2016	HSA

Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
		MW-309	Feet	652.5 Feet	8.5 in

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 403,189 N, 1,902,070 E S/C/N
NE 1/4 of SE 1/4 of Section 26, T 73 N, R 15 W
Lat ° ' "
Long ° ' "
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

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

Sample Number and Type	Sample 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: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			1–9	Hydrovac borehole to 10 ft bgs.										
S1		3 3 6 7	10–11	LEAN CLAY, very dark grayish brown (10YR 3/2), trace sand.	CL					W				
S2		2 2 2 2	12–14							W				
			15											

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 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: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
S3		1 1 1 1	16	SILTY SAND, very dark grayish brown (10YR 3/2), fine to medium grained.						W				
			17		SM									
S4		3 5 4 6	18 19							W				
				POORLY GRADED SAND, yellowish brown (10YR 5/4), coarse grained.										
S5		2 3 7 50	20 21		SP					W				
			22	WEATHERED SANDSTONE.										
S6			23 24 25 26 27							W				
				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	License/Permit/Monitoring Number	Boring Number
IPL-Ottumwa Generating Station SCS#: 25216148.00		B-309X

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Mike Mueller Cascade Drilling	10/26/2016	10/26/2016	HSA

Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
			Feet	Feet	8.5 in

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane N, E S/C/N
NE 1/4 of SE 1/4 of Section 26, T 73 N, R 15 W
Lat ° ' "
Long ° ' "
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

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

Sample Number and Type	Sample 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: Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			1–15	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									Water at 6.5 ft bgs
S1	12	1 3 3 4	9–12	LEAN CLAY, dark brown (10YR 3/3), medium dense.	CL					W				
S2	18	3 3 3 3	13–15	SILT, dark brown (10YR 3/3), some clay.	ML					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 B-309X

Sample Number and Type	Sample 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: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			16	SILT, dark brown (10YR 3/3), some clay. *(continued)*	ML									
S3	20	3 3 3 2	17	POORLY GRADED SAND, very dark grayish brown (10YR 3/2), fine grained.	SP					W				
			18	SILT, dark brown (10YR 3/3).	ML									
S4	15	1 17 50/0.2	19	POORLY GRADED SAND, brown (10YR 4/3).	SP					W				Bedrock at18.5 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.										

SCS ENGINEERS
Environmental Consultants and Contractors

SOIL BORING LOG INFORMATION

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

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
IPL-Ottumwa Generating Station SCS#: 25221162.00		MW-315

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Bryan Kinzer Direct Push Analytical	11/29/2022	11/29/2022	Geoprbe/HSA

Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
		MW-315	Feet MSL	Feet MSL	8.25" in

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒
State Plane 402757.793 N 1902367.433 E S / C / N
SE 1/4 of NE 1/4 of Section 26, T 73 N, R 15 W

Lat 41° 06 ' 05.558 "
Long -92° 32 ' 58.170 "

Local Grid Location
☐ N ☐ E
Feet ☐ S Feet ☐ W

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

Sample Number and Type	Sample 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: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			1	Hydrovaced 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	POORLY GRADED SAND, fine to medium grained, brown (backfill).	FILL									
			9	LEAN CLAY, dark brown with trace dark reddish brown mottling, medium stiff.										
S1	27		10						1.0	M				
			11		CL									
			12	Same as above but with dark grayish bown with trace roots and wood.										
			13											
S2	32		14						0.75	M/W				Measured water at 14' bgs.
			15		ML				0.25 - 0.5					

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 Number and Type	Sample 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: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			16	SANDY SILT, dark gray and trace reddish brown with trace roots and wood, sand is fine grained, gray. *(continued)*	ML									
S3	40		17 18 19	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					W				
S4	26		20 21 22	POORLY GRADED SAND, fine grained, orange-brown (weathered bedrock). Same as above but orangish tan, transitioning to olive green to white,	SP					W				Refusal at 22' bgs with Geoprobe, tripped out of boring and continued drilling with hollow stem augers to 25' bgs.
			23 24 25	End of boring at 25' below ground surface.										

Print Form

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

Locations (± 0.5 ft):

Specify corner of site: SE of Parcel 003052640340000

Distance & direction along boundary: 106' W

Distance & direction from boundary to wall: 306' N

Elevations (± 0.01 ft MSL):

Ground Surface: 684.28

Top of protective casing: 687.12

Top of well casing: 686.63

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: Todd Schmalfeld

Drilling Method: HSA

Drilling Fluid: NA

Bore Hole Diameter: 8 inch

Soil Sampling Method: Spoon

Depth of Boring: 15 ft

C. MONITORING WELL INSTALLATION

Casing material: PVC sch 40

Length of casing: 4 ft

Outside casing diameter: 2.38"

Inside casing diameter: 2"

Casing joint type: threaded

Casing/screen joint type: threaded

Screen material: PVC

Screen opening size: 0.010"

Screen length: 10 ft

Depth of well: 14 ft

Filter Pack:

Material: Red Flint

Grain size: #40

Volume: 4 cu. ft.

Seal (minimum 3 ft length above filter pack):

Material: 3/8 inch bentonite chips

Placement method: Gravity

Volume: 8 cu. ft.

Backfill (if different from seal):

Material:

Placement method:

Volume:

Surface seal design:

Material of protective casing: Steel 6 inch

Material of grout between protective casing and well casing: sand

Protective cap:

Material: Steel, vented

Vented: ☐ Yes ☐ No Locking: ☑ Yes ☐ No

Well Cap:

Material: PVC

Vented: ☐ Yes ☑ No

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

Water level: 3.09 ft Stabilization Time: <5 minutes

Well development method: Surged with block and pumped to reduce turbidity. 435 gallons pumped.

Average depth of frostline: 3.5'

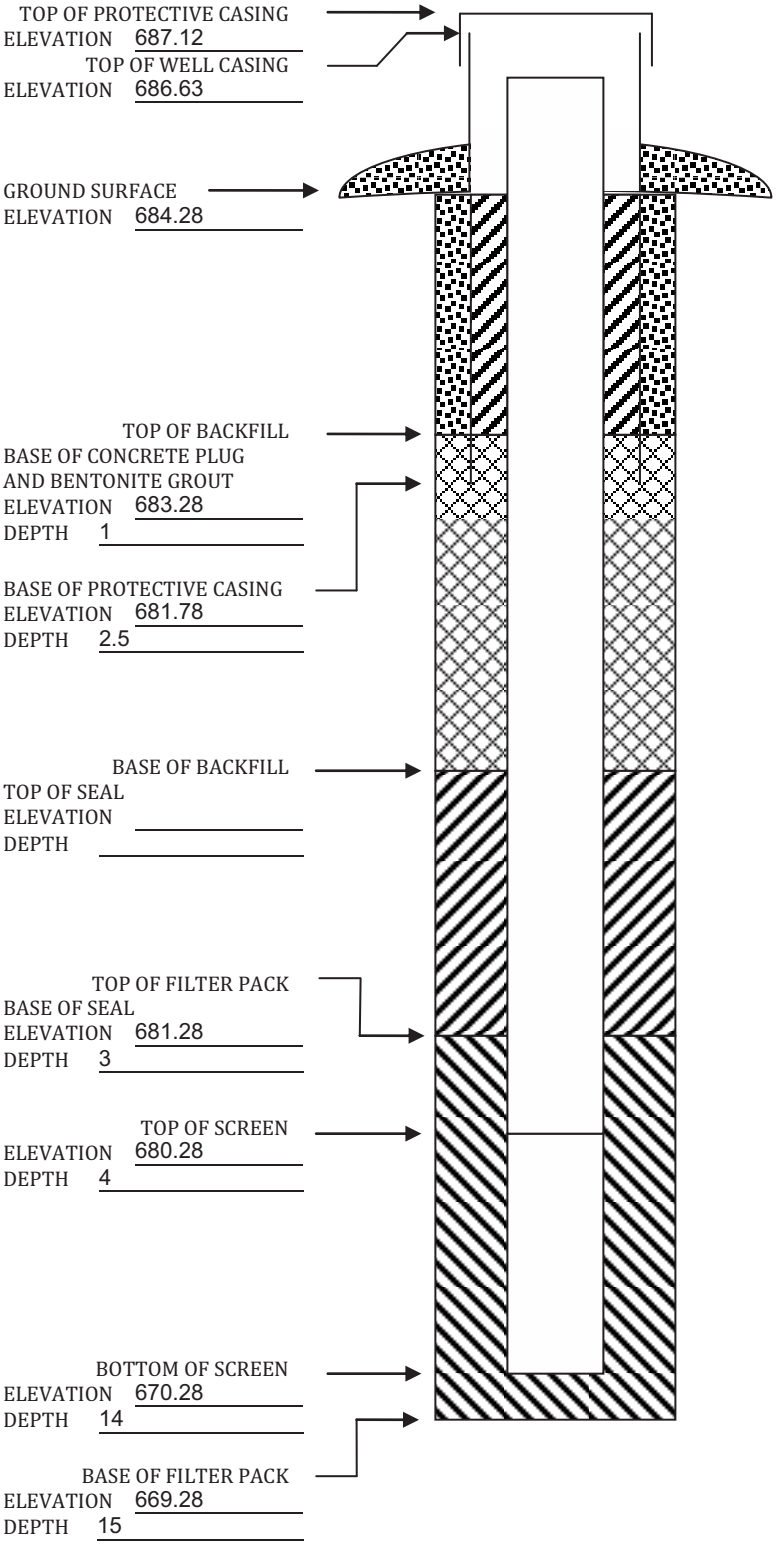
Attachments: Driller's log. Pipe schedules and grouting schedules. 8 ½x11 inch map showing locations of all monitoring wells and piezometers.

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.)



Print Form

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

Casing material: PVC sch 40

Length of casing: 22 ft

Outside casing diameter: 2.38"

Inside casing diameter: 2"

Casing joint type: threaded

Casing/screen joint type: threaded

Screen material: PVC

Screen opening size: 0.010"

Screen length: 5 ft

Depth of well: 27 ft

Filter Pack:

Material: Red Flint

Grain size: #40

Volume: 200 lbs

Seal (minimum 3 ft length above filter pack):

Material: 3/8 inch bentonite chips

Placement method: Gravity

Volume: 250 lbs

Backfill (if different from seal):

Material:

Placement method:

Volume:

Surface seal design:

Material of protective casing: Steel 6 inch

Material of grout between protective casing and well casing: sand

Protective cap:

Material: Steel, vented

Vented: ☑ Yes ☐ No Locking: ☐ Yes ☐ No

Well Cap:

Material: PVC

Vented: ☐ Yes ☑ No

D. GROUNDWATER MEASURMENT (± 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'

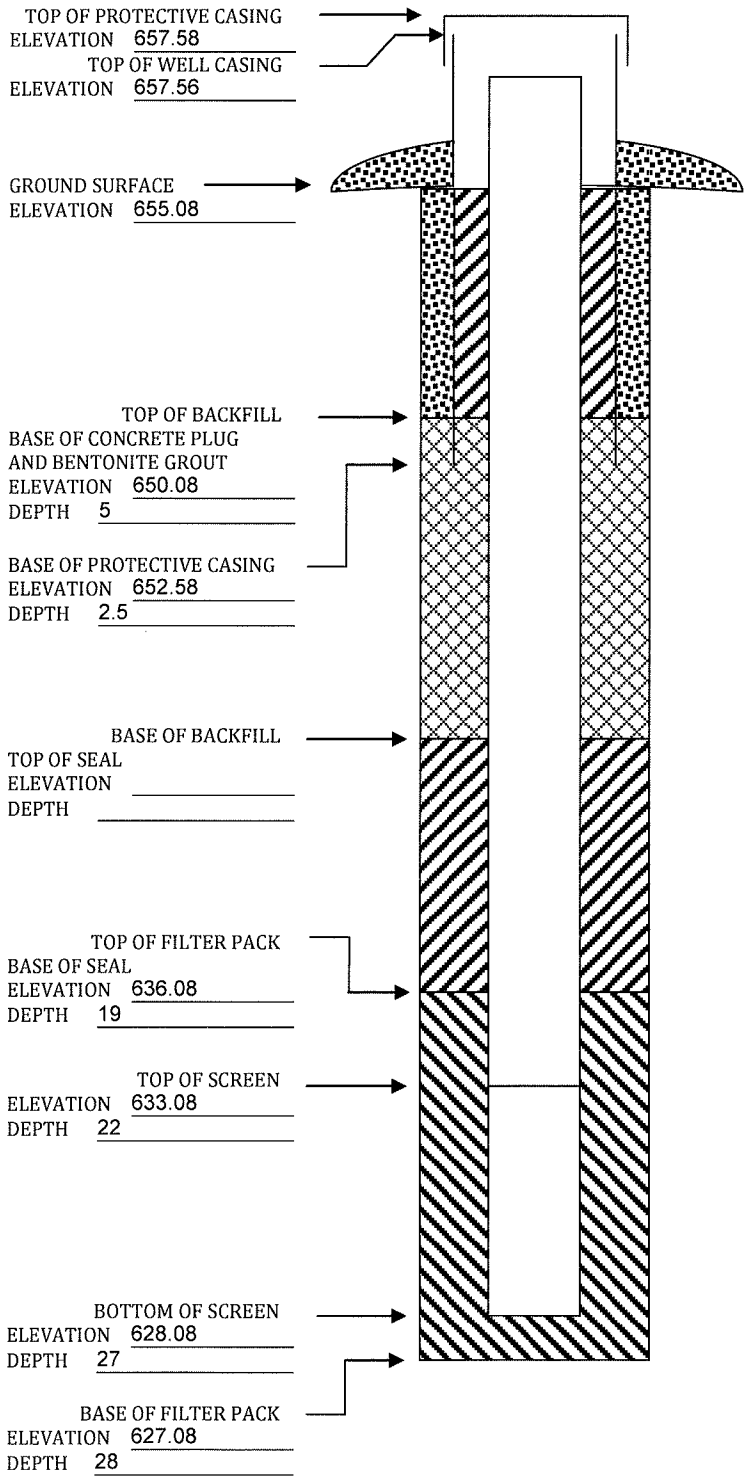
Attachments: Driller's log. Pipe schedules and grouting schedules. 8 ½x11 inch map showing locations of all monitoring wells and piezometers.

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.)



Print Form

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

Casing material: PVC sch 40

Length of casing: 19 ft

Outside casing diameter: 2.38"

Inside casing diameter: 2"

Casing joint type: threaded

Casing/screen joint type: threaded

Screen material: PVC

Screen opening size: 0.010"

Screen length: 5 ft

Depth of well: 24 ft

Filter Pack:

Material: Red Flint

Grain size: #40

Volume: 200 lbs

Seal (minimum 3 ft length above filter pack):

Material: 3/8 inch bentonite chips

Placement method: Gravity

Volume: 200 lbs

Backfill (if different from seal):

Material:

Placement method:

Volume:

Surface seal design:

Material of protective casing: Steel 6 inch

Material of grout between protective casing and well casing: sand

Protective cap:

Material: Steel, vented

Vented: ☑ Yes ☐ No Locking: ☐ Yes ☐ No

Well Cap:

Material: PVC

Vented: ☐ Yes ☑ No

D. GROUNDWATER MEASURMENT (± 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'

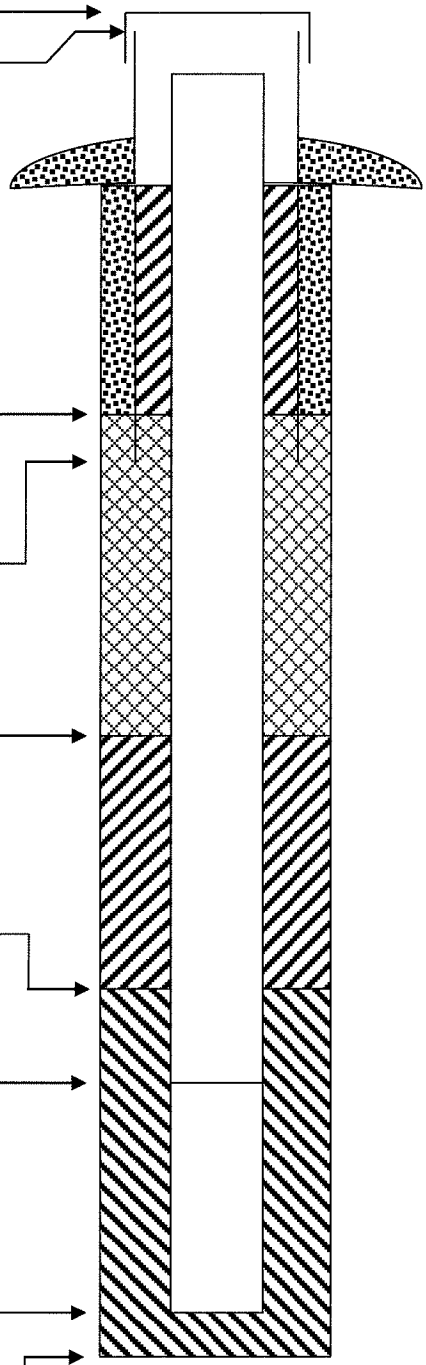
Attachments: Driller's log. Pipe schedules and grouting schedules. 8 ½x11 inch map showing locations of all monitoring wells and piezometers.

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.)



TOP OF PROTECTIVE CASING
ELEVATION 655.23
TOP OF WELL CASING
ELEVATION 655.39

GROUND SURFACE
ELEVATION 652.87

TOP OF BACKFILL
BASE OF CONCRETE PLUG
AND BENTONITE GROUT
ELEVATION 647.87
DEPTH 5

BASE OF PROTECTIVE CASING
ELEVATION 650.37
DEPTH 2.5

BASE OF BACKFILL
TOP OF SEAL
ELEVATION
DEPTH

TOP OF FILTER PACK
BASE OF SEAL
ELEVATION 635.87
DEPTH 17

TOP OF SCREEN
ELEVATION 633.87
DEPTH 19

BOTTOM OF SCREEN
ELEVATION 628.87
DEPTH 24

BASE OF FILTER PACK
ELEVATION 627.87
DEPTH 25

Print Form

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

Locations (± 0.5 ft):

Specify corner of site: NE of Parcel 003052620204000

Distance & direction along boundary: 480' W

Distance & direction from boundary to wall: 438' S

Elevations (± 0.01 ft MSL):

Ground Surface: 652.45

Top of protective casing: 654.97

Top of well casing: 654.94

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: 27.5 ft

C. MONITORING WELL INSTALLATION

Casing material: PVC sch 40

Length of casing: 21.5 ft

Outside casing diameter: 2.38"

Inside casing diameter: 2"

Casing joint type: threaded

Casing/screen joint type: threaded

Screen material: PVC

Screen opening size: 0.010"

Screen length: 5 ft

Depth of well: 26.5 ft

Filter Pack:

Material: Red Flint

Grain size: #40

Volume: 200 lbs

Seal (minimum 3 ft length above filter pack):

Material: 3/8 inch bentonite chips

Placement method: Gravity

Volume: 600 lbs

Backfill (if different from seal):

Material:

Placement method:

Volume:

Surface seal design:

Material of protective casing: Steel 6 inch

Material of grout between protective casing and well casing: sand

Protective cap:

Material: Steel, vented

Vented: ☑ Yes ☐ No Locking: ☐ Yes ☐ No

Well Cap:

Material: PVC

Vented: ☐ Yes ☑ No

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

Water level: 9.87 Stabilization Time: 5 minutes

Well development method: surged with bailer and pumped

Average depth of frostline: 3.5'

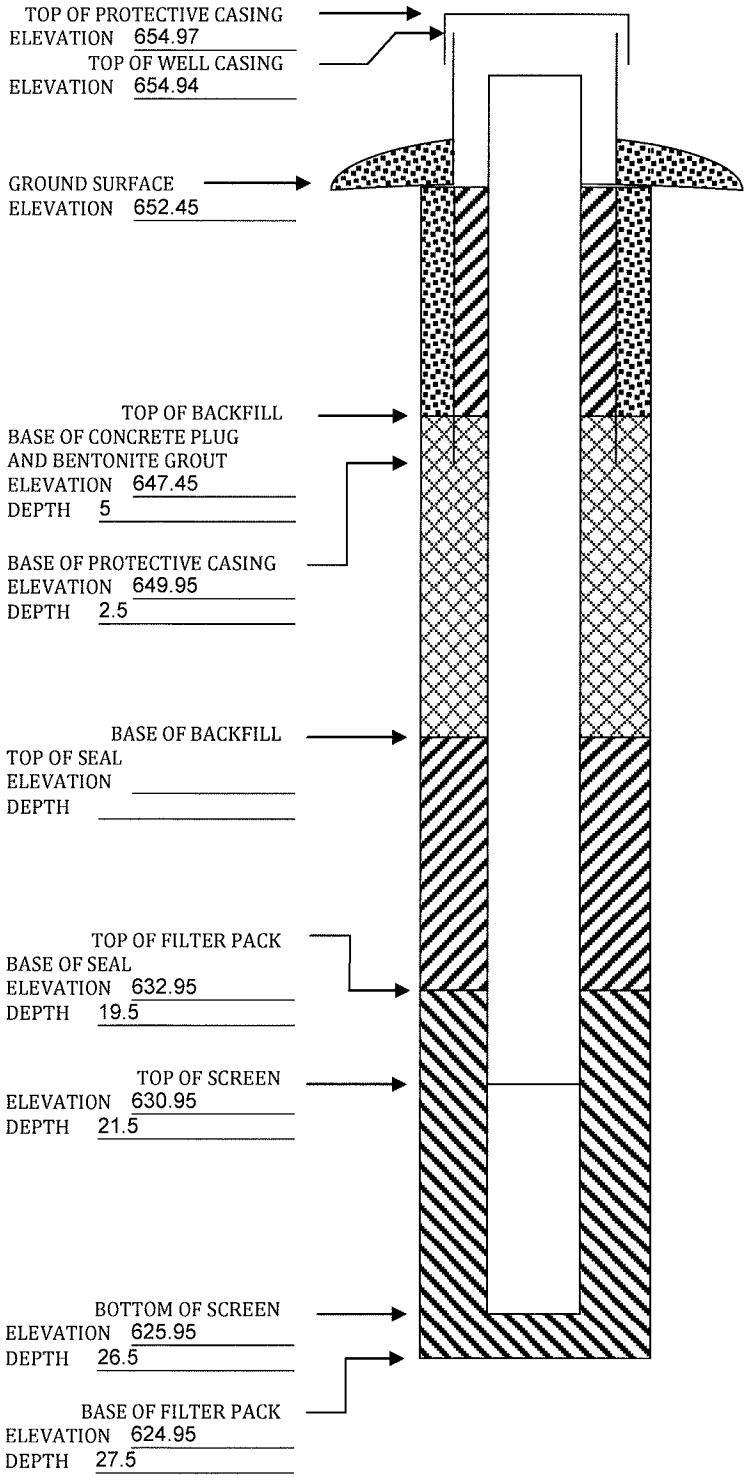
Attachments: Driller's log. Pipe schedules and grouting schedules. 8 ½x11 inch map showing locations of all monitoring wells and piezometers.

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

Length of casing: 22.59'

Outside casing diameter: 2.4"

Inside casing diameter: 2.04"

Casing joint type: Threaded

Casing/screen joint type: Threaded

Screen material: Sch. 40 PVC

Screen opening size: 0.01"

Screen length: 5'

Depth of Well: 24' below ground surface

Filter Pack:

- Material: R.W. Sidley filter sand
- Grain Size: #5
- Volume: 3.5 bags/1.75 Ft^3

Seal (minimum 3 ft. length above filter pack):

- Material: 3/8" Bentonite Chips

Placement method: Poured

Volume: 4 cu. ft.

Backfill (if different from seal):

- Material:
- Placement method:
- Volume:

Surface seal design:

Material of protective casing: Steel

Material of grout between protective casing and well casing: Bentonite chips and sand

Protective cap:

- Material: Steel
- Vented?: ☒ Y ☐ N | Locking?: ☒ Y ☐ N

Well cap:

- Material: Plastic
- 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: [signature] | **Certification #:** 5498 | **Date:** 2-6-2023

Attachments: Driller's log. Pipe schedules and grouting schedules. 8 ½ inch x 11 inch map showing locations of all monitoring wells and piezometers.

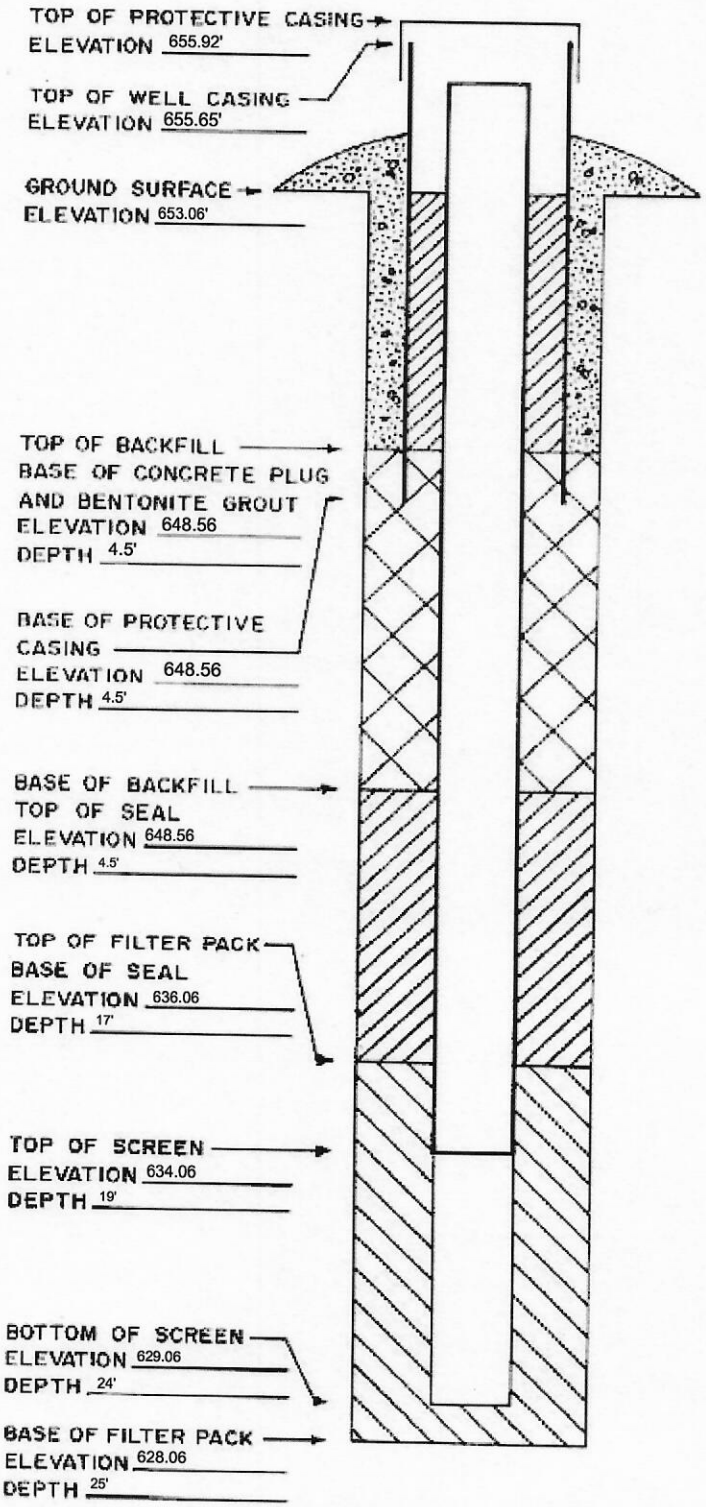
Please mail completed form to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E. 9th St, Des Moines, IA 50319.

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

ELEVATIONS: ± 0.01 FT. MSL

DEPTHS: ± 0.1 FT. FROM GROUND SERFACE

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



Appendix C

Analytical Laboratory Reports

C1 February 2023 Supplemental Assessment Monitoring

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

ANALYTICAL REPORT

PREPARED FOR

Attn: Meghan Blodgett
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Generated 2/23/2023 4:11:47 PM

JOB DESCRIPTION

Ottumwa Generating Station 25222072

JOB NUMBER

310-249151-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

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

Table of Contents

Case Narrative

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

Job ID: 310-249151-1

Job ID: 310-249151-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-249151-1

Comments
No additional comments.

Receipt
The samples were received on 2/3/2023 4:35 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 0.9º C and 1.5º C.

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

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

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

Sample Summary

Client: SCS Engineers
Job ID: 310-249151-1
Project/Site: Ottumwa Generating Station 25222072

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-249151-1	MW-315	Water	02/02/23 13:25	02/03/23 16:35
310-249151-2	Field Blank	Water	02/02/23 13:00	02/03/23 16:35

Detection Summary

Client: SCS Engineers
Job ID: 310-249151-1
Project/Site: Ottumwa Generating Station 25222072

Client Sample ID: MW-315 — Lab Sample ID: 310-249151-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	45	B	5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	450		5.0	2.0	mg/L	5		9056A	Total/NA
Arsenic	1.3	J	2.0	0.75	ug/L	1		6020B	Total/NA
Barium	36		2.0	0.88	ug/L	1		6020B	Total/NA
Boron	1300		100	58	ug/L	1		6020B	Total/NA
Calcium	140		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	7.0		0.50	0.19	ug/L	1		6020B	Total/NA
Lithium	6.2	J	10	2.5	ug/L	1		6020B	Total/NA
Molybdenum	1.5	J	2.0	1.2	ug/L	1		6020B	Total/NA
Total Dissolved Solids	940		50	26	mg/L	1		SM 2540C	Total/NA
pH	7.1	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	642.40				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-6.3				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	1.44				mg/L	1		Field Sampling	Total/NA
pH, Field	6.94				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1293				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	12.7				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	1.53				NTU	1		Field Sampling	Total/NA

Client Sample ID: Field Blank — Lab Sample ID: 310-249151-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	0.28	J	0.50	0.19	mg/L	1		6020B	Total/NA
pH	5.5	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: SCS Engineers
Job ID: 310-249151-1
Project/Site: Ottumwa Generating Station 25222072

Client Sample ID: MW-315
Lab Sample ID: 310-249151-1
Date Collected: 02/02/23 13:25
Matrix: Water
Date Received: 02/03/23 16:35

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**45**	**B**	5.0	2.3	mg/L			02/13/23 10:42	5
Fluoride	<0.22		0.50	0.22	mg/L			02/13/23 10:42	5
Sulfate	**450**		5.0	2.0	mg/L			02/13/23 10:42	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		02/10/23 08:55	02/10/23 18:38	1
Arsenic	**1.3**	**J**	2.0	0.75	ug/L		02/10/23 08:55	02/10/23 18:38	1
Barium	**36**		2.0	0.88	ug/L		02/10/23 08:55	02/10/23 18:38	1
Beryllium	<0.27		1.0	0.27	ug/L		02/10/23 08:55	02/10/23 18:38	1
Boron	**1300**		100	58	ug/L		02/10/23 08:55	02/10/23 18:38	1
Cadmium	<0.055		0.10	0.055	ug/L		02/10/23 08:55	02/10/23 18:38	1
Calcium	**140**		0.50	0.19	mg/L		02/10/23 08:55	02/10/23 18:38	1
Chromium	<1.1		5.0	1.1	ug/L		02/10/23 08:55	02/10/23 18:38	1
Cobalt	**7.0**		0.50	0.19	ug/L		02/10/23 08:55	02/10/23 18:38	1
Lead	<0.24		0.50	0.24	ug/L		02/10/23 08:55	02/10/23 18:38	1
Lithium	**6.2**	**J**	10	2.5	ug/L		02/10/23 08:55	02/10/23 18:38	1
Molybdenum	**1.5**	**J**	2.0	1.2	ug/L		02/10/23 08:55	02/10/23 18:38	1
Selenium	<0.96		5.0	0.96	ug/L		02/10/23 08:55	02/10/23 18:38	1
Thallium	<0.26		1.0	0.26	ug/L		02/10/23 08:55	02/10/23 18:38	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		02/07/23 15:49	02/08/23 11:39	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**940**		50	26	mg/L			02/07/23 15:14	1
pH (SM 4500 H+ B)	**7.1**	**HF**	0.1	0.1	SU			02/03/23 16:49	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	**642.40**				ft			02/02/23 13:25	1
Oxidation Reduction Potential	**-6.3**				millivolts			02/02/23 13:25	1
Oxygen, Dissolved, Client Supplied	**1.44**				mg/L			02/02/23 13:25	1
pH, Field	**6.94**				SU			02/02/23 13:25	1
Specific Conductance, Field	**1293**				umhos/cm			02/02/23 13:25	1
Temperature, Field	**12.7**				Degrees C			02/02/23 13:25	1
Turbidity, Field	**1.53**				NTU			02/02/23 13:25	1

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

Job ID: 310-249151-1

Client Sample ID: Field Blank

Date Collected: 02/02/23 13:00
Date Received: 02/03/23 16:35

Lab Sample ID: 310-249151-2

Matrix: Water

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			02/13/23 10:58	1
Fluoride	<0.044		0.10	0.044	mg/L			02/13/23 10:58	1
Sulfate	<0.40		1.0	0.40	mg/L			02/13/23 10:58	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		02/10/23 08:55	02/10/23 18:41	1
Arsenic	<0.75		2.0	0.75	ug/L		02/10/23 08:55	02/10/23 18:41	1
Barium	<0.88		2.0	0.88	ug/L		02/10/23 08:55	02/10/23 18:41	1
Beryllium	<0.27		1.0	0.27	ug/L		02/10/23 08:55	02/10/23 18:41	1
Boron	<58		100	58	ug/L		02/10/23 08:55	02/10/23 18:41	1
Cadmium	<0.055		0.10	0.055	ug/L		02/10/23 08:55	02/10/23 18:41	1
Calcium	**0.28**	**J**	0.50	0.19	mg/L		02/10/23 08:55	02/10/23 18:41	1
Chromium	<1.1		5.0	1.1	ug/L		02/10/23 08:55	02/10/23 18:41	1
Cobalt	<0.19		0.50	0.19	ug/L		02/10/23 08:55	02/10/23 18:41	1
Lead	<0.24		0.50	0.24	ug/L		02/10/23 08:55	02/10/23 18:41	1
Lithium	<2.5		10	2.5	ug/L		02/10/23 08:55	02/10/23 18:41	1
Molybdenum	<1.2		2.0	1.2	ug/L		02/10/23 08:55	02/10/23 18:41	1
Selenium	<0.96		5.0	0.96	ug/L		02/10/23 08:55	02/10/23 18:41	1
Thallium	<0.26		1.0	0.26	ug/L		02/10/23 08:55	02/10/23 18:41	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		02/07/23 15:49	02/08/23 11:41	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	<26		50	26	mg/L			02/07/23 15:14	1
pH (SM 4500 H+ B)	**5.5**	**HF**	0.1	0.1	SU			02/03/23 16:55	1

Definitions/Glossary

Client: SCS Engineers
Job ID: 310-249151-1
Project/Site: Ottumwa Generating Station 25222072

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

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

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-379175/3
Matrix: Water
Analysis Batch: 379175

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	0.476	J	1.0	0.45	mg/L			02/13/23 09:25	1
Fluoride	<0.044		0.10	0.044	mg/L			02/13/23 09:25	1
Sulfate	<0.40		1.0	0.40	mg/L			02/13/23 09:25	1

Lab Sample ID: LCS 310-379175/4
Matrix: Water
Analysis Batch: 379175

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	9.70		mg/L		97	90 - 110
Fluoride	2.00	2.12		mg/L		106	90 - 110
Sulfate	10.0	9.90		mg/L		99	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-378869/1-A
Matrix: Water
Analysis Batch: 379022

