

2020 Annual Groundwater Monitoring and Corrective Action Report

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

Prepared for:



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SCS ENGINEERS

25221072.00 | May 26, 2021

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OVERVIEW OF CURRENT STATUS

Ottumwa Generating Station, Zero Liquid Discharge Pond 2020 Annual Report

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

Category	Rule Requirement	Site Status
Monitoring Status – Start of Year	(i) At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95;	Assessment
Monitoring Status – End of Year	(ii) At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95;	Assessment
Statistically Significant Increases (SSIs)	(iii) If it was determined that there was a statistically significant increase over background for one or more constituents listed in Appendix III to this part pursuant to §257.94(e):	
	(A) Identify those constituents listed in Appendix III to this part and the names of the monitoring wells associated with such an increase; and	<u>February 2020</u> Boron: MW-309 Calcium: MW-307, MW-308, MW-309 Chloride: MW-307, MW-308 Field pH: MW-309 Sulfate: MW-308, MW-309 Total Dissolved Solids: MW-307, MW-308, MW-309

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

Category	Rule Requirement	Site Status
Statistically Significant Levels (SSL) Above Groundwater Protection Standard	(iv) If it was determined that there was a statistically significant level above the groundwater protection standard for one or more constituents listed in Appendix IV to this part pursuant to §257.95(g) include all of the following:	
	(A) Identify those constituents listed in Appendix IV to this part and the names of the monitoring wells associated with such an increase;	<u>February 2020</u> Cobalt: MW-307 <u>April 2020</u> Cobalt: MW-307 <u>October 2020</u> None
	(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;	Not Applicable – Alternative Source Demonstration completed for Feb/April 2020 SSL above GPS
	(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and	Not Applicable – ACM not required.
	(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.	Not Applicable – ACM not required.
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	Not applicable – Selection of remedy not required
Corrective Action	(vi) Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.	Not applicable – Remedial activities not required

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Table of Contents

Section	Page
OVERVIEW OF CURRENT STATUS.....	i
1.0 Introduction.....	1
2.0 Background.....	1
2.1 Geologic and HydroGeologic Setting.....	1
2.1.1 Regional Geologic Information	1
2.1.2 Site Information	2
2.2 CCR Rule Monitoring System	2
3.0 §257.100(e)(5) Groundwater Monitoring and Corrective Action for Inactive CCR Surface Impoundments	3
4.0 §257.90(e) Annual Report Requirements.....	3
4.1 §257.90(e)(1) Site Map.....	3
4.2 §257.90(e)(2) Monitoring System Changes.....	3
4.3 §257.90(e)(3) Summary of Sampling Events.....	4
4.4 §257.90(e)(4) Monitoring Transition Narrative.....	4
4.5 §257.90(e)(5) Other Requirements.....	5
4.5.1 §257.90(e) General Requirements.....	5
4.5.2 §257.94(d) Alternative Detection Monitoring Frequency.....	6
4.5.3 §257.94(e)(2) Alternative Source Demonstration for Detection Monitoring	6
4.5.4 §257.95(c) Alternative Assessment Monitoring Frequency	6
4.5.5 §257.95(d)(3) Assessment Monitoring Results and Standards	7
4.5.6 §257.95(g)(3)(ii) Alternative Source Demonstration for Assessment Monitoring ..	7
4.5.7 §257.96(a) Extension of Time for Corrective Measures Assessment	7
5.0 §257.90(E)(6) Overview	7
6.0 References.....	8

Tables

Table 1.	Groundwater Monitoring Network
Table 2.	Groundwater Sample Summary
Table 3.	Groundwater Elevation Summary
Table 4.	Groundwater Gradients and Average Linear Velocities
Table 5.	2020 Groundwater Analytical Results Summary
Table 6.	2020 Groundwater Field Data Summary

Figures

- Figure 1. Site Location Map
- Figure 2. Site Plan and Monitoring Well Locations–Zero Liquid Discharge Pond
- Figure 3. Shallow Potentiometric Surface, April 13-14, 2020
- Figure 4. Deep Potentiometric Surface, April 13-14, 2020
- Figure 5. Shallow Potentiometric Surface, October 5-12, 2020
- Figure 6. Deep Potentiometric Surface, October 5-12, 2020

Appendices

- Appendix A Summary of Regional Hydrogeologic Stratigraphy
- Appendix B Boring Logs and Well Construction Documentation
- Appendix C Analytical Laboratory Reports
 - C1 February 2020 Assessment Monitoring
 - C2 April 2020 Assessment Monitoring
 - C3 October 2020 Assessment Monitoring
- Appendix D Historical Monitoring Results
- Appendix E Alternative Source Demonstration Report
- Appendix F Statistical Evaluation

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1.0 INTRODUCTION

This 2020 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 (USEPA) in the *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities*; Final Rule, dated April 17, 2015 (USEPA, 2015) and subsequent amendments. Specifically, this report was prepared to fulfill the requirements of 40 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 2020 Annual Groundwater Monitoring and Corrective Action Report for the CCR unit.

This report covers the period of groundwater monitoring from January 1, 2020, through December 31, 2020.

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

- OGS ZLDP (inactive CCR surface impoundment)

The system is designed to detect monitored constituents at the waste boundary of the OGS ZLDP as required by 40 CFR 257.91(d). The groundwater monitoring system consists of one upgradient and three downgradient monitoring wells (**Table 1**, **Figure 1**, and **Figure 2**).

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

2.0 BACKGROUND

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

- Geologic and hydrogeologic setting
- CCR Rule monitoring system

2.1 GEOLOGIC AND HYDROGEOLOGIC SETTING

2.1.1 Regional Geologic Information

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

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

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

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

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

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

2.1.2 Site Information

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

The shallow and deep potentiometric surfaces and groundwater flow patterns based on April 2020 water level measurements are shown on **Figures 3** and **4**. The shallow and deep potentiometric surfaces and groundwater flow patterns for the October 2020 water level measurements are shown on **Figures 5** and **6**. These maps are based on water levels measured at all OGS monitoring wells, including the ZLDP compliance wells, Ash Pond compliance wells, and additional delineation wells installed for the ACM and selection of remedy for the Ash Pond CCR unit. All four potentiometric surface maps show groundwater flow moving to the east, following the same flow patterns observed in regional flow maps of the area.

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

2.2 CCR RULE MONITORING SYSTEM

The groundwater monitoring system established in accordance with the CCR Rule consists of one upgradient (background) monitoring well and three downgradient monitoring for the OGS ZLDP (**Table 1** and **Figure 2**). The background well is MW-301 and the three downgradient compliance

wells include MW-307, MW-308, and MW-309. The CCR Rule wells are installed in the Mississippian aquifer and/or hydraulically connected overlying unconsolidated deposits, which comprise the uppermost aquifer unit at the site. Well depths range from approximately 15 to 28 feet.

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

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

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

This report is submitted to fulfill the report requirement.

4.0 §257.90(E) ANNUAL REPORT REQUIREMENTS

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

4.1 §257.90(E)(1) SITE MAP

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

A map showing the site location of the OGS site is provided as **Figure 1**. A map showing the site layout and all background (or upgradient) and downgradient monitoring wells with identification numbers for the groundwater monitoring program 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;

No new monitoring wells were installed and no wells were decommissioned as part of the groundwater monitoring program for the OGS ZLDP in 2020.

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;

Three groundwater sampling events were completed for the inactive OGS ZLDP CCR unit in 2020. One assessment monitoring event occurred in February 2020. Two semiannual sampling events occurred in April 2020 and October 2020. As described in **Section 4.4**, the site transitioned to an assessment monitoring program in 2019. The first round of assessment monitoring sampling was completed in December 2019.

The sampling results for Appendix III and Appendix IV parameters in 2020 are summarized in **Table 5**. Field parameter results for the 2020 sampling events are provided in **Table 6**. The analytical laboratory reports for 2020 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);

Assessment monitoring for the ZLDP was initiated in January 2020. The statistical evaluation of the April 2019 detection monitoring results, completed on July 16, 2019, identified statistically significant increases (SSIs) in boron, calcium, chloride, field pH, and total dissolved solids (TDS) at one or more of the ZLDP compliance wells. Interstate Power and Light Company (IPL) collected the first round of assessment monitoring samples in December 2019 and established an assessment monitoring program on January 13, 2020, in accordance with §257.95(b).

The statistical evaluation of the October 2019 results was completed in January 2020. The initial evaluation of assessment groundwater monitoring performed at OGS included the December 2019, February 2020, and April 2020 results and was completed in July 2020.

USEPA's Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (EPA 530-R-09-007, March 2009) recommends the use of confidence intervals for comparison of assessment monitoring data to fixed GPS values. Specifically, the suggested approach for comparing assessment groundwater monitoring data to GPS values based on long-term chronic health risk, such as drinking water Maximum Contaminant Levels (MCLs), is to compare the lower confidence limit around the arithmetic mean with the fixed GPS.

Although a confidence interval approach is recommended, a minimum of four samples are required for this approach, and for the April 2020 event only three assessment monitoring compliance samples had been collected to date; therefore, the initial evaluation was based on a direct comparison of the results to the GPS values. A confidence interval approach was used beginning with the October 2020 event when a fourth sample was obtained.

For the initial assessment monitoring events, evaluated in July 2020, the only assessment monitoring parameter for which a monitoring result exceeded the GPS was cobalt in the samples from MW-307. Cobalt exceeded the GPS in the samples from MW-307 for all three initial assessment

monitoring events. On October 12, 2020, an alternative source demonstration (ASD) was completed for cobalt at MW-307 (**Appendix E**). The ASD concluded that, based on the available data, the most likely source of the GPS exceedance for cobalt at MW-307 was the adjacent Ash Pond, and not the OGS ZLDP. The OGS Ash Pond is currently in the corrective action process in response to the cobalt concentrations observed at the Ash Pond downgradient wells.

For the October 2020 event, evaluated in January 2021, an Lower Confidence Level (LCL) evaluation was 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 most recent LCL evaluation, completed for the October event is provided in **Appendix F**.

For the October 2020 event, cobalt was not determined to be at a statistically significant level (SSL) above the GPS, because the LCL for the mean was below the GPS. Based on these results, the site remained in assessment monitoring. The calculated LCL was only slightly below the GPS, and if future cobalt results at MW-307 continue to exceed the GPS, then the LCL may increase above the GPS, indicating that cobalt is at an SSL above the GPS. Whether or not at an SSL, the most likely source for the detected cobalt concentrations at MW-307 appears to be the Ash Pond CCR Unit, as described in the ASD (**Appendix E**).

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 2020 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 transitioned from detection monitoring to assessment monitoring in 2020.

Summary of Key Actions Completed.

- Establishment of assessment monitoring program (January 13, 2020).
- Statistical evaluation and determination of SSIs for the October 2019 monitoring event (January 13, 2020).
- The second round of initial assessment monitoring (February 2020).

- The initial statistical evaluation of assessment groundwater monitoring for the OGS ZLDP, in December 2019, February 2020, and April 2020, was completed July 13, 2020.
- Two semiannual groundwater sampling and analysis events (April and October 2020).

Description of Any Problems Encountered: No problems were encountered during the groundwater sampling events in 2020.

Discussion of Actions to Resolve the Problems: Not Applicable.

Projection of Key Activities for the Upcoming Year (2021):

- Statistical evaluation and determination of any SSLs exceeding the GPS for the October 2020 monitoring event (by January 15, 2021).
- Two Semiannual Groundwater Sampling and Analysis Events (April and October 2021).
- Statistical evaluation and determination of any SSLs exceeding the GPS for the April 2021 monitoring event (by July 15, 2021).
- IPL will be closing the pond by dewatering and excavating CCR starting in the summer of 2021.

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. OGS ZLDP is no longer in 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. OGS ZLDP is no longer in 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 2020 assessment monitoring results, background upper prediction limits (UPLs), and GPSs established for the ZLDP 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 2020 to support the selection of remedy process for the OGS Ash Pond CCR unit. 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.

An ASD for cobalt at MW-307 was completed in October 2020 to address the observed cobalt concentrations above the GPS for the initial assessment monitoring events. The ASD is provided in **Appendix F** and includes certification by a qualified professional engineer.

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. Corrective measures assessment has not been initiated.

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 (USEPA), 2009, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, EPA 530-R-09-007, March 2009.

Tables

- 1 Groundwater Monitoring Well Network
- 2 Groundwater Samples Summary
- 3 Groundwater Elevation Summary
- 4 Groundwater Gradients and Average Linear Flow Velocities
- 5 2020 Groundwater Analytical Results Summary
- 6 2020 Groundwater Field Data Summary

**Table 1. Groundwater Monitoring Well Network
Ottumwa Generating Station - Zero Liquid Discharge Pond
SCS Engineers Project #25221072.00**

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

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

Date: 12/14/2020
 Date: 2/2/2021
 Date: 2/9/2021

**Table 2. Groundwater Samples Summary
 Ottumwa Generating Station - Zero Liquid Discharge Pond
 SCS Engineers Project #25221072.00**

Sample Dates	Compliance Wells			Background Well
	MW-307	MW-308	MW-309	MW-301
2/5/2020	A	A	A	A
4/14/2020	A	A	A	A
10/7/2020	A	A	A	A
Total Samples	3	3	3	3

Abbreviations:

A = Required by Assessment Monitoring Program

R-A = Resample for the Assessment Monitoring Program

Created by: NDK Date: 1/4/2018
 Last revision by: RM Date: 2/2/2021
 Checked by: NDK Date: 2/9/2021

I:\25220072.00\Deliverables\2020 Fed Annual Report - OGS ZLDP\Tables\[Table 2 - GW Samples Summary.xlsx]GW Summary

Table 3. Groundwater Elevation Summary
IPL - Ottumwa Generating Station / SCS Engineers Project #25220072.00

Ground Water or Surface Water Elevation in feet above mean sea level (amsl)															
Well Number	MW-301	MW-302	MW-303	MW-304	MW-305	MW-305A	MW-306	MW-307	MW-308	MW-309	MW-310	MW-310A	MW-311	MW-311A	River at Intake
Top of Well Casing Elevation / Surface Water Reference Elevation (feet amsl)	686.63	673.90	661.07	682.84	683.91	684.03	683.47	657.56	655.39	654.94	658.63	657.93	654.18	653.54	656.31
Screen Length (ft)	10.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	NA
Total Depth (ft from top of casing)	17.0	25.8	17.5	52.3	51.5	81.91	36.6	28.0	25.0	27.5	25.9	55.55	17.9	47.68	NA
Top of Well Screen Elevation (ft)	679.63	653.10	648.57	635.54	637.41	607.12	651.87	634.56	635.39	632.44	637.76	607.38	641.24	610.86	NA
Measurement Date															
April 26, 2016	682.80	655.63	652.42	655.37	661.67	NI	670.86	NI	NI	NI	NI	NI	NI	NI	NI
June 23, 2016	682.58	655.65	652.89	656.53	662.36	NI	670.64	NI	NI	NI	NI	NI	NI	NI	NI
August 9, 2016	682.27	655.52	651.76	653.79	660.78	NI	670.35	NI	NI	NI	NI	NI	NI	NI	NI
October 26-27, 2016	682.04	655.67	652.17	655.03	661.37	NI	670.21	NI	NI	NI	NI	NI	NI	NI	NI
January 18-19, 2017	681.67	655.46	651.74	654.50	660.87	NI	669.89	648.81	647.42	646.66	NI	NI	NI	NI	NI
April 19-20, 2017	682.15	656.35	654.57	657.48	663.27	NI	670.69	653.62	651.09	650.16	NI	NI	NI	NI	NI
June 20-21, 2017	681.91	655.65	652.42	654.75	661.26	NI	669.94	649.85	648.26	647.60	NI	NI	NI	NI	NI
August 21-23, 2017	681.28	655.13	650.58	652.39	659.00	NI	668.77	645.78	643.12	641.82	NI	NI	NI	NI	NI
November 8, 2017	681.54	655.40	651.34	653.03	659.76	NI	669.04	647.37	644.99	644.20	NI	NI	NI	NI	NI
April 18, 2018	681.53	655.71	652.47	655.55	660.99	NI	668.92	649.66	647.91	647.65	NI	NI	NI	NI	NI
May 30, 2018	NM	NM	NM	NM	NM	NI	NM	652.45	651.05	650.98	NI	NI	NI	NI	NI
June 28, 2018	NM	NM	NM	NM	NM	NI	NM	652.87	651.43	651.47	NI	NI	NI	NI	NI
July 18, 2018	NM	NM	NM	NM	NM	NI	NM	652.27	650.67	650.69	NI	NI	NI	NI	NI
August 14-15, 2018	680.91	656.05	652.57	656.35	661.56	NI	668.66	NM	NM	NM	NI	NI	NI	NI	NI
August 29, 2018	681.09	655.89	655.07	657.82	NM	NI	NM	NM	NM	NM	NI	NI	NI	NI	NI
October 16, 2018	682.50	656.91	656.17	658.20	663.37	NI	670.24	654.13	NM	651.61	NI	NI	NI	NI	NI
January 8, 2019	682.22	656.03	654.65	656.28	662.13	NI	669.84	NM	NM	NM	NI	NI	NI	NI	NI
April 8, 2019	682.69	657.23	655.55	659.33	664.01	NI	670.96	654.90	653.70	653.55	NI	NI	NI	NI	NI
August 28, 2019	NM	NM	NM	NM	NM	NI	NM	NM	NM	NM	640.98	NI	642.10	NI	NI
October 23-24, 2019	683.07	660.14	653.86	657.71	663.21	NI	671.28	651.89	651.31	651.28	649.31	NI	647.80	NI	NI
December 11, 2019	NM	NM	NM	NM	NM	NI	NM	649.59	647.39	647.24	NM	NI	NM	NI	NI
February 5, 2020	683.30	NM	NM	NM	NM	NI	NM	649.88	650.12	648.34	644.71	NI	645.00	NI	NI
March 12-13, 2020	682.82	NM	NM	NM	661.41	651.64	NM	NM	NM	NM	645.45	617.84	644.18	624.11	NI
April 1, 2020	683.27	657.00	655.89	658.57	660.59	655.05	671.13	653.76	651.88	651.23	651.09	649.16	649.35	648.27	649.71
April 13-14, 2020	683.25	656.45	654.08	656.42	662.44	653.69	670.71	650.66	650.09	649.19	645.91	647.50	646.79	648.42	645.71
May 4, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
June 30, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	647.73	NM
October 5-12, 2020	682.34	655.80	650.37	652.95	659.81	648.01	670.18	646.18	642.85	641.50	638.46	640.20	638.73	641.09	NM
Bottom of Well Elevation (ft)	669.63	648.10	643.57	630.54	632.41	602.12	646.87	629.56	630.39	627.44	632.76	602.38	636.24	605.86	--

Notes:
 NM = not measured
 NI = not installed

Created by: <u>KAK</u>	Date: <u>5/1/2017</u>
Last rev. by: <u>RM</u>	Date: <u>2/2/2021</u>
Checked by: <u>NDK</u>	Date: <u>2/9/2021</u>
Proj Mgr QA/QC: <u>TK</u>	Date: <u>4/25/2021</u>

06/10/2021 - Classification: Internal - ECRM12608563

**Table 4. Groundwater Gradients and Average Linear Velocity
Ottumwa Generating Station - Zero Liquid Discharge Pond /
SCS Engineers Project #25221072.00
January - December 2020**

Sampling Dates	Northeast				
	h1 (ft)	h2 (ft)	Δl (ft)	Δh/Δl (ft/ft)	V (ft/d)
4/13-14/2020	660.00	650.00	396	0.03	0.2
4/13-14/2020	660.00	650.00	294	0.03	0.3
10/5-12/2020	665.00	642.85	364	0.06	0.5
10/5-12/2020	655.00	640.00	501	0.03	0.2

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

Assumed Porosity, n
0.40

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

ft = feet

ft/d = feet per day

K = hydraulic conductivity

n = effective porosity

V = groundwater flow velocity

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

Δl = distance between location 1 and 2

Δh/Δl = hydraulic gradient

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

Date: 12/29/2020
Date: 12/31/2020
Date: 2/10/2021

Table 5. 2020 Groundwater Analytical Results Summary
Offumwa Generating Station - Zero Liquid Discharge Pond
SCS Engineers Project #25221072.00

Parameter Name	UPL Method	UPL	GPS	Background Wells			Compliance Wells								
				MW-301			MW-307			MW-308			MW-309		
				2/5/2020	4/14/2020	10/8/2020	2/5/2020	4/14/2020	10/7/2020	2/5/2020	4/14/2020	10/7/2020	2/5/2020	4/14/2020	10/7/2020
Appendix III															
Boron, ug/L	P	820		540	700	650 FI	200	240	260	220	210	270	1300	1400	1,200
Calcium, mg/L	P	78.7		68	84	94	210	240	240	210	240	220	130	150	120
Chloride, mg/L	P	86.8		120	140	170	220	230	230	160	170	160	68	69	68
Fluoride, mg/L	P	0.484		--	<0.23	<0.23	--	<0.23	<0.23	--	<0.23	<0.23	--	0.36 J	<0.23
Field pH, Std. Units	P	6.87		6.39	6.58	6.22	6.67	6.76	6.97	6.78	6.90	7.24	7.09	7.21	7.57
Sulfate, mg/L	P	199		130	140	140	100	99	100	300	290	290	370	390	380
Total Dissolved Solids, mg/L	P	628		570	550	660	970	980	1,000 H	1100	1,000	1,000 H	990	1000	930 H
Appendix IV															
Antimony, ug/L	P*	0.22	6	--	<0.58	<0.51	--	<0.58	--	--	<0.58	--	--	<0.58	--
Arsenic, ug/L	P*	0.53	10	<0.88	<0.88	<0.88	<0.88	<0.88	<0.88	<0.88	<0.88	<0.88	<0.88	0.88 J	<0.88
Barium, ug/L	P	68.8	2,000	43	54	58	130	140	140	130	140	130	46	50	42
Beryllium, ug/L	DQ	DQ	4	--	<0.27	--	--	<0.27	--	--	<0.27	--	--	<0.27	--
Cadmium, ug/L	NP*	0.12	5	<0.039	<0.039	0.01 J	<0.039	<0.039	--	<0.039	<0.039	--	<0.039	<0.039	--
Chromium, ug/L	P	1.07	100	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	1.3 J	<1.1
Cobalt, ug/L	NP	4.10	6	1.1	0.52	0.41 J	13	20	18	0.14 J	0.14 J	0.14 J	2.3	3.2	2.0
Fluoride, mg/L	P*	0.484	4	--	<0.23	<0.23	--	<0.23	<0.23	--	<0.23	<0.23	--	0.36 J	<0.23
Lead, ug/L	NP*	0.10	15	<0.27	<0.27	<0.11	<0.27	0.31 J	<0.11	<0.27	<0.27	<0.11	0.63	1.6	<0.11
Lithium, ug/L	P	34.2	40	17	24	23	9.1 J	13	11	12	17	14	6.3 J	9.6 J	6.9 J
Mercury, ug/L	DQ	DQ	2	--	<0.10	--	--	<0.10	--	--	<0.10	--	--	<0.10	--
Molybdenum, ug/L	P	1.74	100	--	1.2 J	<1.1	--	<1.1	<1.1	--	<1.1	<1.1	--	<1.1	<1.1
Selenium, ug/L	P	8.55	50	--	6.8	7.7	--	<1.0	<1.0	--	<1.0	<1.0	--	<1.0	<1.0
Thallium, ug/L	NP*	0.14	2	--	<0.26	<0.26	--	<0.26	--	--	<0.26	--	--	<0.26	--
Radium 226/228 Combined, pCi/L	P	2.15	5	0.228	0.315	0.407	2.23	2.06	2.36	2.13	1.69	2.67	1.02	0.957	1.77
Supplemental Monitoring Parameters															
Cobalt - dissolved, # ug/L	UPL and GPS not applicable			--	0.44 J	--	--	19	19	--	0.11 J	--	--	2.2	--
Iron, dissolved, # ug/L	UPL and GPS not applicable			--	<50	<50	--	3100	3,600	--	4400	4,000	--	590	690
Iron, ug/L	UPL and GPS not applicable			--	50 J	<50	--	3800	3,500	--	5100	3,800	--	1900	890
Magnesium ug/L	UPL and GPS not applicable			--	33000	38,000	--	28000	27,000	--	25000	23,000	--	19000	18,000
Manganese, dissolved, # ug/L	UPL and GPS not applicable			--	16	13	--	290	350	--	770	1,400	--	660	660
Manganese, ug/L	UPL and GPS not applicable			--	19	14	--	310	290 FI	--	800	1,200	--	740	620
Potassium, ug/L	UPL and GPS not applicable			--	1500	1,500	--	1900	1,900	--	3900	4,000	--	670	670
Sodium, ug/L	UPL and GPS not applicable			--	77000	87,000	--	97000	100,000	--	110000	100,000	--	170000	180,000
Bicarbonate Alkalinity, mg/L	UPL and GPS not applicable			--	150	160	--	520	480	--	380	390	--	290	290
Carbonate Alkalinity, mg/L	UPL and GPS not applicable			--	<1.9	<3.8	--	<1.9	<3.8	--	<1.9	<3.8	--	<1.9	<1.9
Total Alkalinity, mg/L	UPL and GPS not applicable			--	150	160	--	520	480	--	380	390	--	290	290

06/10/2021 - Classification: Internal - ECRM12608563

**Table 5. 2020 Groundwater Analytical Results Summary
Ottumwa Generating Station - Zero Liquid Discharge Pond
SCS Engineers Project #25221072.00**

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 OGS Ash Pond selection of remedy and evaluation of Monitored Natural Attenuation.

Abbreviations:

UPL = Upper Prediction Limit

-- = Not Analyzed

P = Parametric UPL with 1-of-2 retesting

GPS = Groundwater Protection Standard

MNA = Monitored Natural Attenuation

F1 = MS and/or MSD recovery exceeds control limits

LOD = Limit of Detection

LOQ = Limit of Quantitation

DQ = Double Quantification Rule (not detected in background)

NP = Nonparametric UPL (highest background value)

J = Estimated concentration at or above the LOD and below the LOQ.

H = Sample was prepped or analyzed beyond the specific holding time

mg/L = milligrams per liter

ug/L = micrograms per liter

mg/L = milligrams per liter

ug/L = micrograms per liter

LOD = Limit of Detection

LOQ = Limit of Quantitation

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

Notes:

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

Created by: NDK
Last revision by: ZTW
Checked by: NDK
Proj Mgr QA/QC: SCC

Date: 6/12/2019
Date: 4/25/2021
Date: 4/25/2021
Date: 5/4/2021

06/10/2021 - Classification: Internal - ECRM12608563

Table 6. 2020 Groundwater Field Data Summary
Ottumwa Generating Station - Zero Liquid Discharge Pond / SCS Engineers Project #25221072.00

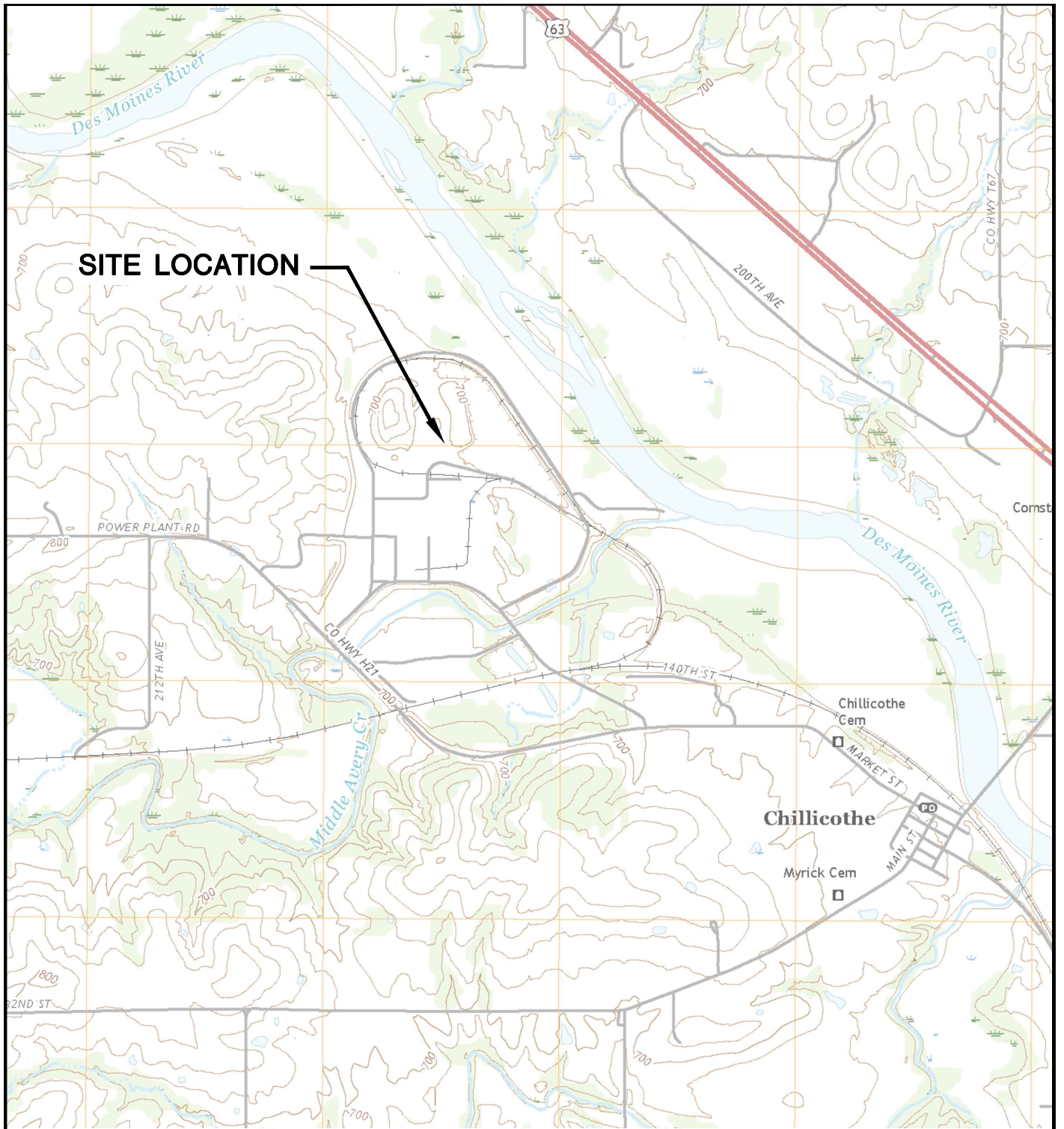
Well	Sample Date	Groundwater Elevation (feet)	Field Temperature (deg C)	Field pH (Std. Units)	Oxygen, Dissolved (mg/L)	Field Specific Conductance (umhos/cm)	Field Oxidation Potential (mV)	Turbidity (NTU)
MW-301	2/5/2020	683.30	5.38	6.39	7.28	966	68.0	1.43
	4/14/2020	683.25	8.70	6.58	5.14	939	176.3	0.87
	10/8/2020	682.34	15.40	6.22	4.20	1035	163.6	0.02
MW-307	2/5/2020	649.88	11.65	6.67	0.90	1681	-15.6	9.74
	4/14/2020	650.66	10.60	6.76	0.69	1554	-52.9	28.90
	10/7/2020	646.18	13.20	6.97	0.08	1637	-62.2	4.56
MW-308	2/5/2020	650.12	11.35	6.78	1.48	1630	-35.9	3.49
	4/14/2020	650.09	10.90	6.90	0.28	1502	-69.1	5.12
	10/7/2020	642.85	13.20	7.24	0.11	1575	-56.5	1.15
MW-309	2/5/2020	648.34	11.42	7.09	1.07	1433	-7.8	18.10
	4/14/2020	649.19	11.20	7.21	0.16	1322	-51.5	100.10
	10/7/2020	641.50	13.30	7.57	0.09	1371	-71.1	7.70

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

Date: 12/24/2020
 Date: 2/3/2021
 Date: 2/10/2021

Figures

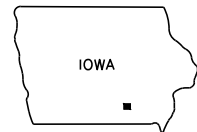
- 1 Site Location Map
- 2 Site Plan and Monitoring Well Locations–Zero Liquid Discharge Pond
- 3 Shallow Potentiometric Surface, April 13-14, 2020
- 4 Deep Potentiometric Surface, April 13-14, 2020
- 5 Shallow Potentiometric Surface, October 5-12, 2020
- 6 Deep Potentiometric Surface, October 5-12, 2020



SITE LOCATION

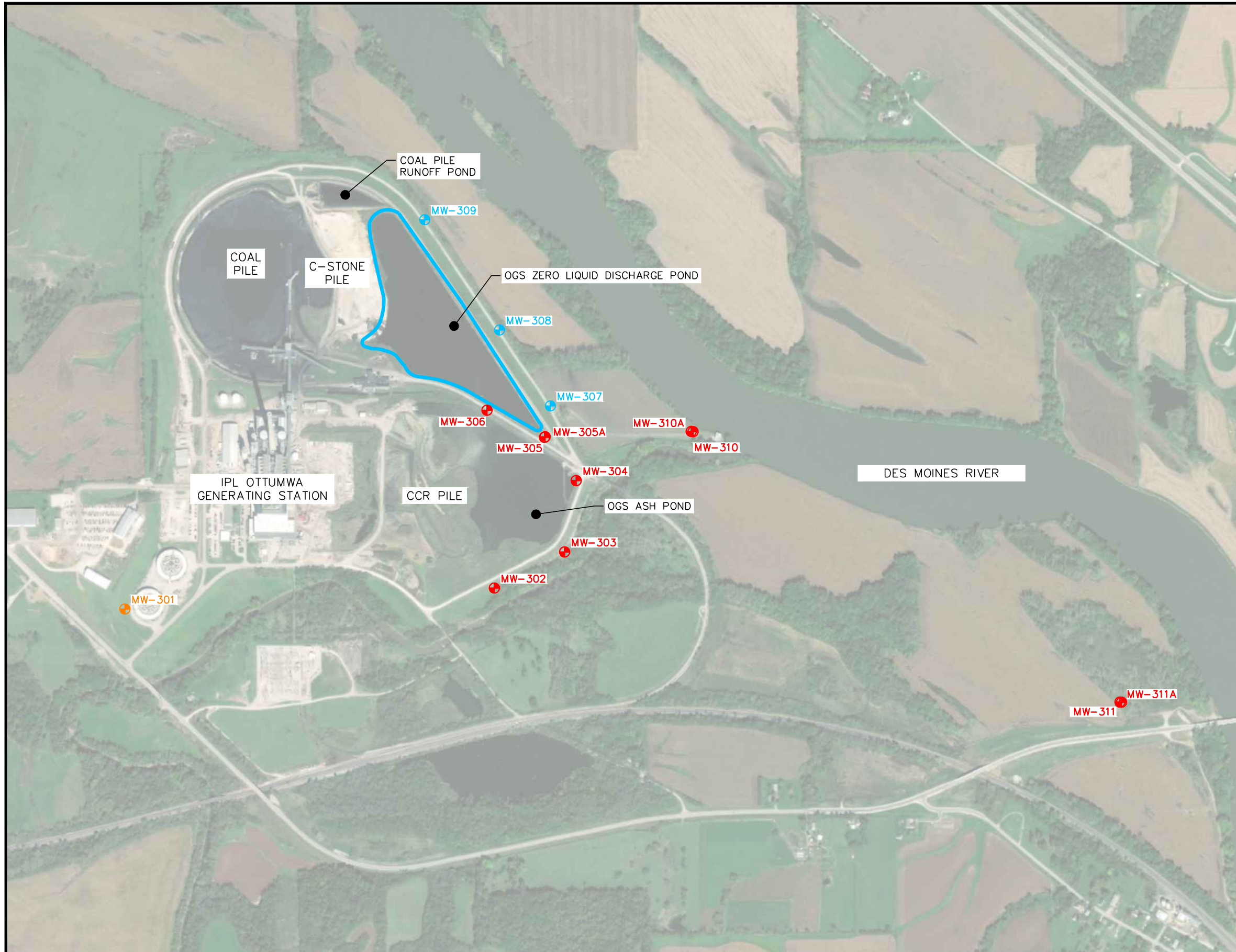


CHILLICOTHE QUADRANGLE
 IOWA—WAPELLO CO.
 7.5 MINUTE SERIES (TOPOGRAPHIC)
 2018
 SCALE: 1" = 2,000'



CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501		SITE	ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA		ENGINEER	SITE LOCATION MAP	
	PROJECT NO.	25219072.00		DRAWN BY:	BSS		SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	FIGURE
	DRAWN:	11/15/2019		CHECKED BY:	MDB			1
REVISED:	01/10/2020	APPROVED BY:	TK 01/28/2021					

I:\25219072.00\Drawings\CCR 2019 Annual Report\Site Location Map.dwg, 1/15/2020 1:15:47 PM



LEGEND

- CCR UNIT
- CCR ZLDP MONITORING WELL
- CCR ASH POND MONITORING WELL
- CCR BACKGROUND MONITORING WELL

NOTES:

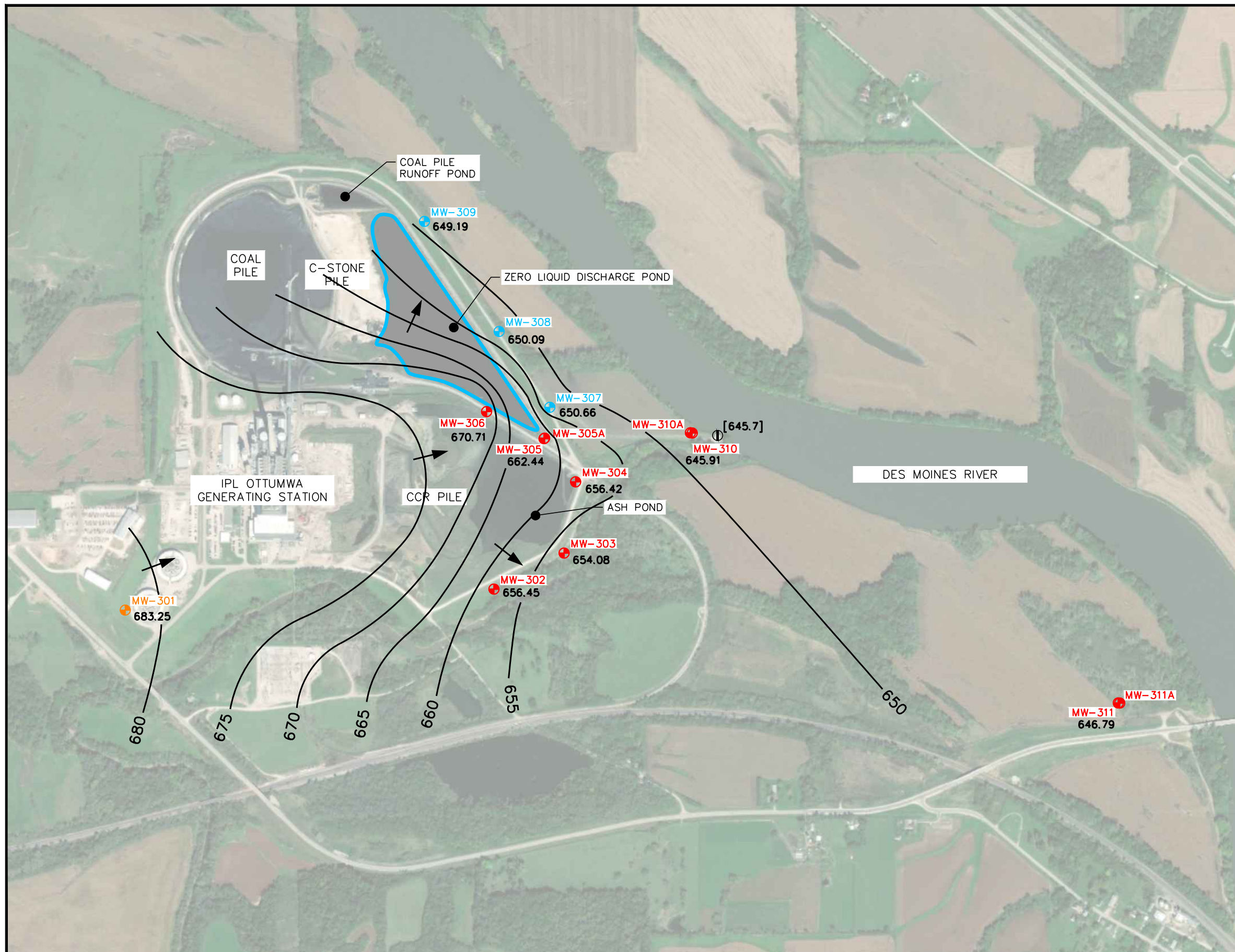
1. 2014 AERIAL PHOTOGRAPH SOURCES: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA FSA, USGS, AEX, GETMAPPING, AEROGRIID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY.
2. CCR UNIT LIMITS ARE APPROXIMATE.
3. MONITORING WELLS MW-301, MW-302, AND MW-304, WERE INSTALLED BY CASCADE DRILLING, LLP. UNDER THE SUPERVISION OF SCS ENGINEERS FROM NOVEMBER 11-12, 2015.
4. MONITORING WELLS MW-303 AND MW-305 WERE INSTALLED BY CASCADE DRILLING LLP. UNDER THE SUPERVISION OF SCS ENGINEERS ON DECEMBER 7-8, 2015.
5. MONITORING WELLS MW-307, MW-308, AND MW-309 WERE INSTALLED BY CASCADE DRILLING, LLP. UNDER THE SUPERVISION OF SCS ENGINEERS FROM OCTOBER 25-27, 2016.
6. MONITORING WELLS MW-310 AND MW-311 WERE INSTALLED BY ROBERTS ENVIRONMENTAL DRILLING ON AUGUST 27, 2019.
7. THE BACKGROUND MONITORING WELL FOR THE OGS ZLDP IS MW-301.