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 378869

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.69		2.0	0.69	ug/L		02/10/23 08:55	02/10/23 17:04	1
Arsenic	<0.75		2.0	0.75	ug/L		02/10/23 08:55	02/10/23 17:04	1
Barium	<0.88		2.0	0.88	ug/L		02/10/23 08:55	02/10/23 17:04	1
Beryllium	<0.27		1.0	0.27	ug/L		02/10/23 08:55	02/10/23 17:04	1
Boron	<58		100	58	ug/L		02/10/23 08:55	02/10/23 17:04	1
Cadmium	<0.055		0.10	0.055	ug/L		02/10/23 08:55	02/10/23 17:04	1
Calcium	<0.19		0.50	0.19	mg/L		02/10/23 08:55	02/10/23 17:04	1
Chromium	<1.1		5.0	1.1	ug/L		02/10/23 08:55	02/10/23 17:04	1
Cobalt	<0.19		0.50	0.19	ug/L		02/10/23 08:55	02/10/23 17:04	1
Lead	<0.24		0.50	0.24	ug/L		02/10/23 08:55	02/10/23 17:04	1
Lithium	<2.5		10	2.5	ug/L		02/10/23 08:55	02/10/23 17:04	1
Molybdenum	<1.2		2.0	1.2	ug/L		02/10/23 08:55	02/10/23 17:04	1
Selenium	<0.96		5.0	0.96	ug/L		02/10/23 08:55	02/10/23 17:04	1
Thallium	<0.26		1.0	0.26	ug/L		02/10/23 08:55	02/10/23 17:04	1

Lab Sample ID: LCS 310-378869/2-A
Matrix: Water
Analysis Batch: 379022

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 378869

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	200	213		ug/L		107	80 - 120
Arsenic	200	190		ug/L		95	80 - 120
Barium	100	98.7		ug/L		99	80 - 120
Beryllium	100	97.0		ug/L		97	80 - 120
Boron	200	179		ug/L		90	80 - 120
Cadmium	100	95.5		ug/L		96	80 - 120
Calcium	2.00	1.89		mg/L		94	80 - 120
Chromium	100	91.5		ug/L		91	80 - 120
Cobalt	100	96.3		ug/L		96	80 - 120

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

Lab Sample ID: LCS 310-378869/2-A
Matrix: Water
Analysis Batch: 379022

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 378869

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lead	200	194		ug/L		97	80 - 120
Lithium	200	198		ug/L		99	80 - 120
Molybdenum	200	186		ug/L		93	80 - 120
Selenium	400	376		ug/L		94	80 - 120
Thallium	200	176		ug/L		88	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-378654/1-A
Matrix: Water
Analysis Batch: 378747

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 378654

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.11		0.20	0.11	ug/L		02/07/23 15:49	02/08/23 11:07	1

Lab Sample ID: LCS 310-378654/2-A
Matrix: Water
Analysis Batch: 378747

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 378654

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	1.67	1.69		ug/L		101	80 - 120

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

Lab Sample ID: MB 310-378652/1
Matrix: Water
Analysis Batch: 378652

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			02/07/23 15:14	1

Lab Sample ID: LCS 310-378652/2
Matrix: Water
Analysis Batch: 378652

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	938		mg/L		94	90 - 110

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-378406/2
Matrix: Water
Analysis Batch: 378406

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

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

QC Association Summary

Client: SCS Engineers
Job ID: 310-249151-1
Project/Site: Ottumwa Generating Station 25222072

HPLC/IC

Analysis Batch: 379175

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249151-1	MW-315	Total/NA	Water	9056A	
310-249151-2	Field Blank	Total/NA	Water	9056A	
MB 310-379175/3	Method Blank	Total/NA	Water	9056A	
LCS 310-379175/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 378654

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249151-1	MW-315	Total/NA	Water	7470A	
310-249151-2	Field Blank	Total/NA	Water	7470A	
MB 310-378654/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-378654/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 378747

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249151-1	MW-315	Total/NA	Water	7470A	378654
310-249151-2	Field Blank	Total/NA	Water	7470A	378654
MB 310-378654/1-A	Method Blank	Total/NA	Water	7470A	378654
LCS 310-378654/2-A	Lab Control Sample	Total/NA	Water	7470A	378654

Prep Batch: 378869

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249151-1	MW-315	Total/NA	Water	3005A	
310-249151-2	Field Blank	Total/NA	Water	3005A	
MB 310-378869/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-378869/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 379022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249151-1	MW-315	Total/NA	Water	6020B	378869
310-249151-2	Field Blank	Total/NA	Water	6020B	378869
MB 310-378869/1-A	Method Blank	Total/NA	Water	6020B	378869
LCS 310-378869/2-A	Lab Control Sample	Total/NA	Water	6020B	378869

General Chemistry

Analysis Batch: 378406

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249151-1	MW-315	Total/NA	Water	SM 4500 H+ B	
310-249151-2	Field Blank	Total/NA	Water	SM 4500 H+ B	
LCS 310-378406/2	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 378652

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249151-1	MW-315	Total/NA	Water	SM 2540C	
310-249151-2	Field Blank	Total/NA	Water	SM 2540C	
MB 310-378652/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-378652/2	Lab Control Sample	Total/NA	Water	SM 2540C	

QC Association Summary

Client: SCS Engineers
Job ID: 310-249151-1
Project/Site: Ottumwa Generating Station 25222072

Field Service / Mobile Lab

Analysis Batch: 379866

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249151-1	MW-315	Total/NA	Water	Field Sampling	

Lab Chronicle

Client: SCS Engineers
Job ID: 310-249151-1
Project/Site: Ottumwa Generating Station 25222072

Client Sample ID: MW-315
Lab Sample ID: 310-249151-1
Date Collected: 02/02/23 13:25
Matrix: Water
Date Received: 02/03/23 16:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	379175	DHM5	EET CF	02/13/23 10:42
Total/NA	Prep	3005A			378869	DHM5	EET CF	02/10/23 08:55
Total/NA	Analysis	6020B		1	379022	A6US	EET CF	02/10/23 18:38
Total/NA	Prep	7470A			378654	XXW3	EET CF	02/07/23 15:49
Total/NA	Analysis	7470A		1	378747	DHM5	EET CF	02/08/23 11:39
Total/NA	Analysis	SM 2540C		1	378652	ENB7	EET CF	02/07/23 15:14
Total/NA	Analysis	SM 4500 H+ B		1	378406	A3GU	EET CF	02/03/23 16:49
Total/NA	Analysis	Field Sampling		1	379866	SJF	EET CF	02/02/23 13:25

Client Sample ID: Field Blank
Lab Sample ID: 310-249151-2
Date Collected: 02/02/23 13:00
Matrix: Water
Date Received: 02/03/23 16:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	379175	DHM5	EET CF	02/13/23 10:58
Total/NA	Prep	3005A			378869	DHM5	EET CF	02/10/23 08:55
Total/NA	Analysis	6020B		1	379022	A6US	EET CF	02/10/23 18:41
Total/NA	Prep	7470A			378654	XXW3	EET CF	02/07/23 15:49
Total/NA	Analysis	7470A		1	378747	DHM5	EET CF	02/08/23 11:41
Total/NA	Analysis	SM 2540C		1	378652	ENB7	EET CF	02/07/23 15:14
Total/NA	Analysis	SM 4500 H+ B		1	378406	A3GU	EET CF	02/03/23 16:55

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

Accreditation/Certification Summary

Client: SCS Engineers
Job ID: 310-249151-1
Project/Site: Ottumwa Generating Station 25222072

Laboratory: Eurofins Cedar Falls

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

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

Method Summary

Client: SCS Engineers
Job ID: 310-249151-1
Project/Site: Ottumwa Generating Station 25222072

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

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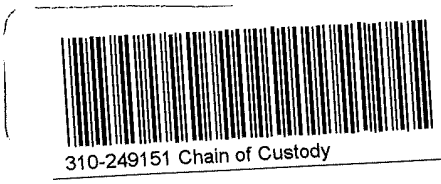

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: SCS			
City/State: CITY		STATE WI	Project:
Receipt Information			
Date/Time Received:	DATE 2/3/23	TIME 1635	Received By: ST
Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☒ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____			
Condition of Cooler/Containers			
Sample(s) received in Cooler? ☒ Yes ☐ No		*If yes:* Cooler ID:	
Multiple Coolers? ☐ Yes ☒ No		*If yes:* Cooler # _____ of _____	
Cooler Custody Seals Present? ☐ Yes ☒ No		*If yes:* Cooler custody seals intact? ☐ Yes ☐ No	
Sample Custody Seals Present? ☐ Yes ☒ No		*If yes:* Sample custody seals intact? ☐ Yes ☐ No	
Trip Blank Present? ☐ Yes ☒ No		*If yes:* Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE			
Thermometer ID: P		Correction Factor (°C): +0.2	
• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): 0.7		Corrected Temp (°C): 0.9	
• **Sample Container Temperature**			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			
3 empty 250 nitric			

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Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS

City/State: CITY | STATE WI | Project:

Receipt Information

Date/Time Received: DATE 2/3/23 | TIME 1635 | Received By: SS

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

Condition of Cooler/Containers

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

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

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

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

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

Temperature Record

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

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

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

Uncorrected Temp (°C): 1.3 | Corrected Temp (°C): 1.5

• Sample Container Temperature

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

Exceptions Noted

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

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

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

Additional Comments

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

Chain of Custody Record

Client Information	Sampler: Sean Marczewski	Lab PM: Sandie Fredrick	Carrier Tracking No(s):	COC No:
Client Contact: Meghan Blodgett	Phone:	E-Mail: sandra.fredrick@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: SCS Engineers	PWSID:			Job #:
Address: 2830 Dairy Drive	Due Date Requested:			
City: Madison	TAT Requested (days):			
State, Zip: WI, 53718	Compliance Project: Δ Yes Δ No			
Phone: 608-224-2830	PO #: 25220100			
Email: mblodgett@scsengineers.com	WO #:			
Project Name: Ottumwa Generating Station 25222072	Project #: 25222072			
Site: Ottumwa IA	SSOW#:			

Analysis Requested

Preservation Codes

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
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 (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Metals, total (Sb As, Ba, Be, B Ca Cd, Cr Co, Pb, Li Mo, Se, Tl, and Hg)	TDS and pH	Chloride, Fluoride, Sulfate	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	D	I	I	X	
MW-315	2/2/23	1325	G	W	N		X	X	X		
Field Blank	2/2/23	1300	G	W	N	N	X	X	X		

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

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

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

Special Instructions/QC Requirements

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

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	2/2/23 3:25		[signature]	2/2/23 15:25	PSM
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by: ST	Date/Time: 2/3/23 1635	Company

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

Cooler Temperature(s) °C and Other Remarks:

Ver 01/16/2019

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-249151-1

Login Number: 249151
List Number: 1
Creator: Richardson, Lydia E

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	

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

ANALYTICAL REPORT

PREPARED FOR

Attn: Meghan Blodgett
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Generated 2/17/2023 3:38:09 PM

JOB DESCRIPTION

Ottumwa Generating Station 25222072

JOB NUMBER

310-249151-2

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

Eurofins Cedar Falls

Job Notes

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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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2/17/2023 3:38:09 PM

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

Table of Contents

Client: SCS Engineers
Job ID: 310-249151-2
Project/Site: Ottumwa Generating Station 25222072

Job ID: 310-249151-2

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-249151-2

Comments
No additional comments.

Receipt
The samples were received on 2/3/2023 4:35 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 0.9º C and 1.5º 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.

Sample Summary

Client: SCS Engineers
Job ID: 310-249151-2
Project/Site: Ottumwa Generating Station 25222072

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-249151-1	MW-315	Water	02/02/23 13:25	02/03/23 16:35
310-249151-2	Field Blank	Water	02/02/23 13:00	02/03/23 16:35

Detection Summary

Client: SCS Engineers
Job ID: 310-249151-2
Project/Site: Ottumwa Generating Station 25222072

Client Sample ID: MW-315 — Lab Sample ID: 310-249151-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	3000		100	36	ug/L	1		6020B	Total/NA
Magnesium	22000		500	150	ug/L	1		6020B	Total/NA
Manganese	6300		100	36	ug/L	10		6020B	Total/NA
Potassium	2000		500	150	ug/L	1		6020B	Total/NA
Sodium	220000		1000	610	ug/L	1		6020B	Total/NA
Cobalt	7.0		0.50	0.19	ug/L	1		6020B	Dissolved
Iron	3000	B	100	36	ug/L	1		6020B	Dissolved
Manganese	6400		40	14	ug/L	4		6020B	Dissolved
Bicarbonate Alkalinity as CaCO3	300		5.0	2.3	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	300		5.0	2.3	mg/L	1		SM 2320B	Total/NA

Client Sample ID: Field Blank — Lab Sample ID: 310-249151-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Manganese	11		10	3.6	ug/L	1		6020B	Total/NA
Sodium	640	J	1000	610	ug/L	1		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: SCS Engineers
Job ID: 310-249151-2
Project/Site: Ottumwa Generating Station 25222072

Client Sample ID: MW-315
Lab Sample ID: 310-249151-1
Date Collected: 02/02/23 13:25
Matrix: Water
Date Received: 02/03/23 16:35

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	3000		100	36	ug/L		02/10/23 08:55	02/10/23 18:38	1
Magnesium	22000		500	150	ug/L		02/10/23 08:55	02/10/23 18:38	1
Manganese	6300		100	36	ug/L		02/10/23 08:55	02/13/23 12:15	10
Potassium	2000		500	150	ug/L		02/10/23 08:55	02/10/23 18:38	1
Sodium	220000		1000	610	ug/L		02/10/23 08:55	02/10/23 18:38	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	7.0		0.50	0.19	ug/L		02/15/23 09:15	02/15/23 17:05	1
Iron	3000	B	100	36	ug/L		02/15/23 09:15	02/15/23 17:05	1
Manganese	6400		40	14	ug/L		02/15/23 09:15	02/16/23 14:50	4

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	300		5.0	2.3	mg/L			02/10/23 17:22	1
Carbonate Alkalinity as CaCO3 (SM 2320B)	<2.3		5.0	2.3	mg/L			02/10/23 17:22	1
Total Alkalinity as CaCO3 (SM 2320B)	300		5.0	2.3	mg/L			02/10/23 17:22	1

Client Sample Results

Client: SCS Engineers
Job ID: 310-249151-2
Project/Site: Ottumwa Generating Station 25222072

Client Sample ID: Field Blank
Lab Sample ID: 310-249151-2
Date Collected: 02/02/23 13:00
Matrix: Water
Date Received: 02/03/23 16:35

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		02/10/23 08:55	02/10/23 18:41	1
Magnesium	<150		500	150	ug/L		02/10/23 08:55	02/10/23 18:41	1
Manganese	**11**		10	3.6	ug/L		02/10/23 08:55	02/10/23 18:41	1
Potassium	<150		500	150	ug/L		02/10/23 08:55	02/10/23 18:41	1
Sodium	**640**	**J**	1000	610	ug/L		02/10/23 08:55	02/10/23 18:41	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.19		0.50	0.19	ug/L		02/15/23 09:15	02/15/23 17:40	1
Iron	<36		100	36	ug/L		02/15/23 09:15	02/15/23 17:40	1
Manganese	<3.6		10	3.6	ug/L		02/15/23 09:15	02/15/23 17:40	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			02/10/23 17:16	1
Carbonate Alkalinity as CaCO3 (SM 2320B)	<2.3		5.0	2.3	mg/L			02/10/23 17:16	1
Total Alkalinity as CaCO3 (SM 2320B)	<2.3		5.0	2.3	mg/L			02/10/23 17:16	1

Definitions/Glossary

Client: SCS Engineers
Job ID: 310-249151-2
Project/Site: Ottumwa Generating Station 25222072

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
B	Compound was found in the blank and sample.
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.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-378869/1-A
Matrix: Water
Analysis Batch: 379022

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 378869

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		02/10/23 08:55	02/10/23 17:04	1
Magnesium	<150		500	150	ug/L		02/10/23 08:55	02/10/23 17:04	1
Manganese	<3.6		10	3.6	ug/L		02/10/23 08:55	02/10/23 17:04	1
Potassium	<150		500	150	ug/L		02/10/23 08:55	02/10/23 17:04	1
Sodium	<610		1000	610	ug/L		02/10/23 08:55	02/10/23 17:04	1

Lab Sample ID: LCS 310-378869/2-A
Matrix: Water
Analysis Batch: 379022

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 378869

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	200	208		ug/L		104	80 - 120
Magnesium	2000	1900		ug/L		95	80 - 120
Manganese	100	90.3		ug/L		90	80 - 120
Potassium	2000	1980		ug/L		99	80 - 120
Sodium	2000	2080		ug/L		104	80 - 120

Lab Sample ID: MB 310-379187/1-A
Matrix: Water
Analysis Batch: 379372

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 379187

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.19		0.50	0.19	ug/L		02/15/23 09:15	02/16/23 11:48	1
Iron	50.8	J	100	36	ug/L		02/15/23 09:15	02/16/23 11:48	1
Manganese	<3.6		10	3.6	ug/L		02/15/23 09:15	02/16/23 11:48	1

Lab Sample ID: LCS 310-379187/2-A
Matrix: Water
Analysis Batch: 379372

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 379187

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cobalt	100	112		ug/L		112	80 - 120
Manganese	100	102		ug/L		102	80 - 120

Lab Sample ID: LCS 310-379187/2-A
Matrix: Water
Analysis Batch: 379372

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 379187

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	200	194		ug/L		97	80 - 120

Lab Sample ID: 310-249151-1 MS
Matrix: Water
Analysis Batch: 379333

Client Sample ID: MW-315
Prep Type: Dissolved
Prep Batch: 379187

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Cobalt	7.0		100	117		ug/L		110	75 - 125
Iron	3000	B	200	3180	4	ug/L		114	75 - 125

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

Lab Sample ID: 310-249151-1 MS
Matrix: Water
Analysis Batch: 379425

Client Sample ID: MW-315
Prep Type: Dissolved
Prep Batch: 379187

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Manganese	6400		100	6540	4	ug/L		174	75 - 125

Lab Sample ID: 310-249151-1 MSD
Matrix: Water
Analysis Batch: 379333

Client Sample ID: MW-315
Prep Type: Dissolved
Prep Batch: 379187

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cobalt	7.0		100	117		ug/L		110	75 - 125	0	20
Iron	3000	B	200	3210	4	ug/L		131	75 - 125	1	20

Lab Sample ID: 310-249151-1 MSD
Matrix: Water
Analysis Batch: 379425

Client Sample ID: MW-315
Prep Type: Dissolved
Prep Batch: 379187

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Manganese	6400		100	6680	4	ug/L		315	75 - 125	2	20

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 310-378973/2
Matrix: Water
Analysis Batch: 378973

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			02/10/23 15:16	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			02/10/23 15:16	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			02/10/23 15:16	1

Lab Sample ID: LCS 310-378973/3
Matrix: Water
Analysis Batch: 378973

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	1060		mg/L		106	90 - 110

QC Association Summary

Client: SCS Engineers
Job ID: 310-249151-2
Project/Site: Ottumwa Generating Station 25222072

Metals

Prep Batch: 378869

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249151-1	MW-315	Total/NA	Water	3005A	
310-249151-2	Field Blank	Total/NA	Water	3005A	
MB 310-378869/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-378869/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 379022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249151-1	MW-315	Total/NA	Water	6020B	378869
310-249151-2	Field Blank	Total/NA	Water	6020B	378869
MB 310-378869/1-A	Method Blank	Total/NA	Water	6020B	378869
LCS 310-378869/2-A	Lab Control Sample	Total/NA	Water	6020B	378869

Analysis Batch: 379073

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249151-1	MW-315	Total/NA	Water	6020B	378869

Prep Batch: 379187

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249151-1	MW-315	Dissolved	Water	3005A	
310-249151-2	Field Blank	Dissolved	Water	3005A	
MB 310-379187/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-379187/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-249151-1 MS	MW-315	Dissolved	Water	3005A	
310-249151-1 MSD	MW-315	Dissolved	Water	3005A	

Analysis Batch: 379333

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249151-1	MW-315	Dissolved	Water	6020B	379187
310-249151-2	Field Blank	Dissolved	Water	6020B	379187
310-249151-1 MS	MW-315	Dissolved	Water	6020B	379187
310-249151-1 MSD	MW-315	Dissolved	Water	6020B	379187

Analysis Batch: 379372

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-379187/1-A	Method Blank	Total/NA	Water	6020B	379187
LCS 310-379187/2-A	Lab Control Sample	Total/NA	Water	6020B	379187
LCS 310-379187/2-A	Lab Control Sample	Total/NA	Water	6020B	379187

Analysis Batch: 379425

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249151-1	MW-315	Dissolved	Water	6020B	379187
310-249151-1 MS	MW-315	Dissolved	Water	6020B	379187
310-249151-1 MSD	MW-315	Dissolved	Water	6020B	379187

General Chemistry

Analysis Batch: 378973

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249151-1	MW-315	Total/NA	Water	SM 2320B	
310-249151-2	Field Blank	Total/NA	Water	SM 2320B	
MB 310-378973/2	Method Blank	Total/NA	Water	SM 2320B	

General Chemistry (Continued)

Analysis Batch: 378973 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 310-378973/3	Lab Control Sample	Total/NA	Water	SM 2320B	

Lab Chronicle

Client: SCS Engineers
Job ID: 310-249151-2
Project/Site: Ottumwa Generating Station 25222072

Client Sample ID: MW-315
Lab Sample ID: 310-249151-1
Date Collected: 02/02/23 13:25
Matrix: Water
Date Received: 02/03/23 16:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	3005A			379187	QTZ5	EET CF	02/15/23 09:15
Dissolved	Analysis	6020B		1	379333	A6US	EET CF	02/15/23 17:05
Dissolved	Prep	3005A			379187	QTZ5	EET CF	02/15/23 09:15
Dissolved	Analysis	6020B		4	379425	A6US	EET CF	02/16/23 14:50
Total/NA	Prep	3005A			378869	DHM5	EET CF	02/10/23 08:55
Total/NA	Analysis	6020B		1	379022	A6US	EET CF	02/10/23 18:38
Total/NA	Prep	3005A			378869	DHM5	EET CF	02/10/23 08:55
Total/NA	Analysis	6020B		10	379073	A6US	EET CF	02/13/23 12:15
Total/NA	Analysis	SM 2320B		1	378973	WZC8	EET CF	02/10/23 17:22

Client Sample ID: Field Blank
Lab Sample ID: 310-249151-2
Date Collected: 02/02/23 13:00
Matrix: Water
Date Received: 02/03/23 16:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	3005A			379187	QTZ5	EET CF	02/15/23 09:15
Dissolved	Analysis	6020B		1	379333	A6US	EET CF	02/15/23 17:40
Total/NA	Prep	3005A			378869	DHM5	EET CF	02/10/23 08:55
Total/NA	Analysis	6020B		1	379022	A6US	EET CF	02/10/23 18:41
Total/NA	Analysis	SM 2320B		1	378973	WZC8	EET CF	02/10/23 17:16

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Job ID: 310-249151-2
Project/Site: Ottumwa Generating Station 25222072

Laboratory: Eurofins Cedar Falls

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

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

Method Summary

Client: SCS Engineers
Job ID: 310-249151-2
Project/Site: Ottumwa Generating Station 25222072

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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310-249151 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS

City/State: CITY | STATE WI | Project:

Receipt Information

Date/Time Received: DATE 2/3/23 | TIME 1635 | Received By: ST

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

Condition of Cooler/Containers

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

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

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

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

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

Temperature Record

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

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

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

Uncorrected Temp (°C): 0.7 | Corrected Temp (°C): 0.9

• **Sample Container Temperature**

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

Exceptions Noted

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

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

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

Additional Comments

3 empty 250 nitric

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Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS

City/State: CITY | STATE WI | Project:

Receipt Information

Date/Time Received: DATE 2/3/23 | TIME 1635 | Received By: SS

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

Condition of Cooler/Containers

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

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

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

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

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

Temperature Record

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

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

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

Uncorrected Temp (°C): 1.3 | Corrected Temp (°C): 1.5

• Sample Container Temperature

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

Exceptions Noted

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

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

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

Additional Comments

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

Chain of Custody Record

Client Information	Sampler: Sean Marczewski	Lab PM: Sandie Fredrick	Carrier Tracking No(s):	COC No:
Client Contact: Meghan Blodgett	Phone:	E-Mail: sandra.frednck@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: SCS Engineers	PWSID:			Job #:
Address: 2830 Dairy Drive	Due Date Requested:			
City: Madison	TAT Requested (days):			
State, Zip: WI, 53718	Compliance Project: Δ Yes Δ No			
Phone: 608-224-2830	PO #: 25220100			
Email: mblodgett@scsengineers.com	WO #:			
Project Name: Ottumwa Generating Station 25222072	Project #: 25222072			
Site: Ottumwa, IA	SSOW#:			

Analysis Requested

Preservation Codes

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
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 (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Bicarbonate & carbonate alkalinity	Metals, total (Fe, Mg, Mn, K, Na)	Metals, dissolved (Co, Fe Mn)	Total Number of containers	Special Instructions/Note:
			Preservation Code:				I	D	D		
MW-315	2/2/23	1325	G	W	N/Y		X	X	X		
Field Blank	2/2/23	1300	G	W	N	N	X	X			

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

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

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

Special Instructions/QC Requirements

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

	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	2/2/23 3:25			2/2/23 15:25	PSM
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by: ST	Date/Time: 2/3/23 1635	Company

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

Ver 01/16/2019

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-249151-2

Login Number: 249151
List Number: 1
Creator: Richardson, Lydia E

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	

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

ANALYTICAL REPORT

PREPARED FOR

Attn: Meghan Blodgett
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Generated 3/6/2023 2:36:11 PM

JOB DESCRIPTION

Ottumwa Generating Station 25222072

JOB NUMBER

310-249150-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

Eurofins Cedar Falls

Job Notes

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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

Table of Contents

Job ID: 310-249150-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-249150-1

Comments
No additional comments.

Receipt
The samples were received on 2/3/2023 4:35 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 1.5º C.

RAD
Method 903.0: Radium-226 prep batch 160-599631:
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-315 (310-249150-1), Field Blank (310-249150-2), (LCS 160-599631/2-A), (MB 160-599631/1-A), (500-229010-I-1-A) and (500-229010-J-1-A DU)

Method 904.0: Radium-228 batch 599633
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-315 (310-249150-1), Field Blank (310-249150-2), (LCS 160-599633/2-A), (MB 160-599633/1-A), (500-229010-I-1-B) and (500-229010-J-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
Job ID: 310-249150-1
Project/Site: Ottumwa Generating Station 25222072

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-249150-1	MW-315	Water	02/02/23 13:25	02/03/23 16:35
310-249150-2	Field Blank	Water	02/02/23 13:00	02/03/23 16:35

Detection Summary

Client: SCS Engineers
Job ID: 310-249150-1
Project/Site: Ottumwa Generating Station 25222072

Client Sample ID: MW-315
Lab Sample ID: 310-249150-1

No Detections.

Client Sample ID: Field Blank
Lab Sample ID: 310-249150-2

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
Job ID: 310-249150-1
Project/Site: Ottumwa Generating Station 25222072

Client Sample ID: MW-315
Date Collected: 02/02/23 13:25
Date Received: 02/03/23 16:35

Lab Sample ID: 310-249150-1
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	0.665		0.133	0.146	1.00	0.0940	pCi/L	02/08/23 08:57	03/02/23 07:16	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*90.6*		*30 - 110*	*02/08/23 08:57*	*03/02/23 07:16*	*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	0.797		0.437	0.443	1.00	0.616	pCi/L	02/08/23 09:22	02/13/23 12:14	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*90.6*		*30 - 110*	*02/08/23 09:22*	*02/13/23 12:14*	*1*
Y Carrier	*69.2*		*30 - 110*	*02/08/23 09:22*	*02/13/23 12:14*	*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	1.46		0.457	0.466	5.00	0.616	pCi/L		03/06/23 12:46	1

Client Sample ID: Field Blank
Lab Sample ID: 310-249150-2

Date Collected: 02/02/23 13:00
Matrix: Water

Date Received: 02/03/23 16:35

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	0.00605	U	0.0490	0.0490	1.00	0.0962	pCi/L	02/08/23 08:57	03/02/23 07:17	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*95.7*		*30 - 110*	*02/08/23 08:57*	*03/02/23 07:17*	*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	0.402	U	0.305	0.307	1.00	0.463	pCi/L	02/08/23 09:22	02/13/23 12:15	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*95.7*		*30 - 110*	*02/08/23 09:22*	*02/13/23 12:15*	*1*
Y Carrier	*80.7*		*30 - 110*	*02/08/23 09:22*	*02/13/23 12:15*	*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	0.408	U	0.309	0.311	5.00	0.463	pCi/L		03/06/23 12:46	1

Definitions/Glossary

Client: SCS Engineers
Job ID: 310-249150-1
Project/Site: Ottumwa Generating Station 25222072

Qualifiers

Rad

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

Glossary

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

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-599631/1-A
Matrix: Water
Analysis Batch: 602181

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 599631

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	0.03018	U	0.0449	0.0449	1.00	0.0771	pCi/L	02/08/23 08:57	03/02/23 07:07	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*92.0*		*30 - 110*	*02/08/23 08:57*	*03/02/23 07:07*	*1*

Lab Sample ID: LCS 160-599631/2-A
Matrix: Water
Analysis Batch: 602181

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 599631

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium 226			11.3	11.07		1.13	1.00	0.0829	pCi/L	98	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*94.9*		*30 - 110*

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-599633/1-A
Matrix: Water
Analysis Batch: 600139

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 599633

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	0.4165	U	0.321	0.323	1.00	0.490	pCi/L	02/08/23 09:22	02/13/23 12:03	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*92.0*		*30 - 110*	*02/08/23 09:22*	*02/13/23 12:03*	*1*
Y Carrier	*82.2*		*30 - 110*	*02/08/23 09:22*	*02/13/23 12:03*	*1*

Lab Sample ID: LCS 160-599633/2-A
Matrix: Water
Analysis Batch: 600139

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 599633

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium 228			8.20	9.812		1.31	1.00	0.498	pCi/L	120	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*94.9*		*30 - 110*
Y Carrier	*80.4*		*30 - 110*

QC Association Summary

Client: SCS Engineers
Job ID: 310-249150-1
Project/Site: Ottumwa Generating Station 25222072

Rad

Prep Batch: 599631

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249150-1	MW-315	Total/NA	Water	PrecSep-21	
310-249150-2	Field Blank	Total/NA	Water	PrecSep-21	
MB 160-599631/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-599631/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	

Prep Batch: 599633

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-249150-1	MW-315	Total/NA	Water	PrecSep_0	
310-249150-2	Field Blank	Total/NA	Water	PrecSep_0	
MB 160-599633/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-599633/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: SCS Engineers
Job ID: 310-249150-1
Project/Site: Ottumwa Generating Station 25222072

Client Sample ID: MW-315
Lab Sample ID: 310-249150-1
Date Collected: 02/02/23 13:25
Matrix: Water
Date Received: 02/03/23 16:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			599631	DJP	EET SL	02/08/23 08:57
Total/NA	Analysis	903.0		1	602180	EMH	EET SL	03/02/23 07:16
Total/NA	Prep	PrecSep_0			599633	DJP	EET SL	02/08/23 09:22
Total/NA	Analysis	904.0		1	600138	FLC	EET SL	02/13/23 12:14
Total/NA	Analysis	Ra226_Ra228 Pos		1	602557	MLK	EET SL	03/06/23 12:46

Client Sample ID: Field Blank
Lab Sample ID: 310-249150-2
Date Collected: 02/02/23 13:00
Matrix: Water
Date Received: 02/03/23 16:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			599631	DJP	EET SL	02/08/23 08:57
Total/NA	Analysis	903.0		1	602180	EMH	EET SL	03/02/23 07:17
Total/NA	Prep	PrecSep_0			599633	DJP	EET SL	02/08/23 09:22
Total/NA	Analysis	904.0		1	600138	FLC	EET SL	02/13/23 12:15
Total/NA	Analysis	Ra226_Ra228 Pos		1	602557	MLK	EET SL	03/06/23 12:46

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
Job ID: 310-249150-1
Project/Site: Ottumwa Generating Station 25222072

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	12-08-23
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	12-01-24
Kansas	NELAP	E-10236	10-31-23
Kentucky (DW)	State	KY90125	12-31-23
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-23
Louisiana (All)	NELAP	04080	06-30-23
Louisiana (DW)	State	LA011	12-31-23
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 Carolina (DW)	State	29700	07-31-23
North Dakota	State	R-207	06-30-23
Oklahoma	NELAP	9997	08-31-23
Oregon	NELAP	4157	09-01-23
Pennsylvania	NELAP	68-00540	02-28-24
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	10-31-23

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

Method Summary

Client: SCS Engineers
Job ID: 310-249150-1
Project/Site: Ottumwa Generating Station 25222072

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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310-249150 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: SCS			
City/State: CITY		STATE WI	Project:
Receipt Information			
Date/Time Received: DATE 2/3/23		TIME 1635	Received By: ST

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

Condition of Cooler/Containers

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

Temperature Record

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

Thermometer ID: P	Correction Factor (°C): +0.2

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

Uncorrected Temp (°C): 1.3	Corrected Temp (°C): 1.5

• Sample Container Temperature

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

Exceptions Noted

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

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

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

Additional Comments

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

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: Sean Marczewski	Lab PM: Sandie Fredrick	Carrier Tracking No(s):	COC No:
Client Contact: Meghan Blodgett	Phone:	E-Mail: sandra.fredrick@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: SCS Engineers	PWSID:			Job #:
Address: 2830 Dairy Drive	Due Date Requested:			
City: Madison	TAT Requested (days):			
State Zip: WI 53718	Compliance Project: Δ Yes Δ No			
Phone: 608-224-2830	PO #: 25220100			
Email: mblodgett@scsengineers.com	WO #:			
Project Name: Ottumwa Generating Station 25222072	Project #: 25222072			
Site: Ottumwa IA	SSOW#:			

Analysis Requested

Preservation Codes

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
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 (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Radium 226 + 228	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D		
MW-315	2/2/23	1325	G	W	N		X		
Field Blank	2/2/23	1300	G	W	N	N	X		

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

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

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

Special Instructions/QC Requirements

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

Relinquished by:	Date/Time: 2/2/23 3:25	Company	Received by:	Date/Time: 2/2/23 - 15:25	Company DBM
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by: SS	Date/Time: 2/3/23 1635	Company

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

Ver: 01/16/2019

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

Chain of Custody Record

eurofins Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Fredrick, Sandie	Carrier Tracking No(s):	COC No: 310-58290.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Sandra.Fredrick@et.eurofinsus.com	State of Origin: Iowa	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Iowa		Job #: 310-249150-1
Address: 13715 Rider Trail North,	Due Date Requested: 3/6/2023			
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Ottumwa Generating Station 25222072	Project #: 31011020			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

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

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Ra226_228GFPC_P/ Combined Radium-226 and Radium-228	903.0/PrecSep_21 Radium-226 (GFPC)	904.0/PrecSep_0 Radium-228 (GFPC)	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
MW-315 (310-249150-1)	2/2/23	13:25 Central		Water			X	X	X	2	DO NOT SHIP ON ICE TO ST. LOUIS
Field Blank (310-249150-2)	2/2/23	13:00 Central		Water			X	X	X	2	DO NOT SHIP ON ICE TO ST. LOUIS

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC.

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

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

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
	2 6 23 1350		M.	2/7/23 10:15	ETA STL
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

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

Ver: 06/08/2021

ICOC No:
310-58290

Containers

Count	Container Type	Preservative
4	Plastic 1 liter - Nitric Acid	Nitric Acid

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-249150-1

Login Number: 249150
List Number: 1
Creator: Richardson, Lydia E

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	

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-249150-1

Login Number: 249150
List Number: 2
Creator: Mazariegos, Leonel A

List Source: Eurofins St. Louis
List Creation: 02/07/23 03:57 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
Job ID: 310-249150-1
Project/Site: Ottumwa Generating Station 25222072

Method: 903.0 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(30-110)
310-249150-1	MW-315	90.6
310-249150-2	Field Blank	95.7
LCS 160-599631/2-A	Lab Control Sample	94.9
MB 160-599631/1-A	Method Blank	92.0

Tracer/Carrier Legend

Ba = Barium

Method: 904.0 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
		Ba	Y
Lab Sample ID	Client Sample ID	(30-110)	(30-110)
310-249150-1	MW-315	90.6	69.2
310-249150-2	Field Blank	95.7	80.7
LCS 160-599633/2-A	Lab Control Sample	94.9	80.4
MB 160-599633/1-A	Method Blank	92.0	82.2

Tracer/Carrier Legend

Ba = Barium
Y = Y Carrier

C2 March 2023 Supplemental Assessment Monitoring

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

ANALYTICAL REPORT

PREPARED FOR

Attn: Meghan Blodgett
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Generated 3/23/2023 9:22:09 AM

JOB DESCRIPTION

Ottumwa Generating Station 25222072

JOB NUMBER

310-250852-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

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
3/23/2023 9:22:09 AM

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

Table of Contents

Case Narrative

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

Job ID: 310-250852-1

Job ID: 310-250852-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-250852-1

Comments
No additional comments.

Receipt
The samples were received on 3/7/2023 4:59 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 1.1° C.

Metals
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: 310-250852-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-250852-1	MW-315	Water	03/06/23 13:25	03/07/23 16:59
310-250852-2	Field Blank	Water	03/06/23 12:12	03/07/23 16:59

Detection Summary

Client: SCS Engineers
Job ID: 310-250852-1
Project/Site: Ottumwa Generating Station 25222072

Client Sample ID: MW-315 — Lab Sample ID: 310-250852-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cobalt	6.4		0.50	0.19	ug/L	1		6020B	Total/NA
Cobalt	6.5		0.50	0.19	ug/L	1		6020B	Dissolved
Ground Water Elevation	648.55				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-60.9				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.86				mg/L	1		Field Sampling	Total/NA
pH, Field	6.86				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1539				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	12.4				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	2.25				NTU	1		Field Sampling	Total/NA

Client Sample ID: Field Blank — Lab Sample ID: 310-250852-2

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client Sample Results

Client: SCS Engineers
Job ID: 310-250852-1
Project/Site: Ottumwa Generating Station 25222072

Client Sample ID: MW-315
Lab Sample ID: 310-250852-1
Date Collected: 03/06/23 13:25
Matrix: Water
Date Received: 03/07/23 16:59

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	6.4		0.50	0.19	ug/L		03/10/23 09:00	03/13/23 21:33	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	6.5		0.50	0.19	ug/L		03/13/23 08:45	03/14/23 14:46	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	648.55				ft			03/06/23 13:25	1
Oxidation Reduction Potential	-60.9				millivolts			03/06/23 13:25	1
Oxygen, Dissolved, Client Supplied	0.86				mg/L			03/06/23 13:25	1
pH, Field	6.86				SU			03/06/23 13:25	1
Specific Conductance, Field	1539				umhos/cm			03/06/23 13:25	1
Temperature, Field	12.4				Degrees C			03/06/23 13:25	1
Turbidity, Field	2.25				NTU			03/06/23 13:25	1

Client Sample Results

Client: SCS Engineers
Job ID: 310-250852-1
Project/Site: Ottumwa Generating Station 25222072

Client Sample ID: Field Blank
Lab Sample ID: 310-250852-2
Date Collected: 03/06/23 12:12
Matrix: Water
Date Received: 03/07/23 16:59

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.19		0.50	0.19	ug/L		03/10/23 09:00	03/13/23 22:00	1

Definitions/Glossary

Client: SCS Engineers
Job ID: 310-250852-1
Project/Site: Ottumwa Generating Station 25222072

Glossary

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

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-380929/1-A
Matrix: Water
Analysis Batch: 381232

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380929

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.19		0.50	0.19	ug/L		03/10/23 09:00	03/13/23 21:07	1

Lab Sample ID: LCS 310-380929/2-A
Matrix: Water
Analysis Batch: 381232

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380929

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cobalt	100	98.9		ug/L		99	80 - 120

Lab Sample ID: MB 310-380990/1-A
Matrix: Water
Analysis Batch: 381311

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380990

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.19		0.50	0.19	ug/L		03/13/23 08:45	03/14/23 14:39	1

Lab Sample ID: LCS 310-380990/2-A
Matrix: Water
Analysis Batch: 381311

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380990

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

Lab Sample ID: 310-250852-1 MS
Matrix: Water
Analysis Batch: 381311

Client Sample ID: MW-315
Prep Type: Dissolved
Prep Batch: 380990

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Cobalt	6.5		100	102		ug/L		95	75 - 125

Lab Sample ID: 310-250852-1 MSD
Matrix: Water
Analysis Batch: 381311

Client Sample ID: MW-315
Prep Type: Dissolved
Prep Batch: 380990

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cobalt	6.5		100	106		ug/L		99	75 - 125	4	20

QC Association Summary

Client: SCS Engineers
Job ID: 310-250852-1
Project/Site: Ottumwa Generating Station 25222072

Metals

Prep Batch: 380929

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250852-1	MW-315	Total/NA	Water	3005A	
310-250852-2	Field Blank	Total/NA	Water	3005A	
MB 310-380929/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-380929/2-A	Lab Control Sample	Total/NA	Water	3005A	

Prep Batch: 380990

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250852-1	MW-315	Dissolved	Water	3005A	
MB 310-380990/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-380990/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-250852-1 MS	MW-315	Dissolved	Water	3005A	
310-250852-1 MSD	MW-315	Dissolved	Water	3005A	

Analysis Batch: 381232

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250852-1	MW-315	Total/NA	Water	6020B	380929
310-250852-2	Field Blank	Total/NA	Water	6020B	380929
MB 310-380929/1-A	Method Blank	Total/NA	Water	6020B	380929
LCS 310-380929/2-A	Lab Control Sample	Total/NA	Water	6020B	380929

Analysis Batch: 381311

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250852-1	MW-315	Dissolved	Water	6020B	380990
MB 310-380990/1-A	Method Blank	Total/NA	Water	6020B	380990
LCS 310-380990/2-A	Lab Control Sample	Total/NA	Water	6020B	380990
310-250852-1 MS	MW-315	Dissolved	Water	6020B	380990
310-250852-1 MSD	MW-315	Dissolved	Water	6020B	380990

Field Service / Mobile Lab

Analysis Batch: 382032

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250852-1	MW-315	Total/NA	Water	Field Sampling	

Lab Chronicle

Client: SCS Engineers
Job ID: 310-250852-1
Project/Site: Ottumwa Generating Station 25222072

Client Sample ID: MW-315
Lab Sample ID: 310-250852-1
Date Collected: 03/06/23 13:25
Matrix: Water
Date Received: 03/07/23 16:59

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Dissolved	Prep	3005A			380990	DHM5	EET CF	03/13/23 08:45
Dissolved	Analysis	6020B		1	381311	A6US	EET CF	03/14/23 14:46
Total/NA	Prep	3005A			380929	DHM5	EET CF	03/10/23 09:00
Total/NA	Analysis	6020B		1	381232	A6US	EET CF	03/13/23 21:33
Total/NA	Analysis	Field Sampling		1	382032	BJ0R	EET CF	03/06/23 13:25

Client Sample ID: Field Blank
Lab Sample ID: 310-250852-2
Date Collected: 03/06/23 12:12
Matrix: Water
Date Received: 03/07/23 16:59

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			380929	DHM5	EET CF	03/10/23 09:00
Total/NA	Analysis	6020B		1	381232	A6US	EET CF	03/13/23 22:00

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Job ID: 310-250852-1
Project/Site: Ottumwa Generating Station 25222072

Laboratory: Eurofins Cedar Falls

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

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

Method Summary

Client: SCS Engineers
Job ID: 310-250852-1
Project/Site: Ottumwa Generating Station 25222072

Method	Method Description	Protocol	Laboratory
6020B	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

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310-250852 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS

City/State: CITY | STATE NM | Project:

Receipt Information

Date/Time Received: DATE 3/7/23 | TIME 1610 | Received By: JT

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

Condition of Cooler/Containers

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

Temperature Record

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

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

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

Uncorrected Temp (°C): 0.9 | Corrected Temp (°C): 1.1

Sample Container Temperature

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

Exceptions Noted

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

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

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

Additional Comments

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

Chain of Custody Record

eurofins

Client Information	Sampler: SEAN MARCZEWSKI	Lab PM: Sandie Fredrick	Carrier Tracking No(s):	COC No:
Client Contact: Meghan Blodgett	Phone: 712-661-9682	E-Mail: shirley.thompson@eurofinset.com	State of Origin:	Page: Page 1 of 1
Company: SCS Engineers	PWSID:			Job #:

Address: 2830 Dairy Drive	Due Date Requested:	
City: Madison	TAT Requested (days):	
State Zip: WI 53718	Compliance Project: Δ Yes Δ No	
Phone: 608-224-2830	PO #: 25220100	
Email: mblodgett@scsengineers.com	WO #:	
Project Name: Ottumwa Generating Station 25222072	Project #: 235222072	
Site: Ottumwa IA	SSOW#:	

Analysis Requested

Preservation Codes

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
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 (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Cobalt	6020B - DISS COBALT											Total Number of containers	Special Instructions/Note
			Preservation Code				D	D	I											
MW-315	3-6-23	13 25	G	W	N		X	X												
Field Blank	3-6-23	12 12	G	W	N	N	X													

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

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

Deliverable Requested I II III IV Other (specify)

Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date	Time	Method of Shipment		
Relinquished by: Sampler	Date/Time: 3-7-23 / 12 00	Company: SCS	Received by:	Date/Time: 3/7/23 1610	Company
Relinquished by	Date/Time	Company	Received by:	Date/Time	Company
Relinquished by	Date/Time	Company	Received by:	Date/Time	Company

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

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-250852-1

Login Number: 250852
List Number: 1
Creator: Tucker, Sarah L

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	

Table 1. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station / SCS Engineers Project No. 25223072.00
March 2023

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-315	3/6/2022 1325	648.55	12.4	6.86	0.86	1539	-60.9	2.25

Abbreviations:
mg/L = milligrams per liter amsl = above mean sea level

Created by: RM Date: 3/7/2023
Last revision by: RM Date: 3/7/2023
Checked by: BLR Date: 3/22/2023

C:\Users\n2ua\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\N3JXYDPB\[2303_March - OGS ZLDP_CCR_Field.xlsx]GW Field Parameters

C3 April 2023 Assessment Monitoring

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ANALYTICAL REPORT

PREPARED FOR

Attn: Meghan Blodgett
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Generated 5/9/2023 2:48:58 PM

JOB DESCRIPTION

OGS - Background III&IV - 25223072

JOB NUMBER

310-253119-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

Eurofins Cedar Falls

Job Notes

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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

Table of Contents

Job ID: 310-253119-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-253119-1

Comments
No additional comments.

Receipt
The samples were received on 4/7/2023 4:00 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 9.3º C.

Receipt Exceptions
The following samples were received at the laboratory outside the required temperature criteria: MW-301 (310-253119-1) and Field Blank (310-253119-2).

HPLC/IC
Method 9056A: The following sample was diluted due to the nature of the sample matrix: MW-301 (310-253119-1). 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.

Narrative

Job Narrative
310-253122-1

Comments
No additional comments.

Receipt
The samples were received on 4/7/2023 4:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 9.3º C and 9.3º C.

Receipt Exceptions
The following samples were received at the laboratory outside the required temperature criteria: MW-301 (310-253122-1) and Field Blank (310-253122-2).

RAD
Methods 903.0, 9315: Radium-226 batch 607419
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 (310-253122-1), Field Blank (310-253122-2), (LCS 160-607419/2-A), (LCSD 160-607419/3-A) and (MB 160-607419/1-A)

Methods 904.0, 9320: Radium-228 batch 607425
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 (310-253122-1), Field Blank (310-253122-2), (LCS 160-607425/2-A), (LCSD 160-607425/3-A) and (MB 160-607425/1-A)

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

Job ID: 310-253119-1 (Continued)

Laboratory: Eurofins Cedar Falls (Continued)

Metals

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

Sample Summary

Client: SCS Engineers
Job ID: 310-253119-1
Project/Site: OGS - Background III&IV - 25223072

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-253119-1	MW-301	Water	04/06/23 08:45	04/07/23 16:00
310-253119-2	Field Blank	Water	04/06/23 11:55	04/07/23 16:00

Detection Summary

Client: SCS Engineers
Job ID: 310-253119-1
Project/Site: OGS - Background III&IV - 25223072

Client Sample ID: MW-301 — Lab Sample ID: 310-253119-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	120		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	160		5.0	2.0	mg/L	5		9056A	Total/NA
Iron	58	J	100	36	ug/L	1		6020B	Total/NA
Barium	31		2.0	0.64	ug/L	1		6020B	Total/NA
Boron	530		100	76	ug/L	1		6020B	Total/NA
Calcium	76		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	0.21	J	0.50	0.17	ug/L	1		6020B	Total/NA
Lithium	17		10	2.5	ug/L	1		6020B	Total/NA
Selenium	4.7	J	5.0	1.4	ug/L	1		6020B	Total/NA
Total Dissolved Solids	580		50	34	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	682.05				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	124.5				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	5.05				mg/L	1		Field Sampling	Total/NA
pH, Field	6.25				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	832				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	7.1				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	2.37				NTU	1		Field Sampling	Total/NA

Client Sample ID: Field Blank — Lab Sample ID: 310-253119-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	0.48	J	0.50	0.19	mg/L	1		6020B	Total/NA
pH	6.0	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 ID: MW-301
Date Collected: 04/06/23 08:45
Date Received: 04/07/23 16:00

Lab Sample ID: 310-253119-1
Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**120**		5.0	2.3	mg/L			04/15/23 02:46	5
Fluoride	<0.22		0.50	0.22	mg/L			04/15/23 02:46	5
Sulfate	**160**		5.0	2.0	mg/L			04/17/23 14:05	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		04/11/23 09:20	04/11/23 20:25	1
Iron	**58**	**J**	100	36	ug/L		04/11/23 09:20	04/11/23 20:54	1
Arsenic	<0.53		2.0	0.53	ug/L		04/11/23 09:20	04/11/23 20:25	1
Barium	**31**		2.0	0.64	ug/L		04/11/23 09:20	04/11/23 20:25	1
Beryllium	<0.33		1.0	0.33	ug/L		04/11/23 09:20	04/11/23 20:25	1
Boron	**530**		100	76	ug/L		04/11/23 09:20	04/11/23 20:25	1
Cadmium	<0.10		0.20	0.10	ug/L		04/11/23 09:20	04/11/23 20:25	1
Calcium	**76**		0.50	0.19	mg/L		04/11/23 09:20	04/11/23 20:25	1
Chromium	<1.1		5.0	1.1	ug/L		04/11/23 09:20	04/11/23 20:25	1
Cobalt	**0.21**	**J**	0.50	0.17	ug/L		04/11/23 09:20	04/11/23 20:25	1
Lead	<0.24		0.50	0.24	ug/L		04/11/23 09:20	04/11/23 20:25	1
Lithium	**17**		10	2.5	ug/L		04/11/23 09:20	04/11/23 20:25	1
Molybdenum	<0.91		2.0	0.91	ug/L		04/11/23 09:20	04/11/23 20:25	1
Selenium	**4.7**	**J**	5.0	1.4	ug/L		04/11/23 09:20	04/11/23 20:25	1
Thallium	<0.26		1.0	0.26	ug/L		04/11/23 09:20	04/11/23 20:25	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		04/12/23 11:59	04/12/23 17:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**580**		50	34	mg/L			04/10/23 14:30	1
pH (SM 4500 H+ B)	**6.7**	**HF**	0.1	0.1	SU			04/08/23 10:44	1

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	0.0491	U	0.147	0.147	1.00	0.279	pCi/L	04/14/23 10:13	05/09/23 07:58	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*84.6*		*30 - 110*	*04/14/23 10:13*	*05/09/23 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	-0.135	U	0.325	0.325	1.00	0.634	pCi/L	04/14/23 10:41	05/08/23 14:57	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*84.6*		*30 - 110*	*04/14/23 10:41*	*05/08/23 14:57*	*1*
Y Carrier	*89.0*		*30 - 110*	*04/14/23 10:41*	*05/08/23 14:57*	*1*

Client Sample Results

Client: SCS Engineers
Job ID: 310-253119-1
Project/Site: OGS - Background III&IV - 25223072

Client Sample ID: MW-301
Date Collected: 04/06/23 08:45
Date Received: 04/07/23 16:00

Lab Sample ID: 310-253119-1
Matrix: Water

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	0.0491	U	0.357	0.357	5.00	0.634	pCi/L		05/09/23 14:13	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	682.05				ft			04/06/23 08:45	1
Oxidation Reduction Potential	124.5				millivolts			04/06/23 08:45	1
Oxygen, Dissolved, Client Supplied	5.05				mg/L			04/06/23 08:45	1
pH, Field	6.25				SU			04/06/23 08:45	1
Specific Conductance, Field	832				umhos/cm			04/06/23 08:45	1
Temperature, Field	7.1				Degrees C			04/06/23 08:45	1
Turbidity, Field	2.37				NTU			04/06/23 08:45	1

Client Sample ID: Field Blank
Lab Sample ID: 310-253119-2

Date Collected: 04/06/23 11:55
Matrix: Water
Date Received: 04/07/23 16:00

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			04/15/23 03:02	1
Fluoride	<0.044		0.10	0.044	mg/L			04/15/23 03:02	1
Sulfate	<0.40		1.0	0.40	mg/L			04/17/23 14:20	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		04/11/23 09:20	04/11/23 20:27	1
Iron	<36		100	36	ug/L		04/11/23 09:20	04/11/23 20:59	1
Arsenic	<0.53		2.0	0.53	ug/L		04/11/23 09:20	04/11/23 20:27	1
Barium	<0.64		2.0	0.64	ug/L		04/11/23 09:20	04/11/23 20:27	1
Beryllium	<0.33		1.0	0.33	ug/L		04/11/23 09:20	04/11/23 20:27	1
Boron	<76		100	76	ug/L		04/11/23 09:20	04/11/23 20:27	1
Cadmium	<0.10		0.20	0.10	ug/L		04/11/23 09:20	04/11/23 20:27	1
Calcium	**0.48**	**J**	0.50	0.19	mg/L		04/11/23 09:20	04/11/23 20:27	1
Chromium	<1.1		5.0	1.1	ug/L		04/11/23 09:20	04/11/23 20:27	1
Cobalt	<0.17		0.50	0.17	ug/L		04/11/23 09:20	04/11/23 20:27	1
Lead	<0.24		0.50	0.24	ug/L		04/11/23 09:20	04/11/23 20:27	1
Lithium	<2.5		10	2.5	ug/L		04/11/23 09:20	04/11/23 20:27	1
Molybdenum	<0.91		2.0	0.91	ug/L		04/11/23 09:20	04/11/23 20:27	1
Selenium	<1.4		5.0	1.4	ug/L		04/11/23 09:20	04/11/23 20:27	1
Thallium	<0.26		1.0	0.26	ug/L		04/11/23 09:20	04/11/23 20:27	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		04/12/23 11:59	04/12/23 17:40	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	<34		50	34	mg/L			04/10/23 14:30	1
pH (SM 4500 H+ B)	**6.0**	**HF**	0.1	0.1	SU			04/08/23 10:43	1

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	0.0777	U	0.163	0.163	1.00	0.295	pCi/L	04/14/23 10:13	05/09/23 07:58	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*79.5*		*30 - 110*	*04/14/23 10:13*	*05/09/23 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	0.123	U	0.301	0.302	1.00	0.535	pCi/L	04/14/23 10:41	05/08/23 14:57	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*79.5*		*30 - 110*	*04/14/23 10:41*	*05/08/23 14:57*	*1*
Y Carrier	*89.3*		*30 - 110*	*04/14/23 10:41*	*05/08/23 14:57*	*1*

Client Sample Results

Client: SCS Engineers
Job ID: 310-253119-1
Project/Site: OGS - Background III&IV - 25223072

Client Sample ID: Field Blank
Lab Sample ID: 310-253119-2
Date Collected: 04/06/23 11:55
Matrix: Water
Date Received: 04/07/23 16:00

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	0.201	U	0.342	0.343	5.00	0.535	pCi/L		05/09/23 14:13	1

Definitions/Glossary

Client: SCS Engineers
Job ID: 310-253119-1
Project/Site: OGS - Background III&IV - 25223072

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.

Rad

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

Glossary

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

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-384675/3
Matrix: Water
Analysis Batch: 384675

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			04/14/23 21:03	1
Fluoride	<0.044		0.10	0.044	mg/L			04/14/23 21:03	1
Sulfate	<0.40		1.0	0.40	mg/L			04/14/23 21:03	1

Lab Sample ID: LCS 310-384675/35
Matrix: Water
Analysis Batch: 384675

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Sulfate	10.0	9.80		mg/L		98	90 - 110

Lab Sample ID: LCS 310-384675/4
Matrix: Water
Analysis Batch: 384675

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	9.96		mg/L		100	90 - 110
Fluoride	2.00	2.07		mg/L		104	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-383825/1-A
Matrix: Water
Analysis Batch: 384024

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 383825

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		04/11/23 09:20	04/11/23 19:38	1
Arsenic	<0.53		2.0	0.53	ug/L		04/11/23 09:20	04/11/23 19:38	1
Barium	<0.64		2.0	0.64	ug/L		04/11/23 09:20	04/11/23 19:38	1
Beryllium	<0.33		1.0	0.33	ug/L		04/11/23 09:20	04/11/23 19:38	1
Boron	<76		100	76	ug/L		04/11/23 09:20	04/11/23 19:38	1
Cadmium	<0.10		0.20	0.10	ug/L		04/11/23 09:20	04/11/23 19:38	1
Calcium	<0.19		0.50	0.19	mg/L		04/11/23 09:20	04/11/23 19:38	1
Chromium	<1.1		5.0	1.1	ug/L		04/11/23 09:20	04/11/23 19:38	1
Cobalt	<0.17		0.50	0.17	ug/L		04/11/23 09:20	04/11/23 19:38	1
Lead	<0.24		0.50	0.24	ug/L		04/11/23 09:20	04/11/23 19:38	1
Lithium	<2.5		10	2.5	ug/L		04/11/23 09:20	04/11/23 19:38	1
Molybdenum	<0.91		2.0	0.91	ug/L		04/11/23 09:20	04/11/23 19:38	1
Selenium	<1.4		5.0	1.4	ug/L		04/11/23 09:20	04/11/23 19:38	1
Thallium	<0.26		1.0	0.26	ug/L		04/11/23 09:20	04/11/23 19:38	1

Lab Sample ID: LCS 310-383825/2-A
Matrix: Water
Analysis Batch: 384024

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 383825

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	200	213		ug/L		106	80 - 120
Arsenic	200	202		ug/L		101	80 - 120
Barium	100	104		ug/L		104	80 - 120
Beryllium	100	105		ug/L		105	80 - 120

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

Lab Sample ID: LCS 310-383825/2-A
Matrix: Water
Analysis Batch: 384024

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 383825

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Boron	200	208		ug/L		104	80 - 120
Cadmium	100	104		ug/L		104	80 - 120
Calcium	2.00	1.97		mg/L		99	80 - 120
Chromium	100	105		ug/L		105	80 - 120
Cobalt	100	104		ug/L		104	80 - 120
Lead	200	216		ug/L		108	80 - 120
Lithium	200	219		ug/L		110	80 - 120
Molybdenum	200	205		ug/L		103	80 - 120
Selenium	400	408		ug/L		102	80 - 120
Thallium	200	174		ug/L		87	80 - 120

Lab Sample ID: 310-253123-1 DU
Matrix: Water
Analysis Batch: 384024

Client Sample ID: MW-301
Prep Type: Total/NA
Prep Batch: 383825

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Iron	58	J	47.9	J	ug/L		19	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-384072/1-A
Matrix: Water
Analysis Batch: 384132

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 384072

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		04/12/23 11:59	04/12/23 17:27	1

Lab Sample ID: LCS 310-384072/2-A
Matrix: Water
Analysis Batch: 384132

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 384072

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	1.67	1.36		ug/L		82	80 - 120

Lab Sample ID: 310-253119-1 MS
Matrix: Water
Analysis Batch: 384132

Client Sample ID: MW-301
Prep Type: Total/NA
Prep Batch: 384072

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	<0.14		1.67	1.51		ug/L		91	80 - 120

Lab Sample ID: 310-253119-1 MSD
Matrix: Water
Analysis Batch: 384132

Client Sample ID: MW-301
Prep Type: Total/NA
Prep Batch: 384072

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	<0.14		1.67	1.66		ug/L		99	80 - 120	9	20

Client: SCS Engineers
Project/Site: OGS - Background III&IV - 25223072

Job ID: 310-253119-1

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

Lab Sample ID: MB 310-383809/1
Matrix: Water
Analysis Batch: 383809

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	<34		50	34	mg/L			04/10/23 14:30	1

Lab Sample ID: LCS 310-383809/2
Matrix: Water
Analysis Batch: 383809

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	968		mg/L		97	90 - 110

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-383669/1
Matrix: Water
Analysis Batch: 383669

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

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

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-607419/1-A
Matrix: Water
Analysis Batch: 610675

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 607419

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	-0.09402	U	0.0762	0.0766	1.00	0.248	pCi/L	04/14/23 10:13	05/09/23 07:50	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*85.8*		*30 - 110*	*04/14/23 10:13*	*05/09/23 07:50*	*1*

Lab Sample ID: LCS 160-607419/2-A
Matrix: Water
Analysis Batch: 610675

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 607419

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium 226	11.3	10.42		1.33	1.00	0.385	pCi/L	92	75 - 113

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*81.8*		*30 - 110*

Lab Sample ID: LCSD 160-607419/3-A
Matrix: Water
Analysis Batch: 610675

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 607419

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium 226	11.3	9.644		1.24	1.00	0.308	pCi/L	85	75 - 113	0.30	1

Method: 903.0 - Radium-226 (GFPC) (Continued)

Lab Sample ID: LCSD 160-607419/3-A
Matrix: Water
Analysis Batch: 610675

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 607419

Carrier	LCSD %Yield	LCSD Qualifier	Limits
Barium	82.5		30 - 110

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-607425/1-A
Matrix: Water
Analysis Batch: 610622

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 607425

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	0.1857	U	0.304	0.305	1.00	0.520	pCi/L	04/14/23 10:41	05/08/23 14:47	1

Carrier	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Barium	85.8		30 - 110	04/14/23 10:41	05/08/23 14:47	1
Y Carrier	91.6		30 - 110	04/14/23 10:41	05/08/23 14:47	1

Lab Sample ID: LCS 160-607425/2-A
Matrix: Water
Analysis Batch: 610622

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 607425

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium 228			7.97	7.984		1.19	1.00	0.532	pCi/L	100	75 - 125		

Carrier	LCS %Yield	LCS Qualifier	Limits
Barium	81.8		30 - 110
Y Carrier	84.1		30 - 110

Lab Sample ID: LCSD 160-607425/3-A
Matrix: Water
Analysis Batch: 610622

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 607425

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium 228			7.97	8.879		1.28	1.00	0.581	pCi/L	111	75 - 125	0.36	1

Carrier	LCSD %Yield	LCSD Qualifier	Limits
Barium	82.5		30 - 110
Y Carrier	84.1		30 - 110

QC Association Summary

Client: SCS Engineers
Job ID: 310-253119-1
Project/Site: OGS - Background III&IV - 25223072

HPLC/IC

Analysis Batch: 384675

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253119-1	MW-301	Total/NA	Water	9056A	
310-253119-1	MW-301	Total/NA	Water	9056A	
310-253119-2	Field Blank	Total/NA	Water	9056A	
310-253119-2	Field Blank	Total/NA	Water	9056A	
MB 310-384675/3	Method Blank	Total/NA	Water	9056A	
LCS 310-384675/35	Lab Control Sample	Total/NA	Water	9056A	
LCS 310-384675/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 383825

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253119-1	MW-301	Total/NA	Water	3005A	
310-253119-1	MW-301	Total/NA	Water	3005A	
310-253119-2	Field Blank	Total/NA	Water	3005A	
310-253119-2	Field Blank	Total/NA	Water	3005A	
MB 310-383825/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-383825/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-253123-1 DU	MW-301	Total/NA	Water	3005A	

Analysis Batch: 384024

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253119-1	MW-301	Total/NA	Water	6020B	383825
310-253119-1	MW-301	Total/NA	Water	6020B	383825
310-253119-2	Field Blank	Total/NA	Water	6020B	383825
310-253119-2	Field Blank	Total/NA	Water	6020B	383825
MB 310-383825/1-A	Method Blank	Total/NA	Water	6020B	383825
LCS 310-383825/2-A	Lab Control Sample	Total/NA	Water	6020B	383825
310-253123-1 DU	MW-301	Total/NA	Water	6020B	383825

Prep Batch: 384072

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253119-1	MW-301	Total/NA	Water	7470A	
310-253119-2	Field Blank	Total/NA	Water	7470A	
MB 310-384072/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-384072/2-A	Lab Control Sample	Total/NA	Water	7470A	
310-253119-1 MS	MW-301	Total/NA	Water	7470A	
310-253119-1 MSD	MW-301	Total/NA	Water	7470A	

Analysis Batch: 384132

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253119-1	MW-301	Total/NA	Water	7470A	384072
310-253119-2	Field Blank	Total/NA	Water	7470A	384072
MB 310-384072/1-A	Method Blank	Total/NA	Water	7470A	384072
LCS 310-384072/2-A	Lab Control Sample	Total/NA	Water	7470A	384072
310-253119-1 MS	MW-301	Total/NA	Water	7470A	384072
310-253119-1 MSD	MW-301	Total/NA	Water	7470A	384072

QC Association Summary

Client: SCS Engineers
Job ID: 310-253119-1
Project/Site: OGS - Background III&IV - 25223072

General Chemistry

Analysis Batch: 383669

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253119-1	MW-301	Total/NA	Water	SM 4500 H+ B	
310-253119-2	Field Blank	Total/NA	Water	SM 4500 H+ B	
LCS 310-383669/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 383809

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253119-1	MW-301	Total/NA	Water	SM 2540C	
310-253119-2	Field Blank	Total/NA	Water	SM 2540C	
MB 310-383809/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-383809/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Rad

Prep Batch: 607419

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253119-1	MW-301	Total/NA	Water	PrecSep-21	
310-253119-2	Field Blank	Total/NA	Water	PrecSep-21	
MB 160-607419/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-607419/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-607419/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 607425

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253119-1	MW-301	Total/NA	Water	PrecSep_0	
310-253119-2	Field Blank	Total/NA	Water	PrecSep_0	
MB 160-607425/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-607425/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-607425/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Field Service / Mobile Lab

Analysis Batch: 385536

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253119-1	MW-301	Total/NA	Water	Field Sampling	

Lab Chronicle

Client: SCS Engineers
Job ID: 310-253119-1
Project/Site: OGS - Background III&IV - 25223072

Client Sample ID: MW-301
Lab Sample ID: 310-253119-1
Date Collected: 04/06/23 08:45
Matrix: Water
Date Received: 04/07/23 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	384675	QTZ5	EET CF	04/15/23 02:46
Total/NA	Analysis	9056A		5	384675	QTZ5	EET CF	04/17/23 14:05
Total/NA	Prep	3005A			383825	QTZ5	EET CF	04/11/23 09:20
Total/NA	Analysis	6020B		1	384024	ZRI4	EET CF	04/11/23 20:25
Total/NA	Prep	3005A			383825	QTZ5	EET CF	04/11/23 09:20
Total/NA	Analysis	6020B		1	384024	ZRI4	EET CF	04/11/23 20:54
Total/NA	Prep	7470A			384072	XXW3	EET CF	04/12/23 11:59
Total/NA	Analysis	7470A		1	384132	XXW3	EET CF	04/12/23 17:34
Total/NA	Analysis	SM 2540C		1	383809	ENB7	EET CF	04/10/23 14:30
Total/NA	Analysis	SM 4500 H+ B		1	383669	A3GU	EET CF	04/08/23 10:44
Total/NA	Prep	PrecSep-21			607419	KAC	EET SL	04/14/23 10:13
Total/NA	Analysis	903.0		1	610676	FLC	EET SL	05/09/23 07:58
Total/NA	Prep	PrecSep_0			607425	KAC	EET SL	04/14/23 10:41
Total/NA	Analysis	904.0		1	610612	FLC	EET SL	05/08/23 14:57
Total/NA	Analysis	Ra226_Ra228 Pos		1	610749	SCB	EET SL	05/09/23 14:13
Total/NA	Analysis	Field Sampling		1	385536	BJ0R	EET CF	04/06/23 08:45

Client Sample ID: Field Blank
Lab Sample ID: 310-253119-2
Date Collected: 04/06/23 11:55
Matrix: Water
Date Received: 04/07/23 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	384675	QTZ5	EET CF	04/15/23 03:02
Total/NA	Analysis	9056A		1	384675	QTZ5	EET CF	04/17/23 14:20
Total/NA	Prep	3005A			383825	QTZ5	EET CF	04/11/23 09:20
Total/NA	Analysis	6020B		1	384024	ZRI4	EET CF	04/11/23 20:27
Total/NA	Prep	3005A			383825	QTZ5	EET CF	04/11/23 09:20
Total/NA	Analysis	6020B		1	384024	ZRI4	EET CF	04/11/23 20:59
Total/NA	Prep	7470A			384072	XXW3	EET CF	04/12/23 11:59
Total/NA	Analysis	7470A		1	384132	XXW3	EET CF	04/12/23 17:40
Total/NA	Analysis	SM 2540C		1	383809	ENB7	EET CF	04/10/23 14:30
Total/NA	Analysis	SM 4500 H+ B		1	383669	A3GU	EET CF	04/08/23 10:43
Total/NA	Prep	PrecSep-21			607419	KAC	EET SL	04/14/23 10:13
Total/NA	Analysis	903.0		1	610676	FLC	EET SL	05/09/23 07:58
Total/NA	Prep	PrecSep_0			607425	KAC	EET SL	04/14/23 10:41
Total/NA	Analysis	904.0		1	610612	FLC	EET SL	05/08/23 14:57
Total/NA	Analysis	Ra226_Ra228 Pos		1	610749	SCB	EET SL	05/09/23 14:13

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

Accreditation/Certification Summary

Client: SCS Engineers
Job ID: 310-253119-1
Project/Site: OGS - Background III&IV - 25223072

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

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	12-08-23
California	Los Angeles County Sanitation Districts	10259	06-30-22 *
California	State	2886	06-30-23
Florida	NELAP	E87689	06-30-23
HI - RadChem Recognition	State	n/a	06-30-23
Illinois	NELAP	200023	11-30-23
Iowa	State	373	12-01-24
Kansas	NELAP	E-10236	10-31-23
Kentucky (DW)	State	KY90125	12-31-23
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-23
Louisiana (All)	NELAP	04080	06-30-23
Louisiana (DW)	State	LA011	12-31-23
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	03-31-24
North Carolina (DW)	State	29700	07-31-23
North Dakota	State	R-207	06-30-23
Oklahoma	NELAP	9997	08-31-23
Oregon	NELAP	4157	09-01-23
Pennsylvania	NELAP	68-00540	02-28-24
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	06-11-23
Utah	NELAP	MO000542021-14	07-31-23
Virginia	NELAP	10310	06-14-23
Washington	State	C592	08-30-23
West Virginia DEP	State	381	10-31-23

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

Method Summary

Client: SCS Engineers
Job ID: 310-253119-1
Project/Site: OGS - Background III&IV - 25223072

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

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310-253119 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS

City/State: CITY | STATE

Project: OGS-Background III + IV

Receipt Information

Date/Time Received: DATE 4/7/23 | TIME 1600

Received By: AM

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

Condition of Cooler/Containers

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

Temperature Record

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

Thermometer ID: W

Correction Factor (°C): 0

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

Uncorrected Temp (°C): 9.3

Corrected Temp (°C): 9.3

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:	250 mL plastic	250 mL plastic
Uncorrected Temp (°C):	10.8	8.9
Corrected Temp (°C):	10.8	8.9

Exceptions Noted

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

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

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

Additional Comments

MW304 MW305A

Field Blank

MW301

Shipping Summary

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

Bottle Order Information

Bottle Order: OGS-Background III&IV
Bottle Order #: 22380
Request From Client: 3/23/2023
Date Order Posted: 3/21/2023 3:56:13PM
Order Status: Shipped
Prepared By: Meredith Liechti
Deliver By Date: ***3/30/2023 11:59:00PM***

When To Ship: ***3/30/2023***

Project/Event Information

Project Manager: Sandie Fredrick
Tel: (920) 261-1660 Em: Sandra.Fredrick@et.eurofinsus.com
Lab Project Number: 31011020
Project Ref: IA CCR Monitoring
Event Desc:

Client Samples: MW-301

Sets	Bottles/Set	Bottle Type Description	Field Filtered	Preservative	Method	Matrix	Comments
2	1	Plastic 250ml - unpreserved		None	9056A_ORGFM_28D - Chloride, Fluoride & Sulfate	Water	Cl/F/S
2	1	Plastic 250ml - with Nitric Acid		Nitric Acid	7470A - Mercury 6020B - Metals (14)	Water Water	METALS + Hg
2	1	Plastic 1 liter - unpreserved		None	2540C_Calcd - Total Dissolved Solids	Water	TDS + pH
2	1	Plastic Bag		None		Water	

MC 4-7-23 1600

Please notify your PM immediately if an error is found in shipment. When returning samples, please return all provided QC samples.