SCALE: 1" = 800'

PROJECT NO. 25220072.00	DRAWN BY: BSS	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	FIGURE SITE PLAN AND MONITORING WELL LOCATIONS-ZERO LIQUID DISCHARGE POND 2
DRAWN: 11/15/2019	CHECKED BY: MDB				
REVISED: 05/06/2021	APPROVED BY: SCC 05/06/2021				

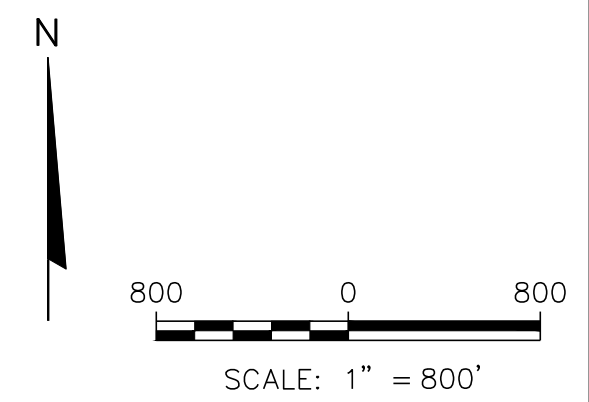
\\10.2.1...data\Projects\25220072.00\Drawings\Site Plan and Monitoring Well Locations-LDP.dwg, 5/7/2021 4:21:33 PM



LEGEND	
	CCR UNIT
	CCR ZLDP MONITORING WELL
	CCR ASH POND MONITORING WELL
	CCR BACKGROUND MONITORING WELL
	RIVER ELEVATION MEASUREMENT LOCATION
651.09	POTENTIOMETRIC ELEVATION AT WELL (APRIL 13-14, 2020)
[649.7]	SURFACE WATER ELEVATION (APRIL 13, 2020)
	POTENTIOMETRIC SURFACE CONTOUR
	APPROXIMATE GROUNDWATER FLOW DIRECTION

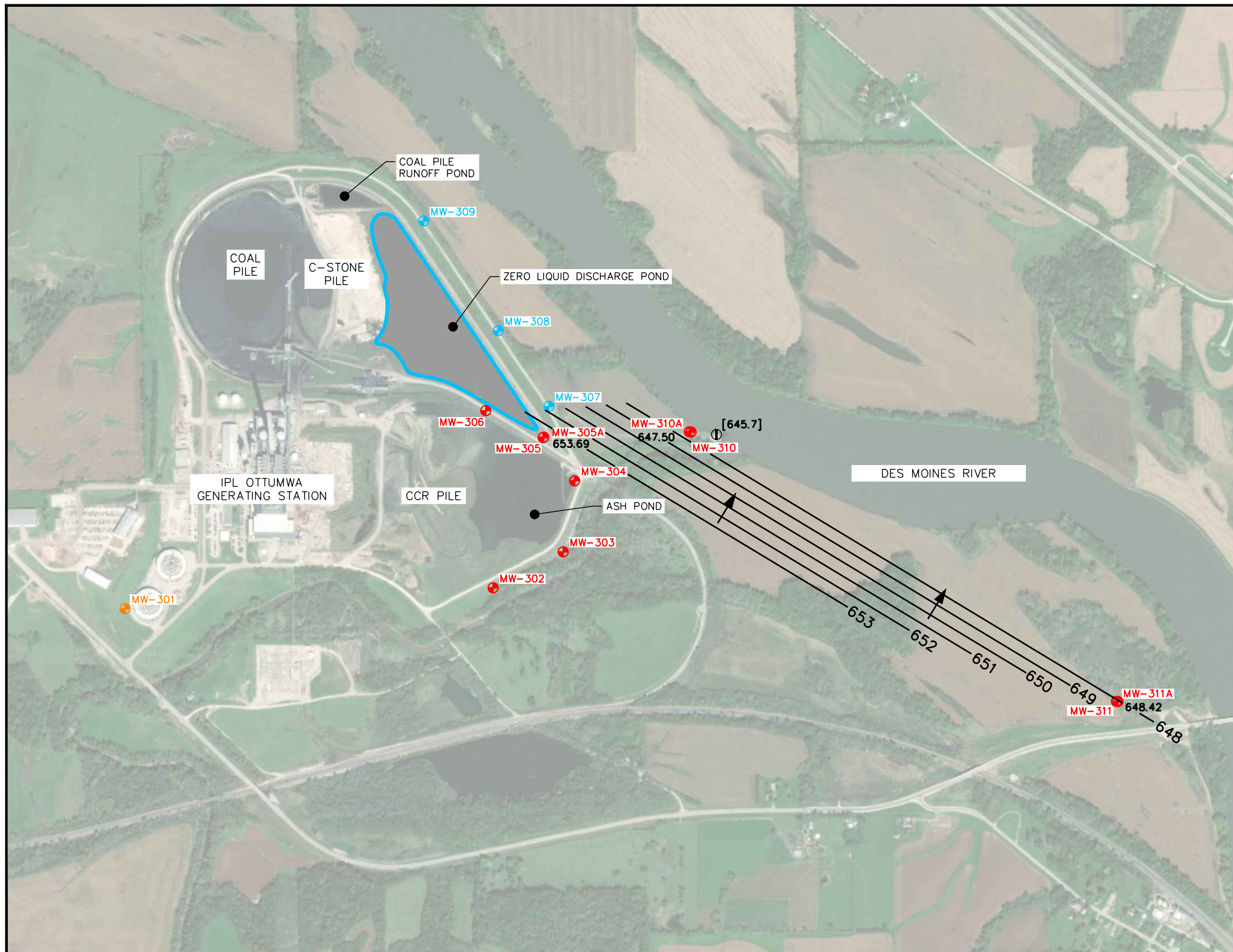
NOTE:

1. THE BACKGROUND MONITORING WELL FOR THE OGS ZLDP IS MW-301.



PROJECT NO. 25220072.00	DRAWN BY: KP/BSS	 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 13-14, 2020	FIGURE
DRAWN: 04/28/2020	CHECKED BY: NDK/SCC					3
REVISED: 05/06/2021	APPROVED BY: SCC 05/06/2021					

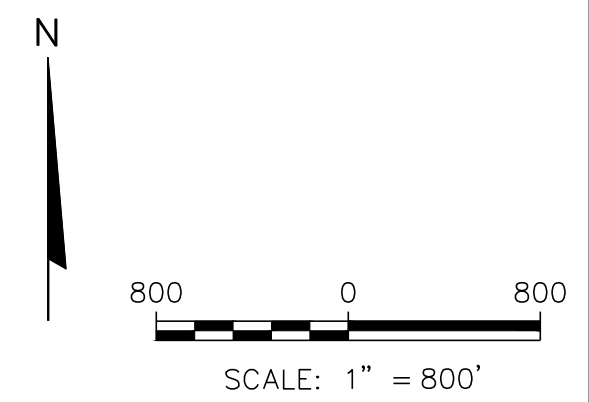
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LEGEND	
	CCR UNIT
	CCR ZLDP MONITORING WELL
	CCR ASH POND MONITORING WELL
	CCR BACKGROUND MONITORING WELL
	RIVER ELEVATION MEASUREMENT LOCATION
648.42	POTENTIOMETRIC ELEVATION AT WELL (APRIL 13-14, 2020)
[645.7]	SURFACE WATER ELEVATION (APRIL 13, 2020)
	POTENTIOMETRIC SURFACE CONTOUR
	APPROXIMATE GROUNDWATER FLOW DIRECTION

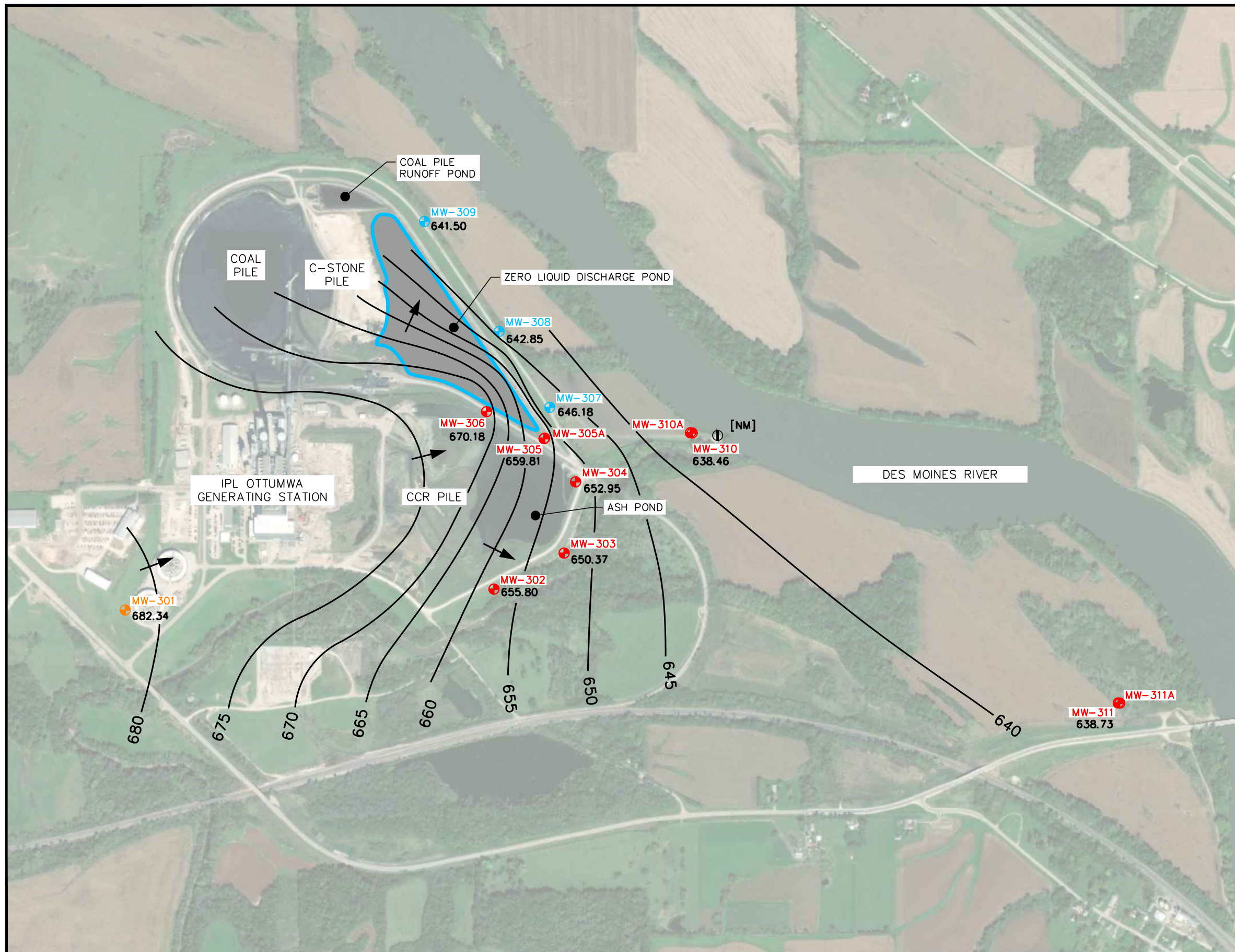
NOTE:

1. THE BACKGROUND MONITORING WELL FOR THE OGS ZLDP IS MW-301.



PROJECT NO. 25220072.00	DRAWN BY: KP/BSS	 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	DEEP POTENTIOMETRIC SURFACE APRIL 13-14, 2020	FIGURE
DRAWN: 04/28/2020	CHECKED BY: NDK					4
REVISED: 05/06/2021	APPROVED BY: SCC 05/06/2021					

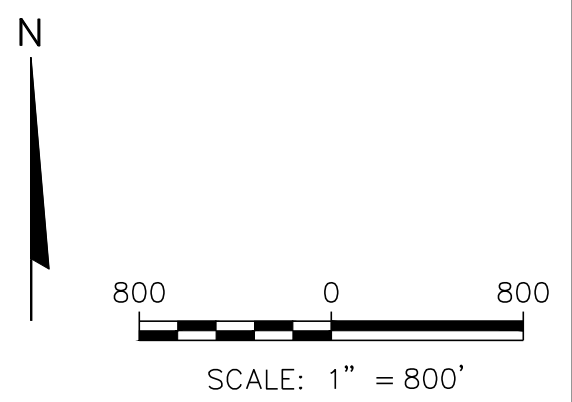
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LEGEND	
	CCR UNIT
	CCR ZLDP MONITORING WELL
	CCR ASH POND MONITORING WELL
	CCR BACKGROUND MONITORING WELL
	RIVER ELEVATION MEASUREMENT LOCATION
645.91	POTENTIOMETRIC ELEVATION AT WELL (OCTOBER 5-12, 2020)
[645.7]	SURFACE WATER ELEVATION (OCTOBER 5-12, 2020)
	POTENTIOMETRIC SURFACE CONTOUR
	APPROXIMATE GROUNDWATER FLOW DIRECTION

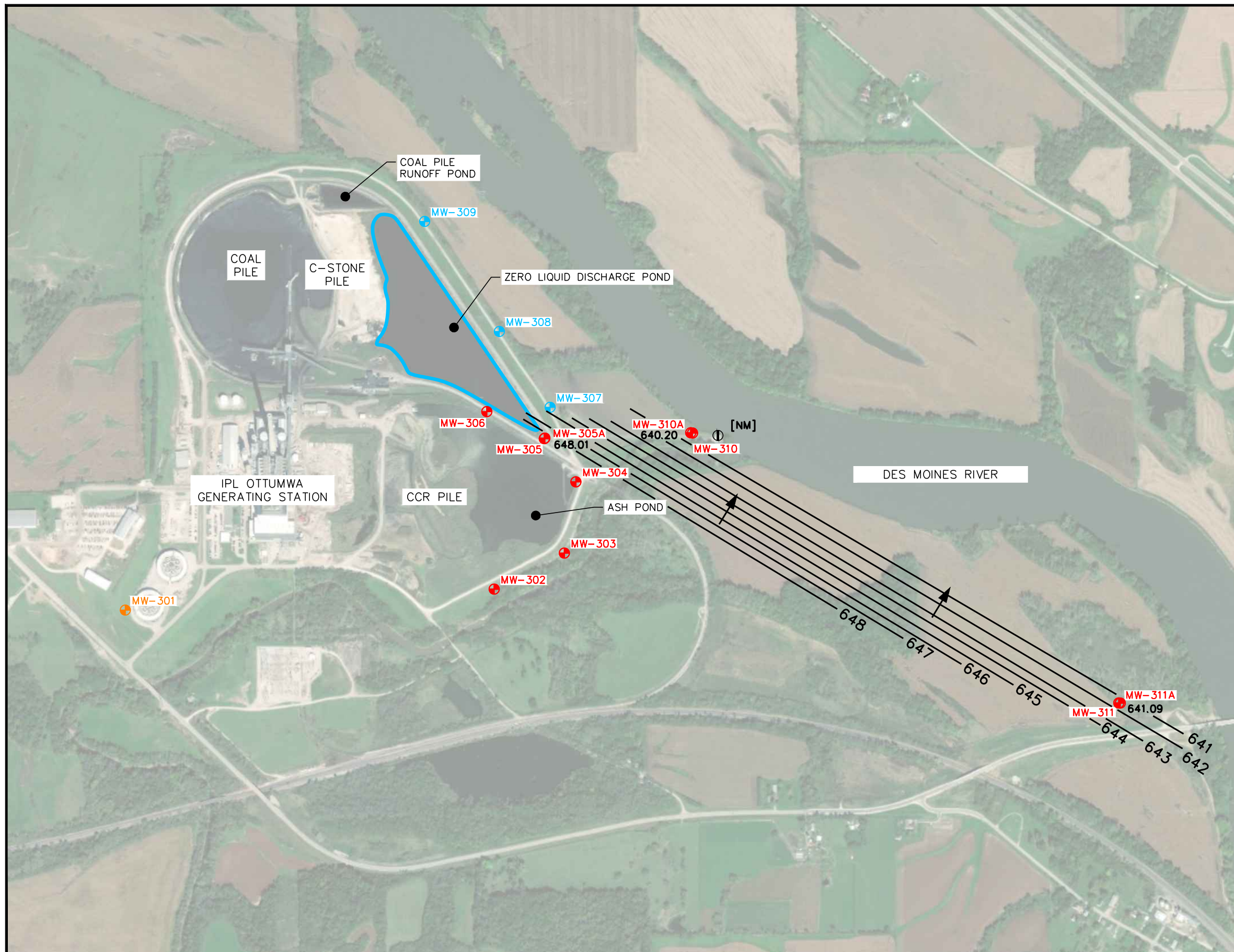
NOTE:

1. THE BACKGROUND MONITORING WELL FOR THE OGS ZLDP IS MW-301.



PROJECT NO. 25220072.00	DRAWN BY: KP/BSS/RJG/ZTW	 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 5-12, 2020	FIGURE
DRAWN: 04/28/2020	CHECKED BY: NDK					5
REVISED: 05/06/2021	APPROVED BY: SCC 05/06/2021					

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LEGEND	
	CCR UNIT
	CCR ZLDP MONITORING WELL
	CCR ASH POND MONITORING WELL
	CCR BACKGROUND MONITORING WELL
	RIVER ELEVATION MEASUREMENT LOCATION
648.42	POTENTIOMETRIC ELEVATION AT WELL (OCTOBER 5-12, 2020)
[645.7]	SURFACE WATER ELEVATION (OCTOBER 5-12, 2020)
	POTENTIOMETRIC SURFACE CONTOUR
	APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTE:
 1. THE BACKGROUND MONITORING WELL FOR THE OGS ZLDP IS MW-301.

PROJECT NO. 25220072.00	DRAWN BY: KP/BSS/ZTW	 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	DEEP POTENTIOMETRIC SURFACE OCTOBER 5-12, 2020	FIGURE
DRAWN: 04/28/2020	CHECKED BY: NDK					6
REVISED: 05/06/2021	APPROVED BY: SCC 05/06/2021					

\\10.2.1...data\Projects\25220072.00\Drawings\Potentiometric Surface 2020 - LDP.dwg, 5/7/2021 4:35:35 PM



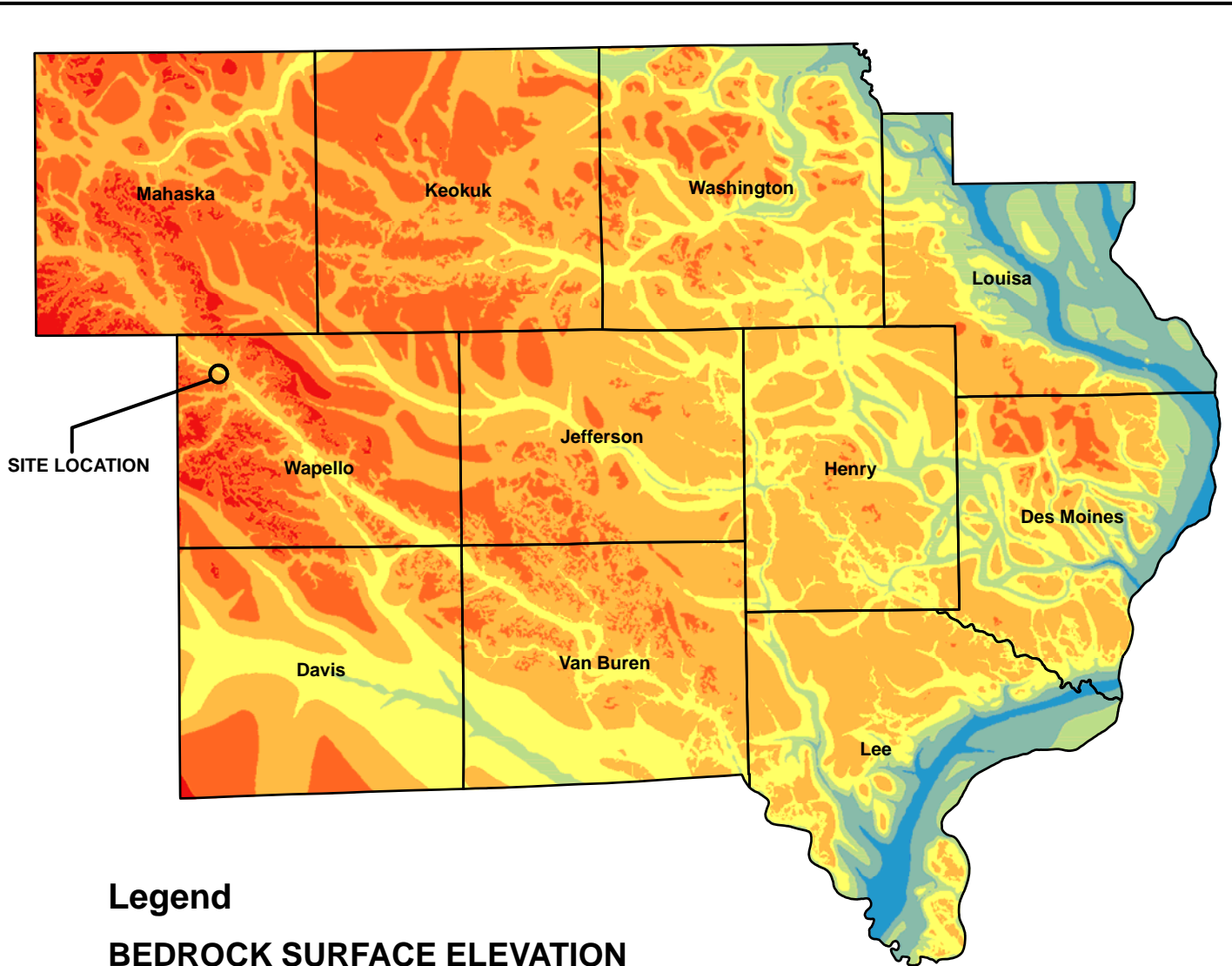
Appendix A
Summary of Regional Hydrogeologic Stratigraphy

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

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

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

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

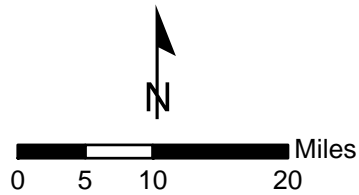


Legend

BEDROCK SURFACE ELEVATION

ELEVATION ABOVE MEAN SEA LEVEL IN FEET

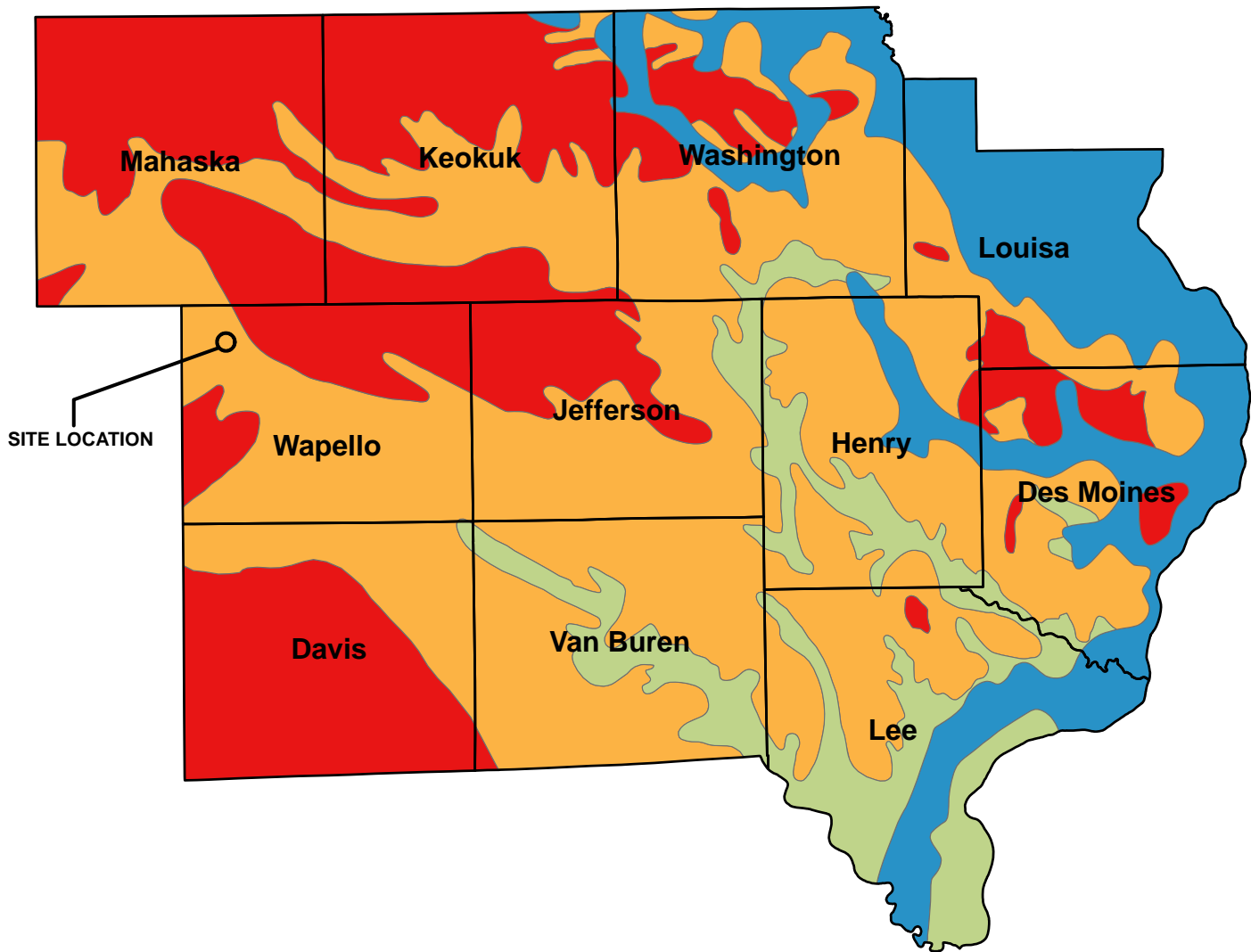
- BELOW 300
- 300 TO 400
- 400 TO 500
- 500 TO 600
- 600 TO 700
- 700 TO 800
- 800 TO 900



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

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

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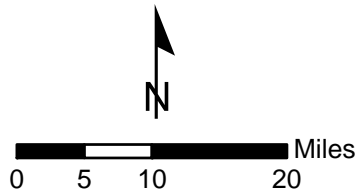


Legend

MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE

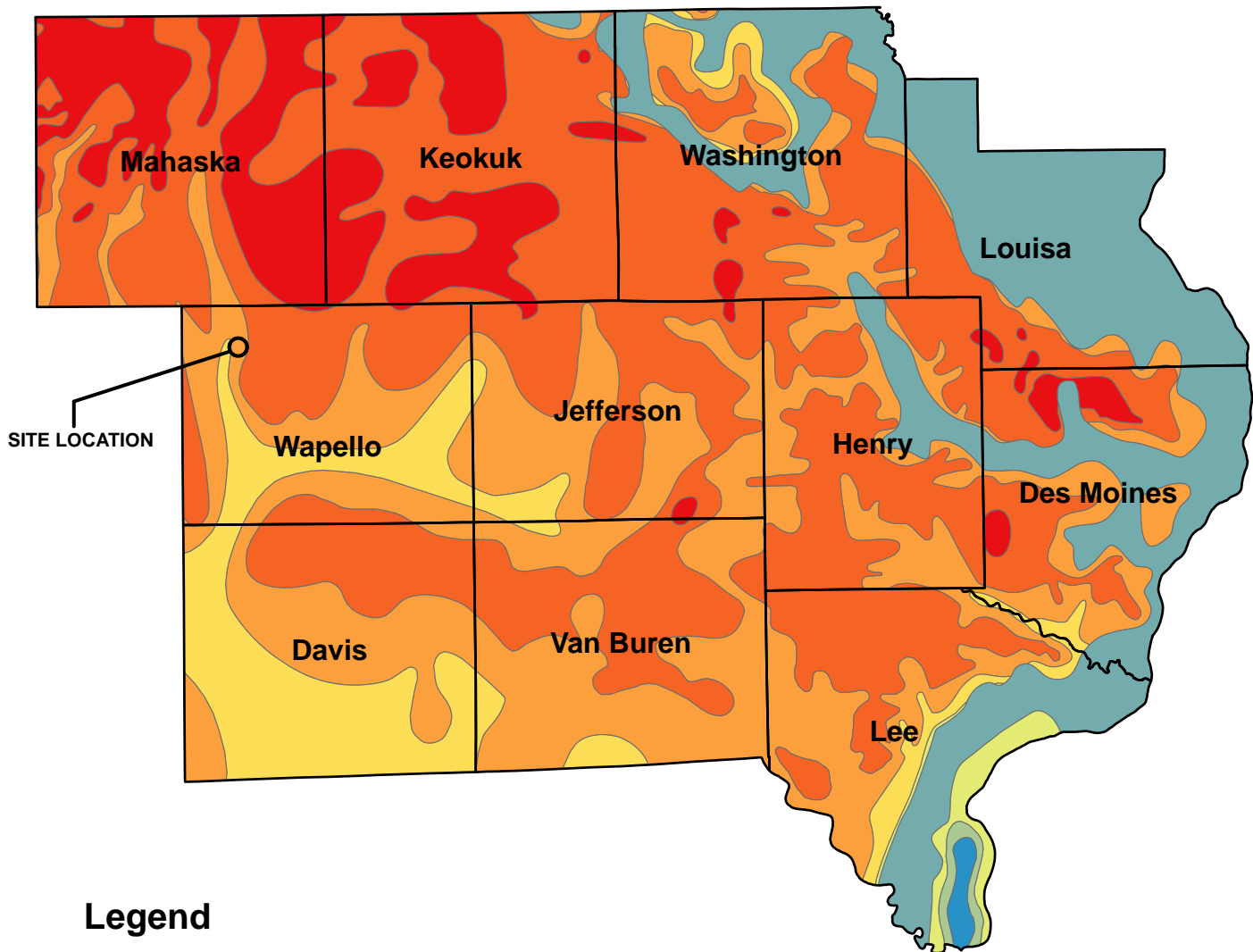
ELEVATION ABOVE MEAN SEA LEVEL IN FEET

- MISSISSIPPIAN NOT PRESENT
- 550
- 650
- 750



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

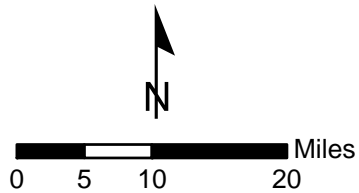
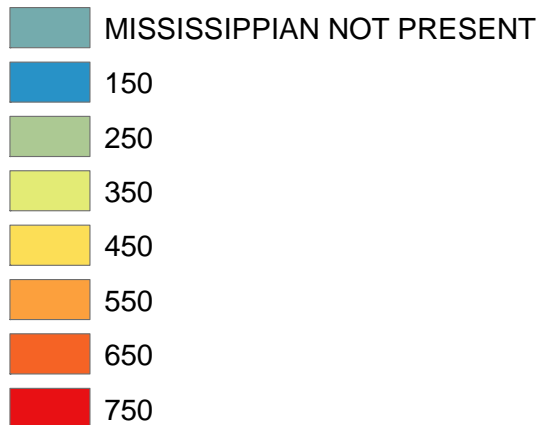
CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE	OTTUMWA GENERATING STATION OTTUMWA, IOWA	SE IOWA REGIONAL MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE ELEVATION
PROJECT NO.	25215053.03	DRAWN BY:	JB	SCS ENGINEERS <small>2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: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



Legend

MISSISSIPPIAN AQUIFER ELEVATION

ELEVATION ABOVE MEAN SEA LEVEL IN FEET



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

CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE	OTTUMWA GENERATING STATION OTTUMWA, IOWA	ENGINEER	 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830 FAX: (608) 224-2839	FIGURE
	PROJECT NO. 25215053.03		DRAWN BY: JB			
	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

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

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

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

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

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



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

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

Well or Piezometer No: MW-301

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

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

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

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

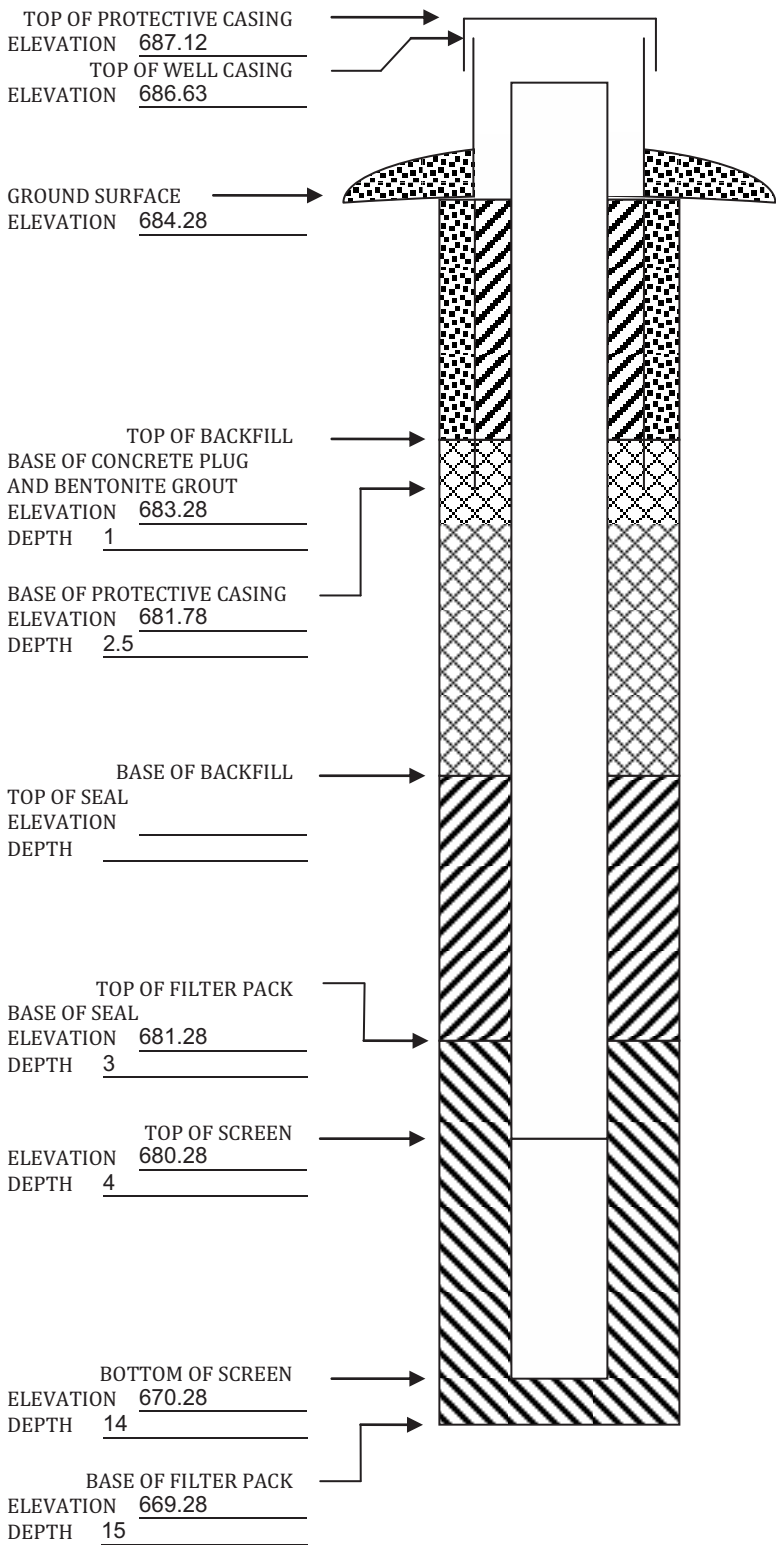
Attachments: Driller's log. Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.

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

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

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

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





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

Disposal Site Name: 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 **B. SOIL BORING INFORMATION**

Locations (± 0.5 ft): _____
Specify corner of site: _____
Distance & direction along boundary: _____
Distance & direction from boundary to wall: _____
Elevations (± 0.01 ft MSL): _____
Ground Surface: _____
Top of protective casing: _____
Top of well casing: _____
Benchmark elevation: _____
Benchmark description: _____

Name & Address of Construction Company: Cascade Drilling
Name of Driller: Mike Mueller
Drilling Method: hollow stem auger
Drilling Fluid: —
Bore Hole Diameter: 8.5"
Soil Sampling Method: split spoon
Depth of Boring: 28.0'

C. MONITORING WELL INSTALLATION

Casing material: Schedule 40 PVC
Length of casing: 29'6"
Outside casing diameter: 2 3/8" 2.375"
Inside casing diameter: 2.067"
Casing joint type: Flush Threaded
Casing/screen joint type: Flush Threaded
Screen material: PVC
Screen opening size: 10 slot
Screen length: 5.0'
Depth of well: 27.0'
Filter Pack: _____
Material: Filtex Industrial sand (Red Flint Sand & Gravel)
Grain size: #40
Volume: 200 LBS
Seal (minimum 3 ft length above filter pack): _____
Material: 3/8" Bentonite chips

Placement method: gravity
Volume: 250 LBS
Backfill (if different from seal): _____
Material: _____
Placement method: _____
Volume: _____
Surface seal design: _____
Material of protective casing: _____
Material of grout between protective casing and well casing: _____
Protective cap: _____
Material: aluminum
Vented: Yes No Locking: Yes No
Well Cap: _____
Material: plastic with rubber gasket
Vented: Yes No

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

Water level: _____ Stabilization Time: _____
Well development method: _____
Average depth of frostline: 4 ft

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

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

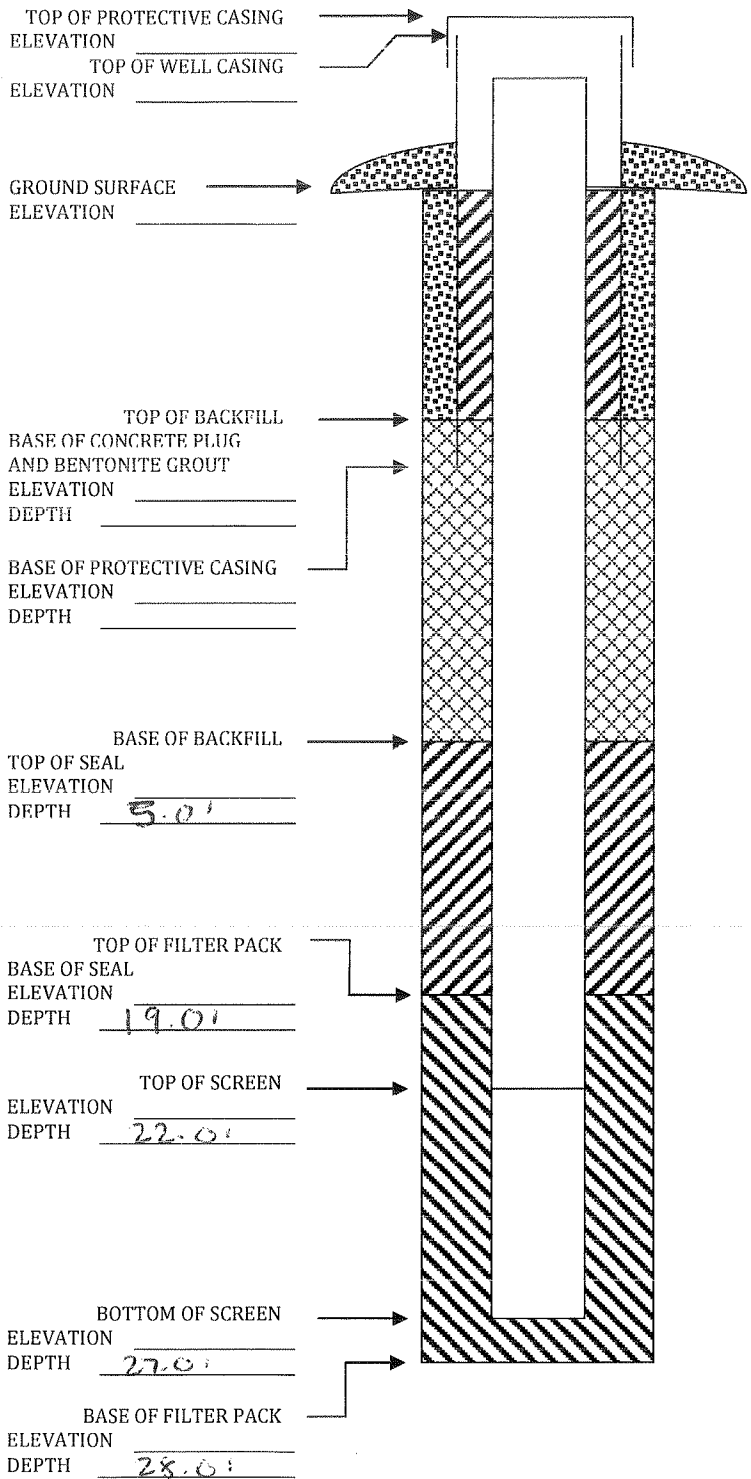
Questions? Call or Email: Nina Koger, Environmental Engineer Sr., 515-281-8986, Nina.Koger@dnr.iowa.gov

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

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

filter pack - 4.5 50lb bags
 bentonite - used 5 bags

filter sand - 28-19'
 bentonite - 19-5'
 concrete - 5-0'





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

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

Well or Piezometer No: mw-308

Dates Started: 9-10-26-16 Date Completed: 10-26-16

A. SURVEYED LOCATIONS AND ELEVATIONS **B. SOIL BORING INFORMATION**

Locations (± 0.5 ft): _____
Specify corner of site: _____
Distance & direction along boundary: _____
Distance & direction from boundary to wall: _____
Elevations (± 0.01 ft MSL): _____
Ground Surface: _____
Top of protective casing: _____
Top of well casing: _____
Benchmark elevation: _____
Benchmark description: _____

Name & Address of Construction Company:
Cascade Drilling
Name of Driller: Mike Mueller
Drilling Method: 4 1/4 hollow stem auger
Drilling Fluid: -
Bore Hole Diameter: 8.5"
Soil Sampling Method: split spoon
Depth of Boring: 25'

C. MONITORING WELL INSTALLATION

Casing material: Schedule 40 PVC
Length of casing: 27' 6"
Outside casing diameter: 2.375"
Inside casing diameter: 2.067"
Casing joint type: Flush Threaded
Casing/screen joint type: Flush Threaded
Screen material: PVC
Screen opening size: 10 slot
Screen length: 5.0'
Depth of well: 24.0'
Filter Pack: _____
Material: Red Flint Sand & gravel
Grain size: #40
Volume: 200 LBS
Seal (minimum 3 ft length above filter pack): _____
Material: 3/8" Bentonite chips

Placement method: gravity
Volume: 200 LBS
Backfill (if different from seal): _____
Material: _____
Placement method: _____
Volume: _____
Surface seal design: _____
Material of protective casing: _____
Material of grout between protective casing and well casing: _____
Protective cap: _____
Material: aluminum
Vented: Yes No Locking: Yes No
Well Cap: _____
Material: plastic with rubber gasket
Vented: Yes No

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

Water level: _____ Stabilization Time: _____
Well development method: _____
Average depth of frostline: 4 ft

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

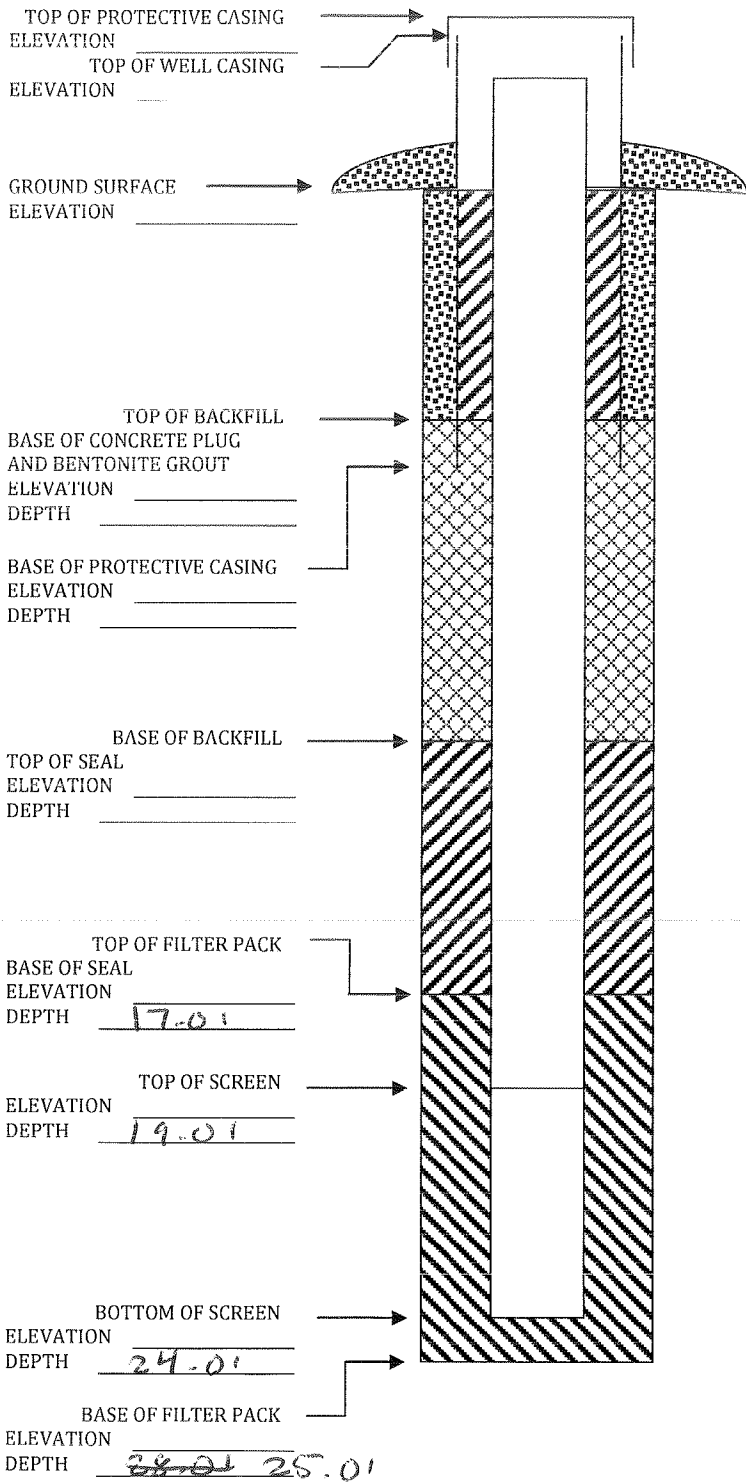
Please mail completed for to: Iowa Department of Natural Resources, Land Quality Bureau, 502 E 9th St, Des Moines IA 50319-0034.