Shipping Summary

Client Samples: Field Blank

Sets	Bottles/Set	Bottle Type Description	Field Filtered	Preservative	Method	Matrix	Comments
1	1	Plastic 1 liter - unpreserved		None	2540C_Calcd - Total Dissolved Solids	Water	TDS + pH
1	1	Plastic 250ml - unpreserved		None	9056A_ORGFM_28D - Chloride, Fluoride & Sulfate	Water	CL/F/S
1	1	Plastic 250ml - with Nitric Acid		Nitric Acid	7470A - Mercury 6020B - Metals (14)	Water Water	Metals 14 +Hg
1	1	Plastic Bag		None		Water	

MC 4-7-23 1600

Please notify your PM immediately if an error is found in shipment. When returning samples, please return all provided QC samples.

Shipping Summary

Total Bottle Summary

Bottle Type Description	Preservative	Bottle Count
Plastic 1 liter - unpreserved	None	3
Plastic 250ml - unpreserved	None	3
Plastic 250ml - with Nitric Acid	Nitric Acid	3
Plastic Bag	None	3
	Total Bottles:	12

Notes to Field Staff:

Scan QR code for field sampler instructions

Health and Safety Notes:

Preservative	Comment
Nitric Acid	CAUTION! STRONG OXIDIZER! CONTAINS 1:1 NITRIC ACID. Avoid skin and eye contact. If contact is made, FLUSH IMMEDIATELY with water.

Relinquished By	Company	Date	Time	Received By	Company	Seal #:
		4.7.23	1600	MC		Seal #: Seal #:
Relinquished By	Company	Date	Time	Received By	Company	Seal #: Seal #: Seal #:

Please notify your PM immediately if an error is found in shipment. When returning samples, please return all provided QC samples.

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

Chain of Custody Record

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Client Information	Sampler: Tyler Stirling	Lab PM: Sandie Fredrick	Carrier Tracking No(s):	COC No:
Client Contact: Meghan Blodgett	Phone: 515-505-2716	E-Mail: Sandra.Fredrick@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: SCS Engineers	PWSID:			Job #: 25223072

Address: 2830 Dairy Drive	Due Date Requested:
City: Madison	TAT Requested (days):
State, Zip: WI, 53718	Compliance Project: Δ Yes Δ No
Phone: 608-224-2830	PO #: 25223072
Email: mblodgett@scsengineers.com	WO #:
Project Name: Ottumwa Generating Station 25223072	Project #: 25223072
Site: Ottumwa, IA	SSOW#:

Analysis Requested

Preservation Codes:

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

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020 Metals, total (Sb, As, Ba, Be, B, Ca, Cd, Cr, Co, Fe, Pb, Li, Mo, Se, Tl, and Hg)	TDS and pH	Chloride, Fluoride, Sulfate	EPA 903/904 Radium 226 + 228	Bicarbonate & carbonate alkalinity	6020 Metals, total (Fe, Mg, Mn, K, Na)	6020 Metals, dissolved (Co, Fe, Mn)	6020 Metals, dissolved (Fe, Mn)					Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	I	I	D	I	D	D	D						
MW-301	4/6/23	8:45	G	W	N		X	X	X	X										
Field Blank	4/6/23	11:55	G	W	N		X	X	X	X										

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

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

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

Special Instructions/QC Requirements:

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

Relinquished by: Tyler Stirling	Date/Time: 4/7/23	Company SCS	Received by: MC	Date/Time: 4-7-23 1600	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

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

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-253119-1

Login Number: 253119
List Number: 1
Creator: Costello, Mackenzie K

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	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.	False	9.3
Cooler Temperature is acceptable.	False	Cooler temperature outside required temperature criteria.
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
Job ID: 310-253119-1
Project/Site: OGS - Background III&IV - 25223072

Method: 903.0 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
		Ba
Lab Sample ID	Client Sample ID	(30-110)
310-253119-1	MW-301	84.6
310-253119-2	Field Blank	79.5
LCS 160-607419/2-A	Lab Control Sample	81.8
LCSD 160-607419/3-A	Lab Control Sample Dup	82.5
MB 160-607419/1-A	Method Blank	85.8

Tracer/Carrier Legend

Ba = Barium

Method: 904.0 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
		Ba	Y
Lab Sample ID	Client Sample ID	(30-110)	(30-110)
310-253119-1	MW-301	84.6	89.0
310-253119-2	Field Blank	79.5	89.3
LCS 160-607425/2-A	Lab Control Sample	81.8	84.1
LCSD 160-607425/3-A	Lab Control Sample Dup	82.5	84.1
MB 160-607425/1-A	Method Blank	85.8	91.6

Tracer/Carrier Legend

Ba = Barium
Y = Y Carrier

Table 1. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station / SCS Engineers Project No. 25223072.00
April 2023

	Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmhos/cm)	ORP (mV)	Turbidity
Background	MW-301	4/6/2023 0845	682.05	7.1	6.25	5.05	832	124.5	2.37
Ash Pond	MW-302	4/5/2023 1645	653.30	11.2	6.62	1.86	1953	97.0	2.03
	MW-303	4/5/2023 1545	652.57	8.3	6.65	1.70	1215	62.9	3.54
	MW-304	4/6/20231009	650.29	13.1	6.70	-0.13	1888	-93.7	0.02
	MW-305	4/4/2023 1555	655.02	13.6	6.70	0.63	1896	166.4	0.02
	MW-305A	4/6/2023 0909	647.70	11.1	6.74	0.12	1224	198.2	0.02
	MW-306	4/6/2023 1005	659.12	13.4	6.61	0.12	1583	103.1	3.09
	MW-310	4/4/2023 1415	641.71	11.8	6.91	4.34	852	252.5	0.02
	MW-310A	4/5/2023 1155	643.11	12.1	7.46	0.49	3045	-15.5	1.97
	MW-311	4/4/2023 1707	641.88	10.5	6.56	0.00	932	257	0.02
	MW-311A	4/6/2023 1310	643.59	11.5	7.54	2.47	3037	47.7	0.02
	MW-312	4/5/2023 1410	644.08	12.0	7.11	0.28	1576	0.5	1.32
	MW-313	4/5/2023 1310	642.02	11.5	6.93	0.09	1878	-14.5	5.09
	MW-316	4/6/2023 1107	642.78	10.6	6.70	-0.16	1694	104.1	0.02
	MW-316A	4/6/2023 1105	643.49	11.2	7.40	3.29	1976	99.6	4.77
	MW-317	4/6/2023 1220	642.84	11.5	6.57	0.12	1561	-24.0	3.89
ZLDP	MW-307	4/5/2023 1611	647.28	11.9	6.62	0.00	1776	31.9	0.02
	MW-308	4/5/2023 1502	645.16	11.7	6.70	0.18	1634	7.3	1.55
	MW-309	4/5/2023 1150	644.41	11.7	7.10	0.42	1511	-7.0	0.02
	MW-315	4/5/2023 1308	645.12	11.8	6.96	0.32	1523	-45.7	0.02

Abbreviations:
mg/L = milligrams per liter amsl = above mean sea level NA = Not Analyzed NM= Not Measured

Created by: EMS Date: 4/13/2023
Last revision by: EMS Date: 4/13/2023
Checked by: MDB Date: 4/21/2023

C:\Users\hld0\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\USG3GGGC\[2304_April - OGS combined_CCR_Field.xlsx]GW Field Parameters

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ANALYTICAL REPORT

PREPARED FOR

Attn: Meghan Blodgett
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Generated 5/10/2023 1:21:53 PM

JOB DESCRIPTION

OGS-ZLPD 25223072

JOB NUMBER

310-253120-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

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.

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Authorization

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

Table of Contents

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Job ID: 310-253120-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-253120-1

Comments
No additional comments.

Receipt
The samples were received on 4/7/2023 4:00 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 0.9º C.

HPLC/IC
Method 9056A: The following samples were diluted due to the nature of the sample matrix: MW-307 (310-253120-1), MW-308 (310-253120-2) and MW-309 (310-253120-3). 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.

Narrative

Job Narrative
310-253125-1

Comments
No additional comments.

Receipt
The samples were received on 4/7/2023 4:00 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 0.9º 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.

Narrative

Job Narrative
310-253126-1

Comments
No additional comments.

Receipt
The samples were received on 4/7/2023 4:00 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 0.9º C.

RAD
Method 903.0: Radium-226 batch 607823
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 (310-253126-1), MW-308 (310-253126-2), MW-309 (310-253126-3), MW-315

Job ID: 310-253120-1 (Continued)

Laboratory: Eurofins Cedar Falls (Continued)

(310-253126-4), (LCS 160-607823/2-A), (LCSD 160-607823/3-A) and (MB 160-607823/1-A)

Method 904.0: Radium-228 batch 607829
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 (310-253126-1), MW-308 (310-253126-2), MW-309 (310-253126-3), MW-315 (310-253126-4), (LCS 160-607829/2-A), (LCSD 160-607829/3-A) and (MB 160-607829/1-A)

Method PrecSep_0: Radium-228 Prep Batch 160-607829
Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-307 (310-253126-1), MW-308 (310-253126-2), MW-309 (310-253126-3) and MW-315 (310-253126-4). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep-21: Radium-226 Prep Batch 160-607823
Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-307 (310-253126-1), MW-308 (310-253126-2), MW-309 (310-253126-3) and MW-315 (310-253126-4). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

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: OGS-ZLPD 25223072

Job ID: 310-253120-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-253120-1	MW-307	Water	04/05/23 16:11	04/07/23 16:00
310-253120-2	MW-308	Water	04/05/23 15:02	04/07/23 16:00
310-253120-3	MW-309	Water	04/05/23 11:50	04/07/23 16:00
310-253120-4	MW-315	Water	04/05/23 13:08	04/07/23 16:00

Detection Summary

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Client Sample ID: MW-307 — Lab Sample ID: 310-253120-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	130		5.0	2.0	mg/L	5		9056A	Total/NA
Iron	2700		100	36	ug/L	1		6020B	Total/NA
Barium	130		2.0	0.64	ug/L	1		6020B	Total/NA
Boron	250		100	76	ug/L	1		6020B	Total/NA
Calcium	230		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	30		0.50	0.17	ug/L	1		6020B	Total/NA
Lithium	11		10	2.5	ug/L	1		6020B	Total/NA
Cobalt	32		0.50	0.17	ug/L	1		6020B	Dissolved
Total Dissolved Solids	1200		50	34	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	647.28				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	31.9				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.00				mg/L	1		Field Sampling	Total/NA
pH, Field	6.62				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1776				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	11.9				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	0.02				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-308 — Lab Sample ID: 310-253120-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	150		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	300		5.0	2.0	mg/L	5		9056A	Total/NA
Iron	3200		100	36	ug/L	1		6020B	Total/NA
Barium	110		2.0	0.64	ug/L	1		6020B	Total/NA
Boron	280		100	76	ug/L	1		6020B	Total/NA
Calcium	210		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	0.45	J	0.50	0.17	ug/L	1		6020B	Total/NA
Lithium	14		10	2.5	ug/L	1		6020B	Total/NA
Total Dissolved Solids	1100		50	34	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	645.16				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	7.3				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.18				mg/L	1		Field Sampling	Total/NA
pH, Field	6.70				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1634				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	11.7				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	1.55				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-309 — Lab Sample ID: 310-253120-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	65		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	450		5.0	2.0	mg/L	5		9056A	Total/NA
Iron	720		100	36	ug/L	1		6020B	Total/NA
Barium	51		2.0	0.64	ug/L	1		6020B	Total/NA
Boron	1400		100	76	ug/L	1		6020B	Total/NA
Calcium	140		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	2.0		0.50	0.17	ug/L	1		6020B	Total/NA
Lithium	7.8	J	10	2.5	ug/L	1		6020B	Total/NA
Total Dissolved Solids	1000		50	34	mg/L	1		SM 2540C	Total/NA
pH	7.3	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

Detection Summary

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Client Sample ID: MW-309 (Continued) — Lab Sample ID: 310-253120-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ground Water Elevation	644.41				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-7.0				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.42				mg/L	1		Field Sampling	Total/NA
pH, Field	7.10				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1511				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	11.7				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	0.02				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-315 — Lab Sample ID: 310-253120-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	45		5.0	2.3	mg/L	5		9056A	Total/NA
Fluoride	0.22	J	0.50	0.22	mg/L	5		9056A	Total/NA
Sulfate	460		5.0	2.0	mg/L	5		9056A	Total/NA
Iron	2800		100	36	ug/L	1		6020B	Total/NA
Arsenic	1.3	J	2.0	0.53	ug/L	1		6020B	Total/NA
Magnesium	19000		500	150	ug/L	1		6020B	Total/NA
Barium	35		2.0	0.64	ug/L	1		6020B	Total/NA
Manganese	6700		40	14	ug/L	4		6020B	Total/NA
Potassium	1400		500	150	ug/L	1		6020B	Total/NA
Boron	1100		100	76	ug/L	1		6020B	Total/NA
Sodium	200000		1000	460	ug/L	1		6020B	Total/NA
Calcium	120		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	7.0		0.50	0.17	ug/L	1		6020B	Total/NA
Lithium	5.3	J	10	2.5	ug/L	1		6020B	Total/NA
Molybdenum	1.4	J	2.0	0.91	ug/L	1		6020B	Total/NA
Cobalt	6.9		0.50	0.17	ug/L	1		6020B	Dissolved
Iron	2700		100	36	ug/L	1		6020B	Dissolved
Manganese	6800		40	14	ug/L	4		6020B	Dissolved
Bicarbonate Alkalinity as CaCO3	320		5.0	2.5	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	320		5.0	2.5	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	1100		50	34	mg/L	1		SM 2540C	Total/NA
pH	7.2	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	645.12				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-45.7				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.32				mg/L	1		Field Sampling	Total/NA
pH, Field	6.96				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1523				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	11.8				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	0.02				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Client Sample ID: MW-307

Date Collected: 04/05/23 16:11
Date Received: 04/07/23 16:00

Lab Sample ID: 310-253120-1

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<2.3		5.0	2.3	mg/L			04/15/23 03:18	5
Fluoride	<0.22		0.50	0.22	mg/L			04/15/23 03:18	5
Sulfate	**130**		5.0	2.0	mg/L			04/17/23 14:36	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		04/11/23 09:20	04/11/23 20:30	1
Iron	**2700**		100	36	ug/L		04/11/23 09:20	04/11/23 21:02	1
Arsenic	<0.53		2.0	0.53	ug/L		04/11/23 09:20	04/11/23 20:30	1
Barium	**130**		2.0	0.64	ug/L		04/11/23 09:20	04/11/23 20:30	1
Beryllium	<0.33		1.0	0.33	ug/L		04/11/23 09:20	04/11/23 20:30	1
Boron	**250**		100	76	ug/L		04/11/23 09:20	04/11/23 20:30	1
Cadmium	<0.10		0.20	0.10	ug/L		04/11/23 09:20	04/11/23 20:30	1
Calcium	**230**		0.50	0.19	mg/L		04/11/23 09:20	04/11/23 20:30	1
Chromium	<1.1		5.0	1.1	ug/L		04/11/23 09:20	04/11/23 20:30	1
Cobalt	**30**		0.50	0.17	ug/L		04/11/23 09:20	04/11/23 20:30	1
Lead	<0.24		0.50	0.24	ug/L		04/11/23 09:20	04/11/23 20:30	1
Lithium	**11**		10	2.5	ug/L		04/11/23 09:20	04/11/23 20:30	1
Molybdenum	<0.91		2.0	0.91	ug/L		04/11/23 09:20	04/11/23 20:30	1
Selenium	<1.4		5.0	1.4	ug/L		04/11/23 09:20	04/11/23 20:30	1
Thallium	<0.26		1.0	0.26	ug/L		04/11/23 09:20	04/11/23 20:30	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	**32**		0.50	0.17	ug/L		04/13/23 07:55	04/17/23 16:02	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		04/12/23 11:59	04/12/23 17:47	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**1200**		50	34	mg/L			04/10/23 11:52	1
pH (SM 4500 H+ B)	**7.0**	**HF**	0.1	0.1	SU			04/08/23 10:48	1

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	**1.17**		0.346	0.361	1.00	0.337	pCi/L	04/17/23 12:36	05/09/23 22:11	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*95.1*		*30 - 110*	*04/17/23 12:36*	*05/09/23 22:11*	*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	0.343	U	0.318	0.319	1.00	0.505	pCi/L	04/17/23 13:10	05/09/23 13:09	1

Client Sample ID: MW-307
Date Collected: 04/05/23 16:11
Date Received: 04/07/23 16:00

Lab Sample ID: 310-253120-1
Matrix: Water

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*95.1*		*30 - 110*	*04/17/23 13:10*	*05/09/23 13:09*	*1*
Y Carrier	*84.9*		*30 - 110*	*04/17/23 13:10*	*05/09/23 13:09*	*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	**1.51**		0.470	0.482	5.00	0.505	pCi/L		05/10/23 12:19	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	**647.28**				ft			04/05/23 16:11	1
Oxidation Reduction Potential	**31.9**				millivolts			04/05/23 16:11	1
Oxygen, Dissolved, Client Supplied	**0.00**				mg/L			04/05/23 16:11	1
pH, Field	**6.62**				SU			04/05/23 16:11	1
Specific Conductance, Field	**1776**				umhos/cm			04/05/23 16:11	1
Temperature, Field	**11.9**				Degrees C			04/05/23 16:11	1
Turbidity, Field	**0.02**				NTU			04/05/23 16:11	1

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Client Sample ID: MW-308
Date Collected: 04/05/23 15:02
Date Received: 04/07/23 16:00

Lab Sample ID: 310-253120-2
Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	150		5.0	2.3	mg/L			04/15/23 03:35	5
Fluoride	<0.22		0.50	0.22	mg/L			04/15/23 03:35	5
Sulfate	300		5.0	2.0	mg/L			04/17/23 14:52	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		04/11/23 09:20	04/11/23 20:33	1
Iron	3200		100	36	ug/L		04/11/23 09:20	04/11/23 21:05	1
Arsenic	<0.53		2.0	0.53	ug/L		04/11/23 09:20	04/11/23 20:33	1
Barium	110		2.0	0.64	ug/L		04/11/23 09:20	04/11/23 20:33	1
Beryllium	<0.33		1.0	0.33	ug/L		04/11/23 09:20	04/11/23 20:33	1
Boron	280		100	76	ug/L		04/11/23 09:20	04/11/23 20:33	1
Cadmium	<0.10		0.20	0.10	ug/L		04/11/23 09:20	04/11/23 20:33	1
Calcium	210		0.50	0.19	mg/L		04/11/23 09:20	04/11/23 20:33	1
Chromium	<1.1		5.0	1.1	ug/L		04/11/23 09:20	04/11/23 20:33	1
Cobalt	0.45	J	0.50	0.17	ug/L		04/11/23 09:20	04/11/23 20:33	1
Lead	<0.24		0.50	0.24	ug/L		04/11/23 09:20	04/11/23 20:33	1
Lithium	14		10	2.5	ug/L		04/11/23 09:20	04/11/23 20:33	1
Molybdenum	<0.91		2.0	0.91	ug/L		04/11/23 09:20	04/11/23 20:33	1
Selenium	<1.4		5.0	1.4	ug/L		04/11/23 09:20	04/11/23 20:33	1
Thallium	<0.26		1.0	0.26	ug/L		04/11/23 09:20	04/11/23 20:33	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		04/12/23 11:59	04/12/23 17:49	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	1100		50	34	mg/L			04/10/23 11:52	1
pH (SM 4500 H+ B)	7.0	HF	0.1	0.1	SU			04/08/23 10:47	1

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	1.31		0.376	0.394	1.00	0.362	pCi/L	04/17/23 12:36	05/09/23 22:11	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*91.9*		*30 - 110*	*04/17/23 12:36*	*05/09/23 22:11*	*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	0.508		0.308	0.311	1.00	0.434	pCi/L	04/17/23 13:10	05/09/23 13:09	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*91.9*		*30 - 110*	*04/17/23 13:10*	*05/09/23 13:09*	*1*
Y Carrier	*84.1*		*30 - 110*	*04/17/23 13:10*	*05/09/23 13:09*	*1*

Client Sample Results

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Client Sample ID: MW-308

Date Collected: 04/05/23 15:02
Date Received: 04/07/23 16:00

Lab Sample ID: 310-253120-2

Matrix: Water

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	1.81		0.486	0.502	5.00	0.434	pCi/L		05/10/23 12:19	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	645.16				ft			04/05/23 15:02	1
Oxidation Reduction Potential	7.3				millivolts			04/05/23 15:02	1
Oxygen, Dissolved, Client Supplied	0.18				mg/L			04/05/23 15:02	1
pH, Field	6.70				SU			04/05/23 15:02	1
Specific Conductance, Field	1634				umhos/cm			04/05/23 15:02	1
Temperature, Field	11.7				Degrees C			04/05/23 15:02	1
Turbidity, Field	1.55				NTU			04/05/23 15:02	1

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Client Sample ID: MW-309
Date Collected: 04/05/23 11:50
Date Received: 04/07/23 16:00

Lab Sample ID: 310-253120-3
Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**65**		5.0	2.3	mg/L			04/15/23 03:51	5
Fluoride	<0.22		0.50	0.22	mg/L			04/15/23 03:51	5
Sulfate	**450**		5.0	2.0	mg/L			04/17/23 15:28	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		04/11/23 09:20	04/11/23 20:36	1
Iron	**720**		100	36	ug/L		04/11/23 09:20	04/11/23 21:08	1
Arsenic	<0.53		2.0	0.53	ug/L		04/11/23 09:20	04/11/23 20:36	1
Barium	**51**		2.0	0.64	ug/L		04/11/23 09:20	04/11/23 20:36	1
Beryllium	<0.33		1.0	0.33	ug/L		04/11/23 09:20	04/11/23 20:36	1
Boron	**1400**		100	76	ug/L		04/11/23 09:20	04/11/23 20:36	1
Cadmium	<0.10		0.20	0.10	ug/L		04/11/23 09:20	04/11/23 20:36	1
Calcium	**140**		0.50	0.19	mg/L		04/11/23 09:20	04/11/23 20:36	1
Chromium	<1.1		5.0	1.1	ug/L		04/11/23 09:20	04/11/23 20:36	1
Cobalt	**2.0**		0.50	0.17	ug/L		04/11/23 09:20	04/11/23 20:36	1
Lead	<0.24		0.50	0.24	ug/L		04/11/23 09:20	04/11/23 20:36	1
Lithium	**7.8**	**J**	10	2.5	ug/L		04/11/23 09:20	04/11/23 20:36	1
Molybdenum	<0.91		2.0	0.91	ug/L		04/11/23 09:20	04/11/23 20:36	1
Selenium	<1.4		5.0	1.4	ug/L		04/11/23 09:20	04/11/23 20:36	1
Thallium	<0.26		1.0	0.26	ug/L		04/11/23 09:20	04/11/23 20:36	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		04/12/23 11:59	04/12/23 17:51	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**1000**		50	34	mg/L			04/10/23 11:52	1
pH (SM 4500 H+ B)	**7.3**	**HF**	0.1	0.1	SU			04/08/23 10:46	1

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	**0.710**		0.280	0.287	1.00	0.300	pCi/L	04/17/23 12:36	05/09/23 22:12	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*93.4*		*30 - 110*	*04/17/23 12:36*	*05/09/23 22:12*	*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	0.172	U	0.253	0.254	1.00	0.430	pCi/L	04/17/23 13:10	05/09/23 13:10	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*93.4*		*30 - 110*	*04/17/23 13:10*	*05/09/23 13:10*	*1*
Y Carrier	*84.9*		*30 - 110*	*04/17/23 13:10*	*05/09/23 13:10*	*1*

Client Sample Results

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Client Sample ID: MW-309

Date Collected: 04/05/23 11:50
Date Received: 04/07/23 16:00

Lab Sample ID: 310-253120-3

Matrix: Water

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	0.882		0.377	0.383	5.00	0.430	pCi/L		05/10/23 12:19	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	644.41				ft			04/05/23 11:50	1
Oxidation Reduction Potential	-7.0				millivolts			04/05/23 11:50	1
Oxygen, Dissolved, Client Supplied	0.42				mg/L			04/05/23 11:50	1
pH, Field	7.10				SU			04/05/23 11:50	1
Specific Conductance, Field	1511				umhos/cm			04/05/23 11:50	1
Temperature, Field	11.7				Degrees C			04/05/23 11:50	1
Turbidity, Field	0.02				NTU			04/05/23 11:50	1

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Client Sample ID: MW-315

Date Collected: 04/05/23 13:08
Date Received: 04/07/23 16:00

Lab Sample ID: 310-253120-4

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**45**		5.0	2.3	mg/L			04/15/23 04:07	5
Fluoride	**0.22**	**J**	0.50	0.22	mg/L			04/15/23 04:07	5
Sulfate	**460**		5.0	2.0	mg/L			04/17/23 15:44	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		04/11/23 09:20	04/11/23 20:39	1
Iron	**2800**		100	36	ug/L		04/11/23 09:20	04/11/23 21:11	1
Arsenic	**1.3**	**J**	2.0	0.53	ug/L		04/11/23 09:20	04/11/23 20:39	1
Magnesium	**19000**		500	150	ug/L		04/11/23 09:20	04/11/23 21:11	1
Barium	**35**		2.0	0.64	ug/L		04/11/23 09:20	04/11/23 20:39	1
Manganese	**6700**		40	14	ug/L		04/11/23 09:20	04/12/23 16:46	4
Beryllium	<0.33		1.0	0.33	ug/L		04/11/23 09:20	04/11/23 20:39	1
Potassium	**1400**		500	150	ug/L		04/11/23 09:20	04/11/23 21:11	1
Boron	**1100**		100	76	ug/L		04/11/23 09:20	04/11/23 20:39	1
Sodium	**200000**		1000	460	ug/L		04/11/23 09:20	04/13/23 14:14	1
Cadmium	<0.10		0.20	0.10	ug/L		04/11/23 09:20	04/11/23 20:39	1
Calcium	**120**		0.50	0.19	mg/L		04/11/23 09:20	04/11/23 20:39	1
Chromium	<1.1		5.0	1.1	ug/L		04/11/23 09:20	04/11/23 20:39	1
Cobalt	**7.0**		0.50	0.17	ug/L		04/11/23 09:20	04/11/23 20:39	1
Lead	<0.24		0.50	0.24	ug/L		04/11/23 09:20	04/11/23 20:39	1
Lithium	**5.3**	**J**	10	2.5	ug/L		04/11/23 09:20	04/11/23 20:39	1
Molybdenum	**1.4**	**J**	2.0	0.91	ug/L		04/11/23 09:20	04/11/23 20:39	1
Selenium	<1.4		5.0	1.4	ug/L		04/11/23 09:20	04/11/23 20:39	1
Thallium	<0.26		1.0	0.26	ug/L		04/11/23 09:20	04/11/23 20:39	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	**6.9**		0.50	0.17	ug/L		04/13/23 07:55	04/17/23 16:08	1
Iron	**2700**		100	36	ug/L		04/13/23 07:55	04/19/23 19:13	1
Manganese	**6800**		40	14	ug/L		04/13/23 07:55	04/19/23 19:10	4

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		04/12/23 11:59	04/12/23 17:53	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	**320**		5.0	2.5	mg/L			04/14/23 19:27	1
Carbonate Alkalinity as CaCO3 (SM 2320B)	<2.5		5.0	2.5	mg/L			04/14/23 19:27	1
Total Alkalinity as CaCO3 (SM 2320B)	**320**		5.0	2.5	mg/L			04/14/23 19:27	1
Total Dissolved Solids (SM 2540C)	**1100**		50	34	mg/L			04/10/23 11:52	1
pH (SM 4500 H+ B)	**7.2**	**HF**	0.1	0.1	SU			04/08/23 10:45	1

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Client Sample ID: MW-315

Date Collected: 04/05/23 13:08
Date Received: 04/07/23 16:00

Lab Sample ID: 310-253120-4

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	0.738		0.278	0.285	1.00	0.265	pCi/L	04/17/23 12:36	05/09/23 22:12	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*90.2*		*30 - 110*	*04/17/23 12:36*	*05/09/23 22:12*	*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	0.682		0.389	0.394	1.00	0.560	pCi/L	04/17/23 13:10	05/09/23 13:10	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*90.2*		*30 - 110*	*04/17/23 13:10*	*05/09/23 13:10*	*1*
Y Carrier	*84.9*		*30 - 110*	*04/17/23 13:10*	*05/09/23 13:10*	*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	1.42		0.478	0.486	5.00	0.560	pCi/L		05/10/23 12:19	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	645.12				ft			04/05/23 13:08	1
Oxidation Reduction Potential	-45.7				millivolts			04/05/23 13:08	1
Oxygen, Dissolved, Client Supplied	0.32				mg/L			04/05/23 13:08	1
pH, Field	6.96				SU			04/05/23 13:08	1
Specific Conductance, Field	1523				umhos/cm			04/05/23 13:08	1
Temperature, Field	11.8				Degrees C			04/05/23 13:08	1
Turbidity, Field	0.02				NTU			04/05/23 13:08	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Qualifiers

HPLC/IC

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.

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.