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

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

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

Filter sand from 25'-17'
bentonite - 17.0'-5.0'





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

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

Well or Piezometer No: MW-309

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

A. SURVEYED LOCATIONS AND ELEVATIONS **B. SOIL BORING INFORMATION**

Locations (± 0.5 ft): _____
Specify corner of site: _____
Distance & direction along boundary: _____
Distance & direction from boundary to wall: _____
Elevations (± 0.01 ft MSL): _____
Ground Surface: _____
Top of protective casing: _____
Top of well casing: _____
Benchmark elevation: _____
Benchmark description: _____

Name & Address of Construction Company: Cascade Drilling
Name of Driller: Mike Mueller
Drilling Method: 4 1/4 HSA
Drilling Fluid: _____
Bore Hole Diameter: 8.5"
Soil Sampling Method: split spoon
Depth of Boring: 27.5

C. MONITORING WELL INSTALLATION

Casing material: sch 40 PVC
Length of casing: 21.5
Outside casing diameter: 2.375
Inside casing diameter: 2.067
Casing joint type: Flush Threaded
Casing/screen joint type: Flush Threaded
Screen material: PVC
Screen opening size: .010
Screen length: 5
Depth of well: 26.5
Filter Pack: _____
Material: Red Flint Sand + Gravel
Grain size: #40
Volume: 200 lbs
Seal (minimum 3 ft length above filter pack): _____
Material: 3/8" Bentonite chips

Placement method: Gravity
Volume: 600 lbs
Backfill (if different from seal): _____
Material: _____
Placement method: _____
Volume: _____
Surface seal design: _____
Material of protective casing: _____
Material of grout between protective casing and well casing: _____
Protective cap: _____
Material: aluminum
Vented: Yes No Locking: Yes No
Well Cap: Plastic
Material: plastic with rubber gasket
Vented: Yes No

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

Water level: _____ Stabilization Time: _____
Well development method: _____
Average depth of frostline: 4 ft

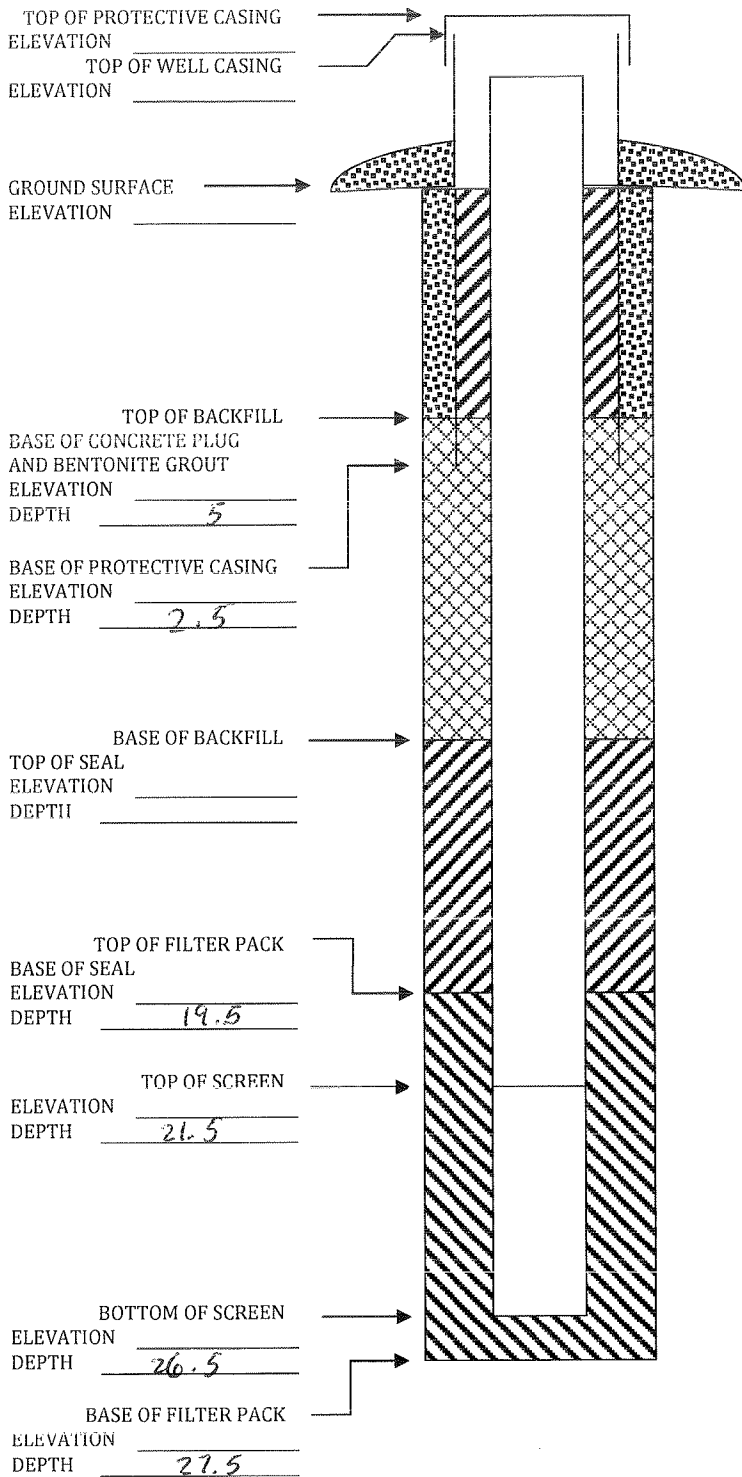
Attachments: Driller's log. Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.

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

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

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

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



SCS ENGINEERS

Environmental Consultants and Contractors

SOIL BORING LOG INFORMATION

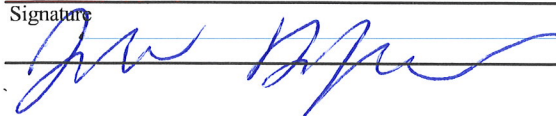
Route To: Watershed/Wastewater Waste Management
 Remediation/Redevelopment Other

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

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

water level 6.5 ft bgs.

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

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

Boring Number MW-307

Page 2 of 2

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S3	24	1 2	16	LEAN CLAY, dark yellowish brown (10YR 4/4), slightly dense. (continued)	CL									
		2 4	17	SILT, dark yellowish brown (10YR 3/4), fine to medium sand.					W					
S4	17	3 3	18		ML									
		3	19						W			Bedrock @19.5 ft bgs.		
S5	5	50/0.5	20	SANDSTONE, dark brown (10YR 3/3),										
			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 IPL-Ottumwa Generating Station SCS#: 25216148.00		License/Permit/Monitoring Number		Boring Number MW-308	
Boring Drilled By: Name of crew chief (first, last) and Firm Mike Mueller Cascade Drilling		Date Drilling Started 10/25/2016		Date Drilling Completed 10/25/2016	
Unique Well No.		DNR Well ID No.		Common Well Name MW-308	
Final Static Water Level Feet		Surface Elevation 652.9 Feet		Borehole Diameter 8.5 in	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/> State Plane 402,312 N, 1,902,665 E S/C/N		Lat ° ' "		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
NE 1/4 of SE 1/4 of Section 26, T 73 N, R 15 W		Long ° ' "		Feet <input type="checkbox"/> S <input type="checkbox"/> W	

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

water @ 6.5 ft bgs.

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

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

Page 2 of 2

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S3	18	1 2	16	SILT, brown (10YR 4/3), some clay. <i>(continued)</i>	ML									
		1 3		SILTY SAND, brown (10YR 4/3).	SM					W				
			17	POORLY GRADED SAND, brown (10YR 4/3), fine grained.	SP									
S4	13	4 12	18	WELL GRADED SAND AND GRAVEL, dark grayish brown (10YR 3/2), fine to coarse grained, (weathered bedrock).	SW						W			
		13 3	19	SANDSTONE, dark grayish brown (10YR 4/2), weathered bedrock.										
S5	6	12 26	20	Same as above except, brown (10YR 4/3).							W			
		50/0.4	21											
S6	4		22											
			23											
		50/0.4	24	Same as above except, dark grayish brown (10YR 4/2).							W			
			25	End of boring at 25 ft bgs.										


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

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

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

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

Signature 	Firm SCS Engineers 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:
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Boring Number MW-309

Page 2 of 2

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

SCS ENGINEERS

Environmental Consultants and Contractors

SOIL BORING LOG INFORMATION

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

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

Facility ID	County Wapello	Civil Town/City/ or Village Ottumwa
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Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S1	12	13 34	1	POORLY GRADED SAND WITH GRAVEL, tan, fine to coarse sand and gravel, (construction fill sand to fill in hydrovac hole cleared to 9 ft bgs).	SP									
			2											
			3											
S2	18	33 33	4	LEAN CLAY, dark brown (10YR 3/3), medium dense.	CL									
			5											
			6											
			7	SILT, dark brown (10YR 3/3), some clay.	ML									Water at 6.5 ft bgs
			8											
			9											


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

Signature 	Firm SCS Engineers 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:
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Boring Number B-309X

Page 2 of 2

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



Appendix C
Laboratory Reports

C1 February 2020 Assessment Monitoring

ANALYTICAL REPORT

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

Laboratory Job ID: 310-175270-1

Client Project/Site: Ottumwa Generating Station 25219072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:
2/18/2020 12:10:09 PM*

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

LINKS

Review your project
results through
TotalAccess

Have a Question?



Visit us at:
www.testamericainc.com

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	6
Definitions	7
QC Sample Results	8
QC Association	10
Chronicle	11
Certification Summary	12
Method Summary	13
Chain of Custody	14
Receipt Checklists	18

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-1

Job ID: 310-175270-1

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative
310-175270-1

Comments

No additional comments.

Receipt

The samples were received on 2/6/2020 6:40 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.5° C.

HPLC/IC

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

Metals

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

General Chemistry

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

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Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-175270-1	MW-301	Water	02/05/20 09:45	02/06/20 18:40	

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Detection Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-1

Client Sample ID: MW-301

Lab Sample ID: 310-175270-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	120		5.0	2.0	mg/L	5		9056A	Total/NA
Sulfate	130		5.0	3.6	mg/L	5		9056A	Total/NA
Barium	43		2.0	0.90	ug/L	1		6020A	Total/NA
Boron	540		200	100	ug/L	1		6020A	Total/NA
Calcium	68		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	1.1		0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	17		10	2.3	ug/L	1		6020A	Total/NA
Total Dissolved Solids	570		30	26	mg/L	1		SM 2540C	Total/NA
pH	6.7	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	683.30				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	68.0				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	7.28				mg/L	1		Field Sampling	Total/NA
pH, Field	6.39				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	966				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	5.38				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	1.43				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls



Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-1

Client Sample ID: MW-301

Lab Sample ID: 310-175270-1

Date Collected: 02/05/20 09:45

Matrix: Water

Date Received: 02/06/20 18:40

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	120		5.0	2.0	mg/L			02/10/20 23:37	5
Sulfate	130		5.0	3.6	mg/L			02/10/20 23:37	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.88		2.0	0.88	ug/L		02/10/20 08:15	02/11/20 19:08	1
Barium	43		2.0	0.90	ug/L		02/10/20 08:15	02/11/20 19:08	1
Boron	540		200	100	ug/L		02/10/20 08:15	02/11/20 19:08	1
Cadmium	<0.039		0.10	0.039	ug/L		02/10/20 08:15	02/11/20 19:08	1
Calcium	68		0.50	0.19	mg/L		02/10/20 08:15	02/11/20 19:08	1
Chromium	<1.1		5.0	1.1	ug/L		02/10/20 08:15	02/11/20 19:08	1
Cobalt	1.1		0.50	0.091	ug/L		02/10/20 08:15	02/11/20 19:08	1
Lead	<0.27		0.50	0.27	ug/L		02/10/20 08:15	02/11/20 19:08	1
Lithium	17		10	2.3	ug/L		02/10/20 08:15	02/11/20 19:08	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	570		30	26	mg/L			02/11/20 10:45	1
pH	6.7	HF	0.1	0.1	SU			02/06/20 22:02	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	683.30				ft			02/05/20 09:45	1
Oxidation Reduction Potential	68.0				millivolts			02/05/20 09:45	1
Oxygen, Dissolved, Client Supplied	7.28				mg/L			02/05/20 09:45	1
pH, Field	6.39				SU			02/05/20 09:45	1
Specific Conductance, Field	966				umhos/cm			02/05/20 09:45	1
Temperature, Field	5.38				Degrees C			02/05/20 09:45	1
Turbidity, Field	1.43				NTU			02/05/20 09:45	1

Eurofins TestAmerica, Cedar Falls

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-1

Qualifiers

General Chemistry

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

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-270331/3
Matrix: Water
Analysis Batch: 270331

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.40		1.0	0.40	mg/L			02/10/20 17:19	1
Sulfate	<0.71		1.0	0.71	mg/L			02/10/20 17:19	1

Lab Sample ID: LCS 310-270331/4
Matrix: Water
Analysis Batch: 270331

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	9.97		mg/L		100	90 - 110
Sulfate	10.0	10.2		mg/L		102	90 - 110

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-269745/1-A
Matrix: Water
Analysis Batch: 270025

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 269745

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.88		2.0	0.88	ug/L		02/10/20 08:15	02/11/20 18:39	1
Barium	<0.90		2.0	0.90	ug/L		02/10/20 08:15	02/11/20 18:39	1
Boron	<100		200	100	ug/L		02/10/20 08:15	02/11/20 18:39	1
Cadmium	<0.039		0.10	0.039	ug/L		02/10/20 08:15	02/11/20 18:39	1
Calcium	<0.19		0.50	0.19	mg/L		02/10/20 08:15	02/11/20 18:39	1
Chromium	<1.1		5.0	1.1	ug/L		02/10/20 08:15	02/11/20 18:39	1
Cobalt	<0.091		0.50	0.091	ug/L		02/10/20 08:15	02/11/20 18:39	1
Lead	<0.27		0.50	0.27	ug/L		02/10/20 08:15	02/11/20 18:39	1
Lithium	<2.3		10	2.3	ug/L		02/10/20 08:15	02/11/20 18:39	1

Lab Sample ID: LCS 310-269745/2-A
Matrix: Water
Analysis Batch: 270025

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 269745

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	80.0	66.6		ug/L		83	80 - 120
Barium	80.0	72.9		ug/L		91	80 - 120
Boron	1760	1580		ug/L		90	80 - 120
Cadmium	40.0	36.6		ug/L		91	80 - 120
Calcium	4.00	3.60		mg/L		90	80 - 120
Chromium	80.0	72.3		ug/L		90	80 - 120
Cobalt	40.0	37.0		ug/L		92	80 - 120
Lead	40.0	37.6		ug/L		94	80 - 120
Lithium	200	165		ug/L		82	80 - 120

Eurofins TestAmerica, Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-1

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

Lab Sample ID: MB 310-269931/1
 Matrix: Water
 Analysis Batch: 269931

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		30	26	mg/L			02/11/20 10:45	1

Lab Sample ID: LCS 310-269931/2
 Matrix: Water
 Analysis Batch: 269931

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	970		mg/L		97	90 - 110

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-269585/1
 Matrix: Water
 Analysis Batch: 269585

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		99	98 - 102

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QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-1

HPLC/IC

Analysis Batch: 270331

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-1	MW-301	Total/NA	Water	9056A	
MB 310-270331/3	Method Blank	Total/NA	Water	9056A	
LCS 310-270331/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 269745

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-1	MW-301	Total/NA	Water	3010A	
MB 310-269745/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-269745/2-A	Lab Control Sample	Total/NA	Water	3010A	

Analysis Batch: 270025

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-1	MW-301	Total/NA	Water	6020A	269745
MB 310-269745/1-A	Method Blank	Total/NA	Water	6020A	269745
LCS 310-269745/2-A	Lab Control Sample	Total/NA	Water	6020A	269745

Analysis Batch: 270043

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-1	MW-301	Total/NA	Water	6020A	269745
MB 310-269745/1-A	Method Blank	Total/NA	Water	6020A	269745
LCS 310-269745/2-A	Lab Control Sample	Total/NA	Water	6020A	269745

General Chemistry

Analysis Batch: 269585

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-1	MW-301	Total/NA	Water	SM 4500 H+ B	
LCS 310-269585/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 269931

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-1	MW-301	Total/NA	Water	SM 2540C	
MB 310-269931/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-269931/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 270470

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-1	MW-301	Total/NA	Water	Field Sampling	

Eurofins TestAmerica, Cedar Falls

Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-1

Client Sample ID: MW-301

Date Collected: 02/05/20 09:45

Date Received: 02/06/20 18:40

Lab Sample ID: 310-175270-1

Matrix: Water

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Prepared or Analyzed</u>	<u>Analyst</u>	<u>Lab</u>
Total/NA	Analysis	9056A		5	270331	02/10/20 23:37	ACJ	TAL CF
Total/NA	Prep	3010A			269745	02/10/20 08:15	HED	TAL CF
Total/NA	Analysis	6020A		1	270025	02/11/20 19:08	SAD	TAL CF
Total/NA	Prep	3010A			269745	02/10/20 08:15	HED	TAL CF
Total/NA	Analysis	6020A		1	270043	02/11/20 19:08	SAD	TAL CF
Total/NA	Analysis	SM 2540C		1	269931	02/11/20 10:45	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	269585	02/06/20 22:02	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	270470	02/05/20 09:45	EAR	TAL CF

Laboratory References:

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

Eurofins TestAmerica, Cedar Falls

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-1

Laboratory: Eurofins TestAmerica, Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-19 *

- 1
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- 12
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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	TAL CF
6020A	Metals (ICP/MS)	SW846	TAL CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL CF
SM 4500 H+ B	pH	SM	TAL CF
Field Sampling	Field Sampling	EPA	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF

Protocol References:

EPA = US Environmental Protection Agency

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

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

Laboratory References:

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





Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS Engineers</u>			
City/State:	CITY <u>Minneapolis</u> STATE <u>MN</u>	Project: <u>Othumwa</u>	
Receipt Information			
Date/Time Received:	DATE <u>2.6.20</u> TIME <u>1840</u>	Received By: <u>LAB</u>	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>M</u>	Correction Factor (°C): <u>+0.1</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>2.4</u>	Corrected Temp (°C): <u>2.5</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container		Preservative	
			pH	Temp	Added (mls)	Lot #
MW-301	310-175270-A-1	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-301	310-175270-C-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-301	310-175270-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-175270-A-2	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-309	310-175270-C-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-175270-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-175270-A-3	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311	310-175270-C-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-175270-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-175270-A-4	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
Field Blank	310-175270-C-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-175270-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072

Parameter	COC #1		COC #2						COC #3			TOTAL	
	MW-301	Field Blank	MW-302	MW-303	MW-304	MW-305	MW-306	MW-310	MW-311	MW-307	MW-308		MW-309
Appendix III Parameters													
Boron	x	x						x	x	x	x	x	7
Calcium	x	x						x	x	x	x	x	7
Chloride	x	x						x	x	x	x	x	7
Fluoride								x	x				2
pH	x	x						x	x	x	x	x	7
Sulfate	x	x						x	x	x	x	x	7
TDS	x	x						x	x	x	x	x	7
Appendix IV Parameters													
Antimony								x	x				2
Arsenic	x	x						x	x	x	x	x	7
Barium	x	x						x	x	x	x	x	7
Beryllium								x	x				2
Cadmium	x	x						x	x	x	x	x	7
Chromium	x	x						x	x	x	x	x	7
Cobalt	x	x						x	x	x	x	x	7
Fluoride								x	x				2
Lead	x	x						x	x	x	x	x	7
Lithium	x	x						x	x	x	x	x	7
Mercury								x	x				2
Molybdenum								x	x				2
Selenium								x	x				2
Thallium								x	x				2
Radium	x	x						x	x	x	x	x	7
Field Parameters													
Groundwater Elevation	x							x	x	x	x	x	6
Well Depth	x							x	x	x	x	x	6
pH (field)	x							x	x	x	x	x	6
Specific Conductance	x							x	x	x	x	x	6
Dissolved Oxygen	x							x	x	x	x	x	6
ORP	x							x	x	x	x	x	6
Temperature	x							x	x	x	x	x	6
Turbidity	x							x	x	x	x	x	6
Color	x							x	x	x	x	x	6
Odor	x							x	x	x	x	x	6

Notes: All samples are unfiltered (total).

I:\25219072.00\Data and Calculations\Tables\Sampling Details\[OGS_CCR_Rule_Sampling_2002.xls]Sheet1



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-175270-1

Login Number: 175270

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Bovy, Lorrainna L

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Field Blank 250 HNO3 has MW-301, time matches FB with 2359, lid marked FB.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

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


Laboratory Job ID: 310-175270-2

Laboratory Sample Delivery Group: MW-301 Rad
Client Project/Site: Ottumwa Generating Station 25219072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:

3/4/2020 11:01:35 AM

Jim Knapp, Project Manager II
(630)758-0262

jim.knapp@testamericainc.com

Designee for

Sandie Fredrick, Project Manager II
(920)261-1660

sandie.fredrick@testamericainc.com

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Sample Summary	3
Detection Summary	4
Client Sample Results	5
Definitions	6
QC Sample Results	7
QC Association	9
Chronicle	10
Certification Summary	11
Method Summary	12
Chain of Custody	13
Receipt Checklists	17
Tracer Carrier Summary	19

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-2
SDG: MW-301 Rad

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-175270-1	MW-301	Water	02/05/20 09:45	02/06/20 18:40	

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

Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-2
SDG: MW-301 Rad

Client Sample ID: MW-301

Lab Sample ID: 310-175270-1

No Detections.

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

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-2
 SDG: MW-301 Rad

Client Sample ID: MW-301

Lab Sample ID: 310-175270-1

Date Collected: 02/05/20 09:45

Matrix: Water

Date Received: 02/06/20 18:40

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0490	U	0.0730	0.0731	1.00	0.124	pCi/L	02/10/20 12:07	03/03/20 11:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.4		40 - 110					02/10/20 12:07	03/03/20 11:59	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.179	U	0.273	0.274	1.00	0.459	pCi/L	02/10/20 12:27	02/18/20 17:26	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.4		40 - 110					02/10/20 12:27	02/18/20 17:26	1
Y Carrier	87.5		40 - 110					02/10/20 12:27	02/18/20 17:26	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.228	U	0.283	0.284	5.00	0.459	pCi/L		03/04/20 08:50	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-2
SDG: MW-301 Rad

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
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-2
 SDG: MW-301 Rad

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-459800/21-A
 Matrix: Water
 Analysis Batch: 462625

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 459800

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	-0.007253	U	0.0361	0.0361	1.00	0.0814	pCi/L	02/10/20 12:07	03/03/20 11:59	1
Carrier	MB %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	103		40 - 110		02/10/20 12:07	03/03/20 11:59	1			

Lab Sample ID: LCS 160-459800/1-A
 Matrix: Water
 Analysis Batch: 462625

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 459800

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	8.658		0.901	1.00	0.111	pCi/L	76	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	110		40 - 110						

Lab Sample ID: LCSD 160-459800/2-A
 Matrix: Water
 Analysis Batch: 462625

Client Sample ID: Lab Control Sample Dup
 Prep Type: Total/NA
 Prep Batch: 459800

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	Limit
				Uncert. (2σ+/-)							
Radium-226	11.3	9.170		0.952	1.00	0.0937	pCi/L	81	75 - 125	0.28	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	103		40 - 110								

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-459801/21-A
 Matrix: Water
 Analysis Batch: 460917

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 459801

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	-0.07100	U	0.183	0.183	1.00	0.346	pCi/L	02/10/20 12:27	02/18/20 17:26	1
Carrier	MB %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	103		40 - 110		02/10/20 12:27	02/18/20 17:26	1			
Y Carrier	87.9		40 - 110		02/10/20 12:27	02/18/20 17:26	1			

Eurofins TestAmerica, Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-2
 SDG: MW-301 Rad

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

Lab Sample ID: LCS 160-459801/1-A

Matrix: Water

Analysis Batch: 460918

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 459801

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	
Radium-228	9.10	7.798		0.934	1.00	0.384	pCi/L	86	75 - 125	
Carrier	LCS %Yield	LCS Qualifier	Limits							
Ba Carrier	110		40 - 110							
Y Carrier	87.1		40 - 110							

Lab Sample ID: LCSD 160-459801/2-A

Matrix: Water

Analysis Batch: 460918

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 459801

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	9.10	8.440		1.01	1.00	0.396	pCi/L	93	75 - 125	0.33	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	103		40 - 110								
Y Carrier	87.1		40 - 110								

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-2
SDG: MW-301 Rad

Rad

Prep Batch: 459800

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-1	MW-301	Total/NA	Water	PrecSep-21	
MB 160-459800/21-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-459800/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-459800/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 459801

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-1	MW-301	Total/NA	Water	PrecSep_0	
MB 160-459801/21-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-459801/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-459801/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	



Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-2
SDG: MW-301 Rad

Client Sample ID: MW-301

Lab Sample ID: 310-175270-1

Date Collected: 02/05/20 09:45

Matrix: Water

Date Received: 02/06/20 18:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			459800	02/10/20 12:07	MNH	TAL SL
Total/NA	Analysis	903.0		1	462625	03/03/20 11:59	AJD	TAL SL
Total/NA	Prep	PrecSep_0			459801	02/10/20 12:27	MNH	TAL SL
Total/NA	Analysis	904.0		1	460917	02/18/20 17:26	CJQ	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	463040	03/04/20 08:50	SMP	TAL SL

Laboratory References:

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



Accreditation/Certification Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-2
 SDG: MW-301 Rad

Laboratory: Eurofins TestAmerica, Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-19 *

Laboratory: Eurofins TestAmerica, 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
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-20
California	Los Angeles County Sanitation Districts	10259	06-30-20
California	State	2886	06-30-20
Connecticut	State	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-20
HI - RadChem Recognition	State	n/a	06-30-20
Illinois	NELAP	004553	11-30-20
Iowa	State	373	09-17-20
Kansas	NELAP	E-10236	10-31-20
Kentucky (DW)	State	KY90125	12-31-20
Louisiana	NELAP	04080	06-30-20
Louisiana (DW)	State	LA011	12-31-20
Maryland	State	310	09-30-20
MI - RadChem Recognition	State	9005	06-30-20
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-20
New Jersey	NELAP	MO002	06-30-20
New York	NELAP	11616	04-01-20
North Dakota	State	R-207	06-30-20
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-20
Pennsylvania	NELAP	68-00540	02-28-20 *
South Carolina	State	85002001	06-30-20
Texas	NELAP	T104704193-19-13	07-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
Utah	NELAP	MO000542019-11	07-31-20
Virginia	NELAP	10310	06-14-20
Washington	State	C592	08-30-20
West Virginia DEP	State	381	10-31-20

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

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-2
SDG: MW-301 Rad

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

Protocol References:

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

Laboratory References:

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





Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS Engineers</u>			
City/State:	CITY <u>Minneapolis</u> STATE <u>MN</u>	Project: <u>Ottumwa</u>	
Receipt Information			
Date/Time Received:	DATE <u>2.6.20</u> TIME <u>1840</u>	Received By: <u>LAB</u>	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>M</u>	Correction Factor (°C): <u>+0.1</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>2.4</u>	Corrected Temp (°C): <u>2.5</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container		Preservative	Lot #
			pH	Temp	Added (mls)	
MW-301	310-175270-A-1	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-301	310-175270-C-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-301	310-175270-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-175270-A-2	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-309	310-175270-C-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-175270-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-175270-A-3	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311	310-175270-C-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-175270-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-175270-A-4	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
Field Blank	310-175270-C-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-175270-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

**Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072**

Parameter	COC #1		COC #2						COC #3			TOTAL	
	MW-301	Field Blank	MW-302	MW-303	MW-304	MW-305	MW-306	MW-310	MW-311	MW-307	MW-308		MW-309
Appendix III Parameters													
Boron	x	x						x	x	x	x	x	7
Calcium	x	x						x	x	x	x	x	7
Chloride	x	x						x	x	x	x	x	7
Fluoride								x	x				2
pH	x	x						x	x	x	x	x	7
Sulfate	x	x						x	x	x	x	x	7
TDS	x	x						x	x	x	x	x	7
Appendix IV Parameters													
Antimony								x	x				2
Arsenic	x	x						x	x	x	x	x	7
Barium	x	x						x	x	x	x	x	7
Beryllium								x	x				2
Cadmium	x	x						x	x	x	x	x	7
Chromium	x	x						x	x	x	x	x	7
Cobalt	x	x						x	x	x	x	x	7
Fluoride								x	x				2
Lead	x	x						x	x	x	x	x	7
Lithium	x	x						x	x	x	x	x	7
Mercury								x	x				2
Molybdenum								x	x				2
Selenium								x	x				2
Thallium								x	x				2
Radium	x	x						x	x	x	x	x	7
Field Parameters													
Groundwater Elevation	x							x	x	x	x	x	6
Well Depth	x							x	x	x	x	x	6
pH (field)	x							x	x	x	x	x	6
Specific Conductance	x							x	x	x	x	x	6
Dissolved Oxygen	x							x	x	x	x	x	6
ORP	x							x	x	x	x	x	6
Temperature	x							x	x	x	x	x	6
Turbidity	x							x	x	x	x	x	6
Color	x							x	x	x	x	x	6
Odor	x							x	x	x	x	x	6

Notes: All samples are unfiltered (total).

I:\25219072.00\Data and Calculations\Tables\Sampling Details\[OGS_CCR_Rule_Sampling_2002.xls]Sheet1



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-175270-2

SDG Number: MW-301 Rad

Login Number: 175270

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Bovy, Lorraine L

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Field Blank 250 HNO3 has MW-301, time matches FB with 2359, lid marked FB.
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: 310-175270-2

SDG Number: MW-301 Rad

Login Number: 175270

List Number: 2

Creator: Hellm, Michael

List Source: Eurofins TestAmerica, St. Louis

List Creation: 02/08/20 10:20 AM

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.	N/A	
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	21.0
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?	N/A	
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").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Tracer/Carrier Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-2
SDG: MW-301 Rad

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	
310-175270-1	MW-301	95.4	
LCS 160-459800/1-A	Lab Control Sample	110	
LCSD 160-459800/2-A	Lab Control Sample Dup	103	
MB 160-459800/21-A	Method Blank	103	

Tracer/Carrier Legend
Ba Carrier = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Y Carrier (40-110)
310-175270-1	MW-301	95.4	87.5
LCS 160-459801/1-A	Lab Control Sample	110	87.1
LCSD 160-459801/2-A	Lab Control Sample Dup	103	87.1
MB 160-459801/21-A	Method Blank	103	87.9

Tracer/Carrier Legend
Ba Carrier = Ba Carrier
Y Carrier = Y Carrier

ANALYTICAL REPORT

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

Laboratory Job ID: 310-175270-5
Laboratory Sample Delivery Group: MW-309
Client Project/Site: Ottumwa Generating Station 25219072

For:
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:
2/18/2020 12:11:31 PM

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

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	6
Definitions	7
QC Sample Results	8
QC Association	10
Chronicle	11
Certification Summary	12
Method Summary	13
Chain of Custody	14
Receipt Checklists	18

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-5
SDG: MW-309

Job ID: 310-175270-5

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative 310-175270-5

Comments

No additional comments.

Receipt

The samples were received on 2/6/2020 6:40 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.5° C.

HPLC/IC

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

Metals

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

General Chemistry

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

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- 2
- 3
- 4
- 5
- 6
- 7
- 8
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- 11
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- 13
- 14

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-5
SDG: MW-309

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-175270-2	MW-309	Water	02/05/20 11:00	02/06/20 18:40	

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Detection Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-5
 SDG: MW-309

Client Sample ID: MW-309

Lab Sample ID: 310-175270-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	68		10	4.0	mg/L	10		9056A	Total/NA
Sulfate	370		10	7.1	mg/L	10		9056A	Total/NA
Barium	46		2.0	0.90	ug/L	1		6020A	Total/NA
Boron	1300		200	100	ug/L	1		6020A	Total/NA
Calcium	130		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	2.3		0.50	0.091	ug/L	1		6020A	Total/NA
Lead	0.63		0.50	0.27	ug/L	1		6020A	Total/NA
Lithium	6.3	J	10	2.3	ug/L	1		6020A	Total/NA
Total Dissolved Solids	990		60	52	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	648.34				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-7.8				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	1.07				mg/L	1		Field Sampling	Total/NA
pH, Field	7.09				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1433				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	11.42				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	18.1				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-5
 SDG: MW-309

Client Sample ID: MW-309

Lab Sample ID: 310-175270-2

Date Collected: 02/05/20 11:00

Matrix: Water

Date Received: 02/06/20 18:40

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	68		10	4.0	mg/L			02/10/20 23:53	10
Sulfate	370		10	7.1	mg/L			02/10/20 23:53	10

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.88		2.0	0.88	ug/L		02/10/20 08:15	02/11/20 19:11	1
Barium	46		2.0	0.90	ug/L		02/10/20 08:15	02/11/20 19:11	1
Boron	1300		200	100	ug/L		02/10/20 08:15	02/11/20 19:11	1
Cadmium	<0.039		0.10	0.039	ug/L		02/10/20 08:15	02/11/20 19:11	1
Calcium	130		0.50	0.19	mg/L		02/10/20 08:15	02/11/20 19:11	1
Chromium	<1.1		5.0	1.1	ug/L		02/10/20 08:15	02/11/20 19:11	1
Cobalt	2.3		0.50	0.091	ug/L		02/10/20 08:15	02/11/20 19:11	1
Lead	0.63		0.50	0.27	ug/L		02/10/20 08:15	02/11/20 19:11	1
Lithium	6.3	J	10	2.3	ug/L		02/10/20 08:15	02/11/20 19:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	990		60	52	mg/L			02/11/20 10:45	1
pH	7.2	HF	0.1	0.1	SU			02/06/20 22:04	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	648.34				ft			02/05/20 11:00	1
Oxidation Reduction Potential	-7.8				millivolts			02/05/20 11:00	1
Oxygen, Dissolved, Client Supplied	1.07				mg/L			02/05/20 11:00	1
pH, Field	7.09				SU			02/05/20 11:00	1
Specific Conductance, Field	1433				umhos/cm			02/05/20 11:00	1
Temperature, Field	11.42				Degrees C			02/05/20 11:00	1
Turbidity, Field	18.1				NTU			02/05/20 11:00	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-5
SDG: MW-309

Qualifiers

Metals

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

General Chemistry

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

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-5
 SDG: MW-309

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-270331/3
Matrix: Water
Analysis Batch: 270331

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.40		1.0	0.40	mg/L			02/10/20 17:19	1
Sulfate	<0.71		1.0	0.71	mg/L			02/10/20 17:19	1

Lab Sample ID: LCS 310-270331/4
Matrix: Water
Analysis Batch: 270331

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	9.97		mg/L		100	90 - 110
Sulfate	10.0	10.2		mg/L		102	90 - 110

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-269745/1-A
Matrix: Water
Analysis Batch: 270025

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 269745

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.88		2.0	0.88	ug/L		02/10/20 08:15	02/11/20 18:39	1
Barium	<0.90		2.0	0.90	ug/L		02/10/20 08:15	02/11/20 18:39	1
Boron	<100		200	100	ug/L		02/10/20 08:15	02/11/20 18:39	1
Cadmium	<0.039		0.10	0.039	ug/L		02/10/20 08:15	02/11/20 18:39	1
Calcium	<0.19		0.50	0.19	mg/L		02/10/20 08:15	02/11/20 18:39	1
Chromium	<1.1		5.0	1.1	ug/L		02/10/20 08:15	02/11/20 18:39	1
Cobalt	<0.091		0.50	0.091	ug/L		02/10/20 08:15	02/11/20 18:39	1
Lead	<0.27		0.50	0.27	ug/L		02/10/20 08:15	02/11/20 18:39	1
Lithium	<2.3		10	2.3	ug/L		02/10/20 08:15	02/11/20 18:39	1

Lab Sample ID: LCS 310-269745/2-A
Matrix: Water
Analysis Batch: 270025

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 269745

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	80.0	66.6		ug/L		83	80 - 120
Barium	80.0	72.9		ug/L		91	80 - 120
Boron	1760	1580		ug/L		90	80 - 120
Cadmium	40.0	36.6		ug/L		91	80 - 120
Calcium	4.00	3.60		mg/L		90	80 - 120
Chromium	80.0	72.3		ug/L		90	80 - 120
Cobalt	40.0	37.0		ug/L		92	80 - 120
Lead	40.0	37.6		ug/L		94	80 - 120
Lithium	200	165		ug/L		82	80 - 120

Eurofins TestAmerica, Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-5
 SDG: MW-309

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

Lab Sample ID: MB 310-269931/1
Matrix: Water
Analysis Batch: 269931

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		30	26	mg/L			02/11/20 10:45	1

Lab Sample ID: LCS 310-269931/2
Matrix: Water
Analysis Batch: 269931

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	970		mg/L		97	90 - 110

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QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-5
SDG: MW-309

HPLC/IC

Analysis Batch: 270331

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-2	MW-309	Total/NA	Water	9056A	
MB 310-270331/3	Method Blank	Total/NA	Water	9056A	
LCS 310-270331/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 269745

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-2	MW-309	Total/NA	Water	3010A	
MB 310-269745/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-269745/2-A	Lab Control Sample	Total/NA	Water	3010A	

Analysis Batch: 270025

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-2	MW-309	Total/NA	Water	6020A	269745
MB 310-269745/1-A	Method Blank	Total/NA	Water	6020A	269745
LCS 310-269745/2-A	Lab Control Sample	Total/NA	Water	6020A	269745

Analysis Batch: 270043

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-2	MW-309	Total/NA	Water	6020A	269745
MB 310-269745/1-A	Method Blank	Total/NA	Water	6020A	269745
LCS 310-269745/2-A	Lab Control Sample	Total/NA	Water	6020A	269745

General Chemistry

Analysis Batch: 269585

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-2	MW-309	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 269931

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-2	MW-309	Total/NA	Water	SM 2540C	
MB 310-269931/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-269931/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 270470

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-2	MW-309	Total/NA	Water	Field Sampling	

Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-5
SDG: MW-309

Client Sample ID: MW-309

Lab Sample ID: 310-175270-2

Date Collected: 02/05/20 11:00

Matrix: Water

Date Received: 02/06/20 18:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		10	270331	02/10/20 23:53	ACJ	TAL CF
Total/NA	Prep	3010A			269745	02/10/20 08:15	HED	TAL CF
Total/NA	Analysis	6020A		1	270025	02/11/20 19:11	SAD	TAL CF
Total/NA	Prep	3010A			269745	02/10/20 08:15	HED	TAL CF
Total/NA	Analysis	6020A		1	270043	02/11/20 19:11	SAD	TAL CF
Total/NA	Analysis	SM 2540C		1	269931	02/11/20 10:45	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	269585	02/06/20 22:04	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	270470	02/05/20 11:00	EAR	TAL CF

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-5
SDG: MW-309

Laboratory: Eurofins TestAmerica, Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-19 *

- 1
- 2
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- 13
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* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-5
SDG: MW-309

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	TAL CF
6020A	Metals (ICP/MS)	SW846	TAL CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL CF
SM 4500 H+ B	pH	SM	TAL CF
Field Sampling	Field Sampling	EPA	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF

Protocol References:

EPA = US Environmental Protection Agency

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

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

Laboratory References:

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





Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS Engineers</u>			
City/State:	CITY <u>Minneapolis</u> STATE <u>MN</u>	Project: <u>Ottumwa</u>	
Receipt Information			
Date/Time Received:	DATE <u>2.6.20</u> TIME <u>1840</u>	Received By: <u>LAB</u>	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>M</u>	Correction Factor (°C): <u>+0.1</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>2.4</u>	Corrected Temp (°C): <u>2.5</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

1
2
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Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container		Preservative	Lot #
			pH	Temp	Added (mls)	
MW-301	310-175270-A-1	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-301	310-175270-C-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-301	310-175270-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-175270-A-2	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-309	310-175270-C-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-175270-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-175270-A-3	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311	310-175270-C-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-175270-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-175270-A-4	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
Field Blank	310-175270-C-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-175270-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072

Parameter	COC #1		COC #2						COC #3			TOTAL	
	MW-301	Field Blank	MW-302	MW-303	MW-304	MW-305	MW-306	MW-310	MW-311	MW-307	MW-308		MW-309
Appendix III Parameters													
Boron	x	x						x	x	x	x	x	7
Calcium	x	x						x	x	x	x	x	7
Chloride	x	x						x	x	x	x	x	7
Fluoride								x	x				2
pH	x	x						x	x	x	x	x	7
Sulfate	x	x						x	x	x	x	x	7
TDS	x	x						x	x	x	x	x	7
Appendix IV Parameters													
Antimony								x	x				2
Arsenic	x	x						x	x	x	x	x	7
Barium	x	x						x	x	x	x	x	7
Beryllium								x	x				2
Cadmium	x	x						x	x	x	x	x	7
Chromium	x	x						x	x	x	x	x	7
Cobalt	x	x						x	x	x	x	x	7
Fluoride								x	x				2
Lead	x	x						x	x	x	x	x	7
Lithium	x	x						x	x	x	x	x	7
Mercury								x	x				2
Molybdenum								x	x				2
Selenium								x	x				2
Thallium								x	x				2
Radium	x	x						x	x	x	x	x	7
Field Parameters													
Groundwater Elevation	x							x	x	x	x	x	6
Well Depth	x							x	x	x	x	x	6
pH (field)	x							x	x	x	x	x	6
Specific Conductance	x							x	x	x	x	x	6
Dissolved Oxygen	x							x	x	x	x	x	6
ORP	x							x	x	x	x	x	6
Temperature	x							x	x	x	x	x	6
Turbidity	x							x	x	x	x	x	6
Color	x							x	x	x	x	x	6
Odor	x							x	x	x	x	x	6

Notes: All samples are unfiltered (total).