Rad

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

Glossary

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

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-384675/3
Matrix: Water
Analysis Batch: 384675

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			04/14/23 21:03	1
Fluoride	<0.044		0.10	0.044	mg/L			04/14/23 21:03	1
Sulfate	<0.40		1.0	0.40	mg/L			04/14/23 21:03	1

Lab Sample ID: LCS 310-384675/35
Matrix: Water
Analysis Batch: 384675

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Sulfate	10.0	9.80		mg/L		98	90 - 110

Lab Sample ID: LCS 310-384675/4
Matrix: Water
Analysis Batch: 384675

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	9.96		mg/L		100	90 - 110
Fluoride	2.00	2.07		mg/L		104	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-383825/1-A
Matrix: Water
Analysis Batch: 384024

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 383825

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		04/11/23 09:20	04/11/23 19:38	1
Arsenic	<0.53		2.0	0.53	ug/L		04/11/23 09:20	04/11/23 19:38	1
Barium	<0.64		2.0	0.64	ug/L		04/11/23 09:20	04/11/23 19:38	1
Beryllium	<0.33		1.0	0.33	ug/L		04/11/23 09:20	04/11/23 19:38	1
Boron	<76		100	76	ug/L		04/11/23 09:20	04/11/23 19:38	1
Cadmium	<0.10		0.20	0.10	ug/L		04/11/23 09:20	04/11/23 19:38	1
Calcium	<0.19		0.50	0.19	mg/L		04/11/23 09:20	04/11/23 19:38	1
Chromium	<1.1		5.0	1.1	ug/L		04/11/23 09:20	04/11/23 19:38	1
Cobalt	<0.17		0.50	0.17	ug/L		04/11/23 09:20	04/11/23 19:38	1
Lead	<0.24		0.50	0.24	ug/L		04/11/23 09:20	04/11/23 19:38	1
Lithium	<2.5		10	2.5	ug/L		04/11/23 09:20	04/11/23 19:38	1
Molybdenum	<0.91		2.0	0.91	ug/L		04/11/23 09:20	04/11/23 19:38	1
Selenium	<1.4		5.0	1.4	ug/L		04/11/23 09:20	04/11/23 19:38	1
Thallium	<0.26		1.0	0.26	ug/L		04/11/23 09:20	04/11/23 19:38	1

Lab Sample ID: LCS 310-383825/2-A
Matrix: Water
Analysis Batch: 384024

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 383825

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	200	213		ug/L		106	80 - 120
Arsenic	200	202		ug/L		101	80 - 120
Barium	100	104		ug/L		104	80 - 120
Beryllium	100	105		ug/L		105	80 - 120

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

Lab Sample ID: LCS 310-383825/2-A
Matrix: Water
Analysis Batch: 384024

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 383825

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Boron	200	208		ug/L		104	80 - 120
Cadmium	100	104		ug/L		104	80 - 120
Calcium	2.00	1.97		mg/L		99	80 - 120
Chromium	100	105		ug/L		105	80 - 120
Cobalt	100	104		ug/L		104	80 - 120
Lead	200	216		ug/L		108	80 - 120
Lithium	200	219		ug/L		110	80 - 120
Molybdenum	200	205		ug/L		103	80 - 120
Selenium	400	408		ug/L		102	80 - 120
Thallium	200	174		ug/L		87	80 - 120

Lab Sample ID: MB 310-384126/1-A
Matrix: Water
Analysis Batch: 384624

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 384126

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.17		0.50	0.17	ug/L		04/13/23 07:55	04/17/23 14:22	1

Lab Sample ID: MB 310-384126/1-A
Matrix: Water
Analysis Batch: 384931

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 384126

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		04/13/23 07:55	04/19/23 18:24	1
Manganese	<3.6		10	3.6	ug/L		04/13/23 07:55	04/19/23 18:24	1

Lab Sample ID: LCS 310-384126/2-A
Matrix: Water
Analysis Batch: 384624

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 384126

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cobalt	100	101		ug/L		101	80 - 120
Iron	200	216		ug/L		108	80 - 120

Lab Sample ID: LCS 310-384126/2-A
Matrix: Water
Analysis Batch: 384931

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 384126

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	200	216		ug/L		108	80 - 120
Manganese	100	95.1		ug/L		95	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-384072/1-A
Matrix: Water
Analysis Batch: 384132

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 384072

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		04/12/23 11:59	04/12/23 17:27	1

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

Lab Sample ID: LCS 310-384072/2-A
Matrix: Water
Analysis Batch: 384132

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 384072

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	1.67	1.36		ug/L		82	80 - 120

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 310-384409/2
Matrix: Water
Analysis Batch: 384409

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	<2.5		5.0	2.5	mg/L			04/14/23 17:08	1
Carbonate Alkalinity as CaCO3	<2.5		5.0	2.5	mg/L			04/14/23 17:08	1
Total Alkalinity as CaCO3	<2.5		5.0	2.5	mg/L			04/14/23 17:08	1

Lab Sample ID: LCS 310-384409/50
Matrix: Water
Analysis Batch: 384409

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	1010		mg/L		101	90 - 110

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

Lab Sample ID: MB 310-383763/1
Matrix: Water
Analysis Batch: 383763

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	<34		50	34	mg/L			04/10/23 11:52	1

Lab Sample ID: LCS 310-383763/2
Matrix: Water
Analysis Batch: 383763

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Dissolved Solids	1000	972		mg/L		97	90 - 110

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-383669/1
Matrix: Water
Analysis Batch: 383669

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

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

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-607823/1-A
Matrix: Water
Analysis Batch: 610675

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 607823

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	-0.01689	U	0.118	0.118	1.00	0.267	pCi/L	04/17/23 12:36	05/09/23 20:25	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*92.9*		*30 - 110*	*04/17/23 12:36*	*05/09/23 20:25*	*1*

Lab Sample ID: LCS 160-607823/2-A
Matrix: Water
Analysis Batch: 610675

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 607823

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium 226			11.3	9.953		1.28	1.00	0.317	pCi/L	88	75 - 113		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*94.1*		*30 - 110*

Lab Sample ID: LCSD 160-607823/3-A
Matrix: Water
Analysis Batch: 610675

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 607823

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium 226			11.3	9.398		1.23	1.00	0.270	pCi/L	83	75 - 113	0.22	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Barium	*95.1*		*30 - 110*

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-607829/1-A
Matrix: Water
Analysis Batch: 610676

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 607829

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	0.3889	U	0.342	0.344	1.00	0.539	pCi/L	04/17/23 13:10	05/09/23 13:05	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*92.9*		*30 - 110*	*04/17/23 13:10*	*05/09/23 13:05*	*1*
Y Carrier	*80.4*		*30 - 110*	*04/17/23 13:10*	*05/09/23 13:05*	*1*

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

Lab Sample ID: LCS 160-607829/2-A
Matrix: Water
Analysis Batch: 610676

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 607829

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium 228			7.97	8.541		1.21	1.00	0.560	pCi/L	107	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*94.1*		*30 - 110*
Y Carrier	*81.5*		*30 - 110*

Lab Sample ID: LCSD 160-607829/3-A
Matrix: Water
Analysis Batch: 610676

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 607829

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium 228			7.97	9.136		1.26	1.00	0.508	pCi/L	115	75 - 125	0.24	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Barium	*95.1*		*30 - 110*
Y Carrier	*83.4*		*30 - 110*

QC Association Summary

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

HPLC/IC

Analysis Batch: 384675

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-1	MW-307	Total/NA	Water	9056A	
310-253120-1	MW-307	Total/NA	Water	9056A	
310-253120-2	MW-308	Total/NA	Water	9056A	
310-253120-2	MW-308	Total/NA	Water	9056A	
310-253120-3	MW-309	Total/NA	Water	9056A	
310-253120-3	MW-309	Total/NA	Water	9056A	
310-253120-4	MW-315	Total/NA	Water	9056A	
310-253120-4	MW-315	Total/NA	Water	9056A	
MB 310-384675/3	Method Blank	Total/NA	Water	9056A	
LCS 310-384675/35	Lab Control Sample	Total/NA	Water	9056A	
LCS 310-384675/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 383825

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-1	MW-307	Total/NA	Water	3005A	
310-253120-1	MW-307	Total/NA	Water	3005A	
310-253120-2	MW-308	Total/NA	Water	3005A	
310-253120-2	MW-308	Total/NA	Water	3005A	
310-253120-3	MW-309	Total/NA	Water	3005A	
310-253120-3	MW-309	Total/NA	Water	3005A	
310-253120-4	MW-315	Total/NA	Water	3005A	
310-253120-4	MW-315	Total/NA	Water	3005A	
MB 310-383825/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-383825/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 384024

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-1	MW-307	Total/NA	Water	6020B	383825
310-253120-1	MW-307	Total/NA	Water	6020B	383825
310-253120-2	MW-308	Total/NA	Water	6020B	383825
310-253120-2	MW-308	Total/NA	Water	6020B	383825
310-253120-3	MW-309	Total/NA	Water	6020B	383825
310-253120-3	MW-309	Total/NA	Water	6020B	383825
310-253120-4	MW-315	Total/NA	Water	6020B	383825
310-253120-4	MW-315	Total/NA	Water	6020B	383825
MB 310-383825/1-A	Method Blank	Total/NA	Water	6020B	383825
LCS 310-383825/2-A	Lab Control Sample	Total/NA	Water	6020B	383825

Prep Batch: 384072

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-1	MW-307	Total/NA	Water	7470A	
310-253120-2	MW-308	Total/NA	Water	7470A	
310-253120-3	MW-309	Total/NA	Water	7470A	
310-253120-4	MW-315	Total/NA	Water	7470A	
MB 310-384072/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-384072/2-A	Lab Control Sample	Total/NA	Water	7470A	

QC Association Summary

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Metals

Prep Batch: 384126

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-1	MW-307	Dissolved	Water	3005A	
310-253120-4	MW-315	Dissolved	Water	3005A	
MB 310-384126/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-384126/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 384132

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-1	MW-307	Total/NA	Water	7470A	384072
310-253120-2	MW-308	Total/NA	Water	7470A	384072
310-253120-3	MW-309	Total/NA	Water	7470A	384072
310-253120-4	MW-315	Total/NA	Water	7470A	384072
MB 310-384072/1-A	Method Blank	Total/NA	Water	7470A	384072
LCS 310-384072/2-A	Lab Control Sample	Total/NA	Water	7470A	384072

Analysis Batch: 384202

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-4	MW-315	Total/NA	Water	6020B	383825

Analysis Batch: 384299

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-4	MW-315	Total/NA	Water	6020B	383825

Analysis Batch: 384624

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-1	MW-307	Dissolved	Water	6020B	384126
310-253120-4	MW-315	Dissolved	Water	6020B	384126
MB 310-384126/1-A	Method Blank	Total/NA	Water	6020B	384126
LCS 310-384126/2-A	Lab Control Sample	Total/NA	Water	6020B	384126

Analysis Batch: 384931

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-4	MW-315	Dissolved	Water	6020B	384126
310-253120-4	MW-315	Dissolved	Water	6020B	384126
MB 310-384126/1-A	Method Blank	Total/NA	Water	6020B	384126
LCS 310-384126/2-A	Lab Control Sample	Total/NA	Water	6020B	384126

General Chemistry

Analysis Batch: 383669

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-1	MW-307	Total/NA	Water	SM 4500 H+ B	
310-253120-2	MW-308	Total/NA	Water	SM 4500 H+ B	
310-253120-3	MW-309	Total/NA	Water	SM 4500 H+ B	
310-253120-4	MW-315	Total/NA	Water	SM 4500 H+ B	
LCS 310-383669/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 383763

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-1	MW-307	Total/NA	Water	SM 2540C	
310-253120-2	MW-308	Total/NA	Water	SM 2540C	
310-253120-3	MW-309	Total/NA	Water	SM 2540C	

General Chemistry (Continued)

Analysis Batch: 383763 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-4	MW-315	Total/NA	Water	SM 2540C	
MB 310-383763/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-383763/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Analysis Batch: 384409

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-4	MW-315	Total/NA	Water	SM 2320B	
MB 310-384409/2	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-384409/50	Lab Control Sample	Total/NA	Water	SM 2320B	

Rad

Prep Batch: 607823

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-1	MW-307	Total/NA	Water	PrecSep-21	
310-253120-2	MW-308	Total/NA	Water	PrecSep-21	
310-253120-3	MW-309	Total/NA	Water	PrecSep-21	
310-253120-4	MW-315	Total/NA	Water	PrecSep-21	
MB 160-607823/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-607823/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-607823/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 607829

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-1	MW-307	Total/NA	Water	PrecSep_0	
310-253120-2	MW-308	Total/NA	Water	PrecSep_0	
310-253120-3	MW-309	Total/NA	Water	PrecSep_0	
310-253120-4	MW-315	Total/NA	Water	PrecSep_0	
MB 160-607829/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-607829/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-607829/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Field Service / Mobile Lab

Analysis Batch: 385536

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-253120-1	MW-307	Total/NA	Water	Field Sampling	
310-253120-2	MW-308	Total/NA	Water	Field Sampling	
310-253120-3	MW-309	Total/NA	Water	Field Sampling	
310-253120-4	MW-315	Total/NA	Water	Field Sampling	

Lab Chronicle

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Client Sample ID: MW-307

Lab Sample ID: 310-253120-1

Date Collected: 04/05/23 16:11

Matrix: Water

Date Received: 04/07/23 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	384675	QTZ5	EET CF	04/15/23 03:18
Total/NA	Analysis	9056A		5	384675	QTZ5	EET CF	04/17/23 14:36
Dissolved	Prep	3005A			384126	DHM5	EET CF	04/13/23 07:55
Dissolved	Analysis	6020B		1	384624	ZRI4	EET CF	04/17/23 16:02
Total/NA	Prep	3005A			383825	QTZ5	EET CF	04/11/23 09:20
Total/NA	Analysis	6020B		1	384024	ZRI4	EET CF	04/11/23 20:30
Total/NA	Prep	3005A			383825	QTZ5	EET CF	04/11/23 09:20
Total/NA	Analysis	6020B		1	384024	ZRI4	EET CF	04/11/23 21:02
Total/NA	Prep	7470A			384072	XXW3	EET CF	04/12/23 11:59
Total/NA	Analysis	7470A		1	384132	XXW3	EET CF	04/12/23 17:47
Total/NA	Analysis	SM 2540C		1	383763	ENB7	EET CF	04/10/23 11:52
Total/NA	Analysis	SM 4500 H+ B		1	383669	A3GU	EET CF	04/08/23 10:48
Total/NA	Prep	PrecSep-21			607823	KAC	EET SL	04/17/23 12:36
Total/NA	Analysis	903.0		1	610695	SCB	EET SL	05/09/23 22:11
Total/NA	Prep	PrecSep_0			607829	KAC	EET SL	04/17/23 13:10
Total/NA	Analysis	904.0		1	610695	SCB	EET SL	05/09/23 13:09
Total/NA	Analysis	Ra226_Ra228 Pos		1	610879	SCB	EET SL	05/10/23 12:19
Total/NA	Analysis	Field Sampling		1	385536	BJ0R	EET CF	04/05/23 16:11

Client Sample ID: MW-308

Lab Sample ID: 310-253120-2

Date Collected: 04/05/23 15:02

Matrix: Water

Date Received: 04/07/23 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	384675	QTZ5	EET CF	04/15/23 03:35
Total/NA	Analysis	9056A		5	384675	QTZ5	EET CF	04/17/23 14:52
Total/NA	Prep	3005A			383825	QTZ5	EET CF	04/11/23 09:20
Total/NA	Analysis	6020B		1	384024	ZRI4	EET CF	04/11/23 20:33
Total/NA	Prep	3005A			383825	QTZ5	EET CF	04/11/23 09:20
Total/NA	Analysis	6020B		1	384024	ZRI4	EET CF	04/11/23 21:05
Total/NA	Prep	7470A			384072	XXW3	EET CF	04/12/23 11:59
Total/NA	Analysis	7470A		1	384132	XXW3	EET CF	04/12/23 17:49
Total/NA	Analysis	SM 2540C		1	383763	ENB7	EET CF	04/10/23 11:52
Total/NA	Analysis	SM 4500 H+ B		1	383669	A3GU	EET CF	04/08/23 10:47
Total/NA	Prep	PrecSep-21			607823	KAC	EET SL	04/17/23 12:36
Total/NA	Analysis	903.0		1	610695	SCB	EET SL	05/09/23 22:11
Total/NA	Prep	PrecSep_0			607829	KAC	EET SL	04/17/23 13:10
Total/NA	Analysis	904.0		1	610695	SCB	EET SL	05/09/23 13:09
Total/NA	Analysis	Ra226_Ra228 Pos		1	610879	SCB	EET SL	05/10/23 12:19
Total/NA	Analysis	Field Sampling		1	385536	BJ0R	EET CF	04/05/23 15:02

Lab Chronicle

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Client Sample ID: MW-309

Lab Sample ID: 310-253120-3

Date Collected: 04/05/23 11:50

Matrix: Water

Date Received: 04/07/23 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	384675	QTZ5	EET CF	04/15/23 03:51
Total/NA	Analysis	9056A		5	384675	QTZ5	EET CF	04/17/23 15:28
Total/NA	Prep	3005A			383825	QTZ5	EET CF	04/11/23 09:20
Total/NA	Analysis	6020B		1	384024	ZRI4	EET CF	04/11/23 20:36
Total/NA	Prep	3005A			383825	QTZ5	EET CF	04/11/23 09:20
Total/NA	Analysis	6020B		1	384024	ZRI4	EET CF	04/11/23 21:08
Total/NA	Prep	7470A			384072	XXW3	EET CF	04/12/23 11:59
Total/NA	Analysis	7470A		1	384132	XXW3	EET CF	04/12/23 17:51
Total/NA	Analysis	SM 2540C		1	383763	ENB7	EET CF	04/10/23 11:52
Total/NA	Analysis	SM 4500 H+ B		1	383669	A3GU	EET CF	04/08/23 10:46
Total/NA	Prep	PrecSep-21			607823	KAC	EET SL	04/17/23 12:36
Total/NA	Analysis	903.0		1	610695	SCB	EET SL	05/09/23 22:12
Total/NA	Prep	PrecSep_0			607829	KAC	EET SL	04/17/23 13:10
Total/NA	Analysis	904.0		1	610695	SCB	EET SL	05/09/23 13:10
Total/NA	Analysis	Ra226_Ra228 Pos		1	610879	SCB	EET SL	05/10/23 12:19
Total/NA	Analysis	Field Sampling		1	385536	BJ0R	EET CF	04/05/23 11:50

Client Sample ID: MW-315

Lab Sample ID: 310-253120-4

Date Collected: 04/05/23 13:08

Matrix: Water

Date Received: 04/07/23 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	384675	QTZ5	EET CF	04/15/23 04:07
Total/NA	Analysis	9056A		5	384675	QTZ5	EET CF	04/17/23 15:44
Dissolved	Prep	3005A			384126	DHM5	EET CF	04/13/23 07:55
Dissolved	Analysis	6020B		1	384624	ZRI4	EET CF	04/17/23 16:08
Dissolved	Prep	3005A			384126	DHM5	EET CF	04/13/23 07:55
Dissolved	Analysis	6020B		4	384931	ZRI4	EET CF	04/19/23 19:10
Dissolved	Prep	3005A			384126	DHM5	EET CF	04/13/23 07:55
Dissolved	Analysis	6020B		1	384931	ZRI4	EET CF	04/19/23 19:13
Total/NA	Prep	3005A			383825	QTZ5	EET CF	04/11/23 09:20
Total/NA	Analysis	6020B		1	384299	ZRI4	EET CF	04/13/23 14:14
Total/NA	Prep	3005A			383825	QTZ5	EET CF	04/11/23 09:20
Total/NA	Analysis	6020B		1	384024	ZRI4	EET CF	04/11/23 20:39
Total/NA	Prep	3005A			383825	QTZ5	EET CF	04/11/23 09:20
Total/NA	Analysis	6020B		1	384024	ZRI4	EET CF	04/11/23 21:11
Total/NA	Prep	3005A			383825	QTZ5	EET CF	04/11/23 09:20
Total/NA	Analysis	6020B		4	384202	ZRI4	EET CF	04/12/23 16:46
Total/NA	Prep	7470A			384072	XXW3	EET CF	04/12/23 11:59
Total/NA	Analysis	7470A		1	384132	XXW3	EET CF	04/12/23 17:53
Total/NA	Analysis	SM 2320B		1	384409	MAQ3	EET CF	04/14/23 19:27
Total/NA	Analysis	SM 2540C		1	383763	ENB7	EET CF	04/10/23 11:52
Total/NA	Analysis	SM 4500 H+ B		1	383669	A3GU	EET CF	04/08/23 10:45

Lab Chronicle

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Client Sample ID: MW-315

Date Collected: 04/05/23 13:08
Date Received: 04/07/23 16:00

Lab Sample ID: 310-253120-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	PrecSep-21			607823	KAC	EET SL	04/17/23 12:36
Total/NA	Analysis	903.0		1	610675	FLC	EET SL	05/09/23 22:12
Total/NA	Prep	PrecSep_0			607829	KAC	EET SL	04/17/23 13:10
Total/NA	Analysis	904.0		1	610695	SCB	EET SL	05/09/23 13:10
Total/NA	Analysis	Ra226_Ra228 Pos		1	610879	SCB	EET SL	05/10/23 12:19
Total/NA	Analysis	Field Sampling		1	385536	BJ0R	EET CF	04/05/23 13:08

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

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

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	12-08-23
California	Los Angeles County Sanitation Districts	10259	06-30-22 *
California	State	2886	06-30-23
Florida	NELAP	E87689	06-30-23
HI - RadChem Recognition	State	n/a	06-30-23
Illinois	NELAP	200023	11-30-23
Iowa	State	373	12-01-24
Kansas	NELAP	E-10236	10-31-23
Kentucky (DW)	State	KY90125	12-31-23
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-23
Louisiana (All)	NELAP	04080	06-30-23
Louisiana (DW)	State	LA011	12-31-23
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	03-31-24
North Carolina (DW)	State	29700	07-31-23
North Dakota	State	R-207	06-30-23
Oklahoma	NELAP	9997	08-31-23
Oregon	NELAP	4157	09-01-23
Pennsylvania	NELAP	68-00540	02-28-24
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	06-11-23
Utah	NELAP	MO000542021-14	07-31-23
Virginia	NELAP	10310	06-14-23
Washington	State	C592	08-30-23
West Virginia DEP	State	381	10-31-23

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

Method Summary

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

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

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310-253120 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS

City/State: CITY | STATE

Project: ZLDP - III + IV

Receipt Information

Date/Time Received: DATE 4-7-23 | TIME 1600

Received By: CC

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

Condition of Cooler/Containers

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

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

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

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

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

Temperature Record

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

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

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

Uncorrected Temp (°C): 0.8 | Corrected Temp (°C): 0.9

• Sample Container Temperature

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

Exceptions Noted

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

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

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

Additional Comments

Shipping Summary

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

eurofins | Environment Testing

Bottle Order Information

Bottle Order: OGS-ZLDP- III & IV
Bottle Order #: 22384
Request From Client: 3/23/2023
Date Order Posted: 3/21/2023 4:22:22PM
Order Status: Shipped
Prepared By: Meredith Liechti
Deliver By Date: ***3/30/2023 11:59:00PM***

When To Ship: ***3/30/2023***

Project/Event Information

Project Manager: Sandie Fredrick
Tel: (920) 261-1660 Em: Sandra.Fredrick@et.eurofinsus.com
Lab Project Number: 31011020
Project Ref: IA CCR Monitoring
Event Desc:

Client Samples: MW-307, MW-308, MW-309, MW-315

Sets	Bottles/Set	Bottle Type Description	Field Filtered	Preservative	Method	Matrix	Comments
5	1	Plastic 250ml - unpreserved		None	9056A_ORGFM_28D - Chloride, Fluoride & Sulfate	Water	CL+F+S
5	1	Plastic 250ml - with Nitric Acid		Nitric Acid	7470A - Mercury 6020B - Metals (14)	Water Water	Tot. Metals + Hg
5	1	Plastic 1 liter - unpreserved		None	2540C_Calcd - Total Dissolved Solids	Water	TDS +pH
5	1	Plastic Bag		None		Water	

MC 4-7-23 1600

Please notify your PM immediately if an error is found in shipment. When returning samples, please return all provided QC samples.

Shipping Summary

Total Bottle Summary

Bottle Type Description	Preservative	Bottle Count
Plastic 1 liter - unpreserved	None	5
Plastic 250ml - unpreserved	None	5
Plastic 250ml - with Nitric Acid	Nitric Acid	5
Plastic Bag	None	5
	Total Bottles:	20

Notes to Field Staff:

Scan QR code for field sampler instructions

Health and Safety Notes:

Preservative	Comment
Nitric Acid	CAUTION! STRONG OXIDIZER! CONTAINS 1:1 NITRIC ACID. Avoid skin and eye contact. If contact is made, FLUSH IMMEDIATELY with water.

Relinquished By	Company	Date	Time	Received By	Company	Seal #:
		4-7-23	1600	MC		Seal #:
						Seal #:
Relinquished By	Company	Date	Time	Received By	Company	Seal #:
						Seal #:
						Seal #:

Please notify your PM immediately if an error is found in shipment. When returning samples, please return all provided QC samples.

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

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler: Tyler Stirling	Lab PM: Sandie Fredrick	Carrier Tracking No(s):	COC No:
Client Contact: Meghan Blodgett	Phone: 515-505-2716	E-Mail: Sandra.Fredrick@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: SCS Engineers	PWSID:			Job #: 25223072
Address: 2830 Dairy Drive	Due Date Requested:			
City: Madison	TAT Requested (days):			
State, Zip: WI, 53718	Compliance Project: Δ Yes Δ No			
Phone: 608-224-2830	PO #: 25223072			
Email: mblodgett@scsengineers.com	WO #:			
Project Name: Ottumwa Generating Station 25223072	Project #: 25223072			
Site: Ottumwa, IA	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
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 (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020 Metals, total (Sb, As, Ba, Be, B, Ca, Cd, Cr, Co, Fe, Pb, Li, Mo, Se, Tl, and Hg)	TDS and pH	Chloride, Fluoride, Sulfate	EPA 903/904 Radium 226 + 228	Bicarbonate & carbonate alkalinity	6020 Metals, total (Mg, Mn, K, Na)	6020 Metals, dissolved (Co, Fe, Mn)	6020 Metals, dissolved (Co)	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	I	I	D	I	D	D	D		
MW-307	4/5/23	4:11	G	W	N/Y		X	X	X	X				X		
MW-308	4/5/23	3:02	G	W	N		X	X	X	X						
MW-309	4/5/23	11:50	G	W	N		X	X	X	X						
MW-315	4/5/23	1:08	G	W	N/Y		X	X	X	X	X	X	X			

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

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

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

Special Instructions/QC Requirements:

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

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Tyler Stirling	4/7/23	SCS	ML	4-7-23 1600	
2						
3						

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

Ver: 01/16/2019

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310-253120 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS

City/State: CITY | STATE | Project: ZLDP - III + IV

Receipt Information

Date/Time Received: DATE 4-7-23 | TIME 1600 | Received By: CC

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

Condition of Cooler/Containers

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

Temperature Record

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

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

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

Uncorrected Temp (°C): 0.8 | Corrected Temp (°C): 0.9

• **Sample Container Temperature**

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

Exceptions Noted

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

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

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

Additional Comments

Sample Login Analytes / Limits

Job 310-253120-1

Client Job Description: OGS-ZLPD 25223072
Purchase Order #: 25223072
Work Order #:
Project Manager: Sandie Fredrick
Job Due Date: 4/21/2023
Job TAT: 10 Days
Max Deliverable Level: II
Earliest Deliverable Due: 4/21/2023

Report To: SCS Engineers
Meghan Blodgett
2830 Dairy Drive
Madison, WI 53718

Bill To: SCS Engineers
Ashley Radunzel
2830 Dairy Drive
Madison, WI 53718

Login 310-253120

Sample Receipt: 4/7/2023 4:00:00 PM
Method of Delivery: Lab Courier
Number of Coolers: 1
Cooler Temperature(s) (C°): 0.9;

Method / Method Description		Rpt Basis			Units	Sample #s Applicable
2320B		Total	MDL	RL		4
Alkalinity						
	Bicarbonate Alkalinity as CaCO3		2.5	5	mg/L	
	Carbonate Alkalinity as CaCO3		2.5	5	mg/L	
	Total Alkalinity as CaCO3		2.5	5	mg/L	
2540C_Calcd		Total	MDL	RL		1,2,3,4
Total Dissolved Solids						
	Total Dissolved Solids		34	50	mg/L	
6020B		Dissolved	MDL	RL		1
D.Metals (1)						
	Cobalt		0.17	0.5	ug/L	
6020B		Dissolved	MDL	RL		4
D.Metals (3)						
	Cobalt		0.17	0.5	ug/L	
	Iron		36	100	ug/L	
	Manganese		3.6	10	ug/L	
6020B		Total	MDL	RL		1,2,3
Metals (14)						
	Antimony		1	2	ug/L	
	Arsenic		0.53	2	ug/L	
	Barium		0.64	2	ug/L	
	Beryllium		0.33	1	ug/L	
	Boron		76	100	ug/L	
	Cadmium		0.1	0.2	ug/L	
	Calcium		0.19	0.5	mg/L	
	Chromium		1.1	5	ug/L	
	Cobalt		0.17	0.5	ug/L	
	Lead		0.24	0.5	ug/L	
	Lithium		2.5	10	ug/L	
	Molybdenum		0.91	2	ug/L	
	Selenium		1.4	5	ug/L	
	Thallium		0.26	1	ug/L	
6020B		Total	MDL	RL		4
Metals (18)						
	Antimony		1	2	ug/L	
	Arsenic		0.53	2	ug/L	
	Barium		0.64	2	ug/L	
	Beryllium		0.33	1	ug/L	
	Boron		76	100	ug/L	
	Cadmium		0.1	0.2	ug/L	
	Calcium		0.19	0.5	mg/L	

Sample Login Analytes / Limits

Method		Rpt Basis			Units	Sample #s Applicable
Method Description						
	Chromium		1.1	5	ug/L	
	Cobalt		0.17	0.5	ug/L	
	Lead		0.24	0.5	ug/L	
	Lithium		2.5	10	ug/L	
	Magnesium		150	500	ug/L	
	Manganese		3.6	10	ug/L	
	Molybdenum		0.91	2	ug/L	
	Potassium		150	500	ug/L	
	Selenium		1.4	5	ug/L	
	Sodium		460	1000	ug/L	
	Thallium		0.26	1	ug/L	
7470A		Total	MDL	RL		1,2,3,4
Mercury						
	Mercury		0.14	0.2	ug/L	
9056A_ORGFM_28D		Total	MDL	RL		1,2,3,4
Chloride, Fluoride & Sulfate						
	Chloride		0.45	1	mg/L	
	Fluoride		0.044	0.1	mg/L	
	Sulfate		0.4	1	mg/L	
FieldSampling		Total	RL	RL		1,2,3,4
Field Parameters						
	Ground Water Elevation				ft	
	Oxidation Reduction Potential				millivolts	
	Oxygen, Dissolved, Client Supplied				mg/L	
	pH, Field		0.1	0.1	SU	
	Specific Conductance, Field				umhos/cm	
	Temperature, Field		0.1	0.1	Degrees C	
	Turbidity, Field				NTU	
SM4500_H+		Total	RL	RL		1,2,3,4
pH						
	pH		0.1	0.1	SU	

Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25222072

		COC #1 (Background)		COC #2 (Ash Pond)														COC #3 (ZLDP)				Surface Water Points			Water Levels Only					
	Parameter	MW-301	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-316	MW-316A	MW-317	MW-307	MW-308	MW-309	MW-315	Piling near MW-310	Avery Creek Gauge 1	Avery Creek Gauge 2	MW-302WT	MW-304WT	MW-306WT	MW-314	MW-314WT	TOTAL
Appendix III Parameters	Boron	x	x	x	x	x	x		x										x	x	x	x									10
	Calcium	x	x	x	x	x	x		x					x	x	x	x	x	x	x	x	x									15
	Chloride	x	x	x	x	x	x		x										x	x	x	x									10
	Fluoride	x	x	x	x	x	x		x										x	x	x	x									10
	pH	x	x	x	x	x	x		x										x	x	x	x									10
	Sulfate	x	x	x	x	x	x		x										x	x	x	x									10
	TDS	x	x	x	x	x	x		x										x	x	x	x									10
Appendix IV Parameters	Antimony	x	x	x	x	x	x		x										x	x	x	x									10
	Arsenic	x	x	x	x	x	x		x										x	x	x	x									10
	Barium	x	x	x	x	x	x		x										x	x	x	x									10
	Beryllium	x	x	x	x	x	x		x										x	x	x	x									10
	Cadmium	x	x	x	x	x	x		x										x	x	x	x									10
	Chromium	x	x	x	x	x	x		x										x	x	x	x									10
	Cobalt	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									20
	Fluoride	x	x	x	x	x	x		x										x	x	x	x									10
	Lead	x	x	x	x	x	x		x										x	x	x	x									10
	Lithium	x	x	x	x	x	x		x										x	x	x	x									10
	Mercury	x	x	x	x	x	x		x										x	x	x	x									10
	Molybdenum	x	x	x	x	x	x		x										x	x	x	x									10
	Selenium	x	x	x	x	x	x		x										x	x	x	x									10
	Thallium	x	x	x	x	x	x		x										x	x	x	x									10
	Radium	x	x	x	x	x	x		x										x	x	x	x									10
Additional Lab Parameters	Bicarbonate (total)													x	x	x	x	x				x									5
	Carbonate (total)													x	x	x	x	x				x									5
	Iron (total)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									20
	Magnesium (total)													x	x	x	x	x				x									5
	Manganese (total)													x	x	x	x	x				x									5
	Potassium (total)													x	x	x	x	x				x									5
	Sodium (total)													x	x	x	x	x				x									5
	Cobalt (filtered)						x		x										x			x									3
	Iron (filtered)													x	x	x	x	x				x									5
	Manganese (filtered)													x	x	x	x	x				x									5
Field Parameters	Groundwater Elevation	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	25
	Surface Water Elevation																						x	x	x						1
	pH (field)	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Specific Conductance	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Dissolved Oxygen	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	ORP	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Temperature	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Turbidity	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Color	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Odor	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19

Notes: All samples are unfiltered (total).

C:\Users\hld0\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\USG3GGGC\[OGS_CCR_Rule_ Sampling_2304.xls]Sheet1

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-253120-1

Login Number: 253120
List Number: 1
Creator: Costello, Mackenzie K

List Source: Eurofins Cedar Falls

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

Tracer/Carrier Summary

Client: SCS Engineers
Project/Site: OGS-ZLPD 25223072

Job ID: 310-253120-1

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits) Ba (30-110)
310-253120-1	MW-307	95.1
310-253120-2	MW-308	91.9
310-253120-3	MW-309	93.4
310-253120-4	MW-315	90.2
LCS 160-607823/2-A	Lab Control Sample	94.1
LCSD 160-607823/3-A	Lab Control Sample Dup	95.1
MB 160-607823/1-A	Method Blank	92.9

Tracer/Carrier Legend

Ba = Barium

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits) Ba (30-110)	Y (30-110)
310-253120-1	MW-307	95.1	84.9
310-253120-2	MW-308	91.9	84.1
310-253120-3	MW-309	93.4	84.9
310-253120-4	MW-315	90.2	84.9
LCS 160-607829/2-A	Lab Control Sample	94.1	81.5
LCSD 160-607829/3-A	Lab Control Sample Dup	95.1	83.4
MB 160-607829/1-A	Method Blank	92.9	80.4

Tracer/Carrier Legend

Ba = Barium
Y = Y Carrier

Table 1. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station / SCS Engineers Project No. 25223072.00
April 2023

	Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmhos/cm)	ORP (mV)	Turbidity
Background	MW-301	4/6/2023 0845	682.05	7.1	6.25	5.05	832	124.5	2.37
Ash Pond	MW-302	4/5/2023 1645	653.30	11.2	6.62	1.86	1953	97.0	2.03
	MW-303	4/5/2023 1545	652.57	8.3	6.65	1.70	1215	62.9	3.54
	MW-304	4/6/20231009	650.29	13.1	6.70	-0.13	1888	-93.7	0.02
	MW-305	4/4/2023 1555	655.02	13.6	6.70	0.63	1896	166.4	0.02
	MW-305A	4/6/2023 0909	647.70	11.1	6.74	0.12	1224	198.2	0.02
	MW-306	4/6/2023 1005	659.12	13.4	6.61	0.12	1583	103.1	3.09
	MW-310	4/4/2023 1415	641.71	11.8	6.91	4.34	852	252.5	0.02
	MW-310A	4/5/2023 1155	643.11	12.1	7.46	0.49	3045	-15.5	1.97
	MW-311	4/4/2023 1707	641.88	10.5	6.56	0.00	932	257	0.02
	MW-311A	4/6/2023 1310	643.59	11.5	7.54	2.47	3037	47.7	0.02
	MW-312	4/5/2023 1410	644.08	12.0	7.11	0.28	1576	0.5	1.32
	MW-313	4/5/2023 1310	642.02	11.5	6.93	0.09	1878	-14.5	5.09
	MW-316	4/6/2023 1107	642.78	10.6	6.70	-0.16	1694	104.1	0.02
	MW-316A	4/6/2023 1105	643.49	11.2	7.40	3.29	1976	99.6	4.77
	MW-317	4/6/2023 1220	642.84	11.5	6.57	0.12	1561	-24.0	3.89
ZLDP	MW-307	4/5/2023 1611	647.28	11.9	6.62	0.00	1776	31.9	0.02
	MW-308	4/5/2023 1502	645.16	11.7	6.70	0.18	1634	7.3	1.55
	MW-309	4/5/2023 1150	644.41	11.7	7.10	0.42	1511	-7.0	0.02
	MW-315	4/5/2023 1308	645.12	11.8	6.96	0.32	1523	-45.7	0.02

Abbreviations:
mg/L = milligrams per liter amsl = above mean sea level NA = Not Analyzed NM= Not Measured

Created by: EMS Date: 4/13/2023
Last revision by: EMS Date: 4/13/2023
Checked by: MDB Date: 4/21/2023

C:\Users\hld0\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\USG3GGGC\[2304_April - OGS combined_CCR_Field.xlsx]GW Field Parameters

C4 October 2023 Assessment Monitoring

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Meghan Blodgett
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Generated 11/13/2023 10:22:01 AM

JOB DESCRIPTION

Ottumwa Generating Station 25223072

JOB NUMBER

310-267273-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

Job Notes

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

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

Authorization

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

Table of Contents

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25223072

Job ID: 310-267273-1

Job ID: 310-267273-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-267273-1

Receipt
The samples were received on 10/13/2023 5:30 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 1.8º C and 2.3º C.

HPLC/IC
Method 9056A: The following sample was diluted due to the nature of the sample matrix: MW-301 (310-267273-1). 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.