I:\25219072.00\Data and Calculations\Tables\Sampling Details\[OGS_CCR_Rule_Sampling_2002.xls]Sheet1



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-175270-5

SDG Number: MW-309

Login Number: 175270

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Bovy, Lorraine L

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Field Blank 250 HNO3 has MW-301, time matches FB with 2359, lid marked FB.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ANALYTICAL REPORT

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


Laboratory Job ID: 310-175270-6

Laboratory Sample Delivery Group: MW-309 Rad
Client Project/Site: Ottumwa Generating Station 25219072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:

3/4/2020 11:08:48 AM

Jim Knapp, Project Manager II
(630)758-0262

jim.knapp@testamericainc.com

Designee for

Sandie Fredrick, Project Manager II
(920)261-1660

sandie.fredrick@testamericainc.com

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Sample Summary	3
Detection Summary	4
Client Sample Results	5
Definitions	6
QC Sample Results	7
QC Association	9
Chronicle	10
Certification Summary	11
Method Summary	12
Chain of Custody	13
Receipt Checklists	17
Tracer Carrier Summary	19

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-6
SDG: MW-309 Rad

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-175270-2	MW-309	Water	02/05/20 11:00	02/06/20 18:40	

- 1
- 2
- 3
- 4
- 5
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- 7
- 8
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- 14

Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-6
SDG: MW-309 Rad

Client Sample ID: MW-309

Lab Sample ID: 310-175270-2

No Detections.

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

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-6
 SDG: MW-309 Rad

Client Sample ID: MW-309

Lab Sample ID: 310-175270-2

Date Collected: 02/05/20 11:00

Matrix: Water

Date Received: 02/06/20 18:40

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.771		0.152	0.167	1.00	0.102	pCi/L	02/10/20 12:07	03/03/20 11:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	92.3		40 - 110					02/10/20 12:07	03/03/20 11:59	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.251	U	0.260	0.261	1.00	0.423	pCi/L	02/10/20 12:27	02/18/20 17:26	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	92.3		40 - 110					02/10/20 12:27	02/18/20 17:26	1
Y Carrier	86.7		40 - 110					02/10/20 12:27	02/18/20 17:26	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	1.02		0.301	0.310	5.00	0.423	pCi/L		03/04/20 08:50	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-6
SDG: MW-309 Rad

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
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-6
 SDG: MW-309 Rad

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-459800/21-A
Matrix: Water
Analysis Batch: 462625

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 459800

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	-0.007253	U	0.0361	0.0361	1.00	0.0814	pCi/L	02/10/20 12:07	03/03/20 11:59	1
Carrier	MB %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	103		40 - 110		02/10/20 12:07	03/03/20 11:59	1			

Lab Sample ID: LCS 160-459800/1-A
Matrix: Water
Analysis Batch: 462625

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 459800

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	8.658		0.901	1.00	0.111	pCi/L	76	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	110		40 - 110						

Lab Sample ID: LCSD 160-459800/2-A
Matrix: Water
Analysis Batch: 462625

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 459800

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	Limit
				Uncert. (2σ+/-)							
Radium-226	11.3	9.170		0.952	1.00	0.0937	pCi/L	81	75 - 125	0.28	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	103		40 - 110								

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-459801/21-A
Matrix: Water
Analysis Batch: 460917

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 459801

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	-0.07100	U	0.183	0.183	1.00	0.346	pCi/L	02/10/20 12:27	02/18/20 17:26	1
Carrier	MB %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	103		40 - 110		02/10/20 12:27	02/18/20 17:26	1			
Y Carrier	87.9		40 - 110		02/10/20 12:27	02/18/20 17:26	1			

Eurofins TestAmerica, Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-6
 SDG: MW-309 Rad

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

Lab Sample ID: LCS 160-459801/1-A

Matrix: Water

Analysis Batch: 460918

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 459801

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	9.10	7.798		0.934	1.00	0.384	pCi/L	86	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	110		40 - 110						
Y Carrier	87.1		40 - 110						

Lab Sample ID: LCSD 160-459801/2-A

Matrix: Water

Analysis Batch: 460918

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 459801

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	9.10	8.440		1.01	1.00	0.396	pCi/L	93	75 - 125	0.33	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	103		40 - 110								
Y Carrier	87.1		40 - 110								

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-6
SDG: MW-309 Rad

Rad

Prep Batch: 459800

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-2	MW-309	Total/NA	Water	PrecSep-21	
MB 160-459800/21-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-459800/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-459800/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 459801

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175270-2	MW-309	Total/NA	Water	PrecSep_0	
MB 160-459801/21-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-459801/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-459801/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	



Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-6
SDG: MW-309 Rad

Client Sample ID: MW-309

Lab Sample ID: 310-175270-2

Date Collected: 02/05/20 11:00

Matrix: Water

Date Received: 02/06/20 18:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			459800	02/10/20 12:07	MNH	TAL SL
Total/NA	Analysis	903.0		1	462625	03/03/20 11:59	AJD	TAL SL
Total/NA	Prep	PrecSep_0			459801	02/10/20 12:27	MNH	TAL SL
Total/NA	Analysis	904.0		1	460917	02/18/20 17:26	CJQ	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	463040	03/04/20 08:50	SMP	TAL SL

Laboratory References:

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



Accreditation/Certification Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-6
 SDG: MW-309 Rad

Laboratory: Eurofins TestAmerica, Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-19 *

Laboratory: Eurofins TestAmerica, 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
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-20
California	Los Angeles County Sanitation Districts	10259	06-30-20
California	State	2886	06-30-20
Connecticut	State	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-20
HI - RadChem Recognition	State	n/a	06-30-20
Illinois	NELAP	004553	11-30-20
Iowa	State	373	09-17-20
Kansas	NELAP	E-10236	10-31-20
Kentucky (DW)	State	KY90125	12-31-20
Louisiana	NELAP	04080	06-30-20
Louisiana (DW)	State	LA011	12-31-20
Maryland	State	310	09-30-20
MI - RadChem Recognition	State	9005	06-30-20
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-20
New Jersey	NELAP	MO002	06-30-20
New York	NELAP	11616	04-01-20
North Dakota	State	R-207	06-30-20
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-20
Pennsylvania	NELAP	68-00540	02-28-20 *
South Carolina	State	85002001	06-30-20
Texas	NELAP	T104704193-19-13	07-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
Utah	NELAP	MO000542019-11	07-31-20
Virginia	NELAP	10310	06-14-20
Washington	State	C592	08-30-20
West Virginia DEP	State	381	10-31-20

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

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-6
SDG: MW-309 Rad

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

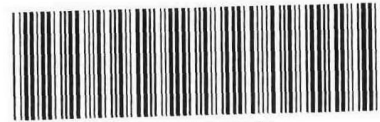
Protocol References:

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

Laboratory References:

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





Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS Engineers</u>			
City/State:	CITY <u>Minneapolis</u> STATE <u>MN</u>	Project: <u>Ottumwa</u>	
Receipt Information			
Date/Time Received:	DATE <u>2.6.20</u> TIME <u>1840</u>	Received By: <u>LAB</u>	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>M</u>	Correction Factor (°C): <u>+0.1</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>2.4</u>	Corrected Temp (°C): <u>2.5</u>	
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



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Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container		Preservative	
			pH	Temp	Added (mls)	Lot #
MW-301	310-175270-A-1	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-301	310-175270-C-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-301	310-175270-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-175270-A-2	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-309	310-175270-C-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-175270-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-175270-A-3	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311	310-175270-C-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-175270-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-175270-A-4	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
Field Blank	310-175270-C-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-175270-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

**Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072**

Parameter	COC #1		COC #2						COC #3			TOTAL	
	MW-301	Field Blank	MW-302	MW-303	MW-304	MW-305	MW-306	MW-310	MW-311	MW-307	MW-308		MW-309
Appendix III Parameters													
Boron	x	x						x	x	x	x	x	7
Calcium	x	x						x	x	x	x	x	7
Chloride	x	x						x	x	x	x	x	7
Fluoride								x	x				2
pH	x	x						x	x	x	x	x	7
Sulfate	x	x						x	x	x	x	x	7
TDS	x	x						x	x	x	x	x	7
Appendix IV Parameters													
Antimony								x	x				2
Arsenic	x	x						x	x	x	x	x	7
Barium	x	x						x	x	x	x	x	7
Beryllium								x	x				2
Cadmium	x	x						x	x	x	x	x	7
Chromium	x	x						x	x	x	x	x	7
Cobalt	x	x						x	x	x	x	x	7
Fluoride								x	x				2
Lead	x	x						x	x	x	x	x	7
Lithium	x	x						x	x	x	x	x	7
Mercury								x	x				2
Molybdenum								x	x				2
Selenium								x	x				2
Thallium								x	x				2
Radium	x	x						x	x	x	x	x	7
Field Parameters													
Groundwater Elevation	x							x	x	x	x	x	6
Well Depth	x							x	x	x	x	x	6
pH (field)	x							x	x	x	x	x	6
Specific Conductance	x							x	x	x	x	x	6
Dissolved Oxygen	x							x	x	x	x	x	6
ORP	x							x	x	x	x	x	6
Temperature	x							x	x	x	x	x	6
Turbidity	x							x	x	x	x	x	6
Color	x							x	x	x	x	x	6
Odor	x							x	x	x	x	x	6

Notes: All samples are unfiltered (total).

I:\25219072.00\Data and Calculations\Tables\Sampling Details\[OGS_CCR_Rule_Sampling_2002.xls]Sheet1



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-175270-6

SDG Number: MW-309 Rad

Login Number: 175270

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Bovy, Lorraine L

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Field Blank 250 HNO3 has MW-301, time matches FB with 2359, lid marked FB.
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: 310-175270-6

SDG Number: MW-309 Rad

Login Number: 175270

List Number: 2

Creator: Hellm, Michael

List Source: Eurofins TestAmerica, St. Louis

List Creation: 02/08/20 10:20 AM

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.	N/A	
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	21.0
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?	N/A	
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").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Tracer/Carrier Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175270-6
SDG: MW-309 Rad

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	
310-175270-2	MW-309	92.3	
LCS 160-459800/1-A	Lab Control Sample	110	
LCSD 160-459800/2-A	Lab Control Sample Dup	103	
MB 160-459800/21-A	Method Blank	103	

Tracer/Carrier Legend
Ba Carrier = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Y Carrier (40-110)
310-175270-2	MW-309	92.3	86.7
LCS 160-459801/1-A	Lab Control Sample	110	87.1
LCSD 160-459801/2-A	Lab Control Sample Dup	103	87.1
MB 160-459801/21-A	Method Blank	103	87.9

Tracer/Carrier Legend
Ba Carrier = Ba Carrier
Y Carrier = Y Carrier

ANALYTICAL REPORT

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

Laboratory Job ID: 310-175272-1

Client Project/Site: Ottumwa Generating Station 25219072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:
2/18/2020 12:00:24 PM*

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

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	6
Definitions	8
QC Sample Results	9
QC Association	11
Chronicle	12
Certification Summary	13
Method Summary	14
Chain of Custody	15
Receipt Checklists	19

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-1

Job ID: 310-175272-1

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative
310-175272-1

Comments

No additional comments.

Receipt

The samples were received on 2/6/2020 6:40 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.0° C.

HPLC/IC

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

Metals

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

General Chemistry

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

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

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-175272-1	MW-308	Water	02/05/20 12:25	02/06/20 18:40	
310-175272-2	MW-307	Water	02/05/20 11:30	02/06/20 18:40	

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Detection Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-1

Client Sample ID: MW-308

Lab Sample ID: 310-175272-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	160		10	4.0	mg/L	10		9056A	Total/NA
Sulfate	300		10	7.1	mg/L	10		9056A	Total/NA
Barium	130		2.0	0.90	ug/L	1		6020A	Total/NA
Boron	220		200	100	ug/L	1		6020A	Total/NA
Calcium	210		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.14	J	0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	12		10	2.3	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1100		60	52	mg/L	1		SM 2540C	Total/NA
pH	6.8	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	650.12				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-35.9				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	1.48				mg/L	1		Field Sampling	Total/NA
pH, Field	6.78				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1630				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	11.35				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	3.49				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-307

Lab Sample ID: 310-175272-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	220		10	4.0	mg/L	10		9056A	Total/NA
Sulfate	100		10	7.1	mg/L	10		9056A	Total/NA
Barium	130		2.0	0.90	ug/L	1		6020A	Total/NA
Boron	200		200	100	ug/L	1		6020A	Total/NA
Calcium	210		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	13		0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	9.1	J	10	2.3	ug/L	1		6020A	Total/NA
Total Dissolved Solids	970		60	52	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	649.88				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-15.6				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.90				mg/L	1		Field Sampling	Total/NA
pH, Field	6.67				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1681				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	11.65				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	9.74				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-1

Client Sample ID: MW-308

Lab Sample ID: 310-175272-1

Date Collected: 02/05/20 12:25

Matrix: Water

Date Received: 02/06/20 18:40

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	160		10	4.0	mg/L			02/11/20 17:26	10
Sulfate	300		10	7.1	mg/L			02/13/20 18:54	10

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.88		2.0	0.88	ug/L		02/10/20 08:15	02/11/20 19:19	1
Barium	130		2.0	0.90	ug/L		02/10/20 08:15	02/11/20 19:19	1
Boron	220		200	100	ug/L		02/10/20 08:15	02/11/20 19:19	1
Cadmium	<0.039		0.10	0.039	ug/L		02/10/20 08:15	02/11/20 19:19	1
Calcium	210		0.50	0.19	mg/L		02/10/20 08:15	02/11/20 19:19	1
Chromium	<1.1		5.0	1.1	ug/L		02/10/20 08:15	02/11/20 19:19	1
Cobalt	0.14	J	0.50	0.091	ug/L		02/10/20 08:15	02/11/20 19:19	1
Lead	<0.27		0.50	0.27	ug/L		02/10/20 08:15	02/11/20 19:19	1
Lithium	12		10	2.3	ug/L		02/10/20 08:15	02/11/20 19:19	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1100		60	52	mg/L			02/11/20 10:45	1
pH	6.8	HF	0.1	0.1	SU			02/06/20 22:13	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	650.12				ft			02/05/20 12:25	1
Oxidation Reduction Potential	-35.9				millivolts			02/05/20 12:25	1
Oxygen, Dissolved, Client Supplied	1.48				mg/L			02/05/20 12:25	1
pH, Field	6.78				SU			02/05/20 12:25	1
Specific Conductance, Field	1630				umhos/cm			02/05/20 12:25	1
Temperature, Field	11.35				Degrees C			02/05/20 12:25	1
Turbidity, Field	3.49				NTU			02/05/20 12:25	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-1

Client Sample ID: MW-307

Lab Sample ID: 310-175272-2

Date Collected: 02/05/20 11:30

Matrix: Water

Date Received: 02/06/20 18:40

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	220		10	4.0	mg/L			02/11/20 17:42	10
Sulfate	100		10	7.1	mg/L			02/13/20 19:10	10

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.88		2.0	0.88	ug/L		02/10/20 08:15	02/11/20 19:22	1
Barium	130		2.0	0.90	ug/L		02/10/20 08:15	02/11/20 19:22	1
Boron	200		200	100	ug/L		02/10/20 08:15	02/11/20 19:22	1
Cadmium	<0.039		0.10	0.039	ug/L		02/10/20 08:15	02/11/20 19:22	1
Calcium	210		0.50	0.19	mg/L		02/10/20 08:15	02/11/20 19:22	1
Chromium	<1.1		5.0	1.1	ug/L		02/10/20 08:15	02/11/20 19:22	1
Cobalt	13		0.50	0.091	ug/L		02/10/20 08:15	02/11/20 19:22	1
Lead	<0.27		0.50	0.27	ug/L		02/10/20 08:15	02/11/20 19:22	1
Lithium	9.1	J	10	2.3	ug/L		02/10/20 08:15	02/11/20 19:22	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	970		60	52	mg/L			02/11/20 10:45	1
pH	6.7	HF	0.1	0.1	SU			02/06/20 22:16	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	649.88				ft			02/05/20 11:30	1
Oxidation Reduction Potential	-15.6				millivolts			02/05/20 11:30	1
Oxygen, Dissolved, Client Supplied	0.90				mg/L			02/05/20 11:30	1
pH, Field	6.67				SU			02/05/20 11:30	1
Specific Conductance, Field	1681				umhos/cm			02/05/20 11:30	1
Temperature, Field	11.65				Degrees C			02/05/20 11:30	1
Turbidity, Field	9.74				NTU			02/05/20 11:30	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-1

Qualifiers

Metals

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

General Chemistry

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

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-270339/3
Matrix: Water
Analysis Batch: 270339

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.40		1.0	0.40	mg/L			02/11/20 14:48	1
Sulfate	<0.71		1.0	0.71	mg/L			02/11/20 14:48	1

Lab Sample ID: LCS 310-270339/4
Matrix: Water
Analysis Batch: 270339

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	10.0		mg/L		100	90 - 110
Sulfate	10.0	10.3		mg/L		103	90 - 110

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-269745/1-A
Matrix: Water
Analysis Batch: 270025

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 269745

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.88		2.0	0.88	ug/L		02/10/20 08:15	02/11/20 18:39	1
Barium	<0.90		2.0	0.90	ug/L		02/10/20 08:15	02/11/20 18:39	1
Boron	<100		200	100	ug/L		02/10/20 08:15	02/11/20 18:39	1
Cadmium	<0.039		0.10	0.039	ug/L		02/10/20 08:15	02/11/20 18:39	1
Calcium	<0.19		0.50	0.19	mg/L		02/10/20 08:15	02/11/20 18:39	1
Chromium	<1.1		5.0	1.1	ug/L		02/10/20 08:15	02/11/20 18:39	1
Cobalt	<0.091		0.50	0.091	ug/L		02/10/20 08:15	02/11/20 18:39	1
Lead	<0.27		0.50	0.27	ug/L		02/10/20 08:15	02/11/20 18:39	1
Lithium	<2.3		10	2.3	ug/L		02/10/20 08:15	02/11/20 18:39	1

Lab Sample ID: LCS 310-269745/2-A
Matrix: Water
Analysis Batch: 270025

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 269745

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	80.0	66.6		ug/L		83	80 - 120
Barium	80.0	72.9		ug/L		91	80 - 120
Boron	1760	1580		ug/L		90	80 - 120
Cadmium	40.0	36.6		ug/L		91	80 - 120
Calcium	4.00	3.60		mg/L		90	80 - 120
Chromium	80.0	72.3		ug/L		90	80 - 120
Cobalt	40.0	37.0		ug/L		92	80 - 120
Lead	40.0	37.6		ug/L		94	80 - 120
Lithium	200	165		ug/L		82	80 - 120

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QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-1

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

Lab Sample ID: MB 310-269931/1
 Matrix: Water
 Analysis Batch: 269931

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		30	26	mg/L			02/11/20 10:45	1

Lab Sample ID: LCS 310-269931/2
 Matrix: Water
 Analysis Batch: 269931

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	1000	970		mg/L		97	90 - 110

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-269585/1
 Matrix: Water
 Analysis Batch: 269585

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		99	98 - 102

Lab Sample ID: 310-175272-1 DU
 Matrix: Water
 Analysis Batch: 269585

Client Sample ID: MW-308
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	6.8	HF	6.9		SU		0.7	20

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-1

HPLC/IC

Analysis Batch: 270339

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175272-1	MW-308	Total/NA	Water	9056A	
310-175272-1	MW-308	Total/NA	Water	9056A	
310-175272-2	MW-307	Total/NA	Water	9056A	
310-175272-2	MW-307	Total/NA	Water	9056A	
MB 310-270339/3	Method Blank	Total/NA	Water	9056A	
LCS 310-270339/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 269745

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175272-1	MW-308	Total/NA	Water	3010A	
310-175272-2	MW-307	Total/NA	Water	3010A	
MB 310-269745/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-269745/2-A	Lab Control Sample	Total/NA	Water	3010A	

Analysis Batch: 270025

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175272-1	MW-308	Total/NA	Water	6020A	269745
310-175272-2	MW-307	Total/NA	Water	6020A	269745
MB 310-269745/1-A	Method Blank	Total/NA	Water	6020A	269745
LCS 310-269745/2-A	Lab Control Sample	Total/NA	Water	6020A	269745

Analysis Batch: 270043

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175272-1	MW-308	Total/NA	Water	6020A	269745
310-175272-2	MW-307	Total/NA	Water	6020A	269745
MB 310-269745/1-A	Method Blank	Total/NA	Water	6020A	269745
LCS 310-269745/2-A	Lab Control Sample	Total/NA	Water	6020A	269745

General Chemistry

Analysis Batch: 269585

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175272-1	MW-308	Total/NA	Water	SM 4500 H+ B	
310-175272-2	MW-307	Total/NA	Water	SM 4500 H+ B	
LCS 310-269585/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-175272-1 DU	MW-308	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 269931

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175272-1	MW-308	Total/NA	Water	SM 2540C	
310-175272-2	MW-307	Total/NA	Water	SM 2540C	
MB 310-269931/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-269931/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 270470

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175272-1	MW-308	Total/NA	Water	Field Sampling	
310-175272-2	MW-307	Total/NA	Water	Field Sampling	

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Lab Chronicle

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-1

Client Sample ID: MW-308

Lab Sample ID: 310-175272-1

Date Collected: 02/05/20 12:25

Matrix: Water

Date Received: 02/06/20 18:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		10	270339	02/11/20 17:26	ACJ	TAL CF
Total/NA	Analysis	9056A		10	270339	02/13/20 18:54	ACJ	TAL CF
Total/NA	Prep	3010A			269745	02/10/20 08:15	HED	TAL CF
Total/NA	Analysis	6020A		1	270025	02/11/20 19:19	SAD	TAL CF
Total/NA	Prep	3010A			269745	02/10/20 08:15	HED	TAL CF
Total/NA	Analysis	6020A		1	270043	02/11/20 19:19	SAD	TAL CF
Total/NA	Analysis	SM 2540C		1	269931	02/11/20 10:45	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	269585	02/06/20 22:13	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	270470	02/05/20 12:25	EAR	TAL CF

Client Sample ID: MW-307

Lab Sample ID: 310-175272-2

Date Collected: 02/05/20 11:30

Matrix: Water

Date Received: 02/06/20 18:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		10	270339	02/11/20 17:42	ACJ	TAL CF
Total/NA	Analysis	9056A		10	270339	02/13/20 19:10	ACJ	TAL CF
Total/NA	Prep	3010A			269745	02/10/20 08:15	HED	TAL CF
Total/NA	Analysis	6020A		1	270025	02/11/20 19:22	SAD	TAL CF
Total/NA	Prep	3010A			269745	02/10/20 08:15	HED	TAL CF
Total/NA	Analysis	6020A		1	270043	02/11/20 19:22	SAD	TAL CF
Total/NA	Analysis	SM 2540C		1	269931	02/11/20 10:45	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	269585	02/06/20 22:16	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	270470	02/05/20 11:30	EAR	TAL CF

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-1

Laboratory: Eurofins TestAmerica, Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-19 *

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

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	TAL CF
6020A	Metals (ICP/MS)	SW846	TAL CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL CF
SM 4500 H+ B	pH	SM	TAL CF
Field Sampling	Field Sampling	EPA	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF

Protocol References:

EPA = US Environmental Protection Agency

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

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

Laboratory References:

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





310-175272 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS Engineers</u>			
City/State:	CITY <u>Minneapolis</u> STATE <u>MN</u>	Project: <u>Ottumwa</u>	
Receipt Information			
Date/Time Received:	DATE <u>2.6.20</u> TIME <u>1840</u>	Received By: <u>LAB</u>	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>M</u>	Correction Factor (°C): <u>+0.1</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>0.9</u>	Corrected Temp (°C): <u>1.0</u>	
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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TestAmerica Docs Carrier Tracking Number: **214**

Client Information Louise Jennings Louise Jennings SCS Engineers Address: 8450 Hickman Road Suite 20 City: Clive State, Zip: IA, 50325 Phone: 25219072 Email: ljennings@scsengineers.com Project Name: Ottumwa Generating Station 25219072 Site:		Lab PM: Fredrick, Sandie E-Mail: sandie.fredrick@testamericainc.com COC No: 310-47095-14655.1 Page: Page 1 of 1 Job #:	
Due Date Requested: TAT Requested (days): PO #: 25219072 WO #:		Analysis Requested Perform MS/MSD (Yes or No) Field Filtered Sample (Yes or No) 903.0, 904.0 6020A, 7470A 2540C, Calcd, 9056A_ORGFM_28D, SMA500_H+	
Sample Identification MW-308 MW-307 MW-310		Sample Date 9/5/20 + +	Sample Time 1225 G 1130 1150
Sample Type (C=Comp, G=grab) Matrix (W=water, S=solid, O=soil, A=air)		Preservation Code: Water Water Water Water Water Water Water	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Dispose By Lab <input type="checkbox"/> Archive For _____ Months	
Deliverable Requested: I, II, III, IV, Other (specify)		Special Instructions/QC Requirements:	
Empty Kit Relinquished by:		Method of Shipment:	
Relinquished by: [Signature] Date/Time: 2/5/20		Received by: Jandy Burchett Date/Time: 2-6-20 1840	
Relinquished by: [Signature] Date/Time:		Received by: Date/Time:	
Relinquished by: [Signature] Date/Time:		Received by: Date/Time:	
Custody Seals Intact: Δ Yes Δ No		Cooler Temperature(s) °C and Other Remarks:	



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Temperature readings: _____

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservative</u>	
			<u>pH</u>	<u>Temp</u>	<u>Added (mls)</u>	<u>Lot #</u>
MW-308	310-175272-A-1	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-308	310-175272-C-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-308	310-175272-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-175272-A-2	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-307	310-175272-C-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-175272-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-175272-A-3	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-310	310-175272-C-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-175272-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

**Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072**

Parameter	COC #1		COC #2						COC #3			TOTAL	
	MW-301	Field Blank	MW-302	MW-303	MW-304	MW-305	MW-306	MW-310	MW-311	MW-307	MW-308		MW-309
Appendix III Parameters													
Boron	x	x						x	x	x	x	x	7
Calcium	x	x						x	x	x	x	x	7
Chloride	x	x						x	x	x	x	x	7
Fluoride								x	x				2
pH	x	x						x	x	x	x	x	7
Sulfate	x	x						x	x	x	x	x	7
TDS	x	x						x	x	x	x	x	7
Appendix IV Parameters													
Antimony								x	x				2
Arsenic	x	x						x	x	x	x	x	7
Barium	x	x						x	x	x	x	x	7
Beryllium								x	x				2
Cadmium	x	x						x	x	x	x	x	7
Chromium	x	x						x	x	x	x	x	7
Cobalt	x	x						x	x	x	x	x	7
Fluoride								x	x				2
Lead	x	x						x	x	x	x	x	7
Lithium	x	x						x	x	x	x	x	7
Mercury								x	x				2
Molybdenum								x	x				2
Selenium								x	x				2
Thallium								x	x				2
Radium	x	x						x	x	x	x	x	7
Field Parameters													
Groundwater Elevation	x							x	x	x	x	x	6
Well Depth	x							x	x	x	x	x	6
pH (field)	x							x	x	x	x	x	6
Specific Conductance	x							x	x	x	x	x	6
Dissolved Oxygen	x							x	x	x	x	x	6
ORP	x							x	x	x	x	x	6
Temperature	x							x	x	x	x	x	6
Turbidity	x							x	x	x	x	x	6
Color	x							x	x	x	x	x	6
Odor	x							x	x	x	x	x	6

Notes: All samples are unfiltered (total).

I:\25219072.00\Data and Calculations\Tables\Sampling Details\[OGS_CCR_Rule_Sampling_2002.xls]Sheet1

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-175272-1

Login Number: 175272

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Bovy, Lorraine L

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



ANALYTICAL REPORT

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

Laboratory Job ID: 310-175272-2

Client Project/Site: Ottumwa Generating Station 25219072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:
3/4/2020 11:34:34 AM

Jim Knapp, Project Manager II
(630)758-0262
jim.knapp@testamericainc.com

Designee for

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

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	6
Definitions	8
QC Sample Results	9
QC Association	11
Chronicle	12
Certification Summary	13
Method Summary	14
Chain of Custody	15
Receipt Checklists	20
Tracer Carrier Summary	22

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-2

Job ID: 310-175272-2

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative 310-175272-2

Comments

No additional comments.

Receipt

The samples were received on 2/6/2020 6:40 PM; the samples arrived in good condition, properly preserved and, where required, on ice.

RAD

Methods 903.0, 9315: Ra-226 Prep Batch 160-459790

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-308 (310-175272-1), MW-307 (310-175272-2), (LCS 160-459790/1-A), (LCSD 160-459790/2-A) and (MB 160-459790/23-A)

Methods 904.0, 9320: Ra-228 Prep Batch 160-459791

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-308 (310-175272-1), MW-307 (310-175272-2), (LCS 160-459791/1-A), (LCSD 160-459791/2-A) and (MB 160-459791/23-A)

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

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-175272-1	MW-308	Water	02/05/20 12:25	02/06/20 18:40	
310-175272-2	MW-307	Water	02/05/20 11:30	02/06/20 18:40	

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Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-2

Client Sample ID: MW-308

Lab Sample ID: 310-175272-1

No Detections.

Client Sample ID: MW-307

Lab Sample ID: 310-175272-2

No Detections.

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This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-2

Client Sample ID: MW-308

Lab Sample ID: 310-175272-1

Date Collected: 02/05/20 12:25

Matrix: Water

Date Received: 02/06/20 18:40

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.42		0.221	0.255	1.00	0.120	pCi/L	02/10/20 10:38	03/03/20 11:18	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.3		40 - 110					02/10/20 10:38	03/03/20 11:18	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.705		0.337	0.343	1.00	0.500	pCi/L	02/10/20 11:00	02/25/20 17:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.3		40 - 110					02/10/20 11:00	02/25/20 17:36	1
Y Carrier	88.6		40 - 110					02/10/20 11:00	02/25/20 17:36	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	2.13		0.403	0.427	5.00	0.500	pCi/L		03/04/20 10:45	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-2

Client Sample ID: MW-307

Lab Sample ID: 310-175272-2

Date Collected: 02/05/20 11:30

Matrix: Water

Date Received: 02/06/20 18:40

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.51		0.219	0.258	1.00	0.104	pCi/L	02/10/20 10:38	03/03/20 11:18	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.8		40 - 110					02/10/20 10:38	03/03/20 11:18	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.718		0.344	0.350	1.00	0.511	pCi/L	02/10/20 11:00	02/25/20 17:36	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	94.8		40 - 110					02/10/20 11:00	02/25/20 17:36	1
Y Carrier	83.7		40 - 110					02/10/20 11:00	02/25/20 17:36	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	2.23		0.408	0.435	5.00	0.511	pCi/L		03/04/20 10:45	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-2

Qualifiers

Rad

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

Glossary

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

QC Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-2

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-459790/23-A
Matrix: Water
Analysis Batch: 462630

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 459790

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.01193	U	0.0438	0.0438	1.00	0.0864	pCi/L	02/10/20 10:38	03/03/20 13:07	1
Carrier	MB %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	104		40 - 110					02/10/20 10:38	03/03/20 13:07	1

Lab Sample ID: LCS 160-459790/1-A
Matrix: Water
Analysis Batch: 462630

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 459790

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	9.766		1.03	1.00	0.0863	pCi/L	86	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits		Prepared	Analyzed	Dil Fac		
Ba Carrier	98.8		40 - 110					02/10/20 10:38	03/03/20 13:07

Lab Sample ID: LCSD 160-459790/2-A
Matrix: Water
Analysis Batch: 462630

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 459790

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	Limit
				Uncert. (2σ+/-)							
Radium-226	11.3	9.634		1.02	1.00	0.135	pCi/L	85	75 - 125	0.06	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits		Prepared	Analyzed	Dil Fac				
Ba Carrier	102		40 - 110					02/10/20 11:00	02/25/20 17:42	1	

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-459791/23-A
Matrix: Water
Analysis Batch: 461694

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 459791

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.1138	U	0.204	0.204	1.00	0.347	pCi/L	02/10/20 11:00	02/25/20 17:42	1
Carrier	MB %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	104		40 - 110					02/10/20 11:00	02/25/20 17:42	1
Y Carrier	90.5		40 - 110		02/10/20 11:00	02/25/20 17:42	1			

Eurofins TestAmerica, Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-2

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

Lab Sample ID: LCS 160-459791/1-A

Matrix: Water

Analysis Batch: 461720

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 459791

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	9.08	8.884		1.05	1.00	0.425	pCi/L	98	75 - 125

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	98.8		40 - 110
Y Carrier	88.2		40 - 110

Lab Sample ID: LCSD 160-459791/2-A

Matrix: Water

Analysis Batch: 461720

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 459791

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	9.08	8.363		0.994	1.00	0.396	pCi/L	92	75 - 125	0.25	1

Carrier	LCSD %Yield	LCSD Qualifier	Limits
Ba Carrier	102		40 - 110
Y Carrier	88.2		40 - 110

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-2

Rad

Prep Batch: 459790

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175272-1	MW-308	Total/NA	Water	PrecSep-21	
310-175272-2	MW-307	Total/NA	Water	PrecSep-21	
MB 160-459790/23-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-459790/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-459790/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 459791

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-175272-1	MW-308	Total/NA	Water	PrecSep_0	
310-175272-2	MW-307	Total/NA	Water	PrecSep_0	
MB 160-459791/23-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-459791/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-459791/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-2

Client Sample ID: MW-308

Lab Sample ID: 310-175272-1

Date Collected: 02/05/20 12:25

Matrix: Water

Date Received: 02/06/20 18:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			459790	02/10/20 10:38	MNH	TAL SL
Total/NA	Analysis	903.0		1	462630	03/03/20 11:18	AJD	TAL SL
Total/NA	Prep	PrecSep_0			459791	02/10/20 11:00	MNH	TAL SL
Total/NA	Analysis	904.0		1	461720	02/25/20 17:36	CJQ	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	463071	03/04/20 10:45	SMP	TAL SL

Client Sample ID: MW-307

Lab Sample ID: 310-175272-2

Date Collected: 02/05/20 11:30

Matrix: Water

Date Received: 02/06/20 18:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			459790	02/10/20 10:38	MNH	TAL SL
Total/NA	Analysis	903.0		1	462630	03/03/20 11:18	AJD	TAL SL
Total/NA	Prep	PrecSep_0			459791	02/10/20 11:00	MNH	TAL SL
Total/NA	Analysis	904.0		1	461720	02/25/20 17:36	CJQ	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	463071	03/04/20 10:45	SMP	TAL SL

Laboratory References:

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



Accreditation/Certification Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-2

Laboratory: Eurofins TestAmerica, Cedar Falls

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

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-19 *

Laboratory: Eurofins TestAmerica, 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
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-20
California	Los Angeles County Sanitation Districts	10259	06-30-20
California	State	2886	06-30-20
Connecticut	State	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-20
HI - RadChem Recognition	State	n/a	06-30-20
Illinois	NELAP	004553	11-30-20
Iowa	State	373	09-17-20
Kansas	NELAP	E-10236	10-31-20
Kentucky (DW)	State	KY90125	12-31-20
Louisiana	NELAP	04080	06-30-20
Louisiana (DW)	State	LA011	12-31-20
Maryland	State	310	09-30-20
MI - RadChem Recognition	State	9005	06-30-20
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-20
New Jersey	NELAP	MO002	06-30-20
New York	NELAP	11616	04-01-20
North Dakota	State	R-207	06-30-20
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-20
Pennsylvania	NELAP	68-00540	02-28-20 *
South Carolina	State	85002001	06-30-20
Texas	NELAP	T104704193-19-13	07-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
Utah	NELAP	MO000542019-11	07-31-20
Virginia	NELAP	10310	06-14-20
Washington	State	C592	08-30-20
West Virginia DEP	State	381	10-31-20

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

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-2

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

Protocol References:

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

Laboratory References:

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



310-175272 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS Engineers</u>			
City/State:	CITY <u>Minneapolis</u>	STATE <u>MN</u>	Project: <u>Ottumwa</u>
Receipt Information			
Date/Time Received:	DATE <u>2.6.20</u>	TIME <u>1840</u>	Received By: <u>LAB</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>M</u>	Correction Factor (°C): <u>+0.1</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>0.9</u>	Corrected Temp (°C): <u>1.0</u>	
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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TestAmerica Docs Mailing Notes SC
Carrier Tracking Number: **214**

Client Information Louise Jennings Phone: 609 509 8245 Lab PM: Fredrick, Sandie E-Mail: sandie.fredrick@testamericainc.com		COC No: 310-47095-14655.1 Page: Page 1 of 1 Job #:	
Company: SCS Engineers Address: 8450 Hickman Road Suite 20 City: Clive State, Zip: IA, 50325 Phone: 25219072 Email: jennings@scsengineers.com Project Name: Ottumwa Generating Station 25219072 Site:		Analysis Requested Perform MS/MSD (Yes or No)	
Due Date Requested: TAT Requested (days): PO #: 25219072 WO #:		Total Number of Containers:	
Sample Identification MW-308 MW-307 MW-310		Special Instructions/Note:	
Sample Date 9/5/20 +	Sample Time 1225 G 1130 L 1150 L	Matrix (W=water, S=solid, O=wastewater, A=air) Water Water Water Water Water Water Water	Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For Months	
Deliverable Requested: I, II, III, IV, Other (specify)		Special Instructions/QC Requirements:	
Empty Kit Relinquished by:		Method of Shipment:	
Relinquished by: <i>[Signature]</i> Date/Time: 9/5/20		Received by: <i>Jandy Binkist</i> Date/Time: 2-6-20 1840	
Relinquished by:		Received by:	
Relinquished by:		Received by:	
Custody Seals Intact: Δ Yes Δ No		Cooler Temperature(s) °C and Other Remarks:	





Temperature readings: _____

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservative</u>	
			<u>pH</u>	<u>Temp</u>	<u>Added (mls)</u>	<u>Lot #</u>
MW-308	310-175272-A-1	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-308	310-175272-C-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-308	310-175272-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-175272-A-2	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-307	310-175272-C-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-175272-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-175272-A-3	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-310	310-175272-C-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-175272-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

**Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072**

Parameter	COC #1		COC #2						COC #3			TOTAL	
	MW-301	Field Blank	MW-302	MW-303	MW-304	MW-305	MW-306	MW-310	MW-311	MW-307	MW-308		MW-309
Appendix III Parameters													
Boron	x	x						x	x	x	x	x	7
Calcium	x	x						x	x	x	x	x	7
Chloride	x	x						x	x	x	x	x	7
Fluoride								x	x				2
pH	x	x						x	x	x	x	x	7
Sulfate	x	x						x	x	x	x	x	7
TDS	x	x						x	x	x	x	x	7
Appendix IV Parameters													
Antimony								x	x				2
Arsenic	x	x						x	x	x	x	x	7
Barium	x	x						x	x	x	x	x	7
Beryllium								x	x				2
Cadmium	x	x						x	x	x	x	x	7
Chromium	x	x						x	x	x	x	x	7
Cobalt	x	x						x	x	x	x	x	7
Fluoride								x	x				2
Lead	x	x						x	x	x	x	x	7
Lithium	x	x						x	x	x	x	x	7
Mercury								x	x				2
Molybdenum								x	x				2
Selenium								x	x				2
Thallium								x	x				2
Radium	x	x						x	x	x	x	x	7
Field Parameters													
Groundwater Elevation	x							x	x	x	x	x	6
Well Depth	x							x	x	x	x	x	6
pH (field)	x							x	x	x	x	x	6
Specific Conductance	x							x	x	x	x	x	6
Dissolved Oxygen	x							x	x	x	x	x	6
ORP	x							x	x	x	x	x	6
Temperature	x							x	x	x	x	x	6
Turbidity	x							x	x	x	x	x	6
Color	x							x	x	x	x	x	6
Odor	x							x	x	x	x	x	6

Notes: All samples are unfiltered (total).