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

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

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

Sample Summary

Client: SCS Engineers
Job ID: 310-267273-1
Project/Site: Ottumwa Generating Station 25223072

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-267273-1	MW-301	Water	10/13/23 10:00	10/13/23 17:30
310-267273-2	Field Blank	Water	10/13/23 09:30	10/13/23 17:30

Detection Summary

Client: SCS Engineers
Job ID: 310-267273-1
Project/Site: Ottumwa Generating Station 25223072

Client Sample ID: MW-301 — Lab Sample ID: 310-267273-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	150		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	190		5.0	2.1	mg/L	5		9056A	Total/NA
Barium	48		2.0	0.64	ug/L	1		6020B	Total/NA
Boron	760		100	76	ug/L	1		6020B	Total/NA
Calcium	94		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	0.20	J	0.50	0.17	ug/L	1		6020B	Total/NA
Lithium	25		10	2.5	ug/L	1		6020B	Total/NA
Molybdenum	1.1	J	2.0	0.91	ug/L	1		6020B	Total/NA
Selenium	5.8		5.0	1.4	ug/L	1		6020B	Total/NA
Total Dissolved Solids	680		50	34	mg/L	1		SM 2540C	Total/NA
pH	7.0	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA
Groundwater Elevation	680.20				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	104.7				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	3.20				mg/L	1		Field Sampling	Total/NA
Field pH	6.24				SU	1		Field Sampling	Total/NA
Field Conductivity	1158				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	17.6				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	1.75				NTU	1		Field Sampling	Total/NA

Client Sample ID: Field Blank — Lab Sample ID: 310-267273-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
pH	7.1	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25223072

Job ID: 310-267273-1

Client Sample ID: MW-301

Date Collected: 10/13/23 10:00
Date Received: 10/13/23 17:30

Lab Sample ID: 310-267273-1

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**150**		5.0	2.3	mg/L			10/27/23 02:24	5
Fluoride	<0.38		1.0	0.38	mg/L			10/27/23 02:24	5
Sulfate	**190**		5.0	2.1	mg/L			10/27/23 02:24	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		10/17/23 09:15	10/19/23 18:43	1
Arsenic	<0.53		2.0	0.53	ug/L		10/17/23 09:15	10/19/23 18:43	1
Barium	**48**		2.0	0.64	ug/L		10/17/23 09:15	10/19/23 18:43	1
Beryllium	<0.33		1.0	0.33	ug/L		10/17/23 09:15	10/19/23 18:43	1
Boron	**760**		100	76	ug/L		10/17/23 09:15	10/19/23 18:43	1
Cadmium	<0.10		0.20	0.10	ug/L		10/17/23 09:15	10/19/23 18:43	1
Calcium	**94**		0.50	0.19	mg/L		10/17/23 09:15	10/19/23 18:43	1
Chromium	<1.1		5.0	1.1	ug/L		10/17/23 09:15	10/19/23 18:43	1
Cobalt	**0.20**	**J**	0.50	0.17	ug/L		10/17/23 09:15	10/19/23 18:43	1
Iron	<36		100	36	ug/L		10/17/23 09:15	10/19/23 18:43	1
Lead	<0.24		0.50	0.24	ug/L		10/17/23 09:15	10/19/23 18:43	1
Lithium	**25**		10	2.5	ug/L		10/17/23 09:15	10/19/23 18:43	1
Molybdenum	**1.1**	**J**	2.0	0.91	ug/L		10/17/23 09:15	10/19/23 18:43	1
Selenium	**5.8**		5.0	1.4	ug/L		10/17/23 09:15	10/19/23 18:43	1
Thallium	<0.26		1.0	0.26	ug/L		10/17/23 09:15	10/19/23 18:43	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		10/26/23 11:07	10/27/23 10:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**680**		50	34	mg/L			10/17/23 15:08	1
pH (SM 4500 H+ B)	**7.0**	**HF**	1.0	1.0	SU			10/14/23 03:26	1

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	**0.250**		0.126	0.128	1.00	0.132	pCi/L	10/18/23 09:10	11/09/23 21:08	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*89.5*		*30 - 110*	*10/18/23 09:10*	*11/09/23 21:08*	*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	0.431	U	0.334	0.337	1.00	0.514	pCi/L	10/18/23 09:12	11/07/23 11:20	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*89.5*		*30 - 110*	*10/18/23 09:12*	*11/07/23 11:20*	*1*
Y Carrier	*86.4*		*30 - 110*	*10/18/23 09:12*	*11/07/23 11:20*	*1*

Client Sample Results

Client: SCS Engineers
Job ID: 310-267273-1
Project/Site: Ottumwa Generating Station 25223072

Client Sample ID: MW-301
Lab Sample ID: 310-267273-1
Date Collected: 10/13/23 10:00
Matrix: Water
Date Received: 10/13/23 17:30

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	0.681		0.357	0.360	5.00	0.514	pCi/L		11/10/23 16:59	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	680.20				ft			10/13/23 10:00	1
Oxidation Reduction Potential	104.7				mV			10/13/23 10:00	1
Oxygen, Dissolved	3.20				mg/L			10/13/23 10:00	1
Field pH	6.24				SU			10/13/23 10:00	1
Field Conductivity	1158				umhos/cm			10/13/23 10:00	1
Field Temperature	17.6				Degrees C			10/13/23 10:00	1
Field Turbidity	1.75				NTU			10/13/23 10:00	1

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25223072

Job ID: 310-267273-1

Client Sample ID: Field Blank

Date Collected: 10/13/23 09:30
Date Received: 10/13/23 17:30

Lab Sample ID: 310-267273-2

Matrix: Water

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			10/27/23 02:38	1
Fluoride	<0.075		0.20	0.075	mg/L			10/27/23 02:38	1
Sulfate	<0.42		1.0	0.42	mg/L			10/27/23 02:38	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		10/17/23 09:15	10/19/23 18:46	1
Arsenic	<0.53		2.0	0.53	ug/L		10/17/23 09:15	10/19/23 18:46	1
Barium	<0.64		2.0	0.64	ug/L		10/17/23 09:15	10/19/23 18:46	1
Beryllium	<0.33		1.0	0.33	ug/L		10/17/23 09:15	10/19/23 18:46	1
Boron	<76		100	76	ug/L		10/17/23 09:15	10/19/23 18:46	1
Cadmium	<0.10		0.20	0.10	ug/L		10/17/23 09:15	10/19/23 18:46	1
Calcium	<0.19		0.50	0.19	mg/L		10/17/23 09:15	10/19/23 18:46	1
Chromium	<1.1		5.0	1.1	ug/L		10/17/23 09:15	10/19/23 18:46	1
Cobalt	<0.17		0.50	0.17	ug/L		10/17/23 09:15	10/19/23 18:46	1
Iron	<36		100	36	ug/L		10/17/23 09:15	10/19/23 18:46	1
Lead	<0.24		0.50	0.24	ug/L		10/17/23 09:15	10/19/23 18:46	1
Lithium	<2.5		10	2.5	ug/L		10/17/23 09:15	10/19/23 18:46	1
Molybdenum	<0.91		2.0	0.91	ug/L		10/17/23 09:15	10/19/23 18:46	1
Selenium	<1.4		5.0	1.4	ug/L		10/17/23 09:15	10/19/23 18:46	1
Thallium	<0.26		1.0	0.26	ug/L		10/17/23 09:15	10/19/23 18:46	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		10/26/23 11:07	10/27/23 10:31	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	<34		50	34	mg/L			10/17/23 15:08	1
pH (SM 4500 H+ B)	**7.1**	**HF**	1.0	1.0	SU			10/14/23 03:30	1

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	0.0859	U	0.102	0.102	1.00	0.166	pCi/L	10/18/23 09:10	11/09/23 21:08	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*89.2*		*30 - 110*	*10/18/23 09:10*	*11/09/23 21:08*	*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	0.466	U	0.324	0.327	1.00	0.484	pCi/L	10/18/23 09:12	11/07/23 11:20	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*89.2*		*30 - 110*	*10/18/23 09:12*	*11/07/23 11:20*	*1*
Y Carrier	*87.9*		*30 - 110*	*10/18/23 09:12*	*11/07/23 11:20*	*1*

Client: SCS Engineers
Job ID: 310-267273-1
Project/Site: Ottumwa Generating Station 25223072

Client Sample ID: Field Blank
Lab Sample ID: 310-267273-2
Date Collected: 10/13/23 09:30
Matrix: Water
Date Received: 10/13/23 17:30

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	0.552		0.340	0.343	5.00	0.484	pCi/L		11/10/23 16:59	1

Definitions/Glossary

Client: SCS Engineers
Job ID: 310-267273-1
Project/Site: Ottumwa Generating Station 25223072

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

Rad

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

Glossary

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

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-404077/3
Matrix: Water
Analysis Batch: 404077

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			10/26/23 23:19	1
Fluoride	<0.075		0.20	0.075	mg/L			10/26/23 23:19	1
Sulfate	<0.42		1.0	0.42	mg/L			10/26/23 23:19	1

Lab Sample ID: LCS 310-404077/4
Matrix: Water
Analysis Batch: 404077

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	9.84		mg/L		98	90 - 110
Fluoride	2.00	2.09		mg/L		105	90 - 110
Sulfate	10.0	10.3		mg/L		103	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-402827/1-A
Matrix: Water
Analysis Batch: 403200

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402827

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		10/17/23 09:15	10/19/23 17:40	1
Arsenic	<0.53		2.0	0.53	ug/L		10/17/23 09:15	10/19/23 17:40	1
Barium	<0.64		2.0	0.64	ug/L		10/17/23 09:15	10/19/23 17:40	1
Beryllium	<0.33		1.0	0.33	ug/L		10/17/23 09:15	10/19/23 17:40	1
Boron	<76		100	76	ug/L		10/17/23 09:15	10/19/23 17:40	1
Cadmium	<0.10		0.20	0.10	ug/L		10/17/23 09:15	10/19/23 17:40	1
Calcium	<0.19		0.50	0.19	mg/L		10/17/23 09:15	10/19/23 17:40	1
Chromium	<1.1		5.0	1.1	ug/L		10/17/23 09:15	10/19/23 17:40	1
Cobalt	<0.17		0.50	0.17	ug/L		10/17/23 09:15	10/19/23 17:40	1
Iron	<36		100	36	ug/L		10/17/23 09:15	10/19/23 17:40	1
Lead	<0.24		0.50	0.24	ug/L		10/17/23 09:15	10/19/23 17:40	1
Lithium	<2.5		10	2.5	ug/L		10/17/23 09:15	10/19/23 17:40	1
Molybdenum	<0.91		2.0	0.91	ug/L		10/17/23 09:15	10/19/23 17:40	1
Selenium	<1.4		5.0	1.4	ug/L		10/17/23 09:15	10/19/23 17:40	1
Thallium	<0.26		1.0	0.26	ug/L		10/17/23 09:15	10/19/23 17:40	1

Lab Sample ID: LCS 310-402827/2-A
Matrix: Water
Analysis Batch: 403200

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402827

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	200	209		ug/L		104	80 - 120
Barium	100	107		ug/L		107	80 - 120
Beryllium	100	98.8		ug/L		99	80 - 120
Boron	200	193		ug/L		96	80 - 120
Cadmium	100	103		ug/L		103	80 - 120
Calcium	2.00	1.85		mg/L		92	80 - 120
Chromium	100	104		ug/L		104	80 - 120
Cobalt	100	112		ug/L		112	80 - 120

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

Lab Sample ID: LCS 310-402827/2-A
Matrix: Water
Analysis Batch: 403200

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402827

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	200	226		ug/L		113	80 - 120
Lead	200	212		ug/L		106	80 - 120
Lithium	200	199		ug/L		99	80 - 120
Molybdenum	200	215		ug/L		108	80 - 120
Selenium	400	409		ug/L		102	80 - 120

Lab Sample ID: LCS 310-402827/2-A
Matrix: Water
Analysis Batch: 403284

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402827

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	200	230		ug/L		115	80 - 120
Thallium	200	173		ug/L		86	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-403843/1-A
Matrix: Water
Analysis Batch: 404051

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403843

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		10/26/23 11:06	10/27/23 09:51	1

Lab Sample ID: LCS 310-403843/2-A
Matrix: Water
Analysis Batch: 404051

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403843

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	1.67	1.68		ug/L		101	80 - 120

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

Lab Sample ID: MB 310-402825/1
Matrix: Water
Analysis Batch: 402825

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	<34		50	34	mg/L			10/17/23 15:08	1

Lab Sample ID: LCS 310-402825/2
Matrix: Water
Analysis Batch: 402825

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	1000		mg/L		100	90 - 110

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-402565/53
Matrix: Water
Analysis Batch: 402565

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

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

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-632482/1-A
Matrix: Water
Analysis Batch: 636166

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 632482

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	0.06510	U	0.108	0.108	1.00	0.188	pCi/L	10/18/23 09:10	11/09/23 21:08	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*92.7*		*30 - 110*	*10/18/23 09:10*	*11/09/23 21:08*	*1*

Lab Sample ID: LCS 160-632482/2-A
Matrix: Water
Analysis Batch: 636166

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 632482

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium 226	11.3	10.88		1.24	1.00	0.229	pCi/L	96	75 - 125

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*88.0*		*30 - 110*

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-632483/1-A
Matrix: Water
Analysis Batch: 635681

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 632483

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	0.6466		0.328	0.334	1.00	0.446	pCi/L	10/18/23 09:12	11/07/23 11:15	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*92.7*		*30 - 110*	*10/18/23 09:12*	*11/07/23 11:15*	*1*
Y Carrier	*84.9*		*30 - 110*	*10/18/23 09:12*	*11/07/23 11:15*	*1*

Lab Sample ID: LCS 160-632483/2-A
Matrix: Water
Analysis Batch: 635681

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 632483

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits
Radium 228	7.74	8.655		1.21	1.00	0.462	pCi/L	112	75 - 125

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

Lab Sample ID: LCS 160-632483/2-A
Matrix: Water
Analysis Batch: 635681

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 632483

Carrier	LCS %Yield	LCS Qualifier	Limits
Barium	88.0		30 - 110
Y Carrier	83.4		30 - 110

HPLC/IC

Analysis Batch: 404077

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267273-1	MW-301	Total/NA	Water	9056A	
310-267273-2	Field Blank	Total/NA	Water	9056A	
MB 310-404077/3	Method Blank	Total/NA	Water	9056A	
LCS 310-404077/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 402827

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267273-1	MW-301	Total/NA	Water	3005A	
310-267273-2	Field Blank	Total/NA	Water	3005A	
MB 310-402827/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-402827/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 403200

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267273-1	MW-301	Total/NA	Water	6020B	402827
310-267273-2	Field Blank	Total/NA	Water	6020B	402827
MB 310-402827/1-A	Method Blank	Total/NA	Water	6020B	402827
LCS 310-402827/2-A	Lab Control Sample	Total/NA	Water	6020B	402827

Analysis Batch: 403284

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 310-402827/2-A	Lab Control Sample	Total/NA	Water	6020B	402827

Prep Batch: 403843

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267273-1	MW-301	Total/NA	Water	7470A	
310-267273-2	Field Blank	Total/NA	Water	7470A	
MB 310-403843/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-403843/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 404051

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267273-1	MW-301	Total/NA	Water	7470A	403843
310-267273-2	Field Blank	Total/NA	Water	7470A	403843
MB 310-403843/1-A	Method Blank	Total/NA	Water	7470A	403843
LCS 310-403843/2-A	Lab Control Sample	Total/NA	Water	7470A	403843

General Chemistry

Analysis Batch: 402565

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267273-1	MW-301	Total/NA	Water	SM 4500 H+ B	
310-267273-2	Field Blank	Total/NA	Water	SM 4500 H+ B	
LCS 310-402565/53	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 402825

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267273-1	MW-301	Total/NA	Water	SM 2540C	
310-267273-2	Field Blank	Total/NA	Water	SM 2540C	
MB 310-402825/1	Method Blank	Total/NA	Water	SM 2540C	

General Chemistry (Continued)

Analysis Batch: 402825 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 310-402825/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Rad

Prep Batch: 632482

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267273-1	MW-301	Total/NA	Water	PrecSep-21	
310-267273-2	Field Blank	Total/NA	Water	PrecSep-21	
MB 160-632482/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-632482/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	

Prep Batch: 632483

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267273-1	MW-301	Total/NA	Water	PrecSep_0	
310-267273-2	Field Blank	Total/NA	Water	PrecSep_0	
MB 160-632483/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-632483/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	

Field Service / Mobile Lab

Analysis Batch: 404163

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267273-1	MW-301	Total/NA	Water	Field Sampling	

Lab Chronicle

Client: SCS Engineers
Job ID: 310-267273-1
Project/Site: Ottumwa Generating Station 25223072

Client Sample ID: MW-301
Lab Sample ID: 310-267273-1
Date Collected: 10/13/23 10:00
Matrix: Water
Date Received: 10/13/23 17:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	404077	QTZ5	EET CF	10/27/23 02:24
Total/NA	Prep	3005A			402827	KCK5	EET CF	10/17/23 09:15
Total/NA	Analysis	6020B		1	403200	A6US	EET CF	10/19/23 18:43
Total/NA	Prep	7470A			403843	NFT2	EET CF	10/26/23 11:07
Total/NA	Analysis	7470A		1	404051	NFT2	EET CF	10/27/23 10:29
Total/NA	Analysis	SM 2540C		1	402825	ENB7	EET CF	10/17/23 15:08
Total/NA	Analysis	SM 4500 H+ B		1	402565	D7CP	EET CF	10/14/23 03:26
Total/NA	Prep	PrecSep-21			632482	KAC	EET SL	10/18/23 09:10
Total/NA	Analysis	903.0		1	636008	SCB	EET SL	11/09/23 21:08
Total/NA	Prep	PrecSep_0			632483	KAC	EET SL	10/18/23 09:12
Total/NA	Analysis	904.0		1	635643	CMM	EET SL	11/07/23 11:20
Total/NA	Analysis	Ra226_Ra228 Pos		1	636390	EMH	EET SL	11/10/23 16:59
Total/NA	Analysis	Field Sampling		1	404163	BJ0R	EET CF	10/13/23 10:00

Client Sample ID: Field Blank
Lab Sample ID: 310-267273-2
Date Collected: 10/13/23 09:30
Matrix: Water
Date Received: 10/13/23 17:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		1	404077	QTZ5	EET CF	10/27/23 02:38
Total/NA	Prep	3005A			402827	KCK5	EET CF	10/17/23 09:15
Total/NA	Analysis	6020B		1	403200	A6US	EET CF	10/19/23 18:46
Total/NA	Prep	7470A			403843	NFT2	EET CF	10/26/23 11:07
Total/NA	Analysis	7470A		1	404051	NFT2	EET CF	10/27/23 10:31
Total/NA	Analysis	SM 2540C		1	402825	ENB7	EET CF	10/17/23 15:08
Total/NA	Analysis	SM 4500 H+ B		1	402565	D7CP	EET CF	10/14/23 03:30
Total/NA	Prep	PrecSep-21			632482	KAC	EET SL	10/18/23 09:10
Total/NA	Analysis	903.0		1	636008	SCB	EET SL	11/09/23 21:08
Total/NA	Prep	PrecSep_0			632483	KAC	EET SL	10/18/23 09:12
Total/NA	Analysis	904.0		1	635643	CMM	EET SL	11/07/23 11:20
Total/NA	Analysis	Ra226_Ra228 Pos		1	636390	EMH	EET SL	11/10/23 16:59

Laboratory References:
EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401
EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Accreditation/Certification Summary

Client: SCS Engineers
Job ID: 310-267273-1
Project/Site: Ottumwa Generating Station 25223072

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

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	12-08-23
California	Los Angeles County Sanitation Districts	10259	06-30-22 *
California	State	2886	06-30-24
Connecticut	State	PH-0241	03-31-25
Florida	NELAP	E87689	06-30-24
HI - RadChem Recognition	State	n/a	06-30-24
Illinois	NELAP	200023	11-30-23
Iowa	State	373	12-01-24
Kentucky (DW)	State	KY90125	12-31-23
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-23
Louisiana	NELAP	04080	06-30-22 *
Louisiana (All)	NELAP	04080	06-30-24
Louisiana (DW)	State	LA011	12-31-23
Maryland	State	310	09-30-24
Massachusetts	State	M-MO054	06-30-24
MI - RadChem Recognition	State	9005	06-30-24
Missouri	State	780	06-30-25
Nevada	State	MO000542020-1	07-31-24
New Jersey	NELAP	MO002	06-30-24
New Mexico	State	MO00054	06-30-24
New York	NELAP	11616	03-31-24
North Carolina (DW)	State	29700	07-31-24
North Dakota	State	R-207	06-30-24
Oklahoma	NELAP	9997	08-31-24
Oregon	NELAP	4157	09-01-24
Pennsylvania	NELAP	68-00540	02-28-24
South Carolina	State	85002001	06-30-24
Texas	NELAP	T104704193	07-31-24
US Fish & Wildlife	US Federal Programs	058448	07-31-24
USDA	US Federal Programs	P330-17-00028	05-18-26
Utah	NELAP	MO000542021-14	07-31-24
Virginia	NELAP	10310	06-15-25
Washington	State	C592	08-30-24
West Virginia DEP	State	381	12-31-23

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

Method Summary

Client: SCS Engineers
Job ID: 310-267273-1
Project/Site: Ottumwa Generating Station 25223072

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
903.0	Radium-226 (GFPC)	EPA	EET SL
904.0	Radium-228 (GFPC)	EPA	EET SL
Ra226_Ra228	Combined Radium-226 and Radium-228	TAL-STL	EET SL
Pos Field Sampling	Field Sampling	EPA	EET CF
3005A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF
PrecSep_0	Preparation, Precipitate Separation	None	EET SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	EET SL

Protocol References:

EPA = US Environmental Protection Agency
None = None
SM = "Standard Methods For The Examination Of Water And Wastewater"
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401
EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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310-267273 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS

City/State: CITY | STATE WI | Project:

Receipt Information

Date/Time Received: DATE 10/13/23 | TIME 1730 | Received By:

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

Condition of Cooler/Containers

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

Multiple Coolers? ☒ Yes ☒ No *If yes:* Cooler # 1 of 2

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

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

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

Temperature Record

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

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

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

Uncorrected Temp (°C): 2.3 | Corrected Temp (°C): 2.3

• **Sample Container Temperature**

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

Exceptions Noted

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

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

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

Additional Comments

eurofins | Environment Testing America

Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS

City/State: CITY | STATE WI | Project:

Receipt Information

Date/Time Received: DATE 10/13/23 | TIME 1730 | Received By: [signature]

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

Condition of Cooler/Containers

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

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

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

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

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

Temperature Record

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

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

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

Uncorrected Temp (°C): 1.8 | Corrected Temp (°C): 1.8

• Sample Container Temperature

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

Exceptions Noted

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

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

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

Additional Comments

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

Chain of Custody Record

eurofins

Client Information	Sampler: Tyler Stirling	Lab PM: Sandie Fredrick	Carrier Tracking No(s):	COC No:
Client Contact: Meghan Blodgett	Phone: 515-505-2716	E-Mail: Sandra.Fredrick@et.eurofinsus.com	State of Origin: IA	Page: Page 1 of 1
Company: SCS Engineers	PWSID:			Job #: 25223072
Address: 2830 Dairy Drive	Due Date Requested:			
City: Madison	TAT Requested (days):			
State, Zip: WI 53718	Compliance Project: Δ Yes Δ No			
Phone: 608-224-2830	PO #: 25223072			
Email: mblodgett@scsengineers.com	WO #:			
Project Name: Ottumwa Generating Station 25223072	Project #: 25223072			
Site: Ottumwa IA	SSOW#:			

Analysis Requested

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020 Metals total (Sb As Ba Be B Ca Cd Cr Co Fe Pb Li Mo Se Tl and Hg)	TDS and pH	Chloride Fluoride Sulfate	EPA 903/904 Radium 226 + 228	Bicarbonate & carbonate alkalinity	6020 Metals total (Fe Mg Mn K Na)	6020 Metals dissolved (Co Fe Mn)	6020 Metals dissolved (Fe Mn)	Total Number of containers	Special Instructions/Note
			Preservation Code				D	I	I	D	I	D	D	D		
MW-301	10/13/23	10 00	G	W	N		X	X	X	X						
Field Blank	10/13/23	9 30	G	W	N		X	X	X	X						

Preservation Codes

A - HCL	M - Hexane
B NaOH	N None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R Na2S2O3
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:

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

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

Deliverable Requested I II III IV Other (specify)

Special Instructions/QC Requirements

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

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Tyler S	10/13/23 2 00	SCS			
2						
3				MC	10/13/23 1750	

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

Cooler Temperature(s) °C and Other Remarks.

Ver: 01/16/2019

Table 1. Sampling Points and Parameters CCR Rule Sampling Program
Groundwater Monitoring Ottumwa Generating Station / SCS Engineers Project #25222072

		COC #1 (Background)		COC #2 (Ash Pond)														COC #3 (ZLDP)				Surface Water Points			Water Levels Only					
	Parameter	MW-301	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-316	MW-316A	MW-317	MW-307	MW-308	MW-309	MW-315	Piling near MW-310	Avery Creek Gauge 1	Avery Creek Gauge 2	MW 302WT	MW 304WT	MW 305WT	MW 314	MW 314WT	TOTAL
Appendix III Parameters	Boron	x	x	x	x	x	x		x										x	x	x	x									10
	Calcium	x	x	x	x	x	x		x					x	x	x	x	x	x	x	x	x									15
	Chloride	x	x	x	x	x	x		x										x	x	x	x									10
	Fluoride	x	x	x	x	x	x		x										x	x	x	x									10
	pH	x	x	x	x	x	x		x										x	x	x	x									10
	Sulfate	x	x	x	x	x	x		x										x	x	x	x									10
	TDS	x	x	x	x	x	x		x										x	x	x	x									10
Appendix IV Parameters	Antimony	x	x	x	x	x	x		x										x	x	x	x									10
	Arsenic	x	x	x	x	x	x		x										x	x	x	x									10
	Barium	x	x	x	x	x	x		x										x	x	x	x									10
	Beryllium	x	x	x	x	x	x		x										x	x	x	x									10
	Cadmium	x	x	x	x	x	x		x										x	x	x	x									10
	Chromium	x	x	x	x	x	x		x										x	x	x	x									10
	Cobalt	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									20
	Fluoride	x	x	x	x	x	x		x										x	x	x	x									10
	Lead	x	x	x	x	x	x		x										x	x	x	x									10
	Lithium	x	x	x	x	x	x		x										x	x	x	x									10
	Mercury	x	x	x	x	x	x		x										x	x	x	x									10
	Molybdenum	x	x	x	x	x	x		x										x	x	x	x									10
	Selenium	x	x	x	x	x	x		x										x	x	x	x									10
	Thallium	x	x	x	x	x	x		x										x	x	x	x									10
	Radium	x	x	x	x	x	x		x										x	x	x	x									10
Additional Lab Parameters	Bicarbonate (total)													x	x	x	x	x				x									5
	Carbonate (total)													x	x	x	x	x				x									5
	Iron (total)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									20
	Magnesium (total)													x	x	x	x	x				x									5
	Manganese (total)													x	x	x	x	x				x									5
	Potassium (total)													x	x	x	x	x				x									5
	Sodium (total)													x	x	x	x	x				x									5
	Cobalt (filtered)						x		x										x			x									3
	Iron (filtered)													x	x	x	x	x				x									5
	Manganese (filtered)													x	x	x	x	x				x									5
Field Parameters	Groundwater Elevation	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	25
	Surface Water Elevation																						x	x	x						1
	pH (field)	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Specific Conductance	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Dissolved Oxygen	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	ORP	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Temperature	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Turbidity	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Color	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Odor	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19

Notes. All samples are unfiltered (total)

I:\25223072.00\Data and Calculations\Field Work Requests\[OGS CCR Rule Sampling_2304.xls]Sheet1

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-267273-1

Login Number: 267273
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	

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-267273-1

Login Number: 267273
List Number: 2
Creator: Pinette, Meadow L

List Source: Eurofins St. Louis
List Creation: 10/17/23 02:51 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
Job ID: 310-267273-1
Project/Site: Ottumwa Generating Station 25223072

Method: 903.0 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Ba (30-110)
310-267273-1	MW-301	89.5
310-267273-2	Field Blank	89.2
LCS 160-632482/2-A	Lab Control Sample	88.0
MB 160-632482/1-A	Method Blank	92.7

Tracer/Carrier Legend

Ba = Barium

Method: 904.0 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)
310-267273-1	MW-301	89.5	86.4
310-267273-2	Field Blank	89.2	87.9
LCS 160-632483/2-A	Lab Control Sample	88.0	83.4
MB 160-632483/1-A	Method Blank	92.7	84.9

Tracer/Carrier Legend

Ba = Barium
Y = Y Carrier

Table 1. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station / SCS Engineers Project No. 25223072.00
October 2023

	Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmhos/cm)	ORP (mV)	Turbidity
Background	MW-301	10/13/2023 1000	680.20	17.6	6.24	3.20	1158	104.7	1.75
Ash Pond	MW-302	--	652.32	--	--	--	--	--	--
	MW-303	--	648.07	--	--	--	--	--	--
	MW-304	10/10/2023 850	646.02	13.3	6.85	0.18	1948	-105.1	7.07
	MW-305	10/12/2023 1135	650.21	13.7	6.88	0.26	1869	4.7	3.25
	MW-305A	10/13/2023 1025	643.60	17.8	6.87	5.74	1357	88.1	12.32
	MW-306	10/12/2023 1055	655.40	13.6	6.63	0.29	1794	25.3	1.90
	MW-310	10/10/2023 1600	638.32	14.7	7.06	0.45	1344	7.5	6.05
	MW-310A	10/12/2023 1215	640.13	14.3	7.50	5.60	3355	46.0	4.96
	MW-311	10/11/2023 1650	638.31	19.6	7.01	7.69	685	37.9	--
	MW-311A	10/11/2023 1515	639.84	13.2	7.72	3.15	3424	-4.2	14.16
	MW-312	10/12/2023 1645	639.45	14.6	6.96	0.23	1827	-26.5	5.45
	MW-313	10/10/2023 1445	639.04	13.9	6.89	0.23	2106	-47.9	6.85
	MW-316	10/12/2023 1350	639.15	16.1	6.73	0.74	1773	61.0	7.20
	MW-316A	10/10/2023 1230	639.79	17.2	7.53	3.43	2399	49.5	43.00
	MW-317	10/12/2023 1535	639.08	13.7	6.54	0.09	1853	-38.7	6.25
ZLDP	MW-307	10/10/2023 950	642.85	12.6	6.56	0.20	1856	-35.0	6.40
	MW-308	10/10/2023 1045	640.79	12.7	6.66	0.22	1704	-54.0	6.31
	MW-309	10/10/2023 1305	640.18	13.3	7.01	0.25	1598	-54.3	8.35
	MW-315	10/10/2023 1210	641.10	13.1	6.93	0.29	1615	-79.7	9.42

Abbreviations:
mg/L = milligrams per liter amsl = above mean sea level NA = Not Analyzed NM= Not Measured

Created by: RM Date: 10/25/2023
Last revision by: RM Date: 10/25/2023
Checked by: JSN Date: 10/27/2023

C:\Users\hld0\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\USG3GGGC\[2310_Oct - OGS combined_CCR_Field.xlsx]GW Field Parameters

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

ANALYTICAL REPORT

PREPARED FOR

Attn: Meghan Blodgett
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Generated 11/30/2023 1:44:39 PM Revision 1

JOB DESCRIPTION

Ottumwa Generating Station 25223072

JOB NUMBER

310-267274-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

Job Notes

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

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

Authorization

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Revision 1

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

Table of Contents

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25223072

Job ID: 310-267274-1

Job ID: 310-267274-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-267274-1

Revision
The report being provided is a revision of the original report sent on 11/21/23. The report (revision 1) is being revised due to: Corrections for Sample 4 - Remove Zinc results, update Calcium units to mg/L

Receipt
The samples were received on 10/13/2023 5:30 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 1.0º C and 2.5º C.

HPLC/IC
Method 9056A: The following samples were diluted due to the nature of the sample matrix: MW-308 (310-267274-2), MW-309 (310-267274-3) and MW-315 (310-267274-4). 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.

RAD
Method 904.0: Radium-228 prep batch 160-632485: The Ra-228 laboratory control sample (LCS) associated with the following samples recovered at 137%. The limits in our LIMS system at (75-125%) reflect the requirements of a regulatory agency that represents a large amount of our work. However the samples associated with this LCS are not from this agency and are therefore held to our in-house statistical limits of (63-150%) per method requirements. The LCS is within criteria and no further action is required. (LCS 160-632485/2-A)

Method 904.0: Radium-228 prep batch 160-632485: The method blank (MB) has Ra-228 activity above the RL. All associated samples have Ra-228 activity either below the MDC and/or RL; therefore re-analysis is not required. The data have been reported with this narrative.

Method 904.0: Radium 228 batch 636344 The LCS recovered at (73%). The limits in our LIMS system at 75-125 reflect the requirements of a regulatory agency that represents a large amount of our work. However the samples associated with this LCS are not from this agency and are therefore held to our in-house statistical limits of (63-150%) per method requirements. The LCS passes, no further action is required (LCSD 160-636344/3-A)

Method PrecSep_0: Radium-228 Prep Batch 160-636344 Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-307 (310-267274-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

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
Job ID: 310-267274-1
Project/Site: Ottumwa Generating Station 25223072

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-267274-1	MW-307	Water	10/10/23 09:50	10/13/23 17:30
310-267274-2	MW-308	Water	10/10/23 10:45	10/13/23 17:30
310-267274-3	MW-309	Water	10/10/23 13:05	10/13/23 17:30
310-267274-4	MW-315	Water	10/10/23 12:10	10/13/23 17:30

Detection Summary

Client: SCS Engineers
Job ID: 310-267274-1
Project/Site: Ottumwa Generating Station 25223072

Client Sample ID: MW-307 — Lab Sample ID: 310-267274-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	270		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	140		5.0	2.1	mg/L	5		9056A	Total/NA
Arsenic	0.62	J	2.0	0.53	ug/L	1		6020B	Total/NA
Barium	120		2.0	0.64	ug/L	1		6020B	Total/NA
Boron	210		100	76	ug/L	1		6020B	Total/NA
Calcium	220		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	36		0.50	0.17	ug/L	1		6020B	Total/NA
Iron	2900		100	36	ug/L	1		6020B	Total/NA
Lithium	12		10	2.5	ug/L	1		6020B	Total/NA
Cobalt	36		0.50	0.17	ug/L	1		6020B	Dissolved
Total Dissolved Solids	1100		50	34	mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA
Groundwater Elevation	642.85				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-35.0				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	0.20				mg/L	1		Field Sampling	Total/NA
Field pH	6.56				SU	1		Field Sampling	Total/NA
Field Conductivity	1856				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	12.6				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	6.40				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-308 — Lab Sample ID: 310-267274-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	170		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	300		5.0	2.1	mg/L	5		9056A	Total/NA
Arsenic	0.53	J	2.0	0.53	ug/L	1		6020B	Total/NA
Barium	120		2.0	0.64	ug/L	1		6020B	Total/NA
Boron	230		100	76	ug/L	1		6020B	Total/NA
Calcium	210		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	0.17	J	0.50	0.17	ug/L	1		6020B	Total/NA
Iron	3600		100	36	ug/L	1		6020B	Total/NA
Lithium	15		10	2.5	ug/L	1		6020B	Total/NA
Total Dissolved Solids	1100		50	34	mg/L	1		SM 2540C	Total/NA
pH	7.6	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA
Groundwater Elevation	640.79				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-54.0				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	0.22				mg/L	1		Field Sampling	Total/NA
Field pH	6.66				SU	1		Field Sampling	Total/NA
Field Conductivity	1704				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	12.7				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	6.31				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-309 — Lab Sample ID: 310-267274-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	68		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	480		5.0	2.1	mg/L	5		9056A	Total/NA
Arsenic	0.59	J	2.0	0.53	ug/L	1		6020B	Total/NA
Barium	55		2.0	0.64	ug/L	1		6020B	Total/NA
Boron	1300		100	76	ug/L	1		6020B	Total/NA
Calcium	140		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	2.3		0.50	0.17	ug/L	1		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: SCS Engineers
Job ID: 310-267274-1
Project/Site: Ottumwa Generating Station 25223072

Client Sample ID: MW-309 (Continued) — Lab Sample ID: 310-267274-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	990		100	36	ug/L	1		6020B	Total/NA
Lithium	8.3	J	10	2.5	ug/L	1		6020B	Total/NA
Total Dissolved Solids	1100		50	34	mg/L	1		SM 2540C	Total/NA
pH	7.8	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA
Groundwater Elevation	640.18				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-54.3				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	0.25				mg/L	1		Field Sampling	Total/NA
Field pH	7.01				SU	1		Field Sampling	Total/NA
Field Conductivity	1598				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	13.3				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	8.35				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-315 — Lab Sample ID: 310-267274-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	55		5.0	2.3	mg/L	5		9056A	Total/NA
Sulfate	500		5.0	2.1	mg/L	5		9056A	Total/NA
Arsenic	1.6	J	2.0	0.53	ug/L	1		6020B	Total/NA
Barium	35		2.0	0.64	ug/L	1		6020B	Total/NA
Boron	1100		100	76	ug/L	1		6020B	Total/NA
Calcium	120		0.50	0.19	mg/L	1		6020B	Total/NA
Cobalt	6.6		0.50	0.17	ug/L	1		6020B	Total/NA
Iron	2900		100	36	ug/L	1		6020B	Total/NA
Lithium	5.4	J	10	2.5	ug/L	1		6020B	Total/NA
Magnesium	21000		500	150	ug/L	1		6020B	Total/NA
Manganese	12000		70	25	ug/L	7		6020B	Total/NA
Molybdenum	1.3	J	2.0	0.91	ug/L	1		6020B	Total/NA
Potassium	1800		500	150	ug/L	1		6020B	Total/NA
Sodium	200000		1000	460	ug/L	1		6020B	Total/NA
Cobalt	7.3		0.50	0.17	ug/L	1		6020B	Dissolved
Iron	2400		100	36	ug/L	1		6020B	Dissolved
Manganese	6800		40	14	ug/L	4		6020B	Dissolved
Bicarbonate Alkalinity as CaCO3	280		5.0	2.5	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	280		5.0	2.5	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	1000		50	34	mg/L	1		SM 2540C	Total/NA
pH	8.3	HF	1.0	1.0	SU	1		SM 4500 H+ B	Total/NA
Groundwater Elevation	641.10				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-79.7				mV	1		Field Sampling	Total/NA
Oxygen, Dissolved	0.29				mg/L	1		Field Sampling	Total/NA
Field pH	6.93				SU	1		Field Sampling	Total/NA
Field Conductivity	1615				umhos/cm	1		Field Sampling	Total/NA
Field Temperature	13.1				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	9.42				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-307
Date Collected: 10/10/23 09:50
Date Received: 10/13/23 17:30

Lab Sample ID: 310-267274-1
Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**270**		5.0	2.3	mg/L			10/25/23 00:28	5
Fluoride	<0.38		1.0	0.38	mg/L			10/25/23 00:28	5
Sulfate	**140**		5.0	2.1	mg/L			10/25/23 00:28	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		10/17/23 09:15	10/19/23 18:48	1
Arsenic	**0.62**	**J**	2.0	0.53	ug/L		10/17/23 09:15	10/19/23 18:48	1
Barium	**120**		2.0	0.64	ug/L		10/17/23 09:15	10/19/23 18:48	1
Beryllium	<0.33		1.0	0.33	ug/L		10/17/23 09:15	10/19/23 18:48	1
Boron	**210**		100	76	ug/L		10/17/23 09:15	10/19/23 18:48	1
Cadmium	<0.10		0.20	0.10	ug/L		10/17/23 09:15	10/19/23 18:48	1
Calcium	**220**		0.50	0.19	mg/L		10/17/23 09:15	10/19/23 18:48	1
Chromium	<1.1		5.0	1.1	ug/L		10/17/23 09:15	10/19/23 18:48	1
Cobalt	**36**		0.50	0.17	ug/L		10/17/23 09:15	10/19/23 18:48	1
Iron	**2900**		100	36	ug/L		10/17/23 09:15	10/19/23 18:48	1
Lead	<0.24		0.50	0.24	ug/L		10/17/23 09:15	10/19/23 18:48	1
Lithium	**12**		10	2.5	ug/L		10/17/23 09:15	10/19/23 18:48	1
Molybdenum	<0.91		2.0	0.91	ug/L		10/17/23 09:15	10/19/23 18:48	1
Selenium	<1.4		5.0	1.4	ug/L		10/17/23 09:15	10/19/23 18:48	1
Thallium	<0.26		1.0	0.26	ug/L		10/17/23 09:15	10/19/23 18:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	**36**		0.50	0.17	ug/L		10/18/23 09:15	10/19/23 22:48	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		10/26/23 11:07	10/27/23 10:38	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**1100**		50	34	mg/L			10/16/23 15:37	1
pH (SM 4500 H+ B)	**7.5**	**HF**	1.0	1.0	SU			10/14/23 04:42	1

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	**1.30**		0.227	0.255	1.00	0.155	pCi/L	10/18/23 09:14	11/09/23 13:47	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*91.2*		*30 - 110*	*10/18/23 09:14*	*11/09/23 13:47*	*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	0.527	U	0.360	0.364	1.00	0.542	pCi/L	11/10/23 11:18	11/20/23 12:01	1

Client Sample ID: MW-307
Lab Sample ID: 310-267274-1

Date Collected: 10/10/23 09:50
Matrix: Water

Date Received: 10/13/23 17:30

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*95.6*		*30 - 110*	*11/10/23 11:18*	*11/20/23 12:01*	*1*
Y Carrier	*79.3*		*30 - 110*	*11/10/23 11:18*	*11/20/23 12:01*	*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	**1.83**		0.426	0.444	5.00	0.542	pCi/L		11/21/23 10:10	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	**642.85**				ft			10/10/23 09:50	1
Oxidation Reduction Potential	**-35.0**				mV			10/10/23 09:50	1
Oxygen, Dissolved	**0.20**				mg/L			10/10/23 09:50	1
Field pH	**6.56**				SU			10/10/23 09:50	1
Field Conductivity	**1856**				umhos/cm			10/10/23 09:50	1
Field Temperature	**12.6**				Degrees C			10/10/23 09:50	1
Field Turbidity	**6.40**				NTU			10/10/23 09:50	1

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25223072

Job ID: 310-267274-1

Client Sample ID: MW-308
Date Collected: 10/10/23 10:45
Date Received: 10/13/23 17:30

Lab Sample ID: 310-267274-2
Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**170**		5.0	2.3	mg/L			10/25/23 00:43	5
Fluoride	<0.38		1.0	0.38	mg/L			10/25/23 00:43	5
Sulfate	**300**		5.0	2.1	mg/L			10/25/23 00:43	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		10/17/23 09:15	10/19/23 18:50	1
Arsenic	**0.53**	**J**	2.0	0.53	ug/L		10/17/23 09:15	10/19/23 18:50	1
Barium	**120**		2.0	0.64	ug/L		10/17/23 09:15	10/19/23 18:50	1
Beryllium	<0.33		1.0	0.33	ug/L		10/17/23 09:15	10/19/23 18:50	1
Boron	**230**		100	76	ug/L		10/17/23 09:15	10/19/23 18:50	1
Cadmium	<0.10		0.20	0.10	ug/L		10/17/23 09:15	10/19/23 18:50	1
Calcium	**210**		0.50	0.19	mg/L		10/17/23 09:15	10/19/23 18:50	1
Chromium	<1.1		5.0	1.1	ug/L		10/17/23 09:15	10/19/23 18:50	1
Cobalt	**0.17**	**J**	0.50	0.17	ug/L		10/17/23 09:15	10/19/23 18:50	1
Iron	**3600**		100	36	ug/L		10/17/23 09:15	10/19/23 18:50	1
Lead	<0.24		0.50	0.24	ug/L		10/17/23 09:15	10/19/23 18:50	1
Lithium	**15**		10	2.5	ug/L		10/17/23 09:15	10/19/23 18:50	1
Molybdenum	<0.91		2.0	0.91	ug/L		10/17/23 09:15	10/19/23 18:50	1
Selenium	<1.4		5.0	1.4	ug/L		10/17/23 09:15	10/19/23 18:50	1
Thallium	<0.26		1.0	0.26	ug/L		10/17/23 09:15	10/19/23 18:50	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		10/26/23 11:07	10/27/23 10:40	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	**1100**		50	34	mg/L			10/16/23 15:37	1
pH (SM 4500 H+ B)	**7.6**	**HF**	1.0	1.0	SU			10/14/23 05:32	1

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	**1.49**		0.233	0.269	1.00	0.146	pCi/L	10/18/23 09:14	11/09/23 13:47	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*99.0*		*30 - 110*	*10/18/23 09:14*	*11/09/23 13:47*	*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	**0.801**		0.342	0.350	1.00	0.443	pCi/L	10/18/23 09:19	11/03/23 15:29	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*99.0*		*30 - 110*	*10/18/23 09:19*	*11/03/23 15:29*	*1*
Y Carrier	*82.6*		*30 - 110*	*10/18/23 09:19*	*11/03/23 15:29*	*1*

Client Sample Results

Client: SCS Engineers
Job ID: 310-267274-1
Project/Site: Ottumwa Generating Station 25223072

Client Sample ID: MW-308
Lab Sample ID: 310-267274-2
Date Collected: 10/10/23 10:45
Matrix: Water
Date Received: 10/13/23 17:30

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	2.29		0.414	0.441	5.00	0.443	pCi/L		11/21/23 10:10	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	640.79				ft			10/10/23 10:45	1
Oxidation Reduction Potential	-54.0				mV			10/10/23 10:45	1
Oxygen, Dissolved	0.22				mg/L			10/10/23 10:45	1
Field pH	6.66				SU			10/10/23 10:45	1
Field Conductivity	1704				umhos/cm			10/10/23 10:45	1
Field Temperature	12.7				Degrees C			10/10/23 10:45	1
Field Turbidity	6.31				NTU			10/10/23 10:45	1

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25223072

Job ID: 310-267274-1

Client Sample ID: MW-309

Date Collected: 10/10/23 13:05
Date Received: 10/13/23 17:30

Lab Sample ID: 310-267274-3

Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	68		5.0	2.3	mg/L			10/25/23 00:57	5
Fluoride	<0.38		1.0	0.38	mg/L			10/25/23 00:57	5
Sulfate	480		5.0	2.1	mg/L			10/25/23 00:57	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		10/17/23 09:15	10/19/23 18:53	1
Arsenic	0.59	J	2.0	0.53	ug/L		10/17/23 09:15	10/19/23 18:53	1
Barium	55		2.0	0.64	ug/L		10/17/23 09:15	10/19/23 18:53	1
Beryllium	<0.33		1.0	0.33	ug/L		10/17/23 09:15	10/19/23 18:53	1
Boron	1300		100	76	ug/L		10/17/23 09:15	10/19/23 18:53	1
Cadmium	<0.10		0.20	0.10	ug/L		10/17/23 09:15	10/19/23 18:53	1
Calcium	140		0.50	0.19	mg/L		10/17/23 09:15	10/19/23 18:53	1
Chromium	<1.1		5.0	1.1	ug/L		10/17/23 09:15	10/19/23 18:53	1
Cobalt	2.3		0.50	0.17	ug/L		10/17/23 09:15	10/19/23 18:53	1
Iron	990		100	36	ug/L		10/17/23 09:15	10/19/23 18:53	1
Lead	<0.24		0.50	0.24	ug/L		10/17/23 09:15	10/19/23 18:53	1
Lithium	8.3	J	10	2.5	ug/L		10/17/23 09:15	10/19/23 18:53	1
Molybdenum	<0.91		2.0	0.91	ug/L		10/17/23 09:15	10/19/23 18:53	1
Selenium	<1.4		5.0	1.4	ug/L		10/17/23 09:15	10/19/23 18:53	1
Thallium	<0.26		1.0	0.26	ug/L		10/17/23 09:15	10/19/23 18:53	1

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		10/26/23 11:07	10/27/23 10:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids (SM 2540C)	1100		50	34	mg/L			10/16/23 15:37	1
pH (SM 4500 H+ B)	7.8	HF	1.0	1.0	SU			10/14/23 04:51	1

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	0.808		0.169	0.184	1.00	0.108	pCi/L	10/18/23 09:14	11/09/23 13:47	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*100*		*30 - 110*	*10/18/23 09:14*	*11/09/23 13:47*	*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	0.462		0.270	0.273	1.00	0.380	pCi/L	10/18/23 09:19	11/03/23 15:29	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*100*		*30 - 110*	*10/18/23 09:19*	*11/03/23 15:29*	*1*
Y Carrier	*86.4*		*30 - 110*	*10/18/23 09:19*	*11/03/23 15:29*	*1*

Client Sample Results

Client: SCS Engineers
Job ID: 310-267274-1
Project/Site: Ottumwa Generating Station 25223072

Client Sample ID: MW-309
Lab Sample ID: 310-267274-3
Date Collected: 10/10/23 13:05
Matrix: Water
Date Received: 10/13/23 17:30

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	1.27		0.319	0.329	5.00	0.380	pCi/L		11/21/23 10:10	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	640.18				ft			10/10/23 13:05	1
Oxidation Reduction Potential	-54.3				mV			10/10/23 13:05	1
Oxygen, Dissolved	0.25				mg/L			10/10/23 13:05	1
Field pH	7.01				SU			10/10/23 13:05	1
Field Conductivity	1598				umhos/cm			10/10/23 13:05	1
Field Temperature	13.3				Degrees C			10/10/23 13:05	1
Field Turbidity	8.35				NTU			10/10/23 13:05	1

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25223072

Job ID: 310-267274-1

Client Sample ID: MW-315
Date Collected: 10/10/23 12:10
Date Received: 10/13/23 17:30

Lab Sample ID: 310-267274-4
Matrix: Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**55**		5.0	2.3	mg/L			10/25/23 01:12	5
Fluoride	<0.38		1.0	0.38	mg/L			10/25/23 01:12	5
Sulfate	**500**		5.0	2.1	mg/L			10/25/23 01:12	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		10/17/23 09:15	10/19/23 18:55	1
Arsenic	**1.6**	**J**	2.0	0.53	ug/L		10/17/23 09:15	10/19/23 18:55	1
Barium	**35**		2.0	0.64	ug/L		10/17/23 09:15	10/19/23 18:55	1
Beryllium	<0.33		1.0	0.33	ug/L		10/17/23 09:15	10/19/23 18:55	1
Boron	**1100**		100	76	ug/L		10/17/23 09:15	10/19/23 18:55	1
Cadmium	<0.10		0.20	0.10	ug/L		10/17/23 09:15	10/19/23 18:55	1
Calcium	**120**		0.50	0.19	mg/L		10/17/23 09:15	10/19/23 18:55	1
Chromium	<1.1		5.0	1.1	ug/L		10/17/23 09:15	10/19/23 18:55	1
Cobalt	**6.6**		0.50	0.17	ug/L		10/17/23 09:15	10/19/23 18:55	1
Iron	**2900**		100	36	ug/L		10/17/23 09:15	10/19/23 18:55	1
Lead	<0.24		0.50	0.24	ug/L		10/17/23 09:15	10/19/23 18:55	1
Lithium	**5.4**	**J**	10	2.5	ug/L		10/17/23 09:15	10/19/23 18:55	1
Magnesium	**21000**		500	150	ug/L		10/17/23 09:15	10/19/23 18:55	1
Manganese	**12000**		70	25	ug/L		10/17/23 09:15	10/20/23 13:51	7
Molybdenum	**1.3**	**J**	2.0	0.91	ug/L		10/17/23 09:15	10/19/23 18:55	1
Potassium	**1800**		500	150	ug/L		10/17/23 09:15	10/19/23 18:55	1
Selenium	<1.4		5.0	1.4	ug/L		10/17/23 09:15	10/19/23 18:55	1
Sodium	**200000**		1000	460	ug/L		10/17/23 09:15	10/19/23 18:55	1
Thallium	<0.26		1.0	0.26	ug/L		10/17/23 09:15	10/19/23 18:55	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	**7.3**		0.50	0.17	ug/L		10/18/23 09:15	10/19/23 23:04	1
Iron	**2400**		100	36	ug/L		10/18/23 09:15	10/19/23 23:04	1
Manganese	**6800**		40	14	ug/L		10/18/23 09:15	10/20/23 13:28	4

Method: SW846 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		10/26/23 11:07	10/27/23 10:44	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3 (SM 2320B)	**280**		5.0	2.5	mg/L			10/16/23 15:48	1
Carbonate Alkalinity as CaCO3 (SM 2320B)	<2.5		5.0	2.5	mg/L			10/16/23 15:48	1
Total Alkalinity as CaCO3 (SM 2320B)	**280**		5.0	2.5	mg/L			10/16/23 15:48	1
Total Dissolved Solids (SM 2540C)	**1000**		50	34	mg/L			10/16/23 15:37	1
pH (SM 4500 H+ B)	**8.3**	**HF**	1.0	1.0	SU			10/14/23 05:05	1

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25223072

Job ID: 310-267274-1

Client Sample ID: MW-315

Date Collected: 10/10/23 12:10
Date Received: 10/13/23 17:30

Lab Sample ID: 310-267274-4

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	0.595		0.150	0.159	1.00	0.116	pCi/L	10/18/23 09:14	11/09/23 13:47	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*99.5*		*30 - 110*	*10/18/23 09:14*	*11/09/23 13:47*	*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	0.694		0.304	0.310	1.00	0.391	pCi/L	10/18/23 09:19	11/03/23 15:29	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*99.5*		*30 - 110*	*10/18/23 09:19*	*11/03/23 15:29*	*1*
Y Carrier	*88.6*		*30 - 110*	*10/18/23 09:19*	*11/03/23 15:29*	*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	1.29		0.339	0.348	5.00	0.391	pCi/L		11/21/23 10:10	1

Method: EPA Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Groundwater Elevation	641.10				ft			10/10/23 12:10	1
Oxidation Reduction Potential	-79.7				mV			10/10/23 12:10	1
Oxygen, Dissolved	0.29				mg/L			10/10/23 12:10	1
Field pH	6.93				SU			10/10/23 12:10	1
Field Conductivity	1615				umhos/cm			10/10/23 12:10	1
Field Temperature	13.1				Degrees C			10/10/23 12:10	1
Field Turbidity	9.42				NTU			10/10/23 12:10	1

Definitions/Glossary

Client: SCS Engineers
Job ID: 310-267274-1
Project/Site: Ottumwa Generating Station 25223072

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
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	Parameter with a holding time of 15 minutes. Test performed by laboratory at client's request. Sample was analyzed outside of hold time.

Rad

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

Glossary

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

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-403851/3
Matrix: Water
Analysis Batch: 403851

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			10/24/23 18:37	1
Fluoride	<0.075		0.20	0.075	mg/L			10/24/23 18:37	1
Sulfate	<0.42		1.0	0.42	mg/L			10/24/23 18:37	1

Lab Sample ID: LCS 310-403851/45
Matrix: Water
Analysis Batch: 403851

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	10.1		mg/L		101	90 - 110
Fluoride	2.00	2.15		mg/L		108	90 - 110
Sulfate	10.0	10.6		mg/L		106	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-402827/1-A
Matrix: Water
Analysis Batch: 403200

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402827

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.0		2.0	1.0	ug/L		10/17/23 09:15	10/19/23 17:40	1
Arsenic	<0.53		2.0	0.53	ug/L		10/17/23 09:15	10/19/23 17:40	1
Barium	<0.64		2.0	0.64	ug/L		10/17/23 09:15	10/19/23 17:40	1
Beryllium	<0.33		1.0	0.33	ug/L		10/17/23 09:15	10/19/23 17:40	1
Boron	<76		100	76	ug/L		10/17/23 09:15	10/19/23 17:40	1
Cadmium	<0.10		0.20	0.10	ug/L		10/17/23 09:15	10/19/23 17:40	1
Calcium	<0.19		0.50	0.19	mg/L		10/17/23 09:15	10/19/23 17:40	1
Chromium	<1.1		5.0	1.1	ug/L		10/17/23 09:15	10/19/23 17:40	1
Cobalt	<0.17		0.50	0.17	ug/L		10/17/23 09:15	10/19/23 17:40	1
Iron	<36		100	36	ug/L		10/17/23 09:15	10/19/23 17:40	1
Lead	<0.24		0.50	0.24	ug/L		10/17/23 09:15	10/19/23 17:40	1
Lithium	<2.5		10	2.5	ug/L		10/17/23 09:15	10/19/23 17:40	1
Magnesium	<150		500	150	ug/L		10/17/23 09:15	10/19/23 17:40	1
Manganese	<3.6		10	3.6	ug/L		10/17/23 09:15	10/19/23 17:40	1
Molybdenum	<0.91		2.0	0.91	ug/L		10/17/23 09:15	10/19/23 17:40	1
Potassium	<150		500	150	ug/L		10/17/23 09:15	10/19/23 17:40	1
Selenium	<1.4		5.0	1.4	ug/L		10/17/23 09:15	10/19/23 17:40	1
Sodium	<460		1000	460	ug/L		10/17/23 09:15	10/19/23 17:40	1
Thallium	<0.26		1.0	0.26	ug/L		10/17/23 09:15	10/19/23 17:40	1

Lab Sample ID: LCS 310-402827/2-A
Matrix: Water
Analysis Batch: 403200

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402827

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	200	209		ug/L		104	80 - 120
Barium	100	107		ug/L		107	80 - 120
Beryllium	100	98.8		ug/L		99	80 - 120
Boron	200	193		ug/L		96	80 - 120

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

Lab Sample ID: LCS 310-402827/2-A
Matrix: Water
Analysis Batch: 403200

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402827

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cadmium	100	103		ug/L		103	80 - 120
Calcium	2.00	1.85		mg/L		92	80 - 120
Chromium	100	104		ug/L		104	80 - 120
Cobalt	100	112		ug/L		112	80 - 120
Iron	200	226		ug/L		113	80 - 120
Lead	200	212		ug/L		106	80 - 120
Lithium	200	199		ug/L		99	80 - 120
Magnesium	2000	2070		ug/L		104	80 - 120
Manganese	100	97.9		ug/L		98	80 - 120
Molybdenum	200	215		ug/L		108	80 - 120
Potassium	2000	2250		ug/L		113	80 - 120
Selenium	400	409		ug/L		102	80 - 120
Sodium	2000	2170		ug/L		108	80 - 120

Lab Sample ID: LCS 310-402827/2-A
Matrix: Water
Analysis Batch: 403284

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402827

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	200	230		ug/L		115	80 - 120
Thallium	200	173		ug/L		86	80 - 120

Lab Sample ID: MB 310-402837/1-A
Matrix: Water
Analysis Batch: 403202

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 402837

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.17		0.50	0.17	ug/L		10/18/23 09:15	10/19/23 22:42	1
Iron	<36		100	36	ug/L		10/18/23 09:15	10/19/23 22:42	1
Manganese	<3.6		10	3.6	ug/L		10/18/23 09:15	10/19/23 22:42	1

Lab Sample ID: LCS 310-402837/2-A
Matrix: Water
Analysis Batch: 403202

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 402837

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cobalt	100	95.7		ug/L		96	80 - 120
Iron	200	209		ug/L		104	80 - 120
Manganese	100	93.9		ug/L		94	80 - 120

Lab Sample ID: 310-267274-1 MS
Matrix: Water
Analysis Batch: 403202

Client Sample ID: MW-307
Prep Type: Dissolved
Prep Batch: 402837

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Cobalt	36		100	129		ug/L		93	75 - 125
Iron	2700		200	2750	4	ug/L		46	75 - 125
Manganese	290		100	371		ug/L		79	75 - 125

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

Lab Sample ID: 310-267274-1 MSD
Matrix: Water
Analysis Batch: 403202

Client Sample ID: MW-307
Prep Type: Dissolved
Prep Batch: 402837

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cobalt	36		100	158		ug/L		122	75 - 125	20	20
Iron	2700		200	2850	4	ug/L		94	75 - 125	3	20
Manganese	290		100	403		ug/L		112	75 - 125	8	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-403843/1-A
Matrix: Water
Analysis Batch: 404051

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 403843

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.14		0.20	0.14	ug/L		10/26/23 11:06	10/27/23 09:51	1

Lab Sample ID: LCS 310-403843/2-A
Matrix: Water
Analysis Batch: 404051

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 403843

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	1.67	1.68		ug/L		101	80 - 120

Method: SM 2320B - Alkalinity

Lab Sample ID: LCS 310-402826/2
Matrix: Water
Analysis Batch: 402826

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	1010		mg/L		101	90 - 110

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

Lab Sample ID: MB 310-402676/1
Matrix: Water
Analysis Batch: 402676

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	<34		50	34	mg/L			10/16/23 15:37	1

Lab Sample ID: LCS 310-402676/2
Matrix: Water
Analysis Batch: 402676

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	968		mg/L		97	90 - 110

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-402565/79
Matrix: Water
Analysis Batch: 402565

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

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

Lab Sample ID: 310-267274-4 DU
Matrix: Water
Analysis Batch: 402565

Client Sample ID: MW-315
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH	8.3	HF		7.8		SU				7	20

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-632484/1-A
Matrix: Water
Analysis Batch: 636008

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 632484

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	-0.002000	U	0.126	0.126	1.00	0.268	pCi/L	10/18/23 09:14	11/09/23 13:37	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*34.0*		*30 - 110*	*10/18/23 09:14*	*11/09/23 13:37*	*1*

Lab Sample ID: LCS 160-632484/2-A
Matrix: Water
Analysis Batch: 636008

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 632484

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium 226			11.3	11.07		1.23	1.00	0.151	pCi/L	98	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*63.1*		*30 - 110*

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-632485/1-A
Matrix: Water
Analysis Batch: 635114

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 632485

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	1.542	G	1.00	1.01	1.00	1.50	pCi/L	10/18/23 09:19	11/03/23 15:28	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*34.0*		*30 - 110*	*10/18/23 09:19*	*11/03/23 15:28*	*1*
Y Carrier	*77.4*		*30 - 110*	*10/18/23 09:19*	*11/03/23 15:28*	*1*

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

Lab Sample ID: LCS 160-632485/2-A
Matrix: Water
Analysis Batch: 635114

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 632485

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium 228			7.75	10.61		1.59	1.00	0.772	pCi/L	137	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*63.1*		*30 - 110*
Y Carrier	*78.1*		*30 - 110*

Lab Sample ID: MB 160-636344/1-A
Matrix: Water
Analysis Batch: 637572

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 636344

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 228	0.2790	U	0.299	0.300	1.00	0.485	pCi/L	11/10/23 11:18	11/20/23 12:01	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Barium	*94.6*		*30 - 110*	*11/10/23 11:18*	*11/20/23 12:01*	*1*
Y Carrier	*78.9*		*30 - 110*	*11/10/23 11:18*	*11/20/23 12:01*	*1*

Lab Sample ID: LCS 160-636344/2-A
Matrix: Water
Analysis Batch: 637572

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 636344

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits		
Radium 228			7.70	6.069		0.918	1.00	0.417	pCi/L	79	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Barium	*100*		*30 - 110*
Y Carrier	*83.7*		*30 - 110*

Lab Sample ID: LCSD 160-636344/3-A
Matrix: Water
Analysis Batch: 637572

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 636344

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec Limits	RER	RER Limit
Radium 228			7.70	5.623		0.922	1.00	0.485	pCi/L	73	75 - 125	0.24	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Barium	*91.3*		*30 - 110*
Y Carrier	*78.9*		*30 - 110*

QC Association Summary

Client: SCS Engineers
Job ID: 310-267274-1
Project/Site: Ottumwa Generating Station 25223072

HPLC/IC

Analysis Batch: 403851

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-1	MW-307	Total/NA	Water	9056A	
310-267274-2	MW-308	Total/NA	Water	9056A	
310-267274-3	MW-309	Total/NA	Water	9056A	
310-267274-4	MW-315	Total/NA	Water	9056A	
MB 310-403851/3	Method Blank	Total/NA	Water	9056A	
LCS 310-403851/45	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 402827

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-1	MW-307	Total/NA	Water	3005A	
310-267274-2	MW-308	Total/NA	Water	3005A	
310-267274-3	MW-309	Total/NA	Water	3005A	
310-267274-4	MW-315	Total/NA	Water	3005A	
MB 310-402827/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-402827/2-A	Lab Control Sample	Total/NA	Water	3005A	

Prep Batch: 402837

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-1	MW-307	Dissolved	Water	3005A	
310-267274-4	MW-315	Dissolved	Water	3005A	
MB 310-402837/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-402837/2-A	Lab Control Sample	Total/NA	Water	3005A	
310-267274-1 MS	MW-307	Dissolved	Water	3005A	
310-267274-1 MSD	MW-307	Dissolved	Water	3005A	

Analysis Batch: 403200

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-1	MW-307	Total/NA	Water	6020B	402827
310-267274-2	MW-308	Total/NA	Water	6020B	402827
310-267274-3	MW-309	Total/NA	Water	6020B	402827
310-267274-4	MW-315	Total/NA	Water	6020B	402827
MB 310-402827/1-A	Method Blank	Total/NA	Water	6020B	402827
LCS 310-402827/2-A	Lab Control Sample	Total/NA	Water	6020B	402827

Analysis Batch: 403202

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-1	MW-307	Dissolved	Water	6020B	402837
310-267274-4	MW-315	Dissolved	Water	6020B	402837
MB 310-402837/1-A	Method Blank	Total/NA	Water	6020B	402837
LCS 310-402837/2-A	Lab Control Sample	Total/NA	Water	6020B	402837
310-267274-1 MS	MW-307	Dissolved	Water	6020B	402837
310-267274-1 MSD	MW-307	Dissolved	Water	6020B	402837

Analysis Batch: 403273

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-4	MW-315	Dissolved	Water	6020B	402837

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25223072

Job ID: 310-267274-1

Metals

Analysis Batch: 403284

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-4	MW-315	Total/NA	Water	6020B	402827
LCS 310-402827/2-A	Lab Control Sample	Total/NA	Water	6020B	402827

Prep Batch: 403843

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-1	MW-307	Total/NA	Water	7470A	
310-267274-2	MW-308	Total/NA	Water	7470A	
310-267274-3	MW-309	Total/NA	Water	7470A	
310-267274-4	MW-315	Total/NA	Water	7470A	
MB 310-403843/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-403843/2-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 404051

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-1	MW-307	Total/NA	Water	7470A	403843
310-267274-2	MW-308	Total/NA	Water	7470A	403843
310-267274-3	MW-309	Total/NA	Water	7470A	403843
310-267274-4	MW-315	Total/NA	Water	7470A	403843
MB 310-403843/1-A	Method Blank	Total/NA	Water	7470A	403843
LCS 310-403843/2-A	Lab Control Sample	Total/NA	Water	7470A	403843

General Chemistry

Analysis Batch: 402565

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-1	MW-307	Total/NA	Water	SM 4500 H+ B	
310-267274-2	MW-308	Total/NA	Water	SM 4500 H+ B	
310-267274-3	MW-309	Total/NA	Water	SM 4500 H+ B	
310-267274-4	MW-315	Total/NA	Water	SM 4500 H+ B	
LCS 310-402565/79	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-267274-4 DU	MW-315	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 402676

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-1	MW-307	Total/NA	Water	SM 2540C	
310-267274-2	MW-308	Total/NA	Water	SM 2540C	
310-267274-3	MW-309	Total/NA	Water	SM 2540C	
310-267274-4	MW-315	Total/NA	Water	SM 2540C	
MB 310-402676/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-402676/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Analysis Batch: 402826

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-4	MW-315	Total/NA	Water	SM 2320B	
LCS 310-402826/2	Lab Control Sample	Total/NA	Water	SM 2320B	

Rad

Prep Batch: 632484

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-1	MW-307	Total/NA	Water	PrecSep-21	
310-267274-2	MW-308	Total/NA	Water	PrecSep-21	

Rad (Continued)

Prep Batch: 632484 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-3	MW-309	Total/NA	Water	PrecSep-21	
310-267274-4	MW-315	Total/NA	Water	PrecSep-21	
MB 160-632484/1-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-632484/2-A	Lab Control Sample	Total/NA	Water	PrecSep-21	

Prep Batch: 632485

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-2	MW-308	Total/NA	Water	PrecSep_0	
310-267274-3	MW-309	Total/NA	Water	PrecSep_0	
310-267274-4	MW-315	Total/NA	Water	PrecSep_0	
MB 160-632485/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-632485/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	

Prep Batch: 636344

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-1	MW-307	Total/NA	Water	PrecSep_0	
MB 160-636344/1-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-636344/2-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-636344/3-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Field Service / Mobile Lab

Analysis Batch: 404163

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-267274-1	MW-307	Total/NA	Water	Field Sampling	
310-267274-2	MW-308	Total/NA	Water	Field Sampling	
310-267274-3	MW-309	Total/NA	Water	Field Sampling	
310-267274-4	MW-315	Total/NA	Water	Field Sampling	

Lab Chronicle

Client: SCS Engineers
Job ID: 310-267274-1
Project/Site: Ottumwa Generating Station 25223072

Client Sample ID: MW-307
Lab Sample ID: 310-267274-1
Date Collected: 10/10/23 09:50
Matrix: Water
Date Received: 10/13/23 17:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	403851	QTZ5	EET CF	10/25/23 00:28
Dissolved	Prep	3005A			402837	KCK5	EET CF	10/18/23 09:15
Dissolved	Analysis	6020B		1	403202	A6US	EET CF	10/19/23 22:48
Total/NA	Prep	3005A			402827	KCK5	EET CF	10/17/23 09:15
Total/NA	Analysis	6020B		1	403200	A6US	EET CF	10/19/23 18:48
Total/NA	Prep	7470A			403843	NFT2	EET CF	10/26/23 11:07
Total/NA	Analysis	7470A		1	404051	NFT2	EET CF	10/27/23 10:38
Total/NA	Analysis	SM 2540C		1	402676	D7CP	EET CF	10/16/23 15:37
Total/NA	Analysis	SM 4500 H+ B		1	402565	D7CP	EET CF	10/14/23 04:42
Total/NA	Prep	PrecSep-21			632484	KAC	EET SL	10/18/23 09:14
Total/NA	Analysis	903.0		1	636166	SCB	EET SL	11/09/23 13:47
Total/NA	Prep	PrecSep_0			636344	KAC	EET SL	11/10/23 11:18
Total/NA	Analysis	904.0		1	637572	FLC	EET SL	11/20/23 12:01
Total/NA	Analysis	Ra226_Ra228 Pos		1	637725	EMH	EET SL	11/21/23 10:10
Total/NA	Analysis	Field Sampling		1	404163	BJ0R	EET CF	10/10/23 09:50

Client Sample ID: MW-308
Lab Sample ID: 310-267274-2
Date Collected: 10/10/23 10:45
Matrix: Water
Date Received: 10/13/23 17:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	403851	QTZ5	EET CF	10/25/23 00:43
Total/NA	Prep	3005A			402827	KCK5	EET CF	10/17/23 09:15
Total/NA	Analysis	6020B		1	403200	A6US	EET CF	10/19/23 18:50
Total/NA	Prep	7470A			403843	NFT2	EET CF	10/26/23 11:07
Total/NA	Analysis	7470A		1	404051	NFT2	EET CF	10/27/23 10:40
Total/NA	Analysis	SM 2540C		1	402676	D7CP	EET CF	10/16/23 15:37
Total/NA	Analysis	SM 4500 H+ B		1	402565	D7CP	EET CF	10/14/23 05:32
Total/NA	Prep	PrecSep-21			632484	KAC	EET SL	10/18/23 09:14
Total/NA	Analysis	903.0		1	636166	SCB	EET SL	11/09/23 13:47
Total/NA	Prep	PrecSep_0			632485	KAC	EET SL	10/18/23 09:19
Total/NA	Analysis	904.0		1	635115	SCB	EET SL	11/03/23 15:29
Total/NA	Analysis	Ra226_Ra228 Pos		1	637725	EMH	EET SL	11/21/23 10:10
Total/NA	Analysis	Field Sampling		1	404163	BJ0R	EET CF	10/10/23 10:45

Client Sample ID: MW-309
Lab Sample ID: 310-267274-3
Date Collected: 10/10/23 13:05
Matrix: Water
Date Received: 10/13/23 17:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	403851	QTZ5	EET CF	10/25/23 00:57
Total/NA	Prep	3005A			402827	KCK5	EET CF	10/17/23 09:15
Total/NA	Analysis	6020B		1	403200	A6US	EET CF	10/19/23 18:53

Lab Chronicle

Client: SCS Engineers
Job ID: 310-267274-1
Project/Site: Ottumwa Generating Station 25223072

Client Sample ID: MW-309
Lab Sample ID: 310-267274-3
Date Collected: 10/10/23 13:05
Matrix: Water
Date Received: 10/13/23 17:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7470A			403843	NFT2	EET CF	10/26/23 11:07
Total/NA	Analysis	7470A		1	404051	NFT2	EET CF	10/27/23 10:42
Total/NA	Analysis	SM 2540C		1	402676	D7CP	EET CF	10/16/23 15:37
Total/NA	Analysis	SM 4500 H+ B		1	402565	D7CP	EET CF	10/14/23 04:51
Total/NA	Prep	PrecSep-21			632484	KAC	EET SL	10/18/23 09:14
Total/NA	Analysis	903.0		1	636166	SCB	EET SL	11/09/23 13:47
Total/NA	Prep	PrecSep_0			632485	KAC	EET SL	10/18/23 09:19
Total/NA	Analysis	904.0		1	635115	SCB	EET SL	11/03/23 15:29
Total/NA	Analysis	Ra226_Ra228 Pos		1	637725	EMH	EET SL	11/21/23 10:10
Total/NA	Analysis	Field Sampling		1	404163	BJ0R	EET CF	10/10/23 13:05