I:\25219072.00\Data and Calculations\Tables\Sampling Details\[OGS_CCR_Rule_Sampling_2002.xls]Sheet1

Chain of Custody Record



Client Information (Sub Contract Lab) Company: TestAmerica Laboratories, Inc. Address: 13715 Rider Trail North, Earth City, MO, 63045 Phone: 314-298-8566(Tel) 314-298-8757(Fax) Email: Project Name: Ottumwa Generating Station 25219072 Site:		Sampler: Lab PM: Fredrick, Sandie Phone: E-Mail: sandie.fredrick@testamericainc.com State of Origin: Iowa Carrier Tracking No(s): 310-24310.1 Page: Page 1 of 1 Job #: 310-175272-2										
Due Date Requested: 2/18/2020 TAT Requested (days): PO #: WO #: Project #: 31011020 SSO#:		Accreditations Required (See note): State Program - Iowa										
<p style="text-align: center;">Analysis Requested</p>												
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=other)	Preservation Code:	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0/Presep_21 Standard Target List	904.0/Presep_0 Standard Target List	Raz26_226GFPC_P	Total Number of Containers	Special Instructions/Note:
MW-308 (310-175272-1)	2/5/20	12:25 Central	Water	Water		X	X	X	X		2	
MW-307 (310-175272-2)	2/5/20	11:30 Central	Water	Water		X	X	X	X		2	
MW-310 (310-175272-3)	2/5/20	14:50 Central	Water	Water		X	X	X	X		2	
Note: Since laboratory accreditations are subject to change, Eurofins TestAmerica 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 TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins TestAmerica attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins TestAmerica.												
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) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Special Instructions/QC Requirements:								
Empty Kit Relinquished by: _____ Date: _____ Time: _____				Method of Shipment: _____								
Relinquished by: <i>T. Deak</i> Date/Time: 2/20/20 15:05 Company: _____				Received by: <i>[Signature]</i> Date/Time: 2-8-20 08:50 Company: ETH SR								
Relinquished by: _____ Date/Time: _____ Company: _____				Received by: _____ Date/Time: _____ Company: _____								
Relinquished by: _____ Date/Time: _____ Company: _____				Received by: _____ Date/Time: _____ Company: _____								
Custody Seals Intact: _____ (Custody Seal No.: _____) Δ Yes Δ No				Cooler Temperature(s) °C and Other Remarks:								



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-175272-2

Login Number: 175272

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Bovy, Lorraine L

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: 310-175272-2

Login Number: 175272

List Number: 2

Creator: Hellm, Michael

List Source: Eurofins TestAmerica, St. Louis

List Creation: 02/08/20 10:20 AM

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
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	21.0
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?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Tracer/Carrier Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25219072

Job ID: 310-175272-2

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	
310-175272-1	MW-308	88.3	
310-175272-2	MW-307	94.8	
LCS 160-459790/1-A	Lab Control Sample	98.8	
LCSD 160-459790/2-A	Lab Control Sample Dup	102	
MB 160-459790/23-A	Method Blank	104	

Tracer/Carrier Legend
Ba Carrier = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Y Carrier (40-110)
310-175272-1	MW-308	88.3	88.6
310-175272-2	MW-307	94.8	83.7
LCS 160-459791/1-A	Lab Control Sample	98.8	88.2
LCSD 160-459791/2-A	Lab Control Sample Dup	102	88.2
MB 160-459791/23-A	Method Blank	104	90.5

Tracer/Carrier Legend
Ba Carrier = Ba Carrier
Y Carrier = Y Carrier

C2 April 2020 Assessment Monitoring

ANALYTICAL REPORT

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

Laboratory Job ID: 310-179710-1

Client Project/Site: Ottumwa Generating Station 25220072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:
4/22/2020 10:37:44 AM*

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

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	6
Definitions	8
QC Sample Results	9
QC Association	12
Chronicle	14
Certification Summary	15
Method Summary	16
Chain of Custody	17
Receipt Checklists	26
Field Data Sheets	27

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-1

Job ID: 310-179710-1

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative 310-179710-1

Comments

No additional comments.

Receipt

The samples were received on 4/16/2020 8:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 1.3° C, 2.6° C and 4.5° C.

HPLC/IC

Method 9056A: The following sample was diluted due to the nature of the sample matrix: MW-301 (310-179710-1). Elevated reporting limits (RLs) are provided.

Methods 300.0, 9056A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 310-276088 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

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

Metals

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

General Chemistry

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

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-179710-1	MW-301	Water	04/14/20 17:45	04/16/20 08:15	
310-179710-15	Field Blank	Water	04/14/20 23:59	04/16/20 08:15	

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Detection Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-1

Client Sample ID: MW-301

Lab Sample ID: 310-179710-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	140		5.0	2.0	mg/L	5		9056A	Total/NA
Sulfate	140		5.0	3.6	mg/L	5		9056A	Total/NA
Barium	54		2.0	0.90	ug/L	1		6020A	Total/NA
Boron	700		200	100	ug/L	1		6020A	Total/NA
Calcium	84		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.52		0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	24		10	2.3	ug/L	1		6020A	Total/NA
Molybdenum	1.2	J	2.0	1.1	ug/L	1		6020A	Total/NA
Selenium	6.8		5.0	1.0	ug/L	1		6020A	Total/NA
Total Dissolved Solids	550		30	26	mg/L	1		SM 2540C	Total/NA
pH	6.6		0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	683.25				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	176.3				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	5.14				mg/L	1		Field Sampling	Total/NA
pH, Field	6.58				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	939				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	8.7				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	0.87				NTU	1		Field Sampling	Total/NA

Client Sample ID: Field Blank

Lab Sample ID: 310-179710-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	0.40	J	1.0	0.40	mg/L	1		9056A	Total/NA
pH	6.3		0.1	0.1	SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-1

Client Sample ID: MW-301

Lab Sample ID: 310-179710-1

Date Collected: 04/14/20 17:45

Matrix: Water

Date Received: 04/16/20 08:15

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	140		5.0	2.0	mg/L			04/16/20 23:42	5
Fluoride	<0.23		0.50	0.23	mg/L			04/16/20 23:42	5
Sulfate	140		5.0	3.6	mg/L			04/16/20 23:42	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.58		1.0	0.58	ug/L		04/17/20 08:00	04/21/20 12:09	1
Arsenic	<0.88		2.0	0.88	ug/L		04/17/20 08:00	04/21/20 12:09	1
Barium	54		2.0	0.90	ug/L		04/17/20 08:00	04/21/20 12:09	1
Beryllium	<0.27		1.0	0.27	ug/L		04/17/20 08:00	04/21/20 12:09	1
Boron	700		200	100	ug/L		04/17/20 08:00	04/21/20 12:09	1
Cadmium	<0.039		0.10	0.039	ug/L		04/17/20 08:00	04/21/20 12:09	1
Calcium	84		0.50	0.19	mg/L		04/17/20 08:00	04/21/20 12:09	1
Chromium	<1.1		5.0	1.1	ug/L		04/17/20 08:00	04/21/20 12:09	1
Cobalt	0.52		0.50	0.091	ug/L		04/17/20 08:00	04/21/20 12:09	1
Lead	<0.27		0.50	0.27	ug/L		04/17/20 08:00	04/21/20 12:09	1
Lithium	24		10	2.3	ug/L		04/17/20 08:00	04/21/20 12:09	1
Molybdenum	1.2 J		2.0	1.1	ug/L		04/17/20 08:00	04/21/20 12:09	1
Selenium	6.8		5.0	1.0	ug/L		04/17/20 08:00	04/21/20 12:09	1
Thallium	<0.26		1.0	0.26	ug/L		04/17/20 08:00	04/21/20 12:09	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/16/20 13:19	04/17/20 14:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	550		30	26	mg/L			04/16/20 09:19	1
pH	6.6		0.1	0.1	SU			04/15/20 22:06	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	683.25				ft			04/14/20 17:45	1
Oxidation Reduction Potential	176.3				millivolts			04/14/20 17:45	1
Oxygen, Dissolved, Client Supplied	5.14				mg/L			04/14/20 17:45	1
pH, Field	6.58				SU			04/14/20 17:45	1
Specific Conductance, Field	939				umhos/cm			04/14/20 17:45	1
Temperature, Field	8.7				Degrees C			04/14/20 17:45	1
Turbidity, Field	0.87				NTU			04/14/20 17:45	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-1

Client Sample ID: Field Blank

Lab Sample ID: 310-179710-15

Date Collected: 04/14/20 23:59

Matrix: Water

Date Received: 04/16/20 08:15

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	0.40	J	1.0	0.40	mg/L			04/17/20 04:09	1
Fluoride	<0.046		0.10	0.046	mg/L			04/17/20 04:09	1
Sulfate	<0.71		1.0	0.71	mg/L			04/17/20 04:09	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.58		1.0	0.58	ug/L		04/17/20 08:00	04/21/20 13:11	1
Arsenic	<0.88		2.0	0.88	ug/L		04/17/20 08:00	04/21/20 13:11	1
Barium	<0.90		2.0	0.90	ug/L		04/17/20 08:00	04/21/20 13:11	1
Beryllium	<0.27		1.0	0.27	ug/L		04/17/20 08:00	04/21/20 13:11	1
Boron	<100		200	100	ug/L		04/17/20 08:00	04/21/20 13:11	1
Cadmium	<0.039		0.10	0.039	ug/L		04/17/20 08:00	04/21/20 13:11	1
Calcium	<0.19		0.50	0.19	mg/L		04/17/20 08:00	04/21/20 13:11	1
Chromium	<1.1		5.0	1.1	ug/L		04/17/20 08:00	04/21/20 13:11	1
Cobalt	<0.091		0.50	0.091	ug/L		04/17/20 08:00	04/21/20 13:11	1
Lead	<0.27		0.50	0.27	ug/L		04/17/20 08:00	04/21/20 13:11	1
Lithium	<2.3		10	2.3	ug/L		04/17/20 08:00	04/21/20 13:11	1
Molybdenum	<1.1		2.0	1.1	ug/L		04/17/20 08:00	04/21/20 13:11	1
Selenium	<1.0		5.0	1.0	ug/L		04/17/20 08:00	04/21/20 13:11	1
Thallium	<0.26		1.0	0.26	ug/L		04/17/20 08:00	04/21/20 13:11	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/16/20 13:20	04/17/20 14:59	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<26		30	26	mg/L			04/16/20 12:43	1
pH	6.3		0.1	0.1	SU			04/15/20 22:29	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-1

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.

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-276088/3
Matrix: Water
Analysis Batch: 276088

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.40		1.0	0.40	mg/L			04/16/20 20:04	1
Fluoride	<0.046		0.10	0.046	mg/L			04/16/20 20:04	1
Sulfate	<0.71		1.0	0.71	mg/L			04/16/20 20:04	1

Lab Sample ID: LCS 310-276088/4
Matrix: Water
Analysis Batch: 276088

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	9.68		mg/L		97	90 - 110
Fluoride	2.00	2.15		mg/L		107	90 - 110
Sulfate	10.0	10.2		mg/L		102	90 - 110

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-276012/1-A
Matrix: Water
Analysis Batch: 276475

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 276012

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.58		1.0	0.58	ug/L		04/17/20 08:00	04/21/20 11:30	1
Arsenic	<0.88		2.0	0.88	ug/L		04/17/20 08:00	04/21/20 11:30	1
Barium	<0.90		2.0	0.90	ug/L		04/17/20 08:00	04/21/20 11:30	1
Beryllium	<0.27		1.0	0.27	ug/L		04/17/20 08:00	04/21/20 11:30	1
Boron	<100		200	100	ug/L		04/17/20 08:00	04/21/20 11:30	1
Cadmium	<0.039		0.10	0.039	ug/L		04/17/20 08:00	04/21/20 11:30	1
Calcium	<0.19		0.50	0.19	mg/L		04/17/20 08:00	04/21/20 11:30	1
Chromium	<1.1		5.0	1.1	ug/L		04/17/20 08:00	04/21/20 11:30	1
Cobalt	<0.091		0.50	0.091	ug/L		04/17/20 08:00	04/21/20 11:30	1
Lead	<0.27		0.50	0.27	ug/L		04/17/20 08:00	04/21/20 11:30	1
Lithium	<2.3		10	2.3	ug/L		04/17/20 08:00	04/21/20 11:30	1
Molybdenum	<1.1		2.0	1.1	ug/L		04/17/20 08:00	04/21/20 11:30	1
Selenium	<1.0		5.0	1.0	ug/L		04/17/20 08:00	04/21/20 11:30	1
Thallium	<0.26		1.0	0.26	ug/L		04/17/20 08:00	04/21/20 11:30	1

Lab Sample ID: LCS 310-276012/2-A
Matrix: Water
Analysis Batch: 276475

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 276012

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	40.0	38.0		ug/L		95	80 - 120
Arsenic	80.0	77.0		ug/L		96	80 - 120
Barium	80.0	80.8		ug/L		101	80 - 120
Beryllium	40.0	39.7		ug/L		99	80 - 120
Boron	1760	1750		ug/L		99	80 - 120
Cadmium	40.0	41.1		ug/L		103	80 - 120
Calcium	4.00	3.99		mg/L		100	80 - 120
Chromium	80.0	80.2		ug/L		100	80 - 120
Cobalt	40.0	40.0		ug/L		100	80 - 120

Eurofins TestAmerica, Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-1

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

Lab Sample ID: LCS 310-276012/2-A
 Matrix: Water
 Analysis Batch: 276475

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 276012

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	40.0	43.3		ug/L		108	80 - 120
Lithium	200	208		ug/L		104	80 - 120
Molybdenum	80.0	79.9		ug/L		100	80 - 120
Selenium	80.0	77.2		ug/L		97	80 - 120
Thallium	32.0	31.4		ug/L		98	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-275975/1-A
 Matrix: Water
 Analysis Batch: 276156

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 275975

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/16/20 13:19	04/17/20 13:31	1

Lab Sample ID: LCS 310-275975/2-A
 Matrix: Water
 Analysis Batch: 276156

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 275975

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	1.67	1.88		ug/L		113	80 - 120

Lab Sample ID: MB 310-275976/1-A
 Matrix: Water
 Analysis Batch: 276156

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 275976

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/16/20 13:20	04/17/20 14:44	1

Lab Sample ID: LCS 310-275976/2-A
 Matrix: Water
 Analysis Batch: 276156

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 275976

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	1.67	1.87		ug/L		112	80 - 120

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

Lab Sample ID: MB 310-275947/1
 Matrix: Water
 Analysis Batch: 275947

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		30	26	mg/L			04/16/20 09:19	1

Lab Sample ID: LCS 310-275947/2
 Matrix: Water
 Analysis Batch: 275947

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	980		mg/L		98	90 - 110

Eurofins TestAmerica, Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-1

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

Lab Sample ID: MB 310-275971/1
 Matrix: Water
 Analysis Batch: 275971

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		30	26	mg/L			04/16/20 12:43	1

Lab Sample ID: LCS 310-275971/2
 Matrix: Water
 Analysis Batch: 275971

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	966		mg/L		97	90 - 110

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-275892/24
 Matrix: Water
 Analysis Batch: 275892

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: 310-179710-1 DU
 Matrix: Water
 Analysis Batch: 275892

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

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	6.6		6.6		SU		0.2	20

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-1

HPLC/IC

Analysis Batch: 276088

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-1	MW-301	Total/NA	Water	9056A	
310-179710-15	Field Blank	Total/NA	Water	9056A	
MB 310-276088/3	Method Blank	Total/NA	Water	9056A	
LCS 310-276088/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 275975

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-1	MW-301	Total/NA	Water	7470A	
MB 310-275975/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-275975/2-A	Lab Control Sample	Total/NA	Water	7470A	

Prep Batch: 275976

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-15	Field Blank	Total/NA	Water	7470A	
MB 310-275976/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-275976/2-A	Lab Control Sample	Total/NA	Water	7470A	

Prep Batch: 276012

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-1	MW-301	Total/NA	Water	3010A	
310-179710-15	Field Blank	Total/NA	Water	3010A	
MB 310-276012/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-276012/2-A	Lab Control Sample	Total/NA	Water	3010A	

Analysis Batch: 276156

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-1	MW-301	Total/NA	Water	7470A	275975
310-179710-15	Field Blank	Total/NA	Water	7470A	275976
MB 310-275975/1-A	Method Blank	Total/NA	Water	7470A	275975
MB 310-275976/1-A	Method Blank	Total/NA	Water	7470A	275976
LCS 310-275975/2-A	Lab Control Sample	Total/NA	Water	7470A	275975
LCS 310-275976/2-A	Lab Control Sample	Total/NA	Water	7470A	275976

Analysis Batch: 276475

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-1	MW-301	Total/NA	Water	6020A	276012
310-179710-15	Field Blank	Total/NA	Water	6020A	276012
MB 310-276012/1-A	Method Blank	Total/NA	Water	6020A	276012
LCS 310-276012/2-A	Lab Control Sample	Total/NA	Water	6020A	276012

General Chemistry

Analysis Batch: 275892

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-1	MW-301	Total/NA	Water	SM 4500 H+ B	
310-179710-15	Field Blank	Total/NA	Water	SM 4500 H+ B	
LCS 310-275892/24	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-179710-1 DU	MW-301	Total/NA	Water	SM 4500 H+ B	

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QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-1

General Chemistry

Analysis Batch: 275947

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-1	MW-301	Total/NA	Water	SM 2540C	
MB 310-275947/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-275947/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Analysis Batch: 275971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-15	Field Blank	Total/NA	Water	SM 2540C	
MB 310-275971/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-275971/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 276362

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-1	MW-301	Total/NA	Water	Field Sampling	

Lab Chronicle

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-1

Client Sample ID: MW-301

Lab Sample ID: 310-179710-1

Date Collected: 04/14/20 17:45

Matrix: Water

Date Received: 04/16/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276088	04/16/20 23:42	ACJ	TAL CF
Total/NA	Prep	3010A			276012	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276475	04/21/20 12:09	SAD	TAL CF
Total/NA	Prep	7470A			275975	04/16/20 13:19	HIS	TAL CF
Total/NA	Analysis	7470A		1	276156	04/17/20 14:04	HIS	TAL CF
Total/NA	Analysis	SM 2540C		1	275947	04/16/20 09:19	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	275892	04/15/20 22:06	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	276362	04/14/20 17:45	ANO	TAL CF

Client Sample ID: Field Blank

Lab Sample ID: 310-179710-15

Date Collected: 04/14/20 23:59

Matrix: Water

Date Received: 04/16/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1	276088	04/17/20 04:09	ACJ	TAL CF
Total/NA	Prep	3010A			276012	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276475	04/21/20 13:11	SAD	TAL CF
Total/NA	Prep	7470A			275976	04/16/20 13:20	HIS	TAL CF
Total/NA	Analysis	7470A		1	276156	04/17/20 14:59	HIS	TAL CF
Total/NA	Analysis	SM 2540C		1	275971	04/16/20 12:43	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	275892	04/15/20 22:29	JMH	TAL CF

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-1

Laboratory: Eurofins TestAmerica, Cedar Falls

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

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

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

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	TAL CF
6020A	Metals (ICP/MS)	SW846	TAL CF
7470A	Mercury (CVAA)	SW846	TAL CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL CF
SM 4500 H+ B	pH	SM	TAL CF
Field Sampling	Field Sampling	EPA	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF
7470A	Preparation, Mercury	SW846	TAL CF

Protocol References:

EPA = US Environmental Protection Agency

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

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

Laboratory References:

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

Eurofins TestAmerica, Cedar Falls



Environment Testing
TestAmerica



310-179710 Chain of Custody

Cooler/Sample Receipt and Temperature Log

Client Information		
Client: <u>SCS Eng.</u>		
City/State: <u>Madison</u> <small>CITY</small>	<u>WI</u> <small>STATE</small>	Project: <u>Ottumura Generating Station</u>
Receipt Information		
Date/Time Received: <u>4-15-20</u> <small>DATE</small>	<u>1740</u> <small>TIME</small>	Received By: <u>LAB</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>3</u>
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
Temperature Record		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>N</u>	Correction Factor (°C): <u>+0.5</u>	
• Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>2.4</u>	Corrected Temp (°C): <u>2.6</u>	
• Sample Container Temperature		
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):		
Corrected Temp (°C):		
Exceptions Noted		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
Additional Comments		

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

Eurofins TestAmerica, Cedar Falls

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





214

Cooler/Sample Receipt and Temperature Log Form

Client Information		
Client: SCS Eng.		
City/State: <small>CITY</small> Madison	<small>STATE</small> WI	Project: Ottumura Generating Station
Receipt Information		
Date/Time Received: <small>DATE</small> 4-15-20	<small>TIME</small> 1740	Received By: LAB
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>2</u> of <u>3</u>
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
Temperature Record		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: N	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): 1.3	Corrected Temp (°C): 1.3	
• Sample Container Temperature		
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):		
Corrected Temp (°C):		
Exceptions Noted		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
Additional Comments		



214

Cooler/Sample Receipt and Temperature Log Form

Client Information		
Client: SCS Eng.		
City/State: <small>CITY</small> Madison	<small>STATE</small> WI	Project: Ottumura Generating Station
Receipt Information		
Date/Time Received: <small>DATE</small> 4-15-20	<small>TIME</small> 1740	Received By: LAB
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>3</u> of <u>3</u>
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
Temperature Record		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: N	Correction Factor (°C): 10.0	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): 4.5	Corrected Temp (°C): 4.5	
• Sample Container Temperature		
Container(s) used:	CONTAINER 1	CONTAINER 2
Uncorrected Temp (°C):		
Corrected Temp (°C):		
Exceptions Noted		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
Additional Comments		

Chain of Custody Record

Client Information Client Contact: Meghan Blodgett Company: SCS Engineers Address: 2830 Dairy Drive City: Madison State, Zip: WI, 53718 Phone: [Redacted] Email: mblodgett@scsengineers.com Project Name: Ottumwa Generating Station 25220072 Site: [Redacted]		Lab PM: Fredrick, Sandie E-Mail: sandie.fredrick@testamericainc.com Phone: 608-509-8245 Project #: 31011020 SSOW#: [Redacted]		Carrier Tracking No(s): 310-48977-15135.1 Page: Page 1 of 2 Job #: [Redacted]						
Analysis Requested Due Date Requested: TAT Requested (days): PO #: 25220072 WO #: Standard Perform MS/MSD (Yes or No): Field Filtered Sample (Yes or No): 2540C_Calcd, 9056A_ORGFM_28D, SM4500_H+ 6020A, 7470A 903.0, 904.0 D D N		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:		Special Instructions/Note: Please refer to enclosed Table for correct grouping of wells on COCs This is for 3 coolers						
Sample Identification Sample Date Sample Time Sample Type (C=comp, G=grab) Matrix (W=water, S=solid, G=wastewater, A=air) Preservation Code:		Total Number of containers:		Special Instructions/Note:						
MW-301	4/14/20	1745	G	Water	X					
MW-302	4/14/20	1700	G	Water	X					
MW-303	4/14/20	1550	G	Water	X					
MW-304	4/13/20	1705	G	Water	X					
MW-305	4/13/20	1450	G	Water	X					
MW-305a	4/14/20	1015	G	Water	X					
MW-306	4/14/20	1450	G	Water	X					
MW-307	4/14/20	1140	G	Water	X					
MW-308	4/14/20	1240	G	Water	X					
MW-309	4/14/20	1350	G	Water	X					
MW-310	4/13/20	1010	G	Water	X					
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		Special Instructions/QC Requirements:						
Empty Kit Relinquished by: [Signature] Relinquished by: [Signature] Relinquished by: [Signature]		Date/Time: 4/15/2020 1400 Date/Time: [Redacted] Date/Time: [Redacted]		Method of Shipment:						
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		Ver: 01/16/2019						



Client Information		Lab PM: Fredrick, Sandie		Carrier Tracking No(s):		COC No: 310-48977-15135.2	
Client Contact: Meghan Blodgett		E-Mail: sandie.fredrick@testamericainc.com		Phone: 608-509-8245		Page: Page 2 of 2	
Company: SCS Engineers		Address: 2830 Dairy Drive		City: Madison		Job #:	
State, Zip: WI, 53718		Phone: 25220072		TAT Requested (days):		Preservation Codes:	
Email: mblodgett@scsengineers.com		WO #: 31011020		Project #: 25220072		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 X - EDTA Y - EDA Z - other (specify)	
Site: Oitumwa Generating Station 25220072		SSOW#:		Due Date Requested:		Other:	
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=soil, B=biological, T=tissue, A=air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Special Instructions/Note:
MW-310A	4/14/20	0940	G	Water	X	X	Please refer to enclosed Table for correct grouping of wells on COCs
MW-311	4/13/20	1240	G	Water	X	X	
MW-311A	4/13/20	0835	G	Water	X	X	
FIELD BLANK	4/14/20	2359	G	Water	X	X	
							This is for 3 coolers
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological							
Deliverable Requested: I, II, III, IV, Other (specify)							
Empty Kit Relinquished by:							
Relinquished by: <i>Loise Jennings</i>		Date/Time: 4/15/20 1400		Company: SCS		Relinquished by: <i>Sunday Burdett</i>	
Relinquished by:		Date/Time:		Company:		Relinquished by:	
Relinquished by:		Date/Time:		Company:		Relinquished by:	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		Special Instructions/QC Requirements:	



Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072

Parameter	COC #1		COC #3										COC #4			TOTAL	
	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-307	MW-308	MW-309		
Appendix III Parameters																	
Boron	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Calcium	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	X	X	X	X	15
Fluoride	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
pH	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sulfate	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
TDS	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Appendix IV Parameters																	
Antimony	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Arsenic	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Barium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Beryllium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cadmium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Chromium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Fluoride	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lead	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lithium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Mercury	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Molybdenum	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Selenium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Thallium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Radium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Additional Lab Parameters																	
Bicarbonate (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Carbonate (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Magnesium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Manganese (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Manganese (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Potassium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sodium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Field Parameters																	
Total Iron (CHEMeis)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Ferrous Iron (CHEMeis)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Groundwater Elevation	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Well Depth	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
pH (field)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Specific Conductance	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Dissolved Oxygen	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
ORP	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Temperature	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Turbidity	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Color	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Odor	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15

Notes: All samples are unfiltered (total).

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Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container		Preservative	
			pH	Temp	Added (mls)	Lot #
MW-301	310-179710-A-1	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-301	310-179710-B-1	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-301	310-179710-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-301	310-179710-E-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-A-2	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-302	310-179710-B-2	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-E-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-A-3	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-303	310-179710-B-3	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-E-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-A-4	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-304	310-179710-B-4	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-E-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-A-5	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-305	310-179710-B-5	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-D-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-E-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-A-6	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-305A	310-179710-B-6	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-D-6	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-E-6	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-A-7	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-306	310-179710-B-7	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-D-7	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-E-7	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-A-8	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-307	310-179710-B-8	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-D-8	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-E-8	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-308	310-179710-A-9	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-308	310-179710-B-9	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-308	310-179710-D-9	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservative</u>	
			<u>pH</u>	<u>Temp</u>	<u>Added (mls)</u>	<u>Lot #</u>
MW-308	310-179710-E-9	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-A-10	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-309	310-179710-B-10	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-D-10	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-E-10	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-A-11	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-310	310-179710-B-11	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-D-11	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-E-11	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-A-12	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-310A	310-179710-B-12	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-D-12	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-E-12	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-A-13	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-311	310-179710-B-13	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-D-13	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-E-13	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-A-14	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-311A	310-179710-B-14	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-D-14	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-E-14	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-A-15	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
Field Blank	310-179710-B-15	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-D-15	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-E-15	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072

Parameter	COC #1 - RUSH NON-RAD		COC #2 - RUSH NON-RAD												COC #3 - NO RUSH			TOTAL	
	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-307	MW-308	MW-309				
Appendix III Parameters	Boron	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15		
	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	X	X	X	X	X	15	
	Fluoride	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	pH	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Sulfate	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	TDS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
Appendix IV Parameters	Antimony	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Arsenic	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Barium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Beryllium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Cadmium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Chromium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Chromium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Cobalt	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Fluoride	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Lead	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Lithium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Mercury	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Molybdenum	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Selenium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Thallium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Radium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Additional Lab Parameters - REPORT SEPARATELY	Bicarbonate (total)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
		Carbonate (total)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
		Cobalt (filtered)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
		Cobalt (total)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
		Iron (filtered)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (total)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
Magnesium (total)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
Manganese (total)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
Manganese (filtered)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
Potassium (total)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
Sodium (total)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
Field Parameters	Total Iron (CHEMets)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Ferrous Iron (CHEMets)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Groundwater Elevation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Well Depth	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	pH (field)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Specific Conductance	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Dissolved Oxygen	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	ORP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Temperature	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Turbidity	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	Color	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
Odor	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15		

Notes: All samples are unfiltered (total).

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Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-179710-1

Login Number: 179710

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Lickness, Corina A

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

Table 1. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station / SCS Engineers Project No. 25220072.00
April 2020

Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (umhos/cm)	ORP (mV)	Turbidity
MW-301	4/14/20 - 1745	683.25	8.7	6.58	5.14	939	176.3	0.87
MW-302	4/14/20 - 1700	656.45	10.5	6.70	0.22	1971	135.6	31.1
MW-303	1/14/20 - 1550	654.08	8.9	6.98	1.94	1097	104.3	12.1
MW-304	4/13/20 - 1705	656.42	11.9	7.12	0.24	1764	-119.8	54.1
MW-305	4/13/20 - 1450	662.44	9.1	7.00	0.28	1772	6.6	21.7
MW-305A	4/14/20 - 1015	N/A	11.2	7.63	2.26	807	106.7	4.91
MW-306	4/14/20 - 1450	670.71	11.7	6.68	0.21	1158	49.7	15.7
MW-307	4/14/20 - 1140	650.66	10.6	6.76	0.69	1554	-52.9	28.9
MW-308	4/14/20 - 1240	650.09	10.9	6.90	0.28	1502	-69.1	5.12
MW-309	4/14/20 - 1350	649.19	11.2	7.21	0.16	1322	-51.5	100.1
MW-310	4/13/20 - 1010	645.91	10.3	7.00	0.22	1823	179.4	0.87
MW-310A	4/14/20 - 0940	N/A	8.8	7.85	6.39	2915	146.1	NA
MW-311	4/13/20 - 1240	646.79	8.8	6.86	0.29	912	103.4	0.44
MW-311A	4/14/20 - 0835	N/A	7.9	8.40	3.87	3027	115.8	3.19

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

Notes:
none

Created by: KAK Date: 5/1/2017
Last revision by: LWJ Date: 4/19/2020
Checked by: AJR Date: 4/20/2020

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ANALYTICAL REPORT

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

Laboratory Job ID: 310-179710-2

Client Project/Site: Ottumwa Generating Station 25220072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:
4/22/2020 10:39:37 AM

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	6
Definitions	8
QC Sample Results	9
QC Association	11
Chronicle	12
Certification Summary	13
Method Summary	14
Chain of Custody	15
Receipt Checklists	24

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-2

Job ID: 310-179710-2

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

**Job Narrative
310-179710-2**

Comments

No additional comments.

Receipt

The samples were received on 4/16/2020 8:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 1.3° C, 2.6° C and 4.5° C.

Metals

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

General Chemistry

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

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Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-179710-1	MW-301	Water	04/14/20 17:45	04/16/20 08:15	
310-179710-15	Field Blank	Water	04/14/20 23:59	04/16/20 08:15	

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Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-2

Client Sample ID: MW-301

Lab Sample ID: 310-179710-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	50	J	100	50	ug/L	1		6020A	Total/NA
Magnesium	33000		500	100	ug/L	1		6020A	Total/NA
Manganese	19		10	4.0	ug/L	1		6020A	Total/NA
Potassium	1500		500	150	ug/L	1		6020A	Total/NA
Sodium	77000		1000	520	ug/L	1		6020A	Total/NA
Cobalt	0.44	J	0.50	0.091	ug/L	1		6020A	Dissolved
Manganese	16		10	4.0	ug/L	1		6020A	Dissolved
Total Alkalinity as CaCO3	150		5.0	1.9	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	150		5.0	1.9	mg/L	1		SM 2320B	Total/NA

Client Sample ID: Field Blank

Lab Sample ID: 310-179710-15

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-2

Client Sample ID: MW-301

Lab Sample ID: 310-179710-1

Date Collected: 04/14/20 17:45

Matrix: Water

Date Received: 04/16/20 08:15

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	50	J	100	50	ug/L		04/17/20 08:00	04/21/20 12:09	1
Magnesium	33000		500	100	ug/L		04/17/20 08:00	04/21/20 12:09	1
Manganese	19		10	4.0	ug/L		04/17/20 08:00	04/21/20 12:09	1
Potassium	1500		500	150	ug/L		04/17/20 08:00	04/21/20 12:09	1
Sodium	77000		1000	520	ug/L		04/17/20 08:00	04/21/20 12:09	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.44	J	0.50	0.091	ug/L		04/17/20 08:00	04/21/20 13:51	1
Iron	<50		100	50	ug/L		04/17/20 08:00	04/21/20 13:51	1
Manganese	16		10	4.0	ug/L		04/17/20 08:00	04/21/20 13:51	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3	150		5.0	1.9	mg/L			04/17/20 10:32	1
Carbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/17/20 10:32	1
Bicarbonate Alkalinity as CaCO3	150		5.0	1.9	mg/L			04/17/20 10:32	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-2

Client Sample ID: Field Blank

Lab Sample ID: 310-179710-15

Date Collected: 04/14/20 23:59

Matrix: Water

Date Received: 04/16/20 08:15

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<50		100	50	ug/L		04/17/20 08:00	04/21/20 13:11	1
Magnesium	<100		500	100	ug/L		04/17/20 08:00	04/21/20 13:11	1
Manganese	<4.0		10	4.0	ug/L		04/17/20 08:00	04/21/20 13:11	1
Potassium	<150		500	150	ug/L		04/17/20 08:00	04/21/20 13:11	1
Sodium	<520		1000	520	ug/L		04/17/20 08:00	04/21/20 13:11	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.091		0.50	0.091	ug/L		04/17/20 08:00	04/21/20 15:29	1
Iron	<50		100	50	ug/L		04/17/20 08:00	04/21/20 15:29	1
Manganese	<4.0		10	4.0	ug/L		04/17/20 08:00	04/21/20 15:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/17/20 09:18	1
Carbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/17/20 09:18	1
Bicarbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/17/20 09:18	1



Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-2

Qualifiers

Metals

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

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-2

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-276012/1-A
Matrix: Water
Analysis Batch: 276475

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 276012

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<50		100	50	ug/L		04/17/20 08:00	04/21/20 11:30	1
Magnesium	<100		500	100	ug/L		04/17/20 08:00	04/21/20 11:30	1
Manganese	<4.0		10	4.0	ug/L		04/17/20 08:00	04/21/20 11:30	1
Potassium	<150		500	150	ug/L		04/17/20 08:00	04/21/20 11:30	1
Sodium	<520		1000	520	ug/L		04/17/20 08:00	04/21/20 11:30	1

Lab Sample ID: LCS 310-276012/2-A
Matrix: Water
Analysis Batch: 276475

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 276012

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Iron	4000	4040		ug/L		101	80 - 120
Magnesium	4000	4320		ug/L		108	80 - 120
Manganese	400	418		ug/L		105	80 - 120
Potassium	4000	4090		ug/L		102	80 - 120
Sodium	4000	3990		ug/L		100	80 - 120

Lab Sample ID: MB 310-276015/1-A
Matrix: Water
Analysis Batch: 276475

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 276015

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.091		0.50	0.091	ug/L		04/17/20 08:00	04/21/20 13:45	1
Iron	<50		100	50	ug/L		04/17/20 08:00	04/21/20 13:45	1
Manganese	<4.0		10	4.0	ug/L		04/17/20 08:00	04/21/20 13:45	1

Lab Sample ID: LCS 310-276015/2-A
Matrix: Water
Analysis Batch: 276475

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 276015

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Cobalt	40.0	40.6		ug/L		102	80 - 120
Iron	4000	4040		ug/L		101	80 - 120
Manganese	400	427		ug/L		107	80 - 120

Lab Sample ID: 310-179710-1 MS
Matrix: Water
Analysis Batch: 276475

Client Sample ID: MW-301
Prep Type: Dissolved
Prep Batch: 276015

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Cobalt	0.44	J	40.0	39.7		ug/L		98	75 - 125
Iron	<50		4000	4210		ug/L		105	75 - 125
Manganese	16		400	439		ug/L		106	75 - 125

Lab Sample ID: 310-179710-1 MSD
Matrix: Water
Analysis Batch: 276475

Client Sample ID: MW-301
Prep Type: Dissolved
Prep Batch: 276015

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Cobalt	0.44	J	40.0	39.6		ug/L		98	75 - 125	0	20

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QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-2

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

Lab Sample ID: 310-179710-1 MSD
 Matrix: Water
 Analysis Batch: 276475

Client Sample ID: MW-301
 Prep Type: Dissolved
 Prep Batch: 276015

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	<50		4000	4140		ug/L		104	75 - 125	2	20
Manganese	16		400	433		ug/L		104	75 - 125	1	20

Method: 2320B - Alkalinity (Low Level)

Lab Sample ID: MB 310-276070/1
 Matrix: Water
 Analysis Batch: 276070

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/17/20 09:18	1
Carbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/17/20 09:18	1
Bicarbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/17/20 09:18	1

Lab Sample ID: LCS 310-276070/2
 Matrix: Water
 Analysis Batch: 276070

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 2320B - Alkalinity

Lab Sample ID: MB 310-276083/1
 Matrix: Water
 Analysis Batch: 276083

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/17/20 10:32	1
Carbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/17/20 10:32	1
Bicarbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/17/20 10:32	1

Lab Sample ID: LCS 310-276083/2
 Matrix: Water
 Analysis Batch: 276083

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	946		mg/L		95	90 - 110

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-2

Metals

Prep Batch: 276012

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-1	MW-301	Total/NA	Water	3010A	
310-179710-15	Field Blank	Total/NA	Water	3010A	
MB 310-276012/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-276012/2-A	Lab Control Sample	Total/NA	Water	3010A	

Prep Batch: 276015

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-1	MW-301	Dissolved	Water	3010A	
310-179710-15	Field Blank	Dissolved	Water	3010A	
MB 310-276015/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-276015/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-179710-1 MS	MW-301	Dissolved	Water	3010A	
310-179710-1 MSD	MW-301	Dissolved	Water	3010A	

Analysis Batch: 276475

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-1	MW-301	Dissolved	Water	6020A	276015
310-179710-1	MW-301	Total/NA	Water	6020A	276012
310-179710-15	Field Blank	Dissolved	Water	6020A	276015
310-179710-15	Field Blank	Total/NA	Water	6020A	276012
MB 310-276012/1-A	Method Blank	Total/NA	Water	6020A	276012
MB 310-276015/1-A	Method Blank	Total/NA	Water	6020A	276015
LCS 310-276012/2-A	Lab Control Sample	Total/NA	Water	6020A	276012
LCS 310-276015/2-A	Lab Control Sample	Total/NA	Water	6020A	276015
310-179710-1 MS	MW-301	Dissolved	Water	6020A	276015
310-179710-1 MSD	MW-301	Dissolved	Water	6020A	276015

General Chemistry

Analysis Batch: 276070

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-15	Field Blank	Total/NA	Water	2320B	
MB 310-276070/1	Method Blank	Total/NA	Water	2320B	
LCS 310-276070/2	Lab Control Sample	Total/NA	Water	2320B	

Analysis Batch: 276083

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-1	MW-301	Total/NA	Water	SM 2320B	
MB 310-276083/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-276083/2	Lab Control Sample	Total/NA	Water	SM 2320B	

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Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-2

Client Sample ID: MW-301

Date Collected: 04/14/20 17:45

Date Received: 04/16/20 08:15

Lab Sample ID: 310-179710-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			276015	04/17/20 08:00	HED	TAL CF
Dissolved	Analysis	6020A		1	276475	04/21/20 13:51	SAD	TAL CF
Total/NA	Prep	3010A			276012	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276475	04/21/20 12:09	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	276083	04/17/20 10:32	WJF	TAL CF

Client Sample ID: Field Blank

Date Collected: 04/14/20 23:59

Date Received: 04/16/20 08:15

Lab Sample ID: 310-179710-15

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			276015	04/17/20 08:00	HED	TAL CF
Dissolved	Analysis	6020A		1	276475	04/21/20 15:29	SAD	TAL CF
Total/NA	Prep	3010A			276012	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276475	04/21/20 13:11	SAD	TAL CF
Total/NA	Analysis	2320B		1	276070	04/17/20 09:18	WJF	TAL CF

Laboratory References:

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

Eurofins TestAmerica, Cedar Falls

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-2

Laboratory: Eurofins TestAmerica, Cedar Falls

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

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

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Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-2

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS)	SW846	TAL CF
2320B	Alkalinity (Low Level)	SM	TAL CF
SM 2320B	Alkalinity	SM	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF

Protocol References:

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

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

Laboratory References:

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





Environment Testing
TestAmerica



310-179710 Chain of Custody

Cooler/Sample Receipt and Temperature Log

Client Information			
Client: <u>SCS Eng.</u>			
City/State: <u>Madison</u>	CITY	STATE <u>WI</u>	Project: <u>Ottumwa Generating Station</u>
Receipt Information			
Date/Time Received: <u>4-15-20</u>	DATE	TIME <u>1740</u>	Received By: <u>LAB</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>N</u>	Correction Factor (°C): <u>+0.5</u>		
• Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>2.4</u>	Corrected Temp (°C): <u>2.6</u>		
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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

Eurofins TestAmerica, Cedar Falls

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

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214

Cooler/Sample Receipt and Temperature Log Form

Client Information		
Client: SCS Eng.		
City/State: <small>CITY</small> Madison	<small>STATE</small> WI	Project: Ottumura Generating Station
Receipt Information		
Date/Time Received: <small>DATE</small> 4-15-20	<small>TIME</small> 1740	Received By: LAB
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>2</u> of <u>3</u>
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
Temperature Record		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: N	Correction Factor (°C): +0.6	
• 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): 1.3	
• Sample Container Temperature		
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):		
Corrected Temp (°C):		
Exceptions Noted		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
Additional Comments		

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14



214

Cooler/Sample Receipt and Temperature Log Form

Client Information		
Client: SCS Eng.		
City/State: <small>CITY</small> Madison	<small>STATE</small> WI	Project: Ottumura Generating Station
Receipt Information		
Date/Time Received: <small>DATE</small> 4-15-20	<small>TIME</small> 1740	Received By: LAB
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>3</u> of <u>3</u>
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
Temperature Record		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: N	Correction Factor (°C): 10.0	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): 4.5	Corrected Temp (°C): 4.5	
• Sample Container Temperature		
Container(s) used:	CONTAINER 1	CONTAINER 2
Uncorrected Temp (°C):		
Corrected Temp (°C):		
Exceptions Noted		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
Additional Comments		

Chain of Custody Record

Client Information Client Contact: Meghan Blodgett Company: SCS Engineers Address: 2830 Dairy Drive City: Madison State, Zip: WI, 53718 Phone: [Redacted] Email: mblodgett@scsengineers.com Project Name: Ottumwa Generating Station 25220072 Site: [Redacted]		Lab PM: Fredrick, Sandie E-Mail: sandie.fredrick@testamericainc.com Phone: [Redacted]		Carmer Tracking No(s): 310-48977-15135.1 Page: Page 1 of 2 Job #: [Redacted]											
Due Date Requested: TAT Requested (days): [Redacted] PO #: 25220072 WO #: [Redacted] Project #: 31011020 SSOW#: [Redacted]		Analysis Requested Perform MS/MSD (Yes or No) [X] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] Field Filtered Sample (Yes or No) [X] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] 903.0, 904.0 [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] 6020A, 7470A [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] 2540C_Calcd, 9056A_ORGFM_28D, SM4500_H+ [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] [] []													
Sample Identification MW-301 MW-302 MW-303 MW-304 MW-305 MW-305a MW-306 MW-307 MW-308 MW-309 MW-310		Sample Date 4/14/20 4/14/20 4/14/20 4/13/20 4/13/20 4/14/20 4/14/20 4/14/20 4/14/20 4/13/20		Sample Time 1745 1700 1550 1705 1450 1015 1450 1140 1240 1350 1010		Sample Type (C=comp, G=grab) G G G G G G G G G G G		Matrix (W=water, S=solid, G=wastewater, A=air) Water Water Water Water Water Water Water Water Water Water Water		Preservation Code: G G G G G G G G G G G		Total Number of containers: [Redacted]		Special Instructions/Note: Please refer to enclosed Table for correct grouping of wells on COCs This is for 3 coolers	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Deliverable Requested: I, II, III, IV, Other (specify) [Redacted]		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For [Redacted] Months		Special Instructions/QC Requirements: [Redacted]		Method of Shipment: [Redacted]							
Relinquished by: [Signature] Date/Time: 4/15/2020 1400 Company: SCS		Relinquished by: [Signature] Date/Time: [Redacted] Company: [Redacted]		Relinquished by: [Signature] Date/Time: [Redacted] Company: [Redacted]		Relinquished by: [Signature] Date/Time: [Redacted] Company: [Redacted]		Cooler Temperature(s) °C and Other Remarks: [Redacted]							

Client Information		Sampler: <i>Louise Jennings</i>		Lab PM: Fredrick, Sandie		Carrier Tracking No(s):		COC No: 310-48977-15135.2				
Client Contact: Meghan Blodgett		Phone: <i>608-509-8245</i>		E-Mail: sandie.fredrick@testamericainc.com				Page: Page 2 of 2				
Company: SCS Engineers								Job #:				
Address: 2830 Dairy Drive		Due Date Requested:		Analysis Requested		Total Number of Containers		Preservation Codes:				
City: Madison		TAT Requested (days):						A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:				
State, Zip: WI, 53718		PO #: 25220072		Standard				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)				
Email: mblodgett@scsengineers.com		WO #: 31011020										
Project Name: Oitumwa Generating Station 25220072		Project #:										
Site:		SSOW#:										
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=soil, B=soil, T=tissue, A=air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0, 904.0	6020A, 7470A	2540C, Calcd, 9056A, ORGM_28D, SM4500_H+	D	N	Special Instructions/Note:
MW-310A	4/14/20	0940	G	Water	X	X	X	X	X			
MW-311	4/13/20	1240	G	Water	X	X	X	X	X			Please refer to enclosed Table for correct grouping of wells on COCs
MW-311A	4/13/20	0835	G	Water	X	X	X	X	X			This is for 3 coolers
FIELD BLANK	4/14/20	2359	G	Water	X	X	X	X	X			
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological										Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		
Deliverable Requested: I, II, III, IV, Other (specify)										Special Instructions/QC Requirements:		
Empty Kit Relinquished by:										Method of Shipment:		
Relinquished by: <i>Louise Jennings</i>										Date/Time: 4/15/20 1400		
Relinquished by:										Date/Time: Sunday Burdett		
Relinquished by:										Date/Time: 4-15-20 1740		
Relinquished by:										Date/Time:		
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No										Cooler Temperature(s) °C and Other Remarks:		

Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072

Parameter	COC #1		COC #3										COC #4			TOTAL	
	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-307	MW-308	MW-309		
Appendix III Parameters																	
Boron	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Calcium	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	X	X	X	X	15
Fluoride	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
pH	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sulfate	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
TDS	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Appendix IV Parameters																	
Antimony	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Arsenic	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Barium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Beryllium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cadmium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Chromium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Fluoride	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lead	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lithium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Mercury	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Molybdenum	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Selenium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Thallium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Radium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Additional Lab Parameters																	
Bicarbonate (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Carbonate (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Magnesium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Manganese (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Manganese (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Potassium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sodium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Field Parameters																	
Total Iron (CHEMeis)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Ferrous Iron (CHEMeis)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Groundwater Elevation	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Well Depth	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
pH (field)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Specific Conductance	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Dissolved Oxygen	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
ORP	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Temperature	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Turbidity	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Color	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Odor	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15

Notes: All samples are unfiltered (total).

I:\25220072\00\Data and Calculations\Field Work Requests\OGS_CCR_Rule_Sampling_2004.xls\$Sheet1

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container		Preservative	
			pH	Temp	Added (mls)	Lot #
MW-301	310-179710-A-1	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-301	310-179710-B-1	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-301	310-179710-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-301	310-179710-E-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-A-2	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-302	310-179710-B-2	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-E-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-A-3	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-303	310-179710-B-3	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-E-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-A-4	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-304	310-179710-B-4	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-E-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-A-5	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-305	310-179710-B-5	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-D-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-E-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-A-6	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-305A	310-179710-B-6	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-D-6	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-E-6	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-A-7	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-306	310-179710-B-7	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-D-7	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-E-7	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-A-8	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-307	310-179710-B-8	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-D-8	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-E-8	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-308	310-179710-A-9	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-308	310-179710-B-9	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-308	310-179710-D-9	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservative</u>	
			<u>pH</u>	<u>Temp</u>	<u>Added (mls)</u>	<u>Lot #</u>
MW-308	310-179710-E-9	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-A-10	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-309	310-179710-B-10	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-D-10	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-E-10	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-A-11	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-310	310-179710-B-11	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-D-11	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-E-11	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-A-12	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-310A	310-179710-B-12	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-D-12	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-E-12	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-A-13	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-311	310-179710-B-13	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-D-13	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-E-13	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-A-14	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-311A	310-179710-B-14	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-D-14	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-E-14	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-A-15	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
Field Blank	310-179710-B-15	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-D-15	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-E-15	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072

Parameter	COC #1 - RUSH NON-RAD		COC #2 - RUSH NON-RAD										COC #3 - NO RUSH			TOTAL		
	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-307	MW-308	MW-309			
Appendix III Parameters	Boron	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
	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	X	X	X	X	X	15
	Fluoride	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	pH	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Sulfate	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	TDS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Appendix IV Parameters	Antimony	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Arsenic	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Barium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Beryllium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Cadmium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Chromium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Chromium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Cobalt	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Fluoride	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Lead	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Lithium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Mercury	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Molybdenum	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Selenium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Thallium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Radium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Additional Lab Parameters - REPORT SEPARATELY	Bicarbonate (total)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Carbonate (total)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt (filtered)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt (total)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (filtered)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (total)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Magnesium (total)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Manganese (total)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Manganese (filtered)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Potassium (total)		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sodium (total)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
Field Parameters	Total Iron (CHEMets)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Ferrous Iron (CHEMets)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Groundwater Elevation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Well Depth	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	pH (field)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Specific Conductance	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Dissolved Oxygen	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	ORP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Temperature	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
	Turbidity	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Color	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	
Odor	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15	

Notes: All samples are unfiltered (total).

C:\Users\FredrickS\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\W75MLXP2\OGS_CCR_Rule_Sampling_2004.xls]Sheet1

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-179710-2

Login Number: 179710

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Lickness, Corina A

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



ANALYTICAL REPORT

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

Laboratory Job ID: 310-179710-3

Client Project/Site: Ottumwa Generating Station 25220072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:
5/18/2020 10:50:50 AM*

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

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	6
Definitions	8
QC Sample Results	9
QC Association	12
Chronicle	13
Certification Summary	14
Method Summary	15
Chain of Custody	16
Receipt Checklists	24
Tracer Carrier Summary	26

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-3

Job ID: 310-179710-3

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative 310-179710-3

Receipt

The samples were received on 4/16/2020 8:15 AM; the samples arrived in good condition, properly preserved, and where required, on ice. The temperatures of the 3 coolers at receipt time were 1.3°C, 2.6°C and 4.5°C

Department Gas Flow Proportional Counter

Method 903.0: Radium-226 Prep Batch 160-468451: Insufficient sample volume was available to perform a sample duplicate (DUP) associated with preparation batch 160-468451. A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were created to demonstrate batch precision

Method 903.0: Radium-226 Prep Batch 160-468451 / 160-468932

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 (310-179710-1), (LCS 160-468451/1-A), (LCSD 160-468451/2-A) and (MB 160-468451/23-A, Field Blank (310-179710-15), (LCS 160-468932/1-A), (LCSD 160-468932/2-A) and (MB 160-468932/21-A

Method 904.0: Radium-228 Prep Batch 160-468454: Insufficient sample volume was available to perform a sample duplicate (DUP) associated with preparation batch 160-468454. A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were created to demonstrate batch precision

Method 904.0: Ra-228 Prep Batch 160-468454 / 160-468933

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 (310-179710-1), (LCS 160-468454/1-A), (LCSD 160-468454/2-A) and (MB 160-468454/23, Field Blank (310-179710-15), (LCS 160-468933/1-A), (LCSD 160-468933/2-A) and (MB 160-468933/21-A

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

Department Rad

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



Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-179710-1	MW-301	Water	04/14/20 17:45	04/16/20 08:15	
310-179710-15	Field Blank	Water	04/14/20 23:59	04/16/20 08:15	

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Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-3

Client Sample ID: MW-301

Lab Sample ID: 310-179710-1

No Detections.

Client Sample ID: Field Blank

Lab Sample ID: 310-179710-15

No Detections.

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15

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-3

Client Sample ID: MW-301

Lab Sample ID: 310-179710-1

Date Collected: 04/14/20 17:45

Matrix: Water

Date Received: 04/16/20 08:15

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0921	U	0.0818	0.0822	1.00	0.120	pCi/L	04/21/20 13:39	05/14/20 11:19	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	102		40 - 110					04/21/20 13:39	05/14/20 11:19	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.223	U	0.215	0.216	1.00	0.346	pCi/L	04/21/20 13:39	05/11/20 16:05	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	102		40 - 110					04/21/20 13:39	05/11/20 16:05	1
Y Carrier	83.4		40 - 110					04/21/20 13:39	05/11/20 16:05	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.315	U	0.230	0.231	5.00	0.346	pCi/L		05/15/20 07:55	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-3

Client Sample ID: Field Blank

Lab Sample ID: 310-179710-15

Date Collected: 04/14/20 23:59

Matrix: Water

Date Received: 04/16/20 08:15

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.00550	U	0.0636	0.0636	1.00	0.130	pCi/L	04/26/20 17:31	05/18/20 04:30	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.1		40 - 110					04/26/20 17:31	05/18/20 04:30	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.00439	U	0.217	0.217	1.00	0.390	pCi/L	04/26/20 17:49	05/13/20 07:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.1		40 - 110					04/26/20 17:49	05/13/20 07:53	1
Y Carrier	87.5		40 - 110					04/26/20 17:49	05/13/20 07:53	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.00989	U	0.226	0.226	5.00	0.390	pCi/L		05/18/20 10:15	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-3

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
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-3

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-468451/23-A
Matrix: Water
Analysis Batch: 470398

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 468451

Analyte	MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.04590	U	0.0985	0.0985	1.00	0.181	pCi/L	04/21/20 13:39	05/14/20 11:19	1
Carrier	MB		Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	%Yield	MB Qualifier	40 - 110					04/21/20 13:39	05/14/20 11:19	1
	97.0									

Lab Sample ID: LCS 160-468451/1-A
Matrix: Water
Analysis Batch: 470398

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 468451

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits		
				Uncert. (2σ+/-)							
Radium-226	15.1	13.34		1.48	1.00	0.146	pCi/L	88	75 - 125		
Carrier	LCS	LCS									
Ba Carrier	%Yield	Qualifier	Limits								
	96.6		40 - 110								

Lab Sample ID: LCSD 160-468451/2-A
Matrix: Water
Analysis Batch: 470398

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 468451

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	Limit	
				Uncert. (2σ+/-)								
Radium-226	15.1	11.93		1.35	1.00	0.163	pCi/L	79	75 - 125	0.50	1	
Carrier	LCSD	LCSD										
Ba Carrier	%Yield	Qualifier	Limits									
	96.0		40 - 110									

Lab Sample ID: MB 160-468932/21-A
Matrix: Water
Analysis Batch: 470653

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 468932

Analyte	MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	-0.0009617	U	0.0638	0.0638	1.00	0.134	pCi/L	04/26/20 17:31	05/18/20 06:37	1
Carrier	MB		Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	%Yield	MB Qualifier	40 - 110					04/26/20 17:31	05/18/20 06:37	1
	83.5									

Lab Sample ID: LCS 160-468932/1-A
Matrix: Water
Analysis Batch: 470653

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 468932

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	10.45		1.16	1.00	0.168	pCi/L	92	75 - 125

Eurofins TestAmerica, Cedar Falls

QC Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-3

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

Lab Sample ID: LCS 160-468932/1-A
Matrix: Water
Analysis Batch: 470653

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 468932

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	73.8		40 - 110

Lab Sample ID: LCSD 160-468932/2-A
Matrix: Water
Analysis Batch: 470653

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 468932

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec.		RER
									Limits	RER	Limit
Radium-226	11.3	10.46		1.15	1.00	0.150	pCi/L	92	75 - 125	0.01	1

Carrier	LCSD %Yield	LCSD Qualifier	Limits
Ba Carrier	79.3		40 - 110

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-468454/23-A
Matrix: Water
Analysis Batch: 469973

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 468454

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared		Analyzed		Dil Fac
								04/21/20 13:39	05/11/20 16:05	05/11/20 16:05	16:05	1
Radium-228	-0.1479	U	0.287	0.287	1.00	0.548	pCi/L	04/21/20 13:39	05/11/20 16:05	05/11/20 16:05	16:05	1

Carrier	MB %Yield	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	97.0		40 - 110	04/21/20 13:39	05/11/20 16:05	1
Y Carrier	85.2		40 - 110	04/21/20 13:39	05/11/20 16:05	1

Lab Sample ID: LCS 160-468454/1-A
Matrix: Water
Analysis Batch: 469997

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 468454

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec.	
									Limits	RER
Radium-228	11.8	11.66		1.45	1.00	0.624	pCi/L	99	75 - 125	

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	96.6		40 - 110
Y Carrier	75.5		40 - 110

Lab Sample ID: LCSD 160-468454/2-A
Matrix: Water
Analysis Batch: 469997

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 468454

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec.		RER
									Limits	RER	Limit
Radium-228	11.8	10.53		1.33	1.00	0.594	pCi/L	89	75 - 125	0.41	1

Eurofins TestAmerica, Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-3

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

Lab Sample ID: LCSD 160-468454/2-A
Matrix: Water
Analysis Batch: 469997

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 468454

Carrier	LCSD		Limits
	%Yield	Qualifier	
Ba Carrier	96.0		40 - 110
Y Carrier	80.0		40 - 110

Lab Sample ID: MB 160-468933/21-A
Matrix: Water
Analysis Batch: 470297

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 468933

Analyte	MB		Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Radium-228	0.2426	U	0.273	0.274	1.00	0.449	pCi/L	04/26/20 17:49	05/13/20 07:56	1

Carrier	MB		Limits	Prepared	Analyzed	Dil Fac
	%Yield	Qualifier				
Ba Carrier	83.5		40 - 110	04/26/20 17:49	05/13/20 07:56	1
Y Carrier	83.4		40 - 110	04/26/20 17:49	05/13/20 07:56	1

Lab Sample ID: LCS 160-468933/1-A
Matrix: Water
Analysis Batch: 470272

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 468933

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits

Carrier	LCS		Limits
	%Yield	Qualifier	
Ba Carrier	73.8		40 - 110
Y Carrier	89.7		40 - 110

Lab Sample ID: LCSD 160-468933/2-A
Matrix: Water
Analysis Batch: 470272

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 468933

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit

Carrier	LCSD		Limits
	%Yield	Qualifier	
Ba Carrier	79.3		40 - 110
Y Carrier	88.2		40 - 110

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-3

Rad

Prep Batch: 468451

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-1	MW-301	Total/NA	Water	PrecSep-21	
MB 160-468451/23-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-468451/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-468451/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 468454

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-1	MW-301	Total/NA	Water	PrecSep_0	
MB 160-468454/23-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-468454/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-468454/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Prep Batch: 468932

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-15	Field Blank	Total/NA	Water	PrecSep-21	
MB 160-468932/21-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-468932/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-468932/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 468933

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-15	Field Blank	Total/NA	Water	PrecSep_0	
MB 160-468933/21-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-468933/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-468933/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-3

Client Sample ID: MW-301

Date Collected: 04/14/20 17:45

Date Received: 04/16/20 08:15

Lab Sample ID: 310-179710-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			468451	04/21/20 13:39	MMO	TAL SL
Total/NA	Analysis	903.0		1	470398	05/14/20 11:19	KLS	TAL SL
Total/NA	Prep	PrecSep_0			468454	04/21/20 13:39	MMO	TAL SL
Total/NA	Analysis	904.0		1	469973	05/11/20 16:05	CJQ	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	470557	05/15/20 07:55	SMP	TAL SL

Client Sample ID: Field Blank

Date Collected: 04/14/20 23:59

Date Received: 04/16/20 08:15

Lab Sample ID: 310-179710-15

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			468932	04/26/20 17:31	MNH	TAL SL
Total/NA	Analysis	903.0		1	470653	05/18/20 04:30	KLS	TAL SL
Total/NA	Prep	PrecSep_0			468933	04/26/20 17:49	MNH	TAL SL
Total/NA	Analysis	904.0		1	470272	05/13/20 07:53	KLS	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	470663	05/18/20 10:15	SMP	TAL SL

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-3

Laboratory: Eurofins TestAmerica, Cedar Falls

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

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

Laboratory: Eurofins TestAmerica, 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	05-06-22
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-20
California	Los Angeles County Sanitation Districts	10259	06-30-20
California	State	2886	06-30-20
Connecticut	State	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-20
HI - RadChem Recognition	State	n/a	06-30-20
Illinois	NELAP	004553	11-30-20
Iowa	State	373	09-17-20
Kansas	NELAP	E-10236	10-31-20
Kentucky (DW)	State	KY90125	12-31-20
Louisiana	NELAP	04080	06-30-20
Louisiana (DW)	State	LA011	12-31-20
Maryland	State	310	09-30-20
MI - RadChem Recognition	State	9005	06-30-20
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-20
New Jersey	NELAP	MO002	06-30-20
New York	NELAP	11616	04-01-21
North Dakota	State	R-207	06-30-20
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-20
Pennsylvania	NELAP	68-00540	02-28-21
South Carolina	State	85002001	06-30-20
Texas	NELAP	T104704193-19-13	07-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-17-00028	03-11-23
Utah	NELAP	MO000542019-11	07-31-20
Virginia	NELAP	10310	06-14-20
Washington	State	C592	08-30-20
West Virginia DEP	State	381	10-31-20

Eurofins TestAmerica, Cedar Falls

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-3

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

Protocol References:

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

Laboratory References:

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



Environment Testing
TestAmerica



310-179710 Chain of Custody

Cooler/Sample Receipt and Temperature Log

Client Information			
Client: SCS Eng.			
City/State: <small>CITY</small> Madison	<small>STATE</small> WI	Project: Ottumura Generating Station	
Receipt Information			
Date/Time Received: <small>DATE</small> 4-15-20	<small>TIME</small> 1740	Received By: LAB	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: N	Correction Factor (°C): 10.0		
• Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): 2.4	Corrected Temp (°C): 2.6		
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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

Eurofins TestAmerica, Cedar Falls

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

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Environment Testing
TestAmerica

Place COC scanning label
here

214

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: SCS Eng.			
City/State:	CITY Madison	STATE WI	Project: Ottumura Generating Station
Receipt Information			
Date/Time Received:	DATE 4-15-20	TIME 1740	Received By: LAB
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>2</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: N		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): 1.3		Corrected Temp (°C): 1.3	
• 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? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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214

Cooler/Sample Receipt and Temperature Log Form

Client Information		
Client: <u>SCS Eng.</u>		
City/State: <u>Madison</u>	CITY STATE <u>WI</u>	Project: <u>Ottumwa Generating Station</u>
Receipt Information		
Date/Time Received: <u>4-15-20</u>	DATE TIME <u>1740</u>	Received By: <u>LAB</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>3</u> of <u>3</u>
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
Temperature Record		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>N</u>	Correction Factor (°C): <u>+0.0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>4.5</u>	Corrected Temp (°C): <u>4.5</u>	
• Sample Container Temperature		
Container(s) used:	CONTAINER 1	CONTAINER 2
Uncorrected Temp (°C):		
Corrected Temp (°C):		
Exceptions Noted		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
Additional Comments		

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Chain of Custody Record

Client Information Client Contact: Meghan Blodgett Company: SCS Engineers Address: 2830 Dairy Drive City: Madison State, Zip: WI, 53718 Phone: [Redacted] Email: mblodgett@scsengineers.com Project Name: Ottumwa Generating Station 25220072 Site: [Redacted]		Lab PM: Fredrick, Sandie E-Mail: sandie.fredrick@testamericainc.com Phone: 608-509-8245 Project #: 31011020 SSOW#: [Redacted]		Carrier Tracking No(s): COC No: 310-48977-15135.1 Page: Page 1 of 2 Job #: [Redacted]	
Analysis Requested Due Date Requested: TAT Requested (days): PO #: 25220072 WO #: [Redacted]		Field Filtered Sample (Yes or No) [X] Perform MS/MSD (Yes or No) [X] 933.0, 904.0 6020A, 7470A 2540C_Calcd, 9056A_ORGFM_28D, SM4500_H+		Total Number of Containers: [Redacted]	
Sample Identification MW-301 MW-302 MW-303 MW-304 MW-305 MW-305a MW-306 MW-307 MW-308 MW-309 MW-310		Sample Date 4/14/20 4/14/20 4/14/20 4/13/20 4/13/20 4/14/20 4/14/20 4/14/20 4/14/20 4/13/20		Sample Time 1745 1700 1550 1705 1450 1015 1450 1140 1240 1350 1010	
Sample Type (C=comp, G=grab) G G G G G G G G G G G		Matrix (W=water, S=solid, O=wastewater, BT=tissue, A=air) Water Water Water Water Water Water Water Water Water Water Water		Preservation Code: G G G G G G G G G G G	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Deliverable Requested: I, II, III, IV, Other (specify)		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Empty Kit Relinquished by: [Signature] Relinquished by: [Signature] Relinquished by: [Signature]		Date: 4/15/2020 1400 Date/Time: [Redacted] Date/Time: [Redacted] Date/Time: [Redacted]		Method of Shipment: [Redacted]	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No.: [Redacted]		Cooler Temperature(s) °C and Other Remarks: [Redacted]		Special Instructions/Note: Please refer to enclosed Table for correct grouping of wells on COCs This is for 3 coolers	
Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: [Redacted]		Preservation Codes: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 X - EDTA Z - other (specify)		Special Instructions/Note: Please refer to enclosed Table for correct grouping of wells on COCs This is for 3 coolers	



Client Information		Sampler: <i>Louise Jennings</i>		Lab PM: Fredrick, Sandie		Carrier Tracking No(s):		COC No: 310-48977-15135.2				
Client Contact: Meghan Blodgett		Phone: <i>608-509-8245</i>		E-Mail: sandie.fredrick@testamericainc.com				Page: Page 2 of 2				
Company: SCS Engineers								Job #:				
Address: 2830 Dairy Drive		Due Date Requested:		Analysis Requested		Total Number of Containers		Preservation Codes:				
City: Madison		TAT Requested (days):						A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:				
State, Zip: WI, 53718		PO #: 25220072						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)				
Phone:		WO #: 31011020										
Email: mblodgett@scsengineers.com		Project #:										
Project Name: Oitumwa Generating Station 25220072		SSOW#:										
Site:												
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=soil, B=soil, T=tissue, A=air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0, 904.0	6020A, 7470A	2540C, Calcd, 9056A, ORGM_28D, SM4500_H+	D	N	Special Instructions/Note:
MW-310A	4/14/20	0940	G	Water	X	X	X	X	X			
MW-311	4/13/20	1240	G	Water	X	X	X	X	X			Please refer to enclosed Table for correct grouping of wells on COCs
MW-311A	4/13/20	0835	G	Water	X	X	X	X	X			This is for 3 coolers
FIELD BLANK	4/14/20	2359	G	Water	X	X	X	X	X			
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological										Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		
Deliverable Requested: I, II, III, IV, Other (specify)										Special Instructions/QC Requirements:		
Empty Kit Relinquished by:										Method of Shipment:		
Relinquished by: <i>Louise Jennings</i>										Date/Time: 4/15/20 1400		
Relinquished by:										Company: SCS		
Relinquished by:										Date/Time: 4-15-20 1740		
Relinquished by:										Company:		
Relinquished by:										Date/Time:		
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No										Cooler Temperature(s) °C and Other Remarks:		



Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072

Parameter	COC #1		COC #3										COC #4			TOTAL	
	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-307	MW-308	MW-309		
Appendix III Parameters																	
Boron	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Calcium	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	X	X	X	X	15
Fluoride	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
pH	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sulfate	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
TDS	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Appendix IV Parameters																	
Antimony	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Arsenic	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Barium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Beryllium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cadmium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Chromium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Fluoride	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lead	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lithium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Mercury	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Molybdenum	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Selenium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Thallium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Radium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Additional Lab Parameters																	
Bicarbonate (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Carbonate (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Magnesium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Manganese (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Manganese (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Potassium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sodium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Field Parameters																	
Total Iron (CHEMeis)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Ferrous Iron (CHEMeis)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Groundwater Elevation	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Well Depth	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
pH (field)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Specific Conductance	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Dissolved Oxygen	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
ORP	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Temperature	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Turbidity	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Color	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Odor	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15

Notes: All samples are unfiltered (total).

I:\25220072.00\Data and Calculations\Field Work Requests\OGS_CCR_Rule_Sampling_2004.xls\$Sheet1



Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container		Preservative	
			pH	Temp	Added (mls)	Lot #
MW-301	310-179710-A-1	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-301	310-179710-B-1	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-301	310-179710-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-301	310-179710-E-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-A-2	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-302	310-179710-B-2	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-E-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-A-3	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-303	310-179710-B-3	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-E-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-A-4	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-304	310-179710-B-4	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-E-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-A-5	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-305	310-179710-B-5	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-D-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-E-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-A-6	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-305A	310-179710-B-6	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-D-6	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-E-6	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-A-7	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-306	310-179710-B-7	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-D-7	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-E-7	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-A-8	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-307	310-179710-B-8	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-D-8	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-E-8	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-308	310-179710-A-9	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-308	310-179710-B-9	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-308	310-179710-D-9	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservative</u>	
			<u>pH</u>	<u>Temp</u>	<u>Added (mls)</u>	<u>Lot #</u>
MW-308	310-179710-E-9	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-A-10	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-309	310-179710-B-10	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-D-10	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-E-10	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-A-11	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-310	310-179710-B-11	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-D-11	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-E-11	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-A-12	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-310A	310-179710-B-12	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-D-12	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-E-12	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-A-13	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-311	310-179710-B-13	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-D-13	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-E-13	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-A-14	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-311A	310-179710-B-14	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-D-14	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-E-14	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-A-15	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
Field Blank	310-179710-B-15	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-D-15	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-E-15	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-179710-3

Login Number: 179710

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Lickness, Corina A

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



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-179710-3

Login Number: 179710

List Number: 2

Creator: Korrinhizer, Micha L

List Source: Eurofins TestAmerica, St. Louis

List Creation: 04/17/20 08:53 PM

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

Tracer/Carrier Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-3

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba Carrier (40-110)
310-179710-1	MW-301	102
310-179710-15	Field Blank	88.1
LCS 160-468451/1-A	Lab Control Sample	96.6
LCS 160-468932/1-A	Lab Control Sample	73.8
LCSD 160-468451/2-A	Lab Control Sample Dup	96.0
LCSD 160-468932/2-A	Lab Control Sample Dup	79.3
MB 160-468451/23-A	Method Blank	97.0
MB 160-468932/21-A	Method Blank	83.5

Tracer/Carrier Legend

Ba Carrier = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Y Carrier (40-110)
310-179710-1	MW-301	102	83.4
310-179710-15	Field Blank	88.1	87.5
LCS 160-468454/1-A	Lab Control Sample	96.6	75.5
LCS 160-468933/1-A	Lab Control Sample	73.8	89.7
LCSD 160-468454/2-A	Lab Control Sample Dup	96.0	80.0
LCSD 160-468933/2-A	Lab Control Sample Dup	79.3	88.2
MB 160-468454/23-A	Method Blank	97.0	85.2
MB 160-468933/21-A	Method Blank	83.5	83.4

Tracer/Carrier Legend

Ba Carrier = Ba Carrier

Y Carrier = Y Carrier

ANALYTICAL REPORT

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

Laboratory Job ID: 310-179710-7

Client Project/Site: Ottumwa Generating Station 25220072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:
4/24/2020 4:21:22 PM

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	7
Definitions	10
QC Sample Results	11
QC Association	14
Chronicle	16
Certification Summary	17
Method Summary	18
Chain of Custody	19
Receipt Checklists	27
Field Data Sheets	28

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

Job ID: 310-179710-7

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative 310-179710-7

Comments

No additional comments.

Receipt

The samples were received on 4/16/2020 8:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 1.3° C, 2.6° C and 4.5° C.

HPLC/IC

Method 9056A: The following samples were diluted due to the nature of the sample matrix: MW-307 (310-179710-8) and MW-308 (310-179710-9). Elevated reporting limits (RLs) are provided.

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

Metals

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

General Chemistry

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

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-179710-8	MW-307	Water	04/14/20 11:40	04/16/20 08:15	
310-179710-9	MW-308	Water	04/14/20 12:40	04/16/20 08:15	
310-179710-10	MW-309	Water	04/14/20 13:50	04/16/20 08:15	

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Detection Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

Client Sample ID: MW-307

Lab Sample ID: 310-179710-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	230		5.0	2.0	mg/L	5		9056A	Total/NA
Sulfate	99		5.0	3.6	mg/L	5		9056A	Total/NA
Barium	140		2.0	0.90	ug/L	1		6020A	Total/NA
Boron	240		200	100	ug/L	1		6020A	Total/NA
Calcium	240		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	20		0.50	0.091	ug/L	1		6020A	Total/NA
Lead	0.31	J	0.50	0.27	ug/L	1		6020A	Total/NA
Lithium	13		10	2.3	ug/L	1		6020A	Total/NA
Total Dissolved Solids	980		60	52	mg/L	1		SM 2540C	Total/NA
pH	6.8		0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	650.66				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-52.9				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.69				mg/L	1		Field Sampling	Total/NA
pH, Field	6.76				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1554				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	10.6				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	28.9				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-308

Lab Sample ID: 310-179710-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	170		5.0	2.0	mg/L	5		9056A	Total/NA
Sulfate	290		5.0	3.6	mg/L	5		9056A	Total/NA
Barium	140		2.0	0.90	ug/L	1		6020A	Total/NA
Boron	210		200	100	ug/L	1		6020A	Total/NA
Calcium	240		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.14	J	0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	17		10	2.3	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1000		60	52	mg/L	1		SM 2540C	Total/NA
pH	6.9		0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	650.09				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-69.1				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.28				mg/L	1		Field Sampling	Total/NA
pH, Field	6.90				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1502				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	10.9				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	5.12				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-309

Lab Sample ID: 310-179710-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	69		5.0	2.0	mg/L	5		9056A	Total/NA
Fluoride	0.36	J	0.50	0.23	mg/L	5		9056A	Total/NA
Sulfate	390		5.0	3.6	mg/L	5		9056A	Total/NA
Arsenic	0.88	J	2.0	0.88	ug/L	1		6020A	Total/NA
Barium	50		2.0	0.90	ug/L	1		6020A	Total/NA
Boron	1400		200	100	ug/L	1		6020A	Total/NA
Calcium	150		0.50	0.19	mg/L	1		6020A	Total/NA
Chromium	1.3	J	5.0	1.1	ug/L	1		6020A	Total/NA
Cobalt	3.2		0.50	0.091	ug/L	1		6020A	Total/NA
Lead	1.6		0.50	0.27	ug/L	1		6020A	Total/NA
Lithium	9.6	J	10	2.3	ug/L	1		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Detection Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

Client Sample ID: MW-309 (Continued)

Lab Sample ID: 310-179710-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	1000		30	26	mg/L	1		SM 2540C	Total/NA
pH	7.1		0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	649.19				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-51.5				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.16				mg/L	1		Field Sampling	Total/NA
pH, Field	7.21				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1322				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	11.2				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	100.1				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls



Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

Client Sample ID: MW-307

Lab Sample ID: 310-179710-8

Date Collected: 04/14/20 11:40

Matrix: Water

Date Received: 04/16/20 08:15

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	230		5.0	2.0	mg/L			04/21/20 13:45	5
Fluoride	<0.23		0.50	0.23	mg/L			04/21/20 13:45	5
Sulfate	99		5.0	3.6	mg/L			04/21/20 13:45	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.58		1.0	0.58	ug/L		04/17/20 08:00	04/21/20 12:45	1
Arsenic	<0.88		2.0	0.88	ug/L		04/17/20 08:00	04/21/20 12:45	1
Barium	140		2.0	0.90	ug/L		04/17/20 08:00	04/21/20 12:45	1
Beryllium	<0.27		1.0	0.27	ug/L		04/17/20 08:00	04/21/20 12:45	1
Boron	240		200	100	ug/L		04/17/20 08:00	04/21/20 12:45	1
Cadmium	<0.039		0.10	0.039	ug/L		04/17/20 08:00	04/21/20 12:45	1
Calcium	240		0.50	0.19	mg/L		04/17/20 08:00	04/21/20 12:45	1
Chromium	<1.1		5.0	1.1	ug/L		04/17/20 08:00	04/21/20 12:45	1
Cobalt	20		0.50	0.091	ug/L		04/17/20 08:00	04/21/20 12:45	1
Lead	0.31	J	0.50	0.27	ug/L		04/17/20 08:00	04/21/20 12:45	1
Lithium	13		10	2.3	ug/L		04/17/20 08:00	04/21/20 12:45	1
Molybdenum	<1.1		2.0	1.1	ug/L		04/17/20 08:00	04/21/20 12:45	1
Selenium	<1.0		5.0	1.0	ug/L		04/17/20 08:00	04/21/20 12:45	1
Thallium	<0.26		1.0	0.26	ug/L		04/17/20 08:00	04/21/20 12:45	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/16/20 13:19	04/17/20 14:32	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	980		60	52	mg/L			04/16/20 12:43	1
pH	6.8		0.1	0.1	SU			04/15/20 22:14	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	650.66				ft			04/14/20 11:40	1
Oxidation Reduction Potential	-52.9				millivolts			04/14/20 11:40	1
Oxygen, Dissolved, Client Supplied	0.69				mg/L			04/14/20 11:40	1
pH, Field	6.76				SU			04/14/20 11:40	1
Specific Conductance, Field	1554				umhos/cm			04/14/20 11:40	1
Temperature, Field	10.6				Degrees C			04/14/20 11:40	1
Turbidity, Field	28.9				NTU			04/14/20 11:40	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

Client Sample ID: MW-308

Lab Sample ID: 310-179710-9

Date Collected: 04/14/20 12:40

Matrix: Water

Date Received: 04/16/20 08:15

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	170		5.0	2.0	mg/L			04/21/20 14:32	5
Fluoride	<0.23		0.50	0.23	mg/L			04/21/20 14:32	5
Sulfate	290		5.0	3.6	mg/L			04/21/20 14:32	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.58		1.0	0.58	ug/L		04/17/20 08:00	04/21/20 12:48	1
Arsenic	<0.88		2.0	0.88	ug/L		04/17/20 08:00	04/21/20 12:48	1
Barium	140		2.0	0.90	ug/L		04/17/20 08:00	04/21/20 12:48	1
Beryllium	<0.27		1.0	0.27	ug/L		04/17/20 08:00	04/21/20 12:48	1
Boron	210		200	100	ug/L		04/17/20 08:00	04/21/20 12:48	1
Cadmium	<0.039		0.10	0.039	ug/L		04/17/20 08:00	04/21/20 12:48	1
Calcium	240		0.50	0.19	mg/L		04/17/20 08:00	04/21/20 12:48	1
Chromium	<1.1		5.0	1.1	ug/L		04/17/20 08:00	04/21/20 12:48	1
Cobalt	0.14	J	0.50	0.091	ug/L		04/17/20 08:00	04/21/20 12:48	1
Lead	<0.27		0.50	0.27	ug/L		04/17/20 08:00	04/21/20 12:48	1
Lithium	17		10	2.3	ug/L		04/17/20 08:00	04/21/20 12:48	1
Molybdenum	<1.1		2.0	1.1	ug/L		04/17/20 08:00	04/21/20 12:48	1
Selenium	<1.0		5.0	1.0	ug/L		04/17/20 08:00	04/21/20 12:48	1
Thallium	<0.26		1.0	0.26	ug/L		04/17/20 08:00	04/21/20 12:48	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/16/20 13:19	04/17/20 14:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1000		60	52	mg/L			04/16/20 12:43	1
pH	6.9		0.1	0.1	SU			04/15/20 22:15	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	650.09				ft			04/14/20 12:40	1
Oxidation Reduction Potential	-69.1				millivolts			04/14/20 12:40	1
Oxygen, Dissolved, Client Supplied	0.28				mg/L			04/14/20 12:40	1
pH, Field	6.90				SU			04/14/20 12:40	1
Specific Conductance, Field	1502				umhos/cm			04/14/20 12:40	1
Temperature, Field	10.9				Degrees C			04/14/20 12:40	1
Turbidity, Field	5.12				NTU			04/14/20 12:40	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

Client Sample ID: MW-309

Lab Sample ID: 310-179710-10

Date Collected: 04/14/20 13:50

Matrix: Water

Date Received: 04/16/20 08:15

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	69		5.0	2.0	mg/L			04/21/20 14:47	5
Fluoride	0.36	J	0.50	0.23	mg/L			04/21/20 14:47	5
Sulfate	390		5.0	3.6	mg/L			04/21/20 14:47	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.58		1.0	0.58	ug/L		04/17/20 08:00	04/21/20 12:55	1
Arsenic	0.88	J	2.0	0.88	ug/L		04/17/20 08:00	04/21/20 12:55	1
Barium	50		2.0	0.90	ug/L		04/17/20 08:00	04/21/20 12:55	1
Beryllium	<0.27		1.0	0.27	ug/L		04/17/20 08:00	04/21/20 12:55	1
Boron	1400		200	100	ug/L		04/17/20 08:00	04/21/20 12:55	1
Cadmium	<0.039		0.10	0.039	ug/L		04/17/20 08:00	04/21/20 12:55	1
Calcium	150		0.50	0.19	mg/L		04/17/20 08:00	04/21/20 12:55	1
Chromium	1.3	J	5.0	1.1	ug/L		04/17/20 08:00	04/21/20 12:55	1
Cobalt	3.2		0.50	0.091	ug/L		04/17/20 08:00	04/21/20 12:55	1
Lead	1.6		0.50	0.27	ug/L		04/17/20 08:00	04/21/20 12:55	1
Lithium	9.6	J	10	2.3	ug/L		04/17/20 08:00	04/21/20 12:55	1
Molybdenum	<1.1		2.0	1.1	ug/L		04/17/20 08:00	04/21/20 12:55	1
Selenium	<1.0		5.0	1.0	ug/L		04/17/20 08:00	04/21/20 12:55	1
Thallium	<0.26		1.0	0.26	ug/L		04/17/20 08:00	04/21/20 12:55	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/16/20 13:19	04/17/20 14:36	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1000		30	26	mg/L			04/16/20 12:43	1
pH	7.1		0.1	0.1	SU			04/15/20 22:21	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	649.19				ft			04/14/20 13:50	1
Oxidation Reduction Potential	-51.5				millivolts			04/14/20 13:50	1
Oxygen, Dissolved, Client Supplied	0.16				mg/L			04/14/20 13:50	1
pH, Field	7.21				SU			04/14/20 13:50	1
Specific Conductance, Field	1322				umhos/cm			04/14/20 13:50	1
Temperature, Field	11.2				Degrees C			04/14/20 13:50	1
Turbidity, Field	100.1				NTU			04/14/20 13:50	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

Qualifiers

HPLC/IC

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.