Client Sample ID: MW-315
Lab Sample ID: 310-267274-4
Date Collected: 10/10/23 12:10
Matrix: Water
Date Received: 10/13/23 17:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	403851	QTZ5	EET CF	10/25/23 01:12
Dissolved	Prep	3005A			402837	KCK5	EET CF	10/18/23 09:15
Dissolved	Analysis	6020B		1	403202	A6US	EET CF	10/19/23 23:04
Dissolved	Prep	3005A			402837	KCK5	EET CF	10/18/23 09:15
Dissolved	Analysis	6020B		4	403273	A6US	EET CF	10/20/23 13:28
Total/NA	Prep	3005A			402827	KCK5	EET CF	10/17/23 09:15
Total/NA	Analysis	6020B		7	403284	A6US	EET CF	10/20/23 13:51
Total/NA	Prep	3005A			402827	KCK5	EET CF	10/17/23 09:15
Total/NA	Analysis	6020B		1	403200	A6US	EET CF	10/19/23 18:55
Total/NA	Prep	7470A			403843	NFT2	EET CF	10/26/23 11:07
Total/NA	Analysis	7470A		1	404051	NFT2	EET CF	10/27/23 10:44
Total/NA	Analysis	SM 2320B		1	402826	MAQ3	EET CF	10/16/23 15:48
Total/NA	Analysis	SM 2540C		1	402676	D7CP	EET CF	10/16/23 15:37
Total/NA	Analysis	SM 4500 H+ B		1	402565	D7CP	EET CF	10/14/23 05:05
Total/NA	Prep	PrecSep-21			632484	KAC	EET SL	10/18/23 09:14
Total/NA	Analysis	903.0		1	636166	SCB	EET SL	11/09/23 13:47
Total/NA	Prep	PrecSep_0			632485	KAC	EET SL	10/18/23 09:19
Total/NA	Analysis	904.0		1	635115	SCB	EET SL	11/03/23 15:29
Total/NA	Analysis	Ra226_Ra228 Pos		1	637725	EMH	EET SL	11/21/23 10:10
Total/NA	Analysis	Field Sampling		1	404163	BJ0R	EET CF	10/10/23 12:10

Laboratory References:
EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401
EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Accreditation/Certification Summary

Client: SCS Engineers
Job ID: 310-267274-1
Project/Site: Ottumwa Generating Station 25223072

Laboratory: Eurofins Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	11-15-23

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	12-08-23
California	Los Angeles County Sanitation Districts	10259	06-30-22 *
California	State	2886	06-30-24
Connecticut	State	PH-0241	03-31-25
Florida	NELAP	E87689	06-30-24
HI - RadChem Recognition	State	n/a	06-30-24
Illinois	NELAP	200023	11-30-24
Iowa	State	373	12-01-24
Kansas	NELAP	E-10236	10-31-24
Kentucky (DW)	State	KY90125	12-31-23
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-23
Louisiana	NELAP	04080	06-30-22 *
Louisiana (All)	NELAP	04080	06-30-24
Louisiana (DW)	State	LA011	12-31-23
Maryland	State	310	09-30-24
Massachusetts	State	M-MO054	06-30-24
MI - RadChem Recognition	State	9005	06-30-24
Missouri	State	780	06-30-25
Nevada	State	MO000542020-1	07-31-24
New Jersey	NELAP	MO002	06-30-24
New Mexico	State	MO00054	06-30-24
New York	NELAP	11616	03-31-24
North Carolina (DW)	State	29700	07-31-24
North Dakota	State	R-207	06-30-24
Oklahoma	NELAP	9997	08-31-24
Oregon	NELAP	4157	09-01-24
Pennsylvania	NELAP	68-00540	02-28-24
South Carolina	State	85002001	06-30-24
Texas	NELAP	T104704193	07-31-24
US Fish & Wildlife	US Federal Programs	058448	07-31-24
USDA	US Federal Programs	P330-17-00028	05-18-26
Utah	NELAP	MO000542021-14	07-31-24
Virginia	NELAP	10310	06-15-25
Washington	State	C592	08-30-24
West Virginia DEP	State	381	12-31-23

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

Method Summary

Client: SCS Engineers
Job ID: 310-267274-1
Project/Site: Ottumwa Generating Station 25223072

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 2320B	Alkalinity	SM	EET CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	EET CF
SM 4500 H+ B	pH	SM	EET CF
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
Field Sampling	Field Sampling	EPA	EET CF
3005A	Preparation, Total Metals	SW846	EET CF
7470A	Preparation, Mercury	SW846	EET CF
PrecSep_0	Preparation, Precipitate Separation	None	EET SL
PrecSep-21	Preparation, Precipitate Separation (21-Day In-Growth)	None	EET SL

Protocol References:

EPA = US Environmental Protection Agency
None = None
SM = "Standard Methods For The Examination Of Water And Wastewater"
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.
TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401
EET SL = Eurofins St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

eurofins | Environment Testing America

310-267274 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: SCS			
City/State: CITY		STATE WI	Project:
Receipt Information			
Date/Time Received:	DATE 10/13/23	TIME 1730	Received By:

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

Condition of Cooler/Containers			
Sample(s) received in Cooler?	☒ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☒ Yes	☐ No	*If yes:* Cooler # 1 of 2
Cooler Custody Seals Present?	☐ Yes	☒ No	*If yes:* Cooler custody seals intact? ☐ Yes ☐ No
Sample Custody Seals Present?	☐ Yes	☒ No	*If yes:* Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?	☐ Yes	☒ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record			
Coolant:	☒ Wet ice	☐ Blue ice ☐ Dry ice ☐ Other:_____	☐ NONE
Thermometer ID: T		Correction Factor (°C): +0.0	

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

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

• Sample Container Temperature

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

Exceptions Noted

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

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

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

Additional Comments

eurofins | Environment Testing America

Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS

City/State: CITY | STATE WI | Project:

Receipt Information

Date/Time Received: DATE 10/13/23 | TIME 1730 | Received By: M

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

Condition of Cooler/Containers

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

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

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

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

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

Temperature Record

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

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

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

Uncorrected Temp (°C): 1.0 | Corrected Temp (°C): 1.0

• **Sample Container Temperature**

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

Exceptions Noted

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

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

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

Additional Comments

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

Chain of Custody Record

eurofins

Client Information	Sampler: Tyler Stirling 515-305-2776	Lab PM: Sandie Fredrick	Carrier Tracking No(s):	COC No.
Client Contact: Meghan Blodgett	Phone	E-Mail: Sandra.Fredrick@et.eurofinsus.com	State of Origin: IA	Page: Page 1 of 1
Company: SCS Engineers	PWSID			Job #: 25223072
Address: 2830 Dairy Drive	Due Date Requested:			
City: Madison	TAT Requested (days)			
State, Zip: WI 53718	Compliance Project: Δ Yes Δ No			
Phone: 608-224-2830	PO #: 25223072			
Email: mblodgett@scsengineers.com	WO #:			
Project Name: Ottumwa Generating Station 25223072	Project #: 25223072			
Site: Ottumwa IA	SSOW#:			

Analysis Requested

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6020 Metals total (Sb As Ba Be B Ca Cd Cr Co Fe Pb Li Mo Se Tl and Hg) D	TDS and pH I	Chloride Fluoride Sulfate I	EPA 903/904 Radium 226 + 228 D	Bicarbonate & carbonate alkalinity I	6020 Metals total (Mg Mn K Na) D	6020 Metals dissolved (Co, Fe Mn) D	6020 Metals dissolved (Co) D	Total Number of containers	Special Instructions/Note
			Preservation Code:													
MW-307	10/10/23	950	G	W	N/Y		X	X	X	X				X		
MW-308	10/10/23	1045	G	W	N		X	X	X	X						
MW-309	10/10/23	1305	G	W	N		X	X	X	X						
MW-315	~~10/10/23~~	1210	G	W	N/Y		X	X	X	X	X	X	X			

Preservation Codes

A	HCL	M	Hexane
B	NaOH	N	None
C	Zn Acetate	O	AsNaO2
D	Nitric Acid	P	Na2O4S
E	NaHSO4	Q	Na2SO3
F	MeOH	R	Na2S2O3
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:

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

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

Deliverable Requested I II III IV Other (specify)

Special Instructions/QC Requirements

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

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Tyler S	10/13/23 2:00	SCS			
2						
3				MC	10/13/23 1730	

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

Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Table 1. Sampling Points and Parameters CCR Rule Sampling Program
Groundwater Monitoring Ottumwa Generating Station / SCS Engineers Project #25222072

		COC #1 (Background)		COC #2 (Ash Pond)														COC #3 (ZLDP)				Surface Water Points			Water Levels Only					
	Parameter	MW-301	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-316	MW-316A	MW-317	MW-307	MW-308	MW-309	MW-315	Piling near MW-310	Avery Creek Gauge 1	Avery Creek Gauge 2	MW 302WT	MW 304WT	MW-306WT	MW-314	MW-314WT	TOTAL
Appendix III Parameters	Boron	x	x	x	x	x	x		x										x	x	x	x									10
	Calcium	x	x	x	x	x	x		x					x	x	x	x	x	x	x	x	x									15
	Chloride	x	x	x	x	x	x		x										x	x	x	x									10
	Fluoride	x	x	x	x	x	x		x										x	x	x	x									10
	pH	x	x	x	x	x	x		x										x	x	x	x									10
	Sulfate	x	x	x	x	x	x		x										x	x	x	x									10
	TDS	x	x	x	x	x	x		x										x	x	x	x									10
Appendix IV Parameters	Antimony	x	x	x	x	x	x		x										x	x	x	x									10
	Arsenic	x	x	x	x	x	x		x										x	x	x	x									10
	Barium	x	x	x	x	x	x		x										x	x	x	x									10
	Beryllium	x	x	x	x	x			x										x	x	x	x									10
	Cadmium	x	x	x	x	x	x		x										x	x	x	x									10
	Chromium	x	x	x	x	x	x		x										x	x	x	x									10
	Cobalt	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									20
	Fluoride	x	x	x	x	x	x		x										x	x	x	x									10
	Lead	x	x	x	x	x			x										x	x	x	x									10
	Lithium	x	x	x	x	x			x										x	x	x	x									10
	Mercury	x	x	x	x	x			x										x	x	x	x									10
	Molybdenum	x	x	x	x	x			x										x	x	x	x									10
	Selenium	x	x	x	x	x			x										x	x	x	x									10
	Thallium	x	x	x	x	x			x										x	x	x	x									10
	Radium	x	x	x	x	x			x										x	x	x	x									10
Additional Lab Parameters	Bicarbonate (total)													x	x	x	x	x				x									5
	Carbonate (total)													x	x	x	x	x				x									5
	Iron (total)	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									20
	Magnesium (total)													x	x	x	x	x				x									5
	Manganese (total)													x	x	x	x	x				x									5
	Potassium (total)													x	x	x	x	x				x									5
	Sodium (total)													x	x	x	x	x				x									5
	Cobalt (filtered)								x										x			x									3
	Iron (filtered)													x	x	x	x	x				x									5
	Manganese (filtered)													x	x	x	x	x				x									5
Field Parameters	Groundwater Elevation	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	25
	Surface Water Elevation																						x	x	x						1
	pH (field)	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Specific Conductance	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Dissolved Oxygen	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	ORP	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Temperature	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Turbidity	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Color	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19
	Odor	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x									19

Notes. All samples are unfiltered (total).

I:\25223072.00\Data and Calculations\Field Work Requests\[OGS CCR_Rule_ Sampling_2304.xls]Sheet1

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

Chain of Custody Record

eurofins Environment Testing

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Fredrick, Sandie	Carrier Tracking No(s):	COC No: 310-67292.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Sandra.Fredrick@et.eurofinsus.com	State of Origin: Iowa	Page: Page 1 of 1
Company: TestAmerica Laboratories, Inc.		Accreditations Required (See note): State Program - Iowa		Job #: 310-267274-1
Address: 13715 Rider Trail North,	Due Date Requested: 11/15/2023	Analysis Requested		Preservation Codes:
City: Earth City	TAT Requested (days):			
State, Zip: MO, 63045				
Phone: 314-298-8566(Tel) 314-298-8757(Fax)	PO #:			
Email:	WO #:			
Project Name: Ottumwa Generating Station 25223072	Project #: 31011020			
Site:	SSOW#:			

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

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/PrecSep_21 Radium-226 (GFPC)	904.0/PrecSep_0 Radium-228 (GFPC)	Ra226_228GFPC_P/ Combined Radium-226 and Radium-228	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
MW-307 (310-267274-1)	10/10/23	09:50 Central		Water			X	X	X	1	DO NOT SHIP ON ICE TO ST. LOUIS

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing North Central, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing North Central, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC.

Possible Hazard Identification
Unconfirmed
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2

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

Empty Kit Relinquished by:		Date:	Time:	Method of Shipment:	
Relinquished by: [signature]	Date/Time: 11/9/23 1505	Company	Received by: Fedex	Date/Time:	Company
Relinquished by: Fedex	Date/Time:	Company	Received by: M. Pinotto	Date/Time: 11/9/23 0900	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

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

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-267274-1

Login Number: 267274
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	

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-267274-1

Login Number: 267274
List Number: 2
Creator: Pinette, Meadow L

List Source: Eurofins St. Louis
List Creation: 10/17/23 02:51 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
Job ID: 310-267274-1
Project/Site: Ottumwa Generating Station 25223072

Method: 903.0 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Ba (30-110)
310-267274-1	MW-307	91.2
310-267274-2	MW-308	99.0
310-267274-3	MW-309	100
310-267274-4	MW-315	99.5
LCS 160-632484/2-A	Lab Control Sample	63.1
MB 160-632484/1-A	Method Blank	34.0

Tracer/Carrier Legend

Ba = Barium

Method: 904.0 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (30-110)	Y (30-110)
310-267274-1	MW-307	95.6	79.3
310-267274-2	MW-308	99.0	82.6
310-267274-3	MW-309	100	86.4
310-267274-4	MW-315	99.5	88.6
LCS 160-632485/2-A	Lab Control Sample	63.1	78.1
LCS 160-636344/2-A	Lab Control Sample	100	83.7
LCSD 160-636344/3-A	Lab Control Sample Dup	91.3	78.9
MB 160-632485/1-A	Method Blank	34.0	77.4
MB 160-636344/1-A	Method Blank	94.6	78.9

Tracer/Carrier Legend

Ba = Barium
Y = Y Carrier

Table 1. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station / SCS Engineers Project No. 25223072.00
October 2023

	Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmhos/cm)	ORP (mV)	Turbidity
Background	MW-301	10/13/2023 1000	680.20	17.6	6.24	3.20	1158	104.7	1.75
Ash Pond	MW-302	--	652.32	--	--	--	--	--	--
	MW-303	--	648.07	--	--	--	--	--	--
	MW-304	10/10/2023 850	646.02	13.3	6.85	0.18	1948	-105.1	7.07
	MW-305	10/12/2023 1135	650.21	13.7	6.88	0.26	1869	4.7	3.25
	MW-305A	10/13/2023 1025	643.60	17.8	6.87	5.74	1357	88.1	12.32
	MW-306	10/12/2023 1055	655.40	13.6	6.63	0.29	1794	25.3	1.90
	MW-310	10/10/2023 1600	638.32	14.7	7.06	0.45	1344	7.5	6.05
	MW-310A	10/12/2023 1215	640.13	14.3	7.50	5.60	3355	46.0	4.96
	MW-311	10/11/2023 1650	638.31	19.6	7.01	7.69	685	37.9	--
	MW-311A	10/11/2023 1515	639.84	13.2	7.72	3.15	3424	-4.2	14.16
	MW-312	10/12/2023 1645	639.45	14.6	6.96	0.23	1827	-26.5	5.45
	MW-313	10/10/2023 1445	639.04	13.9	6.89	0.23	2106	-47.9	6.85
	MW-316	10/12/2023 1350	639.15	16.1	6.73	0.74	1773	61.0	7.20
	MW-316A	10/10/2023 1230	639.79	17.2	7.53	3.43	2399	49.5	43.00
	MW-317	10/12/2023 1535	639.08	13.7	6.54	0.09	1853	-38.7	6.25
ZLDP	MW-307	10/10/2023 950	642.85	12.6	6.56	0.20	1856	-35.0	6.40
	MW-308	10/10/2023 1045	640.79	12.7	6.66	0.22	1704	-54.0	6.31
	MW-309	10/10/2023 1305	640.18	13.3	7.01	0.25	1598	-54.3	8.35
	MW-315	10/10/2023 1210	641.10	13.1	6.93	0.29	1615	-79.7	9.42

Abbreviations:
mg/L = milligrams per liter amsl = above mean sea level NA = Not Analyzed NM= Not Measured

Created by: RM Date: 10/25/2023
Last revision by: RM Date: 10/25/2023
Checked by: JSN Date: 10/27/2023

C:\Users\hld0\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\USG3GGGC\[2310_Oct - OGS combined_CCR_Field.xlsx]GW Field Parameters

Appendix D

Historical Monitoring Results

Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-301
Number of Sampling Dates: 26

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	4/6/2023	10/13/2023
Boron	ug/L	574	612	597	620	599	565	657	779	488	480	735	--	410	--	380	680	540	--	700	650	690	800	640	780	530	760
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	76	94
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	120	150
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	<0.22	<0.38
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	6.25	6.24
Sulfate	mg/L	150	157	159	169	171	190	166	162	178	186	--	181	164	--	81	130	130	--	140	140	140	180	160	180	160	190
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	580	680
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	<1	<1
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	<0.53	<0.53
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	31	48
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	<0.33	<0.33
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	<0.1	<0.1
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	<1.1	<1.1
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	0.21	0.2
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	<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	17	25
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	<0.14	<0.14
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	<0.91	1.1
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	4.7	5.8
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	<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	0.0491	0.681
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	0.0491	0.25
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	-0.135	0.431
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	832	1158
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	7.1	17.6
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	682.05	680.2
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	5.05	3.2
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	2.37	1.75
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	6.7	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	124.5	104.7
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	58	<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	<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: 26

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	4/5/2023	10/10/2023
Boron	ug/L	207	205	197	197	214	200	--	210	--	195	240	200	190	200	240	260	--	200	--	230	--	250	--	250	250	210
Calcium	mg/L	230	241	229	221	227	220	--	239	--	222	240	230	230	210	240	240	--	250	--	240	--	260	--	260	230	220
Chloride	mg/L	210	201	213	219	217	224	--	--	223	293	220	220	200	220	230	230	--	210	--	240	--	330	--	260	<2.3	270
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	<0.22	<0.38
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	6.62	6.56
Sulfate	mg/L	105	105	110	102	102	103	--	--	105	104	100	95	92	100	99	100	--	92	--	110	--	140	--	130	130	140
Total Dissolved Solids	mg/L	1050	1100	1070	1050	1030	--	1100	--	1070	1070	1000	1000	1000	970	980	1000	--	1000	--	1000	--	1100	--	1100	1200	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	<1	<1
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	<0.53	0.62
Barium	ug/L	127	139	132	128	131	126	--	147	--	145	--	--	140	130	140	140	--	160	--	140	--	150	--	130	130	120
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	<0.33	<0.33
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	<0.1	<0.1
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	<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	30	36
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	<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	11	12
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	<0.14	<0.14
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	<0.91	<0.91
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	<1.4	<1.4
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	<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	1.51	1.83
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	1.17	1.3
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	0.343	0.527
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	1776	1856
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	11.9	12.6
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	647.28	642.85
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	0	0.2
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	0.02	6.4
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	7	7.5
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	31.9	-35
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	2700	2900
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	32	36
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: 22

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	4/5/2023	10/10/2023
Boron	ug/L	218	146	182	214	240	210	--	153	--	162	190	220	160	220	210	270	220	200	300	260	280	230
Calcium	mg/L	212	222	209	218	212	229	--	215	--	209	240	240	220	210	240	220	230	230	240	240	210	210
Chloride	mg/L	151	149	146	151	156	153	--	--	158	158	160	160	150	160	170	160	150	170	180	160	150	170
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	<0.22	<0.38
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	6.7	6.66
Sulfate	mg/L	296	283	303	294	297	305	--	--	310	311	300	300	280	300	290	290	270	290	320	290	300	300
Total Dissolved Solids	mg/L	1060	1100	1050	1020	1120	--	1090	--	1080	1110	1200	1100	1100	1100	1000	1000	1100	1000	1000	1000	1100	1100
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	<1	<1
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	<0.53	0.53
Barium	ug/L	118	118	125	132	133	123	--	134	--	143	--	--	130	130	140	130	140	130	140	120	110	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	<0.33	<0.33
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	<0.1	<0.1
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	<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	0.45	0.17
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	<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	14	15
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	<0.14	<0.14
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	<0.91	<0.91
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	<1.4	<1.4
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	<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	1.81	2.29
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	1.31	1.49
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	0.508	0.801
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	1634	1704
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	11.7	12.7
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	645.16	640.79
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	0.18	0.22
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	1.55	6.31
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	7	7.6
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	7.3	-54
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	3200	3600
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: 22

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	4/5/2023	10/10/2023
Boron	ug/L	1300	1280	1250	1320	1360	1340	--	1360	--	1280	1500	1300	1100	1300	1400	1200	1400	1300	1600	1400	1400	1300
Calcium	mg/L	134	152	136	135	135	150	--	181	--	139	160	150	150	130	150	120	130	120	150	160	140	140
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	65	68
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	<0.22	<0.38
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	7.1	7.01
Sulfate	mg/L	406	393	415	395	402	373	--	--	417	453	410	400	370	370	390	380	360	400	420	420	450	480
Total Dissolved Solids	mg/L	1030	1030	1020	1010	1010	--	1050	--	1030	1040	1100	1100	980	990	1000	930	940	950	940	1100	1000	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	<1	<1
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	<0.53	0.59
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	51	55
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	<0.33	<0.33
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	<0.1	<0.1
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	<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	2	2.3
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	<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	7.8	8.3
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	<0.14	<0.14
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	<0.91	<0.91
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	<1.4	<1.4
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	<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	0.882	1.27
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	0.71	0.808
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	0.172	0.462
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	1511	1598
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	11.7	13.3
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	644.41	640.18
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	0.42	0.25
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	0.02	8.35
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	7.3	7.8
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	-7	-54.3
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	720	990
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	--	--

Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-315
Number of Sampling Dates: 4

Parameter Name	Units	2/2/2023	3/6/2023	4/5/2023	10/10/2023
Boron	ug/L	1300	--	1100	1100
Calcium	mg/L	140	--	120	120
Chloride	mg/L	45	--	45	55
Fluoride	mg/L	<0.22	--	0.22	<0.38
Field pH	Std. Units	6.94	6.86	6.96	6.93
Sulfate	mg/L	450	--	460	500
Total Dissolved Solids	mg/L	940	--	1100	1000
Antimony	ug/L	<0.69	--	<1	<1
Arsenic	ug/L	1.3	--	1.3	1.6
Barium	ug/L	36	--	35	35
Beryllium	ug/L	<0.27	--	<0.33	<0.33
Cadmium	ug/L	<0.055	--	<0.1	<0.1
Chromium	ug/L	<1.1	--	<1.1	<1.1
Cobalt	ug/L	7	6.4	7	6.6
Lead	ug/L	<0.24	--	<0.24	<0.24
Lithium	ug/L	6.2	--	5.3	5.4
Mercury	ug/L	<0.11	--	<0.14	<0.14
Molybdenum	ug/L	1.5	--	1.4	1.3
Selenium	ug/L	<0.96	--	<1.4	<1.4
Thallium	ug/L	<0.26	--	<0.26	<0.26
Total Radium	pCi/L	1.46	--	1.42	1.29
Radium-226	pCi/L	0.665	--	0.738	0.595
Radium-228	pCi/L	0.797	--	0.682	0.694
Field Specific Conductance	umhos/cm	1293	1539	1523	1615
Field Temperature	deg C	12.7	12.4	11.8	13.1
Groundwater Elevation	feet	642.4	648.55	645.12	641.1
Oxygen, Dissolved	mg/L	1.44	0.86	0.32	0.29
Turbidity	NTU	1.53	2.25	0.02	9.42
pH at 25 Degrees C	Std. Units	7.1	--	7.2	8.3
Field Oxidation Potential	millivolts	-6.3	-60.9	-45.7	-79.7
Bicarbonate Alkalinity as CaCO3	mg/L	300	--	320	280
Carbonate Alkalinity as CaCO3	mg/L	<2.3	--	<2.5	<2.5
Total Alkalinity as CaCO3	mg/L	300	--	320	280
Iron, total	ug/L	3000	--	2800	2900
Magnesium, total	ug/L	22000	--	19000	21000
Manganese, dissolved	ug/L	6400	--	--	6800
Potassium, total	ug/L	2000	--	1400	1800
Sodium, total	ug/L	220000	--	200000	200000
Cobalt, dissolved	ug/L	7	6.5	--	7.3
Iron, dissolved	ug/L	3000	--	2700	2400
Manganese, total	ug/L	6300	--	6700	12000

Appendix E

Statistical Evaluation

E1 LCL Evaluation for April 2023

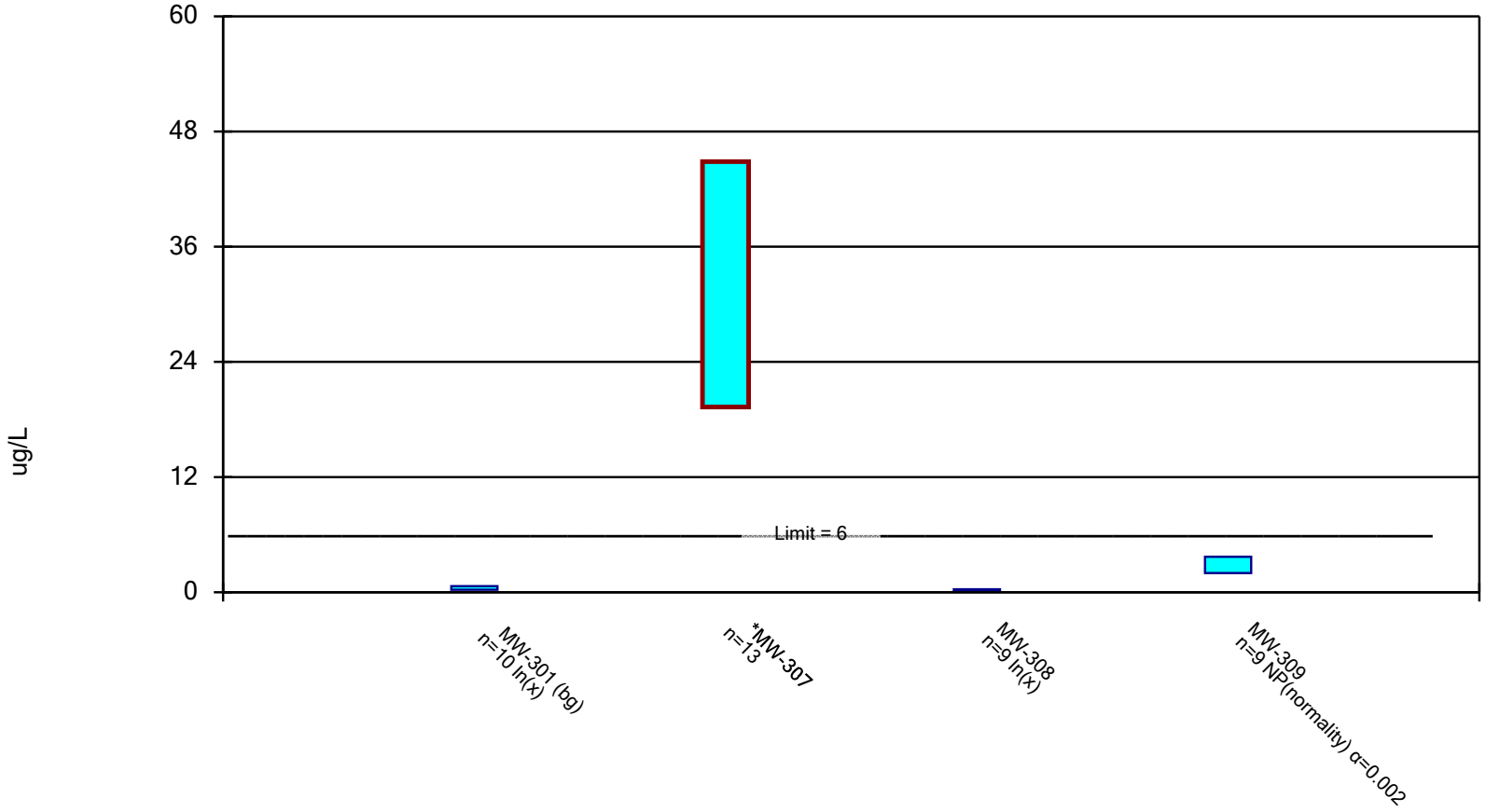
Confidence Interval

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122 Printed 6/26/2023, 4:39 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	ND Adj.	Transform	Alpha	Method
Cobalt (ug/L)	MW-301 (bg)	0.6306	0.2598	6	No	10	0	None	ln(x)	0.01	Param.
Cobalt (ug/L)	**MW-307**	**44.86**	**19.3**	**6**	**Yes**	**13**	**0**	**None**	**No**	**0.01**	**Param.**
Cobalt (ug/L)	MW-308	0.2998	0.1407	6	No	9	0	None	ln(x)	0.01	Param.
Cobalt (ug/L)	MW-309	3.7	2	6	No	9	0	None	No	0.002	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 6/26/2023 4:38 PM View: OGS - Ash Pond

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Confidence Interval

Constituent: Cobalt (ug/L) Analysis Run 6/26/2023 4:39 PM View: OGS - Ash Pond
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
4/5/2023		30	0.45 (J)	2
4/6/2023	0.21 (J)			
Mean	0.456	32.08	0.2211	2.411
Std. Dev.	0.2603	17.19	0.0988	0.6153
Upper Lim.	0.6306	44.86	0.2998	3.7
Lower Lim.	0.2598	19.3	0.1407	2

E2 LCL Evaluation for October 2023

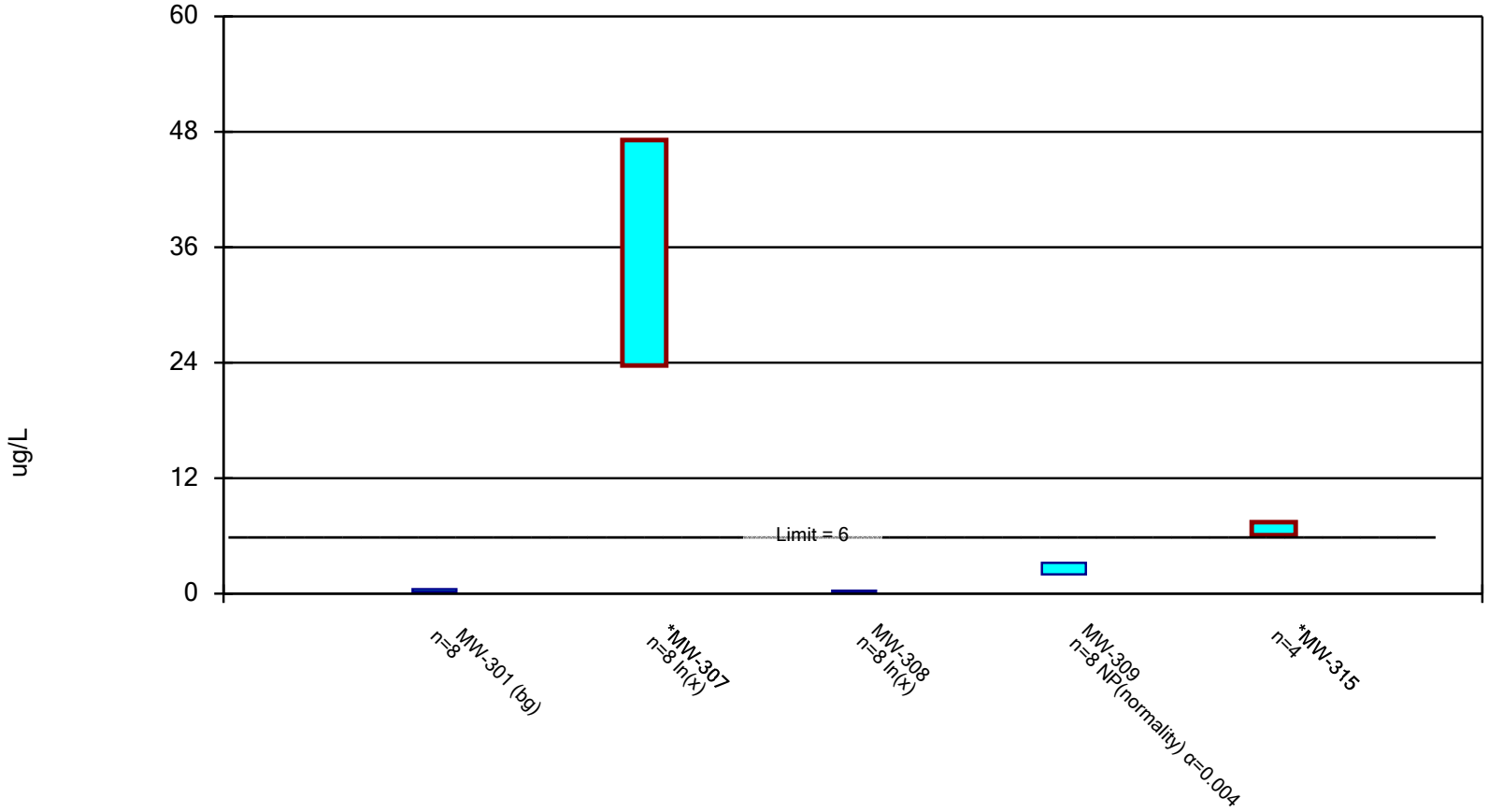
Confidence Interval

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122 Printed 2/13/2024, 5:19 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	%NDs	ND Adj.	Transform	Alpha	Method
Cobalt (ug/L)	MW-301 (bg)	0.4613	0.1962	6	No	8	0	None	No	0.01	Param.
Cobalt (ug/L)	**MW-307**	**47.15**	**23.71**	**6**	**Yes**	**8**	**0**	**None**	**ln(x)**	**0.01**	**Param.**
Cobalt (ug/L)	MW-308	0.3087	0.1353	6	No	8	0	None	ln(x)	0.01	Param.
Cobalt (ug/L)	MW-309	3.2	2	6	No	8	0	None	No	0.004	NP (normality)
Cobalt (ug/L)	**MW-315**	**7.431**	**6.069**	**6**	**Yes**	**4**	**0**	**None**	**No**	**0.01**	**Param.**

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 2/13/2024 5:18 PM View: OGS - Ash Pond

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Confidence Interval

Constituent: Cobalt (ug/L) Analysis Run 2/13/2024 5:19 PM View: OGS - Ash Pond
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

	MW-301 (bg)	MW-307	MW-308	MW-309	MW-315
4/14/2020	0.52		0.14 (J)	3.2	
10/7/2020			0.14 (J)	2	
10/8/2020	0.41 (J)				
4/14/2021	0.29 (J)		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	
2/2/2023					7
3/6/2023					6.4
4/5/2023		30	0.45 (J)	2	7
4/6/2023	0.21 (J)				
10/10/2023		36	0.17 (J)	2.3	6.6
10/13/2023	0.2 (J)				
Mean	0.3288	35.13	0.22	2.25	6.75
Std. Dev.	0.1251	12.65	0.1018	0.4071	0.3
Upper Lim.	0.4613	47.15	0.3087	3.2	7.431
Lower Lim.	0.1962	23.71	0.1353	2	6.069