Metals

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

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-276645/3
 Matrix: Water
 Analysis Batch: 276645

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

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Chloride	<0.40		1.0	0.40	mg/L			04/21/20 13:14	1
Fluoride	<0.046		0.10	0.046	mg/L			04/21/20 13:14	1
Sulfate	<0.71		1.0	0.71	mg/L			04/21/20 13:14	1

Lab Sample ID: LCS 310-276645/4
 Matrix: Water
 Analysis Batch: 276645

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Fluoride	2.00	2.03		mg/L		101	90 - 110
Sulfate	10.0	10.3		mg/L		103	90 - 110

Lab Sample ID: 310-179710-8 MS
 Matrix: Water
 Analysis Batch: 276645

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

Analyte	Sample	Sample	Spike Added	MS	MS	Unit	D	%Rec	%Rec Limits
	Result	Qualifier		Result	Qualifier				
Chloride	230		25.0	250	4	mg/L		70	80 - 120
Fluoride	<0.23		5.00	5.18		mg/L		104	80 - 120
Sulfate	99		25.0	122		mg/L		94	80 - 120

Lab Sample ID: 310-179710-8 MSD
 Matrix: Water
 Analysis Batch: 276645

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

Analyte	Sample	Sample	Spike Added	MSD	MSD	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
	Result	Qualifier		Result	Qualifier						
Chloride	230		25.0	250	4	mg/L		70	80 - 120	0	15
Fluoride	<0.23		5.00	5.07		mg/L		101	80 - 120	2	15
Sulfate	99		25.0	123		mg/L		95	80 - 120	0	15

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-276012/1-A
 Matrix: Water
 Analysis Batch: 276475

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 276012

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Antimony	<0.58		1.0	0.58	ug/L		04/17/20 08:00	04/21/20 11:30	1
Arsenic	<0.88		2.0	0.88	ug/L		04/17/20 08:00	04/21/20 11:30	1
Barium	<0.90		2.0	0.90	ug/L		04/17/20 08:00	04/21/20 11:30	1
Beryllium	<0.27		1.0	0.27	ug/L		04/17/20 08:00	04/21/20 11:30	1
Boron	<100		200	100	ug/L		04/17/20 08:00	04/21/20 11:30	1
Cadmium	<0.039		0.10	0.039	ug/L		04/17/20 08:00	04/21/20 11:30	1
Calcium	<0.19		0.50	0.19	mg/L		04/17/20 08:00	04/21/20 11:30	1
Chromium	<1.1		5.0	1.1	ug/L		04/17/20 08:00	04/21/20 11:30	1
Cobalt	<0.091		0.50	0.091	ug/L		04/17/20 08:00	04/21/20 11:30	1
Lead	<0.27		0.50	0.27	ug/L		04/17/20 08:00	04/21/20 11:30	1
Lithium	<2.3		10	2.3	ug/L		04/17/20 08:00	04/21/20 11:30	1
Molybdenum	<1.1		2.0	1.1	ug/L		04/17/20 08:00	04/21/20 11:30	1

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QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

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

Lab Sample ID: MB 310-276012/1-A
Matrix: Water
Analysis Batch: 276475

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 276012

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Selenium	<1.0		5.0	1.0	ug/L		04/17/20 08:00	04/21/20 11:30	1
Thallium	<0.26		1.0	0.26	ug/L		04/17/20 08:00	04/21/20 11:30	1

Lab Sample ID: LCS 310-276012/2-A
Matrix: Water
Analysis Batch: 276475

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 276012

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec.
							Limits
Antimony	40.0	38.0		ug/L		95	80 - 120
Arsenic	80.0	77.0		ug/L		96	80 - 120
Barium	80.0	80.8		ug/L		101	80 - 120
Beryllium	40.0	39.7		ug/L		99	80 - 120
Boron	1760	1750		ug/L		99	80 - 120
Cadmium	40.0	41.1		ug/L		103	80 - 120
Calcium	4.00	3.99		mg/L		100	80 - 120
Chromium	80.0	80.2		ug/L		100	80 - 120
Cobalt	40.0	40.0		ug/L		100	80 - 120
Lead	40.0	43.3		ug/L		108	80 - 120
Lithium	200	208		ug/L		104	80 - 120
Molybdenum	80.0	79.9		ug/L		100	80 - 120
Selenium	80.0	77.2		ug/L		97	80 - 120
Thallium	32.0	31.4		ug/L		98	80 - 120

Lab Sample ID: 310-179710-9 DU
Matrix: Water
Analysis Batch: 276475

Client Sample ID: MW-308
Prep Type: Total/NA
Prep Batch: 276012

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	RPD
	Result	Qualifier	Result	Qualifier				Limit
Antimony	<0.58		<0.58		ug/L		NC	20
Arsenic	<0.88		<0.88		ug/L		NC	20
Barium	140		135		ug/L		3	20
Beryllium	<0.27		<0.27		ug/L		NC	20
Boron	210		194	J	ug/L		7	20
Cadmium	<0.039		<0.039		ug/L		NC	20
Calcium	240		234		mg/L		1	20
Chromium	<1.1		<1.1		ug/L		NC	20
Cobalt	0.14	J	0.132	J	ug/L		9	20
Lead	<0.27		<0.27		ug/L		NC	20
Lithium	17		17.2		ug/L		0.5	20
Molybdenum	<1.1		<1.1		ug/L		NC	20
Selenium	<1.0		<1.0		ug/L		NC	20
Thallium	<0.26		<0.26		ug/L		NC	20

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-275975/1-A
 Matrix: Water
 Analysis Batch: 276156

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 275975

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/16/20 13:19	04/17/20 13:31	1

Lab Sample ID: LCS 310-275975/2-A
 Matrix: Water
 Analysis Batch: 276156

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 275975

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	1.67	1.88		ug/L		113	80 - 120

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

Lab Sample ID: MB 310-275971/1
 Matrix: Water
 Analysis Batch: 275971

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		30	26	mg/L			04/16/20 12:43	1

Lab Sample ID: LCS 310-275971/2
 Matrix: Water
 Analysis Batch: 275971

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	966		mg/L		97	90 - 110

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-275892/24
 Matrix: Water
 Analysis Batch: 275892

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: 310-179710-10 DU
 Matrix: Water
 Analysis Batch: 275892

Client Sample ID: MW-309
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.1		7.1		SU		0	20

QC Association Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

HPLC/IC

Analysis Batch: 276645

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-8	MW-307	Total/NA	Water	9056A	
310-179710-9	MW-308	Total/NA	Water	9056A	
310-179710-10	MW-309	Total/NA	Water	9056A	
MB 310-276645/3	Method Blank	Total/NA	Water	9056A	
LCS 310-276645/4	Lab Control Sample	Total/NA	Water	9056A	
310-179710-8 MS	MW-307	Total/NA	Water	9056A	
310-179710-8 MSD	MW-307	Total/NA	Water	9056A	

Metals

Prep Batch: 275975

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-8	MW-307	Total/NA	Water	7470A	
310-179710-9	MW-308	Total/NA	Water	7470A	
310-179710-10	MW-309	Total/NA	Water	7470A	
MB 310-275975/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-275975/2-A	Lab Control Sample	Total/NA	Water	7470A	

Prep Batch: 276012

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-8	MW-307	Total/NA	Water	3010A	
310-179710-9	MW-308	Total/NA	Water	3010A	
310-179710-10	MW-309	Total/NA	Water	3010A	
MB 310-276012/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-276012/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-179710-9 DU	MW-308	Total/NA	Water	3010A	

Analysis Batch: 276156

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-8	MW-307	Total/NA	Water	7470A	275975
310-179710-9	MW-308	Total/NA	Water	7470A	275975
310-179710-10	MW-309	Total/NA	Water	7470A	275975
MB 310-275975/1-A	Method Blank	Total/NA	Water	7470A	275975
LCS 310-275975/2-A	Lab Control Sample	Total/NA	Water	7470A	275975

Analysis Batch: 276475

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-8	MW-307	Total/NA	Water	6020A	276012
310-179710-9	MW-308	Total/NA	Water	6020A	276012
310-179710-10	MW-309	Total/NA	Water	6020A	276012
MB 310-276012/1-A	Method Blank	Total/NA	Water	6020A	276012
LCS 310-276012/2-A	Lab Control Sample	Total/NA	Water	6020A	276012
310-179710-9 DU	MW-308	Total/NA	Water	6020A	276012

General Chemistry

Analysis Batch: 275892

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-8	MW-307	Total/NA	Water	SM 4500 H+ B	
310-179710-9	MW-308	Total/NA	Water	SM 4500 H+ B	
310-179710-10	MW-309	Total/NA	Water	SM 4500 H+ B	
LCS 310-275892/24	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

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QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

General Chemistry (Continued)

Analysis Batch: 275892 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-10 DU	MW-309	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 275971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-8	MW-307	Total/NA	Water	SM 2540C	
310-179710-9	MW-308	Total/NA	Water	SM 2540C	
310-179710-10	MW-309	Total/NA	Water	SM 2540C	
MB 310-275971/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-275971/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 276362

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-8	MW-307	Total/NA	Water	Field Sampling	
310-179710-9	MW-308	Total/NA	Water	Field Sampling	
310-179710-10	MW-309	Total/NA	Water	Field Sampling	

Lab Chronicle

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

Client Sample ID: MW-307

Lab Sample ID: 310-179710-8

Date Collected: 04/14/20 11:40

Matrix: Water

Date Received: 04/16/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276645	04/21/20 13:45	ACJ	TAL CF
Total/NA	Prep	3010A			276012	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276475	04/21/20 12:45	SAD	TAL CF
Total/NA	Prep	7470A			275975	04/16/20 13:19	HIS	TAL CF
Total/NA	Analysis	7470A		1	276156	04/17/20 14:32	HIS	TAL CF
Total/NA	Analysis	SM 2540C		1	275971	04/16/20 12:43	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	275892	04/15/20 22:14	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	276362	04/14/20 11:40	ANO	TAL CF

Client Sample ID: MW-308

Lab Sample ID: 310-179710-9

Date Collected: 04/14/20 12:40

Matrix: Water

Date Received: 04/16/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276645	04/21/20 14:32	ACJ	TAL CF
Total/NA	Prep	3010A			276012	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276475	04/21/20 12:48	SAD	TAL CF
Total/NA	Prep	7470A			275975	04/16/20 13:19	HIS	TAL CF
Total/NA	Analysis	7470A		1	276156	04/17/20 14:34	HIS	TAL CF
Total/NA	Analysis	SM 2540C		1	275971	04/16/20 12:43	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	275892	04/15/20 22:15	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	276362	04/14/20 12:40	ANO	TAL CF

Client Sample ID: MW-309

Lab Sample ID: 310-179710-10

Date Collected: 04/14/20 13:50

Matrix: Water

Date Received: 04/16/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	276645	04/21/20 14:47	ACJ	TAL CF
Total/NA	Prep	3010A			276012	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276475	04/21/20 12:55	SAD	TAL CF
Total/NA	Prep	7470A			275975	04/16/20 13:19	HIS	TAL CF
Total/NA	Analysis	7470A		1	276156	04/17/20 14:36	HIS	TAL CF
Total/NA	Analysis	SM 2540C		1	275971	04/16/20 12:43	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	275892	04/15/20 22:21	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	276362	04/14/20 13:50	ANO	TAL CF

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

Laboratory: Eurofins TestAmerica, Cedar Falls

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

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

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

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-7

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	TAL CF
6020A	Metals (ICP/MS)	SW846	TAL CF
7470A	Mercury (CVAA)	SW846	TAL CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL CF
SM 4500 H+ B	pH	SM	TAL CF
Field Sampling	Field Sampling	EPA	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF
7470A	Preparation, Mercury	SW846	TAL CF

Protocol References:

EPA = US Environmental Protection Agency

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

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

Laboratory References:

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





Environment Testing
TestAmerica



310-179710 Chain of Custody

Cooler/Sample Receipt and Temperature Log

Client Information

Client: SCS Eng.
 City/State: Madison CITY WI STATE Project: Ottumwa Generating Station

Receipt Information

Date/Time Received: 4-15-20 DATE 1740 TIME Received By: LAB
 Delivery Type: UPS FedEx FedEx Ground US Mail Spee-Dee
 Lab Courier Lab Field Services Client Drop-off Other: _____

Condition of Cooler/Containers

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

Temperature Record

Coolant: Wet ice Blue ice Dry ice Other: _____ NONE
 Thermometer ID: N Correction Factor (°C): +0.5
 • Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature
 Uncorrected Temp (°C): 2.4 Corrected Temp (°C): 2.6

Sample Container Temperature

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

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? Yes No
 a) If yes: Is there evidence that the chilling process began? Yes No
 2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) Yes No

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

Additional Comments





214

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: SCS Eng.			
City/State:	CITY Madison	STATE WI	Project: Ottumura Generating Station
Receipt Information			
Date/Time Received:	DATE 4-15-20	TIME 1740	Received By: LAB
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>2</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: N		Correction Factor (°C): +0.6	
• 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): 1.3	
• 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? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



214

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: SCS Eng.			
City/State: <small>CITY</small> Madison	<small>STATE</small> WI	Project: Ottumura Generating Station	
Receipt Information			
Date/Time Received: <small>DATE</small> 4-15-20	<small>TIME</small> 1740	Received By: LAB	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>3</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: N	Correction Factor (°C): 10.0		
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): 4.5	Corrected Temp (°C): 4.5		
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Chain of Custody Record

Client Information Client Contact: Meghan Blodgett Company: SCS Engineers Address: 2830 Dairy Drive City: Madison State, Zip: WI, 53718 Phone: [Redacted] Email: mblodgett@scsengineers.com Project Name: Ottumwa Generating Station 25220072 Site: [Redacted]		Lab PM: Fredrick, Sandie E-Mail: sandie.fredrick@testamericainc.com Phone: 608-509-8245 Project #: 31011020 SSOW#: [Redacted]		Carrier Tracking No(s): 310-48977-15135.1 Page: Page 1 of 2 Job #: [Redacted]			
Analysis Requested Due Date Requested: TAT Requested (days): PO #: 25220072 WO #: Standard Field Filtered Sample (Yes or No): Perform MS/MSD (Yes or No): 2540C_Calcd, 9056A_ORGFM_28D, SM4500_H+ 6020A, 7470A 903.0, 904.0 2540C_Calcd, 9056A_ORGFM_28D, SM4500_H+		Total Number of Containers: [Redacted]		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: [Redacted]			
Sample Identification Sample Date Sample Time Sample Type (C=comp, G=grab) Matrix (W=water, S=solid, G=water/soil, BT=Tissue, A=Air) Preservation Code:		Special Instructions/Note: Please refer to enclosed Table for correct grouping of wells on COCs This is for 3 coolers		Special Instructions/Note: Please refer to enclosed Table for correct grouping of wells on COCs This is for 3 coolers			
MW-301	4/14/20	1745	G	Water	X	D	N
MW-302	4/14/20	1700	G	Water	X	D	N
MW-303	4/14/20	1550	G	Water	X	D	N
MW-304	4/13/20	1705	G	Water	X	D	N
MW-305	4/13/20	1450	G	Water	X	D	N
MW-305a	4/14/20	1015	G	Water	X	D	N
MW-306	4/14/20	1450	G	Water	X	D	N
MW-307	4/14/20	1140	G	Water	X	D	N
MW-308	4/14/20	1240	G	Water	X	D	N
MW-309	4/14/20	1350	G	Water	X	D	N
MW-310	4/13/20	1010	G	Water	X	D	N
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		Special Instructions/QC Requirements:			
Empty Kit Relinquished by: [Signature] Relinquished by: [Signature] Relinquished by: [Signature]		Date/Time: 4/15/2020 1400 Date/Time: [Redacted] Date/Time: [Redacted]		Method of Shipment:			
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		Company: SCS Received by: [Signature] Date/Time: 4/15/20 1740 Company: [Redacted]			



Client Information Client Contact: Meghan Blodgett Company: SCS Engineers Address: 2830 Dairy Drive City: Madison State, Zip: WI, 53718 Phone: 25220072 Email: mblodgett@scsengineers.com Project Name: Oitumwa Generating Station 25220072 Site:		Lab PM: Fredrick, Sandie E-Mail: sandie.fredrick@testamericainc.com Carrier Tracking No(s): COC No: 310-48977-15135.2 Page: Page 2 of 2 Job #:	
Due Date Requested: TAT Requested (days): PO #: 25220072 WO #: 31011020 Project #: 31011020 SSOW#:		Analysis Requested Total Number of Containers:	
Sample Identification MW-310A MW-311 MW-311A FIELD BLANK	Sample Date 4/14/20 4/13/20 4/13/20 4/14/20	Sample Time 0940 1240 0835 2359	Sample Type (C=Comp, G=grab) G G G G
Matrix (W=water, S=solid, O=soil, B=soil, T=tissue, A=air) Water Water Water Water Water		Field Filtered Sample (Yes or No) X X X X X	
Perform MS/MSD (Yes or No) 903.0, 904.0 6020A, 7470A 2540C, Calcd, 9056A_ORGM_28D, SM4500_H+		D N X X X X X X X X	
Special Instructions/Note: Please refer to enclosed Table for correct grouping of wells on COCs This is for 3 coolers			
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological			
Deliverable Requested: I, II, III, IV, Other (specify)			
Empty Kit Relinquished by:			
Relinquished by: <i>Loise Jennings</i> Date/Time: 4/15/20 1400 Company: SCS		Relinquished by: <i>Sunday Burdett</i> Date/Time: 4-15-20 1740 Company:	
Relinquished by:		Relinquished by:	
Relinquished by:		Relinquished by:	
Custody Seals Intact: Δ Yes Δ No		Custody Seal No.:	



Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072

Parameter	COC #1		COC #3										COC #4			TOTAL	
	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-307	MW-308	MW-309		
Appendix III Parameters																	
Boron	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Calcium	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	X	X	X	X	15
Fluoride	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
pH	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sulfate	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
TDS	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Appendix IV Parameters																	
Antimony	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Arsenic	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Barium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Beryllium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cadmium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Chromium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Fluoride	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lead	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lithium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Mercury	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Molybdenum	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Selenium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Thallium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Radium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Additional Lab Parameters																	
Bicarbonate (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Carbonate (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Magnesium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Manganese (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Manganese (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Potassium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sodium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Field Parameters																	
Total Iron (CHEMeis)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Ferrous Iron (CHEMeis)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Groundwater Elevation	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Well Depth	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
pH (field)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Specific Conductance	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Dissolved Oxygen	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
ORP	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Temperature	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Turbidity	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Color	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Odor	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15

Notes: All samples are unfiltered (total).

I:\25220072\00\Data and Calculations\Field Work Requests\OGS_CCR_Rule_Sampling_2004.xls\$Sheet1

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container		Preservative	
			pH	Temp	Added (mls)	Lot #
MW-301	310-179710-A-1	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-301	310-179710-B-1	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-301	310-179710-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-301	310-179710-E-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-A-2	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-302	310-179710-B-2	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-E-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-A-3	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-303	310-179710-B-3	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-E-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-A-4	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-304	310-179710-B-4	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-E-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-A-5	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-305	310-179710-B-5	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-D-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-E-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-A-6	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-305A	310-179710-B-6	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-D-6	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-E-6	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-A-7	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-306	310-179710-B-7	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-D-7	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-E-7	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-A-8	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-307	310-179710-B-8	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-D-8	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-E-8	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-308	310-179710-A-9	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-308	310-179710-B-9	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-308	310-179710-D-9	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservative</u>	
			<u>pH</u>	<u>Temp</u>	<u>Added (mls)</u>	<u>Lot #</u>
MW-308	310-179710-E-9	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-A-10	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-309	310-179710-B-10	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-D-10	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-E-10	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-A-11	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-310	310-179710-B-11	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-D-11	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-E-11	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-A-12	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-310A	310-179710-B-12	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-D-12	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-E-12	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-A-13	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-311	310-179710-B-13	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-D-13	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-E-13	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-A-14	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-311A	310-179710-B-14	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-D-14	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-E-14	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-A-15	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
Field Blank	310-179710-B-15	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-D-15	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-E-15	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-179710-7

Login Number: 179710

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Lickness, Corina A

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

Table 1. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station / SCS Engineers Project No. 25220072.00
April 2020

Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (umhos/cm)	ORP (mV)	Turbidity
MW-301	4/14/20 - 1745	683.25	8.7	6.58	5.14	939	176.3	0.87
MW-302	4/14/20 - 1700	656.45	10.5	6.70	0.22	1971	135.6	31.1
MW-303	1/14/20 - 1550	654.08	8.9	6.98	1.94	1097	104.3	12.1
MW-304	4/13/20 - 1705	656.42	11.9	7.12	0.24	1764	-119.8	54.1
MW-305	4/13/20 - 1450	662.44	9.1	7.00	0.28	1772	6.6	21.7
MW-305A	4/14/20 - 1015	N/A	11.2	7.63	2.26	807	106.7	4.91
MW-306	4/14/20 - 1450	670.71	11.7	6.68	0.21	1158	49.7	15.7
MW-307	4/14/20 - 1140	650.66	10.6	6.76	0.69	1554	-52.9	28.9
MW-308	4/14/20 - 1240	650.09	10.9	6.90	0.28	1502	-69.1	5.12
MW-309	4/14/20 - 1350	649.19	11.2	7.21	0.16	1322	-51.5	100.1
MW-310	4/13/20 - 1010	645.91	10.3	7.00	0.22	1823	179.4	0.87
MW-310A	4/14/20 - 0940	N/A	8.8	7.85	6.39	2915	146.1	NA
MW-311	4/13/20 - 1240	646.79	8.8	6.86	0.29	912	103.4	0.44
MW-311A	4/14/20 - 0835	N/A	7.9	8.40	3.87	3027	115.8	3.19

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

Notes:
none

Created by: KAK Date: 5/1/2017
Last revision by: LWJ Date: 4/19/2020
Checked by: AJR Date: 4/20/2020

C:\Users\Fredrick\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\OUR50TNS\OGS_CCR_Field_2020_April.xlsx\GW Field Parameters



ANALYTICAL REPORT

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

Laboratory Job ID: 310-179710-8

Client Project/Site: Ottumwa Generating Station 25220072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:
4/22/2020 2:08:07 PM

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

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	6
Definitions	9
QC Sample Results	10
QC Association	12
Chronicle	13
Certification Summary	14
Method Summary	15
Chain of Custody	16
Receipt Checklists	24

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-8

Job ID: 310-179710-8

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative
310-179710-8

Comments

No additional comments.

Receipt

The samples were received on 4/16/2020 8:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 1.3° C, 2.6° C and 4.5° 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.

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

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-8

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-179710-8	MW-307	Water	04/14/20 11:40	04/16/20 08:15	
310-179710-9	MW-308	Water	04/14/20 12:40	04/16/20 08:15	
310-179710-10	MW-309	Water	04/14/20 13:50	04/16/20 08:15	

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- 8
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- 10
- 11
- 12
- 13
- 14

Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-8

Client Sample ID: MW-307

Lab Sample ID: 310-179710-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	3800		100	50	ug/L	1		6020A	Total/NA
Magnesium	28000		500	100	ug/L	1		6020A	Total/NA
Manganese	310		10	4.0	ug/L	1		6020A	Total/NA
Potassium	1900		500	150	ug/L	1		6020A	Total/NA
Sodium	97000		1000	520	ug/L	1		6020A	Total/NA
Cobalt	19		0.50	0.091	ug/L	1		6020A	Dissolved
Iron	3100		100	50	ug/L	1		6020A	Dissolved
Manganese	290		10	4.0	ug/L	1		6020A	Dissolved
Total Alkalinity as CaCO3	520		5.0	1.9	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	520		5.0	1.9	mg/L	1		SM 2320B	Total/NA

Client Sample ID: MW-308

Lab Sample ID: 310-179710-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	5100		100	50	ug/L	1		6020A	Total/NA
Magnesium	25000		500	100	ug/L	1		6020A	Total/NA
Manganese	800		10	4.0	ug/L	1		6020A	Total/NA
Potassium	3900		500	150	ug/L	1		6020A	Total/NA
Sodium	110000		1000	520	ug/L	1		6020A	Total/NA
Cobalt	0.11	J	0.50	0.091	ug/L	1		6020A	Dissolved
Iron	4400		100	50	ug/L	1		6020A	Dissolved
Manganese	770		10	4.0	ug/L	1		6020A	Dissolved
Total Alkalinity as CaCO3	380		5.0	1.9	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	380		5.0	1.9	mg/L	1		SM 2320B	Total/NA

Client Sample ID: MW-309

Lab Sample ID: 310-179710-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	1900		100	50	ug/L	1		6020A	Total/NA
Magnesium	19000		500	100	ug/L	1		6020A	Total/NA
Manganese	740		10	4.0	ug/L	1		6020A	Total/NA
Potassium	670		500	150	ug/L	1		6020A	Total/NA
Sodium	170000		1000	520	ug/L	1		6020A	Total/NA
Cobalt	2.2		0.50	0.091	ug/L	1		6020A	Dissolved
Iron	590		100	50	ug/L	1		6020A	Dissolved
Manganese	660		10	4.0	ug/L	1		6020A	Dissolved
Total Alkalinity as CaCO3	290		5.0	1.9	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	290		5.0	1.9	mg/L	1		SM 2320B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-8

Client Sample ID: MW-307

Lab Sample ID: 310-179710-8

Date Collected: 04/14/20 11:40

Matrix: Water

Date Received: 04/16/20 08:15

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	3800		100	50	ug/L		04/17/20 08:00	04/21/20 12:45	1
Magnesium	28000		500	100	ug/L		04/17/20 08:00	04/21/20 12:45	1
Manganese	310		10	4.0	ug/L		04/17/20 08:00	04/21/20 12:45	1
Potassium	1900		500	150	ug/L		04/17/20 08:00	04/21/20 12:45	1
Sodium	97000		1000	520	ug/L		04/17/20 08:00	04/21/20 12:45	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	19		0.50	0.091	ug/L		04/17/20 08:00	04/21/20 14:46	1
Iron	3100		100	50	ug/L		04/17/20 08:00	04/21/20 14:46	1
Manganese	290		10	4.0	ug/L		04/17/20 08:00	04/21/20 14:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3	520		5.0	1.9	mg/L			04/20/20 10:19	1
Carbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/20/20 10:19	1
Bicarbonate Alkalinity as CaCO3	520		5.0	1.9	mg/L			04/20/20 10:19	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-8

Client Sample ID: MW-308

Lab Sample ID: 310-179710-9

Date Collected: 04/14/20 12:40

Matrix: Water

Date Received: 04/16/20 08:15

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	5100		100	50	ug/L		04/17/20 08:00	04/21/20 12:48	1
Magnesium	25000		500	100	ug/L		04/17/20 08:00	04/21/20 12:48	1
Manganese	800		10	4.0	ug/L		04/17/20 08:00	04/21/20 12:48	1
Potassium	3900		500	150	ug/L		04/17/20 08:00	04/21/20 12:48	1
Sodium	110000		1000	520	ug/L		04/17/20 08:00	04/21/20 12:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.11	J	0.50	0.091	ug/L		04/17/20 08:00	04/21/20 14:49	1
Iron	4400		100	50	ug/L		04/17/20 08:00	04/21/20 14:49	1
Manganese	770		10	4.0	ug/L		04/17/20 08:00	04/21/20 14:49	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3	380		5.0	1.9	mg/L			04/21/20 08:59	1
Carbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/21/20 08:59	1
Bicarbonate Alkalinity as CaCO3	380		5.0	1.9	mg/L			04/21/20 08:59	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-8

Client Sample ID: MW-309

Lab Sample ID: 310-179710-10

Date Collected: 04/14/20 13:50

Matrix: Water

Date Received: 04/16/20 08:15

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	1900		100	50	ug/L		04/17/20 08:00	04/21/20 12:55	1
Magnesium	19000		500	100	ug/L		04/17/20 08:00	04/21/20 12:55	1
Manganese	740		10	4.0	ug/L		04/17/20 08:00	04/21/20 12:55	1
Potassium	670		500	150	ug/L		04/17/20 08:00	04/21/20 12:55	1
Sodium	170000		1000	520	ug/L		04/17/20 08:00	04/21/20 12:55	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	2.2		0.50	0.091	ug/L		04/17/20 08:00	04/21/20 15:03	1
Iron	590		100	50	ug/L		04/17/20 08:00	04/21/20 15:03	1
Manganese	660		10	4.0	ug/L		04/17/20 08:00	04/21/20 15:03	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3	290		5.0	1.9	mg/L			04/21/20 08:59	1
Carbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/21/20 08:59	1
Bicarbonate Alkalinity as CaCO3	290		5.0	1.9	mg/L			04/21/20 08:59	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-8

Qualifiers

Metals

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

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-8

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-276012/1-A
Matrix: Water
Analysis Batch: 276475

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 276012

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<50		100	50	ug/L		04/17/20 08:00	04/21/20 11:30	1
Magnesium	<100		500	100	ug/L		04/17/20 08:00	04/21/20 11:30	1
Manganese	<4.0		10	4.0	ug/L		04/17/20 08:00	04/21/20 11:30	1
Potassium	<150		500	150	ug/L		04/17/20 08:00	04/21/20 11:30	1
Sodium	<520		1000	520	ug/L		04/17/20 08:00	04/21/20 11:30	1

Lab Sample ID: LCS 310-276012/2-A
Matrix: Water
Analysis Batch: 276475

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 276012

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Iron	4000	4040		ug/L		101	80 - 120
Magnesium	4000	4320		ug/L		108	80 - 120
Manganese	400	418		ug/L		105	80 - 120
Potassium	4000	4090		ug/L		102	80 - 120
Sodium	4000	3990		ug/L		100	80 - 120

Lab Sample ID: 310-179710-9 DU
Matrix: Water
Analysis Batch: 276475

Client Sample ID: MW-308
Prep Type: Total/NA
Prep Batch: 276012

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Iron	5100		4850		ug/L		4	20
Magnesium	25000		23800		ug/L		4	20
Manganese	800		782		ug/L		2	20
Potassium	3900		3820		ug/L		2	20
Sodium	110000		103000		ug/L		4	20

Lab Sample ID: MB 310-276015/1-A
Matrix: Water
Analysis Batch: 276475

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 276015

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.091		0.50	0.091	ug/L		04/17/20 08:00	04/21/20 13:45	1
Iron	<50		100	50	ug/L		04/17/20 08:00	04/21/20 13:45	1
Manganese	<4.0		10	4.0	ug/L		04/17/20 08:00	04/21/20 13:45	1

Lab Sample ID: LCS 310-276015/2-A
Matrix: Water
Analysis Batch: 276475

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 276015

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Cobalt	40.0	40.6		ug/L		102	80 - 120
Iron	4000	4040		ug/L		101	80 - 120
Manganese	400	427		ug/L		107	80 - 120

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-8

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 310-276242/1
Matrix: Water
Analysis Batch: 276242

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/20/20 10:19	1
Carbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/20/20 10:19	1
Bicarbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/20/20 10:19	1

Lab Sample ID: LCS 310-276242/2
Matrix: Water
Analysis Batch: 276242

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

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

Lab Sample ID: MB 310-276345/1
Matrix: Water
Analysis Batch: 276345

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/21/20 08:59	1
Carbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/21/20 08:59	1
Bicarbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			04/21/20 08:59	1

Lab Sample ID: LCS 310-276345/2
Matrix: Water
Analysis Batch: 276345

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

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

Lab Sample ID: 310-179710-9 MS
Matrix: Water
Analysis Batch: 276345

Client Sample ID: MW-308
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Alkalinity as CaCO3	380		100	489		mg/L		108	66 - 124

Lab Sample ID: 310-179710-9 MSD
Matrix: Water
Analysis Batch: 276345

Client Sample ID: MW-308
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Alkalinity as CaCO3	380		100	489		mg/L		108	66 - 124	0	17

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-8

Metals

Prep Batch: 276012

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-8	MW-307	Total/NA	Water	3010A	
310-179710-9	MW-308	Total/NA	Water	3010A	
310-179710-10	MW-309	Total/NA	Water	3010A	
MB 310-276012/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-276012/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-179710-9 DU	MW-308	Total/NA	Water	3010A	

Prep Batch: 276015

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-8	MW-307	Dissolved	Water	3010A	
310-179710-9	MW-308	Dissolved	Water	3010A	
310-179710-10	MW-309	Dissolved	Water	3010A	
MB 310-276015/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-276015/2-A	Lab Control Sample	Total/NA	Water	3010A	

Analysis Batch: 276475

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-8	MW-307	Dissolved	Water	6020A	276015
310-179710-8	MW-307	Total/NA	Water	6020A	276012
310-179710-9	MW-308	Dissolved	Water	6020A	276015
310-179710-9	MW-308	Total/NA	Water	6020A	276012
310-179710-10	MW-309	Dissolved	Water	6020A	276015
310-179710-10	MW-309	Total/NA	Water	6020A	276012
MB 310-276012/1-A	Method Blank	Total/NA	Water	6020A	276012
MB 310-276015/1-A	Method Blank	Total/NA	Water	6020A	276015
LCS 310-276012/2-A	Lab Control Sample	Total/NA	Water	6020A	276012
LCS 310-276015/2-A	Lab Control Sample	Total/NA	Water	6020A	276015
310-179710-9 DU	MW-308	Total/NA	Water	6020A	276012

General Chemistry

Analysis Batch: 276242

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-8	MW-307	Total/NA	Water	SM 2320B	
MB 310-276242/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-276242/2	Lab Control Sample	Total/NA	Water	SM 2320B	

Analysis Batch: 276345

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-9	MW-308	Total/NA	Water	SM 2320B	
310-179710-10	MW-309	Total/NA	Water	SM 2320B	
MB 310-276345/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-276345/2	Lab Control Sample	Total/NA	Water	SM 2320B	
310-179710-9 MS	MW-308	Total/NA	Water	SM 2320B	
310-179710-9 MSD	MW-308	Total/NA	Water	SM 2320B	

Eurofins TestAmerica, Cedar Falls

Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-8

Client Sample ID: MW-307

Date Collected: 04/14/20 11:40

Date Received: 04/16/20 08:15

Lab Sample ID: 310-179710-8

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			276015	04/17/20 08:00	HED	TAL CF
Dissolved	Analysis	6020A		1	276475	04/21/20 14:46	SAD	TAL CF
Total/NA	Prep	3010A			276012	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276475	04/21/20 12:45	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	276242	04/20/20 10:19	LBB	TAL CF

Client Sample ID: MW-308

Date Collected: 04/14/20 12:40

Date Received: 04/16/20 08:15

Lab Sample ID: 310-179710-9

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			276015	04/17/20 08:00	HED	TAL CF
Dissolved	Analysis	6020A		1	276475	04/21/20 14:49	SAD	TAL CF
Total/NA	Prep	3010A			276012	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276475	04/21/20 12:48	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	276345	04/21/20 08:59	LBB	TAL CF

Client Sample ID: MW-309

Date Collected: 04/14/20 13:50

Date Received: 04/16/20 08:15

Lab Sample ID: 310-179710-10

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			276015	04/17/20 08:00	HED	TAL CF
Dissolved	Analysis	6020A		1	276475	04/21/20 15:03	SAD	TAL CF
Total/NA	Prep	3010A			276012	04/17/20 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	276475	04/21/20 12:55	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	276345	04/21/20 08:59	LBB	TAL CF

Laboratory References:

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

Eurofins TestAmerica, Cedar Falls

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-8

Laboratory: Eurofins TestAmerica, Cedar Falls

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

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

- 1
- 2
- 3
- 4
- 5
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- 13
- 14

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-8

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS)	SW846	TAL CF
SM 2320B	Alkalinity	SM	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF

Protocol References:

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

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

Laboratory References:

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





Environment Testing
TestAmerica



310-179710 Chain of Custody

Cooler/Sample Receipt and Temperature Log

Client Information

Client: SCS Eng.
 City/State: Madison CITY WI STATE Project: Ottumwa Generating Station

Receipt Information

Date/Time Received: 4-15-20 DATE 1740 TIME Received By: LAB
 Delivery Type: UPS FedEx FedEx Ground US Mail Spee-Dee
 Lab Courier Lab Field Services Client Drop-off Other: _____

Condition of Cooler/Containers

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

Temperature Record

Coolant: Wet ice Blue ice Dry ice Other: _____ NONE
 Thermometer ID: N Correction Factor (°C): +0.5
 • Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature
 Uncorrected Temp (°C): 2.4 Corrected Temp (°C): 2.6

Sample Container Temperature

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

Exceptions Noted

- 1) If temperature exceeds criteria, was sample(s) received same day of sampling? Yes No
 a) If yes: Is there evidence that the chilling process began? Yes No
 2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) Yes No

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

Additional Comments





214

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: SCS Eng.			
City/State:	CITY Madison	STATE WI	Project: Ottumura Generating Station
Receipt Information			
Date/Time Received:	DATE 4-15-20	TIME 1740	Received By: LAB
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>2</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: N		Correction Factor (°C): +0.6	
• 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): 1.3	
• 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? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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214

Cooler/Sample Receipt and Temperature Log Form

Client Information		
Client: <u>SCS Eng.</u>		
City/State: <u>Madison</u> <small>CITY</small>	<u>WI</u> <small>STATE</small>	Project: <u>Ottumwa Generating Station</u>
Receipt Information		
Date/Time Received: <u>4-15-20</u> <small>DATE</small>	<u>1740</u> <small>TIME</small>	Received By: <u>LAB</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>3</u> of <u>3</u>
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
Temperature Record		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>N</u>	Correction Factor (°C): <u>+0.0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>4.5</u>	Corrected Temp (°C): <u>4.5</u>	
• Sample Container Temperature		
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):		
Corrected Temp (°C):		
Exceptions Noted		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
Additional Comments		

Client Information Client Contact: Meghan Blodgett Company: SCS Engineers Address: 2830 Dairy Drive City: Madison State, Zip: WI, 53718 Phone: [Redacted] Email: mblodgett@scsengineers.com Project Name: Ottumwa Generating Station 25220072 Site: [Redacted]		Lab PM: Fredrick, Sandie E-Mail: sandie.fredrick@testamericainc.com Phone: 608-509-8245 Project #: 31011020 SSOW#: [Redacted]		Carrier Tracking No(s): COC No: 310-48977-15135.1 Page: Page 1 of 2 Job #: [Redacted]	
Analysis Requested Due Date Requested: TAT Requested (days): PO #: 25220072 WO #: [Redacted]		Field Filtered Sample (Yes or No) [X] Perform MS/MSD (Yes or No) [X] 903.0, 904.0 6020A, 7470A 2540C_Calcd, 9056A_ORGFM_28D, SM4500_H+		Total Number of Containers: [Redacted]	
Sample Identification MW-301 MW-302 MW-303 MW-304 MW-305 MW-305a MW-306 MW-307 MW-308 MW-309 MW-310		Sample Date 4/14/20 4/14/20 4/14/20 4/13/20 4/13/20 4/14/20 4/14/20 4/14/20 4/14/20 4/13/20		Sample Time 1745 1700 1550 1705 1450 1015 1450 1140 1240 1350 1010	
Sample Type (C=comp, G=grab) G G G G G G G G G G G		Matrix (W=water, S=solid, G=wastewater, BT=tissue, A=air) Water Water Water Water Water Water Water Water Water Water Water		Preservation Code: G G G G G G G G G G G	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Deliverable Requested: I, II, III, IV, Other (specify)		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Empty Kit Relinquished by: [Signature] Relinquished by: [Signature] Relinquished by: [Signature]		Date: 4/15/2020 1400 Date/Time: [Redacted] Date/Time: [Redacted] Date/Time: [Redacted]		Method of Shipment: _____ Received by: [Signature] Received by: [Redacted] Received by: [Redacted]	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No.: _____		Cooler Temperature(s) °C and Other Remarks: _____		Special Instructions/Note: Please refer to enclosed Table for correct grouping of wells on COCs This is for 3 coolers	



Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072

Parameter	COC #1		COC #3										COC #4			TOTAL	
	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-307	MW-308	MW-309		
Appendix III Parameters																	
Boron	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Calcium	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	X	X	X	X	15
Fluoride	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
pH	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sulfate	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
TDS	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Appendix IV Parameters																	
Antimony	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Arsenic	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Barium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Beryllium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cadmium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Chromium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Fluoride	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lead	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lithium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Mercury	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Molybdenum	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Selenium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Thallium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Radium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Additional Lab Parameters																	
Bicarbonate (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Carbonate (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Magnesium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Manganese (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Manganese (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Potassium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sodium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Field Parameters																	
Total Iron (CHEMeis)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Ferrous Iron (CHEMeis)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Groundwater Elevation	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Well Depth	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
pH (field)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Specific Conductance	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Dissolved Oxygen	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
ORP	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Temperature	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Turbidity	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Color	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Odor	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15

Notes: All samples are unfiltered (total).

I:\25220072\00\Data and Calculations\Field Work Requests\OGS_CCR_Rule_Sampling_2004.xls\$Sheet1

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container		Preservative	
			pH	Temp	Added (mls)	Lot #
MW-301	310-179710-A-1	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-301	310-179710-B-1	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-301	310-179710-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-301	310-179710-E-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-A-2	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-302	310-179710-B-2	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-E-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-A-3	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-303	310-179710-B-3	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-E-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-A-4	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-304	310-179710-B-4	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-E-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-A-5	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-305	310-179710-B-5	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-D-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-E-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-A-6	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-305A	310-179710-B-6	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-D-6	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-E-6	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-A-7	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-306	310-179710-B-7	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-D-7	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-E-7	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-A-8	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-307	310-179710-B-8	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-D-8	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-E-8	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-308	310-179710-A-9	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-308	310-179710-B-9	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-308	310-179710-D-9	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservative</u>	
			<u>pH</u>	<u>Temp</u>	<u>Added (mls)</u>	<u>Lot #</u>
MW-308	310-179710-E-9	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-A-10	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-309	310-179710-B-10	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-D-10	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-E-10	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-A-11	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-310	310-179710-B-11	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-D-11	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-E-11	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-A-12	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-310A	310-179710-B-12	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-D-12	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-E-12	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-A-13	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-311	310-179710-B-13	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-D-13	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-E-13	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-A-14	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-311A	310-179710-B-14	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-D-14	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-E-14	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-A-15	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
Field Blank	310-179710-B-15	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-D-15	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-E-15	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-179710-8

Login Number: 179710

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Lickness, Corina A

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

ANALYTICAL REPORT

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

Laboratory Job ID: 310-179710-9

Client Project/Site: Ottumwa Generating Station 25220072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:
5/18/2020 10:59:42 AM*

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

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	6
Definitions	9
QC Sample Results	10
QC Association	12
Chronicle	13
Certification Summary	14
Method Summary	15
Chain of Custody	16
Receipt Checklists	24
Tracer Carrier Summary	26

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-9

Job ID: 310-179710-9

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative 310-179710-9

Receipt

The samples were received on 4/16/2020 8:15 AM; the samples arrived in good condition, properly preserved, and where required, on ice. The temperatures of the 3 coolers at receipt time were 1.3°C, 2.6°C and 4.5°C

Department Gas Flow Proportional Counter

Method 903.0: Radium 226 Prep Batch 160-468932: Samples 310-179710-4 & 10 were reduced due to a cloudy appearance. Sample 310-179710-7 was reduced due to yellow discoloration: MW-309 (310-179710-10) A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precisio

Method 903.0: Radium-226 Prep Batch 160-468932

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 (310-179710-8), MW-308 (310-179710-9), MW-309 (310-179710-10), (LCS 160-468932/1-A), (LCSD 160-468932/2-A) and (MB 160-468932/21-A

Method 904.0: Radium 228 Prep Batch 160-468933: Samples 310-179710-4 & 10 were reduced due to a cloudy appearance. Sample 310-179710-7 was reduced due to yellow discoloration: MW-309 (310-179710-10) A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precisio

Method 904.0: Radium-228 Prep Batch 160-468933

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 (310-179710-8), MW-308 (310-179710-9), MW-309 (310-179710-10), (LCS 160-468933/1-A), (LCSD 160-468933/2-A) and (MB 160-468933/21-A

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

Department Rad

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

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-9

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-179710-8	MW-307	Water	04/14/20 11:40	04/16/20 08:15	
310-179710-9	MW-308	Water	04/14/20 12:40	04/16/20 08:15	
310-179710-10	MW-309	Water	04/14/20 13:50	04/16/20 08:15	

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Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-9

Client Sample ID: MW-307

Lab Sample ID: 310-179710-8

No Detections.

Client Sample ID: MW-308

Lab Sample ID: 310-179710-9

No Detections.

Client Sample ID: MW-309

Lab Sample ID: 310-179710-10

No Detections.

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This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-9

Client Sample ID: MW-307

Lab Sample ID: 310-179710-8

Date Collected: 04/14/20 11:40

Matrix: Water

Date Received: 04/16/20 08:15

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.50		0.228	0.265	1.00	0.102	pCi/L	04/26/20 17:31	05/18/20 04:30	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	102		40 - 110					04/26/20 17:31	05/18/20 04:30	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.562		0.252	0.258	1.00	0.364	pCi/L	04/26/20 17:49	05/13/20 07:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	102		40 - 110					04/26/20 17:49	05/13/20 07:53	1
Y Carrier	82.2		40 - 110					04/26/20 17:49	05/13/20 07:53	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	2.06		0.340	0.370	5.00	0.364	pCi/L		05/18/20 10:15	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-9

Client Sample ID: MW-308

Lab Sample ID: 310-179710-9

Date Collected: 04/14/20 12:40

Matrix: Water

Date Received: 04/16/20 08:15

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.24		0.219	0.245	1.00	0.111	pCi/L	04/26/20 17:31	05/18/20 04:30	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.1		40 - 110					04/26/20 17:31	05/18/20 04:30	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.454		0.262	0.266	1.00	0.396	pCi/L	04/26/20 17:49	05/13/20 07:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.1		40 - 110					04/26/20 17:49	05/13/20 07:53	1
Y Carrier	87.9		40 - 110					04/26/20 17:49	05/13/20 07:53	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	1.69		0.341	0.362	5.00	0.396	pCi/L		05/18/20 10:15	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-9

Client Sample ID: MW-309

Lab Sample ID: 310-179710-10

Date Collected: 04/14/20 13:50

Matrix: Water

Date Received: 04/16/20 08:15

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.868		0.265	0.276	1.00	0.204	pCi/L	04/26/20 17:31	05/18/20 04:30	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	92.7		40 - 110					04/26/20 17:31	05/18/20 04:30	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0894	U	0.432	0.432	1.00	0.758	pCi/L	04/26/20 17:49	05/13/20 07:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	92.7		40 - 110					04/26/20 17:49	05/13/20 07:53	1
Y Carrier	88.6		40 - 110					04/26/20 17:49	05/13/20 07:53	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.957		0.507	0.513	5.00	0.758	pCi/L		05/18/20 10:15	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-9

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
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

QC Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-9

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-468932/21-A
Matrix: Water
Analysis Batch: 470653

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 468932

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	-0.0009617	U	0.0638	0.0638	1.00	0.134	pCi/L	04/26/20 17:31	05/18/20 06:37	1
Carrier	MB	MB	Limits			Prepared	Analyzed	Dil Fac		
	%Yield	Qualifier								
Ba Carrier	83.5		40 - 110			04/26/20 17:31	05/18/20 06:37	1		

Lab Sample ID: LCS 160-468932/1-A
Matrix: Water
Analysis Batch: 470653

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 468932

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	10.45		1.16	1.00	0.168	pCi/L	92	75 - 125
Carrier	LCS	LCS	Limits			Prepared	Analyzed	Dil Fac	
	%Yield	Qualifier							
Ba Carrier	73.8		40 - 110						

Lab Sample ID: LCSD 160-468932/2-A
Matrix: Water
Analysis Batch: 470653

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 468932

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	Limit
				Uncert. (2σ+/-)							
Radium-226	11.3	10.46		1.15	1.00	0.150	pCi/L	92	75 - 125	0.01	1
Carrier	LCSD	LCSD	Limits			Prepared	Analyzed	Dil Fac			
	%Yield	Qualifier									
Ba Carrier	79.3		40 - 110								

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-468933/21-A
Matrix: Water
Analysis Batch: 470297

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 468933

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.2426	U	0.273	0.274	1.00	0.449	pCi/L	04/26/20 17:49	05/13/20 07:56	1
Carrier	MB	MB	Limits			Prepared	Analyzed	Dil Fac		
	%Yield	Qualifier								
Ba Carrier	83.5		40 - 110			04/26/20 17:49	05/13/20 07:56	1		
Y Carrier	83.4		40 - 110			04/26/20 17:49	05/13/20 07:56	1		

Eurofins TestAmerica, Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-9

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

Lab Sample ID: LCS 160-468933/1-A
Matrix: Water
Analysis Batch: 470272

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 468933

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	8.85	9.002		1.10	1.00	0.476	pCi/L	102	75 - 125

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	73.8		40 - 110
Y Carrier	89.7		40 - 110

Lab Sample ID: LCSD 160-468933/2-A
Matrix: Water
Analysis Batch: 470272

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 468933

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	8.85	8.307		1.02	1.00	0.442	pCi/L	94	75 - 125	0.33	1

Carrier	LCSD %Yield	LCSD Qualifier	Limits
Ba Carrier	79.3		40 - 110
Y Carrier	88.2		40 - 110

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-9

Rad

Prep Batch: 468932

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-8	MW-307	Total/NA	Water	PrecSep-21	
310-179710-9	MW-308	Total/NA	Water	PrecSep-21	
310-179710-10	MW-309	Total/NA	Water	PrecSep-21	
MB 160-468932/21-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-468932/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-468932/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 468933

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-179710-8	MW-307	Total/NA	Water	PrecSep_0	
310-179710-9	MW-308	Total/NA	Water	PrecSep_0	
310-179710-10	MW-309	Total/NA	Water	PrecSep_0	
MB 160-468933/21-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-468933/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-468933/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-9

Client Sample ID: MW-307

Lab Sample ID: 310-179710-8

Date Collected: 04/14/20 11:40

Matrix: Water

Date Received: 04/16/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			468932	04/26/20 17:31	MNH	TAL SL
Total/NA	Analysis	903.0		1	470653	05/18/20 04:30	KLS	TAL SL
Total/NA	Prep	PrecSep_0			468933	04/26/20 17:49	MNH	TAL SL
Total/NA	Analysis	904.0		1	470272	05/13/20 07:53	KLS	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	470663	05/18/20 10:15	SMP	TAL SL

Client Sample ID: MW-308

Lab Sample ID: 310-179710-9

Date Collected: 04/14/20 12:40

Matrix: Water

Date Received: 04/16/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			468932	04/26/20 17:31	MNH	TAL SL
Total/NA	Analysis	903.0		1	470653	05/18/20 04:30	KLS	TAL SL
Total/NA	Prep	PrecSep_0			468933	04/26/20 17:49	MNH	TAL SL
Total/NA	Analysis	904.0		1	470272	05/13/20 07:53	KLS	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	470663	05/18/20 10:15	SMP	TAL SL

Client Sample ID: MW-309

Lab Sample ID: 310-179710-10

Date Collected: 04/14/20 13:50

Matrix: Water

Date Received: 04/16/20 08:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			468932	04/26/20 17:31	MNH	TAL SL
Total/NA	Analysis	903.0		1	470653	05/18/20 04:30	KLS	TAL SL
Total/NA	Prep	PrecSep_0			468933	04/26/20 17:49	MNH	TAL SL
Total/NA	Analysis	904.0		1	470272	05/13/20 07:53	KLS	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	470663	05/18/20 10:15	SMP	TAL SL

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-9

Laboratory: Eurofins TestAmerica, Cedar Falls

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

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

Laboratory: Eurofins TestAmerica, 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	05-06-22
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-20
California	Los Angeles County Sanitation Districts	10259	06-30-20
California	State	2886	06-30-20
Connecticut	State	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-20
HI - RadChem Recognition	State	n/a	06-30-20
Illinois	NELAP	004553	11-30-20
Iowa	State	373	09-17-20
Kansas	NELAP	E-10236	10-31-20
Kentucky (DW)	State	KY90125	12-31-20
Louisiana	NELAP	04080	06-30-20
Louisiana (DW)	State	LA011	12-31-20
Maryland	State	310	09-30-20
MI - RadChem Recognition	State	9005	06-30-20
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-20
New Jersey	NELAP	MO002	06-30-20
New York	NELAP	11616	04-01-21
North Dakota	State	R-207	06-30-20
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-20
Pennsylvania	NELAP	68-00540	02-28-21
South Carolina	State	85002001	06-30-20
Texas	NELAP	T104704193-19-13	07-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-17-00028	03-11-23
Utah	NELAP	MO000542019-11	07-31-20
Virginia	NELAP	10310	06-14-20
Washington	State	C592	08-30-20
West Virginia DEP	State	381	10-31-20

Eurofins TestAmerica, Cedar Falls

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-9

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

Protocol References:

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

Laboratory References:

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



Environment Testing
TestAmerica



310-179710 Chain of Custody

Cooler/Sample Receipt and Temperature Log

Client Information

Client: SCS Eng.
 City/State: Madison CITY WI STATE Project: Ottumwa Generating Station

Receipt Information

Date/Time Received: 4-15-20 DATE 1740 TIME Received By: LAB
 Delivery Type: UPS FedEx FedEx Ground US Mail Spee-Dee
 Lab Courier Lab Field Services Client Drop-off Other: _____

Condition of Cooler/Containers

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

Temperature Record

Coolant: Wet ice Blue ice Dry ice Other: _____ NONE
 Thermometer ID: N Correction Factor (°C): +0.5
 • Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature
 Uncorrected Temp (°C): 2.4 Corrected Temp (°C): 2.6

Sample Container Temperature

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

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? Yes No
 a) If yes: Is there evidence that the chilling process began? Yes No
 2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) Yes No

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

Additional Comments





214

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: SCS Eng.			
City/State:	CITY Madison	STATE WI	Project: Ottumura Generating Station
Receipt Information			
Date/Time Received:	DATE 4-15-20	TIME 1740	Received By: LAB
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>2</u> of <u>3</u>	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: N		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): 1.3		Corrected Temp (°C): 1.3	
• 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? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



214

Cooler/Sample Receipt and Temperature Log Form

Client Information		
Client: SCS Eng.		
City/State: <small>CITY</small> Madison	<small>STATE</small> WI	Project: Ottumura Generating Station
Receipt Information		
Date/Time Received: <small>DATE</small> 4-15-20	<small>TIME</small> 1740	Received By: LAB
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID:
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>3</u> of <u>3</u>
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
Temperature Record		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: N	Correction Factor (°C): 10.0	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): 4.5	Corrected Temp (°C): 4.5	
• Sample Container Temperature		
Container(s) used:	CONTAINER 1	CONTAINER 2
Uncorrected Temp (°C):		
Corrected Temp (°C):		
Exceptions Noted		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
Additional Comments		

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Chain of Custody Record

Client Information Client Contact: Meghan Blodgett Company: SCS Engineers Address: 2830 Dairy Drive City: Madison State, Zip: WI, 53718 Phone: [Redacted] Email: mblodgett@scsengineers.com Project Name: Ottumwa Generating Station 25220072 Site: [Redacted]		Lab PM: Fredrick, Sandie E-Mail: sandie.fredrick@testamericainc.com Phone: 608-509-8245 Project #: 31011020 SSOW#: [Redacted]		Carrier Tracking No(s): 310-48977-15135.1 Page: Page 1 of 2 Job #: [Redacted]			
Analysis Requested Due Date Requested: TAT Requested (days): PO #: 25220072 WO #: Standard Field Filtered Sample (Yes or No): Perform MS/MSD (Yes or No): 2540C_Calcd, 9056A_ORGFM_28D, SM4500_H+ 6020A, 7470A 903.0, 904.0 D D N		Total Number of Containers: [Redacted]		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)			
Sample Identification Sample Date Sample Time Sample Type (C=comp, G=grab) Matrix (W=water, S=solid, G=water/soil, BT=Tissue, A=Air) Preservation Code:		Special Instructions/Note: Please refer to enclosed Table for correct grouping of wells on COCs This is for 3 coolers		Special Instructions/Note: Please refer to enclosed Table for correct grouping of wells on COCs This is for 3 coolers			
MW-301 MW-302 MW-303 MW-304 MW-305 MW-305a MW-306 MW-307 MW-308 MW-309 MW-310		4/14/20 1745 4/14/20 1700 4/14/20 1550 4/13/20 1705 4/13/20 1450 4/14/20 1015 4/14/20 1450 4/14/20 1140 4/14/20 1240 4/14/20 1350 4/13/20 1010		G G G G G G G G G G G G G		Water Water Water Water Water Water Water Water Water Water Water Water Water	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Deliverable Requested: I, II, III, IV, Other (specify)		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months			
Empty Kit Relinquished by: [Signature] Relinquished by: [Signature] Relinquished by: [Signature]		Date: 4/15/2020 1400 Date/Time: 4/15/2020 1740 Date/Time: [Redacted] Date/Time: [Redacted]		Method of Shipment: [Redacted]			
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No.: [Redacted]		Cooler Temperature(s) °C and Other Remarks: [Redacted]		Company: SCS Company: [Redacted] Company: [Redacted]			

Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072

Parameter	COC #1		COC #3										COC #4			TOTAL	
	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-307	MW-308	MW-309		
Appendix III Parameters																	
Boron	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Calcium	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	X	X	X	X	15
Fluoride	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
pH	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sulfate	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
TDS	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Appendix IV Parameters																	
Antimony	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Arsenic	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Barium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Beryllium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cadmium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Chromium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Fluoride	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lead	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lithium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Mercury	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Molybdenum	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Selenium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Thallium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Radium	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Additional Lab Parameters																	
Bicarbonate (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Carbonate (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Magnesium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Manganese (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Manganese (filtered)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Potassium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sodium (total)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Field Parameters																	
Total Iron (CHEMeis)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Ferrous Iron (CHEMeis)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Groundwater Elevation	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Well Depth	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
pH (field)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Specific Conductance	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Dissolved Oxygen	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
ORP	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Temperature	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Turbidity	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Color	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Odor	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	15

Notes: All samples are unfiltered (total).

I:\25220072.00\Data and Calculations\Field Work Requests\OGS_CCR_Rule_Sampling_2004.xls\$Sheet1

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container		Preservative	
			pH	Temp	Added (mls)	Lot #
MW-301	310-179710-A-1	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-301	310-179710-B-1	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-301	310-179710-D-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-301	310-179710-E-1	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-A-2	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-302	310-179710-B-2	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-D-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-302	310-179710-E-2	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-A-3	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-303	310-179710-B-3	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-D-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-303	310-179710-E-3	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-A-4	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-304	310-179710-B-4	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-D-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-304	310-179710-E-4	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-A-5	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-305	310-179710-B-5	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-D-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305	310-179710-E-5	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-A-6	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-305A	310-179710-B-6	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-D-6	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-305A	310-179710-E-6	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-A-7	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-306	310-179710-B-7	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-D-7	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-306	310-179710-E-7	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-A-8	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-307	310-179710-B-8	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-D-8	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-307	310-179710-E-8	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-308	310-179710-A-9	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-308	310-179710-B-9	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-308	310-179710-D-9	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container</u>		<u>Preservative</u>	
			<u>pH</u>	<u>Temp</u>	<u>Added (mls)</u>	<u>Lot #</u>
MW-308	310-179710-E-9	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-A-10	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-309	310-179710-B-10	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-D-10	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-309	310-179710-E-10	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-A-11	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-310	310-179710-B-11	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-D-11	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310	310-179710-E-11	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-A-12	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-310A	310-179710-B-12	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-D-12	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-310A	310-179710-E-12	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-A-13	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-311	310-179710-B-13	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-D-13	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311	310-179710-E-13	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-A-14	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
MW-311A	310-179710-B-14	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-D-14	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
MW-311A	310-179710-E-14	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-A-15	Plastic 250ml - w/nitric - dis	<2	_____	_____	_____
Field Blank	310-179710-B-15	Plastic 250ml - with Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-D-15	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____
Field Blank	310-179710-E-15	Plastic 1 liter - Nitric Acid	<2	_____	_____	_____

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-179710-9

Login Number: 179710

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Lickness, Corina A

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



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-179710-9

Login Number: 179710

List Number: 2

Creator: Korrinhizer, Micha L

List Source: Eurofins TestAmerica, St. Louis

List Creation: 04/17/20 08:53 PM

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



Tracer/Carrier Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-179710-9

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	
310-179710-8	MW-307	102	
310-179710-9	MW-308	88.1	
310-179710-10	MW-309	92.7	
LCS 160-468932/1-A	Lab Control Sample	73.8	
LCSD 160-468932/2-A	Lab Control Sample Dup	79.3	
MB 160-468932/21-A	Method Blank	83.5	

Tracer/Carrier Legend

Ba Carrier = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Y Carrier (40-110)
310-179710-8	MW-307	102	82.2
310-179710-9	MW-308	88.1	87.9
310-179710-10	MW-309	92.7	88.6
LCS 160-468933/1-A	Lab Control Sample	73.8	89.7
LCSD 160-468933/2-A	Lab Control Sample Dup	79.3	88.2
MB 160-468933/21-A	Method Blank	83.5	83.4

Tracer/Carrier Legend

Ba Carrier = Ba Carrier

Y Carrier = Y Carrier

C3 October 2020 Assessment Monitoring

ANALYTICAL REPORT

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

Laboratory Job ID: 310-192743-1

Client Project/Site: Ottumwa Generating Station - 25220072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:
11/24/2020 12:32:04 PM*

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

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	6
Definitions	8
QC Sample Results	9
QC Association	11
Chronicle	12
Certification Summary	13
Method Summary	14
Chain of Custody	15
Receipt Checklists	18
Tracer Carrier Summary	20
Field Data Sheets	21

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072

Job ID: 310-192743-1

Job ID: 310-192743-1

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative 310-192743-1

Comments

No additional comments.

Receipt

The samples were received on 10/9/2020 5:40 PM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.3° C.

RAD

Methods 903.0, 9315: 903/9315 prep batch 160-485829 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 (310-192743-1) and Field Blank (310-192743-2)

Methods 904.0, 9320: 904 prep batch 485913 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 (310-192743-1) and Field Blank (310-192743-2)

Methods 904.0, 9320: 904/9320 prep batch 485913 The LCS recovery (127%) for Ra228 was outside the upper QC limits of 75-125. It was within our statistical upper limit of 138%. The LCSD recovered at 114% of the true value and the RER/RPD was acceptable. Original results will be qualified and reported. (LCS 160-485913/1-A)

Method PrecSep_0: Radium 228 Prep Batch 160-485913: Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-301 (310-192743-1) and Field Blank (310-192743-2). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep-21: Radium 226 Prep Batch 160-485829: Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-301 (310-192743-1) and Field Blank (310-192743-2). 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: Ottumwa Generating Station - 25220072

Job ID: 310-192743-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-192743-1	MW-301	Water	10/08/20 09:25	10/09/20 17:40	
310-192743-2	Field Blank	Water	10/08/20 15:10	10/09/20 17:40	

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072

Job ID: 310-192743-1

Client Sample ID: MW-301

Lab Sample ID: 310-192743-1

No Detections.

Client Sample ID: Field Blank

Lab Sample ID: 310-192743-2

No Detections.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072

Job ID: 310-192743-1

Client Sample ID: MW-301

Lab Sample ID: 310-192743-1

Date Collected: 10/08/20 09:25

Matrix: Water

Date Received: 10/09/20 17:40

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.324		0.201	0.203	1.00	0.254	pCi/L	10/15/20 14:39	11/11/20 21:00	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.9		40 - 110					10/15/20 14:39	11/11/20 21:00	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.0831	U *	0.238	0.238	1.00	0.413	pCi/L	10/16/20 06:54	11/11/20 12:11	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	88.9		40 - 110					10/16/20 06:54	11/11/20 12:11	1
Y Carrier	85.6		40 - 110					10/16/20 06:54	11/11/20 12:11	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.407	U	0.312	0.313	5.00	0.413	pCi/L		11/24/20 12:22	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072

Job ID: 310-192743-1

Client Sample ID: Field Blank

Lab Sample ID: 310-192743-2

Date Collected: 10/08/20 15:10

Matrix: Water

Date Received: 10/09/20 17:40

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0926	U	0.147	0.147	1.00	0.256	pCi/L	10/15/20 14:39	11/11/20 21:01	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.7		40 - 110					10/15/20 14:39	11/11/20 21:01	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.474	*	0.297	0.300	1.00	0.453	pCi/L	10/16/20 06:54	11/11/20 12:29	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.7		40 - 110					10/16/20 06:54	11/11/20 12:29	1
Y Carrier	77.4		40 - 110					10/16/20 06:54	11/11/20 12:29	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.566		0.331	0.334	5.00	0.453	pCi/L		11/24/20 12:22	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072

Job ID: 310-192743-1

Qualifiers

Rad

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
U	Result is less than the sample detection limit.

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072

Job ID: 310-192743-1

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-485829/23-A
Matrix: Water
Analysis Batch: 488915

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 485829

Analyte	MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.004364	U	0.145	0.145	1.00	0.301	pCi/L	10/15/20 14:39	11/11/20 21:01	1
Carrier	MB %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	84.8		40 - 110		10/15/20 14:39	11/11/20 21:01	1			

Lab Sample ID: LCS 160-485829/1-A
Matrix: Water
Analysis Batch: 488915

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 485829

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	10.88		1.42	1.00	0.287	pCi/L	96	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	77.7		40 - 110						

Lab Sample ID: LCSD 160-485829/2-A
Matrix: Water
Analysis Batch: 488915

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 485829

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	Limit
				Uncert. (2σ+/-)							
Radium-226	11.3	8.714		1.21	1.00	0.293	pCi/L	77	75 - 125	0.82	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	81.2		40 - 110								

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-485913/23-A
Matrix: Water
Analysis Batch: 488916

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 485913

Analyte	MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.4431		0.280	0.283	1.00	0.429	pCi/L	10/16/20 06:54	11/11/20 12:30	1
Carrier	MB %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	84.8		40 - 110		10/16/20 06:54	11/11/20 12:30	1			
Y Carrier	86.4		40 - 110		10/16/20 06:54	11/11/20 12:30	1			

Euromins TestAmerica, Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072

Job ID: 310-192743-1

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

Lab Sample ID: LCS 160-485913/1-A

Matrix: Water

Analysis Batch: 488918

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 485913

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	
Radium-228	7.66	9.698	*	1.20	1.00	0.528	pCi/L	127	75 - 125	
Carrier										
	%Yield	LCSD	LCSD	Qualifier	Limits					
Ba Carrier	77.7				40 - 110					
Y Carrier	77.0				40 - 110					

Lab Sample ID: LCSD 160-485913/2-A

Matrix: Water

Analysis Batch: 488918

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 485913

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		RER	
											RER	Limit
Radium-228	7.66	8.740		1.08	1.00	0.457	pCi/L	114	75 - 125	0.42	1	
Carrier												
	%Yield	LCSD	LCSD	Qualifier	Limits							
Ba Carrier	81.2				40 - 110							
Y Carrier	81.5				40 - 110							

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072

Job ID: 310-192743-1

Rad

Prep Batch: 485829

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192743-1	MW-301	Total/NA	Water	PrecSep-21	
310-192743-2	Field Blank	Total/NA	Water	PrecSep-21	
MB 160-485829/23-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-485829/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-485829/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 485913

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192743-1	MW-301	Total/NA	Water	PrecSep_0	
310-192743-2	Field Blank	Total/NA	Water	PrecSep_0	
MB 160-485913/23-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-485913/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-485913/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072

Job ID: 310-192743-1

Client Sample ID: MW-301

Lab Sample ID: 310-192743-1

Date Collected: 10/08/20 09:25

Matrix: Water

Date Received: 10/09/20 17:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			485829	10/15/20 14:39	AVB	TAL SL
Total/NA	Analysis	903.0		1	488915	11/11/20 21:00	SCB	TAL SL
Total/NA	Prep	PrecSep_0			485913	10/16/20 06:54	AVB	TAL SL
Total/NA	Analysis	904.0		1	488918	11/11/20 12:11	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	490073	11/24/20 12:22	SCB	TAL SL

Client Sample ID: Field Blank

Lab Sample ID: 310-192743-2

Date Collected: 10/08/20 15:10

Matrix: Water

Date Received: 10/09/20 17:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			485829	10/15/20 14:39	AVB	TAL SL
Total/NA	Analysis	903.0		1	488915	11/11/20 21:01	SCB	TAL SL
Total/NA	Prep	PrecSep_0			485913	10/16/20 06:54	AVB	TAL SL
Total/NA	Analysis	904.0		1	488916	11/11/20 12:29	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	490073	11/24/20 12:22	SCB	TAL SL

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072

Job ID: 310-192743-1

Laboratory: Eurofins TestAmerica, 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	05-06-22
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-20
California	Los Angeles County Sanitation Districts	10259	06-30-21
California	State	2886	06-30-21
Connecticut	State	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-21
HI - RadChem Recognition	State	n/a	06-30-21
Illinois	NELAP	004553	11-30-20
Iowa	State	373	12-01-20
Kentucky (DW)	State	KY90125	12-31-20
Louisiana	NELAP	04080	06-30-21
Louisiana (DW)	State	LA011	12-31-20
Maryland	State	310	09-30-21
MI - RadChem Recognition	State	9005	06-30-21
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-21
New Jersey	NELAP	MO002	06-30-21
New York	NELAP	11616	04-01-21
North Dakota	State	R-207	06-30-21
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-21
Oregon	NELAP	4157	09-01-21
Pennsylvania	NELAP	68-00540	02-28-21
South Carolina	State	85002001	06-30-21
Texas	NELAP	T104704193-19-13	07-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	US Federal Programs	P330-17-00028	03-11-23
Utah	NELAP	MO000542019-11	07-31-21
Virginia	NELAP	10310	06-14-21
Washington	State	C592	08-30-21
West Virginia DEP	State	381	10-31-21

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072

Job ID: 310-192743-1

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

Protocol References:

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

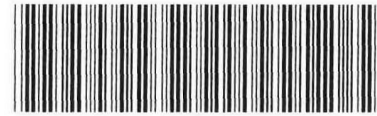
Laboratory References:

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





Environment Testing
TestAmerica



310-192743 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS</u>			
City/State:	CITY <u>Clive</u>	STATE <u>IA</u>	Project: <u>Ottumwa GS</u>
Receipt Information			
Date/Time Received:	DATE <u>10.9.20</u>	TIME <u>1740</u>	Received By: <u>BLM</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____	<input type="checkbox"/> NONE	
Thermometer ID:	<u>N</u>	Correction Factor (°C): <u>+0.0</u>	
Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>3.3</u>	Corrected Temp (°C): <u>3.3</u>	
Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):	<u>3.3</u>		
Corrected Temp (°C):	<u>3.3</u>		
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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Client Information Client Contact: Tanten Buszka Phone: 764-943-0855 Company: SCS Engineers		Lab PM: Fredrick, Sandie E-Mail: sandra.fredrick@eurofinset.com Carrier Tracking No(s):		COC No: 310-54605-16342.1 Page: 2 of 2 Job #:	
Due Date Requested: TAT Requested (days): PO #: 25219072 WO #:		Analysis Requested 6020A - Metals (14) 903.0, 904.0 Perform MS/MSD (Yes or No)		Preservation Codes: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify) Other:	
Address: 8450 Hickman Road Suite 207 City: Clive State: IA, Zip: 50325 Phone: 764-943-0855 Email: tbuszka@scsengineers.com Project Name: Ottumwa Generating Station 25220072 Site: 06S		6020A - Metals (2) 2320B - Alkalinity - Carb/Bicarb 2540C - Calcd, 9056A_ORGFM_28D_SM4500_H+		Total Number of containers:	
Sample Identification MW-301 Field Blank		Sample Date: 10-8-20 Sample Time: 9:25 Matrix: Water Sample Type (C=Comp, G=grab): G Preservation Code:		Special Instructions/Note: - 1 Filtered metals bottle See attached Sampling points + parameters table for requested analyses	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Radiological					
Deliverable Requested: I, II, III, IV, Other (specify)					
Empty Kit Relinquished by:					
Relinquished by: Matthew Cahalan Date/Time: 10/9/20 11:15 Company: SCS		Received by:		Date/Time: 10-9-20 17:00 Company:	
Relinquished by:		Received by:		Date/Time:	
Relinquished by:		Received by:		Date/Time:	
Custody Seals Intact: Δ Yes Δ No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:	



Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072

Parameter	COC Set #1 (Background)		COC Set #2 (Ash Pond)										COC Set #3 (ZLDP)			TOTAL	
	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-307	MW-308	MW-309		
Appendix III Parameters																	
Boron	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15
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	x	x	x	x	x	15
Fluoride	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15
pH	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15
Sulfate	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15
TDS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15
Appendix IV Parameters																	
Antimony	x	x	x	x	x	x	x	x	x	x	x	x					12
Arsenic	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Barium	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Beryllium																	0
Cadmium	x	x	x	x	x	x	x	x	x	x	x	x					12
Chromium	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Cobalt	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Fluoride	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Lead	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Lithium	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Mercury																	0
Molybdenum	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Selenium	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Thallium	x	x	x	x	x	x	x	x	x	x	x	x					12
Radium	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Additional Lab Parameters - REPORT SEPARATELY																	
Bicarbonate (total)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Carbonate (total)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Iron (total)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Magnesium (total)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Manganese (total)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Potassium (total)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Sodium (total)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Cobalt (filtered)							x	x					x				3
Iron (filtered)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Lithium (filtered)									x	x		x					3
Manganese (filtered)	x		x	x	x	x	x	x	x	x	x	x	x	x	x		14
Field Parameters																	
Total Iron (CHEMets)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Ferrous Iron (CHEMets)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Sulfide (CHEMets)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Groundwater Elevation	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Well Depth	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
pH (field)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Specific Conductance	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Dissolved Oxygen	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
ORP	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Temperature	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Turbidity	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Color	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15
Odor	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		15

Notes: All samples are unfiltered (total).

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Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-192743-1

Login Number: 192743

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Ramos, Eric F

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: 310-192743-1

Login Number: 192743

List Source: Eurofins TestAmerica, St. Louis

List Number: 2

List Creation: 10/14/20 12:15 PM

Creator: Mazariegos, Leonel A

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

Tracer/Carrier Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072

Job ID: 310-192743-1

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
		Ba	
Lab Sample ID	Client Sample ID	(40-110)	
310-192743-1	MW-301	88.9	
310-192743-2	Field Blank	87.7	
LCS 160-485829/1-A	Lab Control Sample	77.7	
LCS D 160-485829/2-A	Lab Control Sample Dup	81.2	
MB 160-485829/23-A	Method Blank	84.8	
Tracer/Carrier Legend			
Ba = Ba Carrier			

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
		Ba	Y
Lab Sample ID	Client Sample ID	(40-110)	(40-110)
310-192743-1	MW-301	88.9	85.6
310-192743-2	Field Blank	87.7	77.4
LCS 160-485913/1-A	Lab Control Sample	77.7	77.0
LCS D 160-485913/2-A	Lab Control Sample Dup	81.2	81.5
MB 160-485913/23-A	Method Blank	84.8	86.4
Tracer/Carrier Legend			
Ba = Ba Carrier			
Y = Y Carrier			

Table 1. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station / SCS Engineers Project No. 25220072.00
October 2020

Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmhos/cm)	ORP (mV)	Turbidity
MW-301	10/8/20 - 905	682.34	15.4	6.22	4.2	1035	163.6	0.02
MW-302	10/8/20 - 1245	655.80	14.4	7.00	0.14	2100	34.5	18.7
MW-303	10/8/20 - 1415	650.37	17.0	8.28	0.13	1602	-0.4	30.2
MW-304	10/8/20 - 1110	652.95	13.6	7.88	0.18	1675	-113.0	11.1
MW-305	10/9/20 - 1135	659.81	14	7.44	0.13	1810	-13.0	12.9
MW-305A	10/5/20 - 1108	648.01	14.2	7.46	0.19	11.02	11.0	NM
MW-306	10/9/20 - 910	670.18	13.4	6.54	0.12	1294	41.4	14
MW-307	10/7/20 - 1605	646.18	13.2	6.97	0.08	16.37	-62.2	4.56
MW-308	10/7/20 - 1330	642.85	13.2	7.24	0.11	1575	-56.5	1.15
MW-309	10/7/20 - 1150	641.50	13.3	7.57	0.09	1371	-71.1	7.7
MW-310	10/12/20 - 1000	638.46	13.9	7.07	0.16	1709	146.5	0.02
MW-310A	10/5/20 - 930	640.20	13.1	7.48	0.48	3122	89.7	NM
MW-311	10/12/20 - 1100	638.73	14.4	6.93	7.12	1024	-53.0	NM
MW-311A	10/6/20 - 1625	641.09	12.7	8.33	0.44	3177	39.6	NM

Abbreviations:

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

Notes:

none

Created by: <u>KAK</u>	Date: <u>5/1/2017</u>
Last revision by: <u>RM</u>	Date: <u>10/16/2020</u>
Checked by: <u>NDK</u>	Date: <u>10/20/2020</u>

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ANALYTICAL REPORT

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

Laboratory Job ID: 310-192835-1

Client Project/Site: Ottumwa Generating Station 25220072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:
10/21/2020 2:55:17 PM*

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

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	6
Definitions	8
QC Sample Results	9
QC Association	13
Chronicle	15
Certification Summary	16
Method Summary	17
Chain of Custody	18
Receipt Checklists	21
Field Data Sheets	22

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192835-1

Job ID: 310-192835-1

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative 310-192835-1

Comments

No additional comments.

Receipt

The samples were received on 10/9/2020 5:40 PM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.3° C.

HPLC/IC

Method 9056A: The following sample was diluted due to the nature of the sample matrix: MW-301 (310-192835-1). Elevated reporting limits (RLs) are provided.

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

Metals

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

General Chemistry

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



Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192835-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-192835-1	MW-301	Water	10/08/20 09:25	10/09/20 17:40	
310-192835-2	Field Blank	Water	10/08/20 15:10	10/09/20 17:40	

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Detection Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192835-1

Client Sample ID: MW-301

Lab Sample ID: 310-192835-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	170		5.0	2.0	mg/L	5		9056A	Total/NA
Sulfate	140		5.0	3.6	mg/L	5		9056A	Total/NA
Barium	58		2.0	0.28	ug/L	1		6020A	Total/NA
Boron	650	F1	100	80	ug/L	1		6020A	Total/NA
Cadmium	0.075	J	0.10	0.049	ug/L	1		6020A	Total/NA
Calcium	94		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.41	J	0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	23		10	2.5	ug/L	1		6020A	Total/NA
Selenium	7.7		5.0	1.0	ug/L	1		6020A	Total/NA
Total Dissolved Solids	660		30	26	mg/L	1		SM 2540C	Total/NA
pH	6.4	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	682.34				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	163.6				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	4.2				mg/L	1		Field Sampling	Total/NA
pH, Field	6.22				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1035				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	15.4				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	0.02				NTU	1		Field Sampling	Total/NA

Client Sample ID: Field Blank

Lab Sample ID: 310-192835-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
pH	5.8	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192835-1

Client Sample ID: MW-301

Lab Sample ID: 310-192835-1

Date Collected: 10/08/20 09:25

Matrix: Water

Date Received: 10/09/20 17:40

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	170		5.0	2.0	mg/L			10/18/20 19:27	5
Fluoride	<0.23		0.50	0.23	mg/L			10/18/20 19:27	5
Sulfate	140		5.0	3.6	mg/L			10/18/20 19:27	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.51		1.0	0.51	ug/L		10/14/20 08:37	10/15/20 13:42	1
Arsenic	<0.88		2.0	0.88	ug/L		10/14/20 08:37	10/15/20 13:42	1
Barium	58		2.0	0.28	ug/L		10/14/20 08:37	10/15/20 13:42	1
Boron	650	F1	100	80	ug/L		10/14/20 08:37	10/15/20 13:42	1
Cadmium	0.075	J	0.10	0.049	ug/L		10/14/20 08:37	10/16/20 16:16	1
Calcium	94		0.50	0.19	mg/L		10/14/20 08:37	10/15/20 13:42	1
Chromium	<1.1		5.0	1.1	ug/L		10/14/20 08:37	10/15/20 13:42	1
Cobalt	0.41	J	0.50	0.091	ug/L		10/14/20 08:37	10/15/20 13:42	1
Lead	<0.11		0.50	0.11	ug/L		10/14/20 08:37	10/15/20 13:42	1
Lithium	23		10	2.5	ug/L		10/14/20 08:37	10/15/20 13:42	1
Molybdenum	<1.1		2.0	1.1	ug/L		10/14/20 08:37	10/15/20 13:42	1
Selenium	7.7		5.0	1.0	ug/L		10/14/20 08:37	10/15/20 13:42	1
Thallium	<0.26		1.0	0.26	ug/L		10/14/20 08:37	10/15/20 13:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	660		30	26	mg/L			10/13/20 15:15	1
pH	6.4	HF	0.1	0.1	SU			10/10/20 12:00	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	682.34				ft			10/08/20 09:25	1
Oxidation Reduction Potential	163.6				millivolts			10/08/20 09:25	1
Oxygen, Dissolved, Client Supplied	4.2				mg/L			10/08/20 09:25	1
pH, Field	6.22				SU			10/08/20 09:25	1
Specific Conductance, Field	1035				umhos/cm			10/08/20 09:25	1
Temperature, Field	15.4				Degrees C			10/08/20 09:25	1
Turbidity, Field	0.02				NTU			10/08/20 09:25	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192835-1

Client Sample ID: Field Blank

Lab Sample ID: 310-192835-2

Date Collected: 10/08/20 15:10

Matrix: Water

Date Received: 10/09/20 17:40

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.40		1.0	0.40	mg/L			10/18/20 19:43	1
Fluoride	<0.046		0.10	0.046	mg/L			10/18/20 19:43	1
Sulfate	<0.71		1.0	0.71	mg/L			10/18/20 19:43	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.51		1.0	0.51	ug/L		10/14/20 08:37	10/15/20 13:55	1
Arsenic	<0.88		2.0	0.88	ug/L		10/14/20 08:37	10/15/20 13:55	1
Barium	<0.28		2.0	0.28	ug/L		10/14/20 08:37	10/15/20 13:55	1
Boron	<80		100	80	ug/L		10/14/20 08:37	10/15/20 13:55	1
Cadmium	<0.049		0.10	0.049	ug/L		10/14/20 08:37	10/16/20 16:23	1
Calcium	<0.19		0.50	0.19	mg/L		10/14/20 08:37	10/15/20 13:55	1
Chromium	<1.1		5.0	1.1	ug/L		10/14/20 08:37	10/15/20 13:55	1
Cobalt	<0.091		0.50	0.091	ug/L		10/14/20 08:37	10/15/20 13:55	1
Lead	<0.11		0.50	0.11	ug/L		10/14/20 08:37	10/15/20 13:55	1
Lithium	<2.5		10	2.5	ug/L		10/14/20 08:37	10/15/20 13:55	1
Molybdenum	<1.1		2.0	1.1	ug/L		10/14/20 08:37	10/15/20 13:55	1
Selenium	<1.0		5.0	1.0	ug/L		10/14/20 08:37	10/15/20 13:55	1
Thallium	<0.26		1.0	0.26	ug/L		10/14/20 08:37	10/15/20 13:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<26		30	26	mg/L			10/13/20 15:15	1
pH	5.8	HF	0.1	0.1	SU			10/10/20 12:02	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192835-1

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
E	Result exceeded calibration range.
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

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

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192835-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-296281/3
Matrix: Water
Analysis Batch: 296281

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

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Chloride	<0.40		1.0	0.40	mg/L			10/18/20 17:54	1
Fluoride	<0.046		0.10	0.046	mg/L			10/18/20 17:54	1
Sulfate	<0.71		1.0	0.71	mg/L			10/18/20 17:54	1

Lab Sample ID: LCS 310-296281/4
Matrix: Water
Analysis Batch: 296281

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	2.00	1.96		mg/L		98	90 - 110
Sulfate	10.0	9.68		mg/L		97	90 - 110

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-295356/1-A
Matrix: Water
Analysis Batch: 295753

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 295356

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Antimony	<0.51		1.0	0.51	ug/L		10/14/20 08:37	10/15/20 13:35	1
Arsenic	<0.88		2.0	0.88	ug/L		10/14/20 08:37	10/15/20 13:35	1
Barium	<0.28		2.0	0.28	ug/L		10/14/20 08:37	10/15/20 13:35	1
Boron	<80		100	80	ug/L		10/14/20 08:37	10/15/20 13:35	1
Calcium	<0.19		0.50	0.19	mg/L		10/14/20 08:37	10/15/20 13:35	1
Chromium	<1.1		5.0	1.1	ug/L		10/14/20 08:37	10/15/20 13:35	1
Cobalt	<0.091		0.50	0.091	ug/L		10/14/20 08:37	10/15/20 13:35	1
Lead	<0.11		0.50	0.11	ug/L		10/14/20 08:37	10/15/20 13:35	1
Lithium	<2.5		10	2.5	ug/L		10/14/20 08:37	10/15/20 13:35	1
Molybdenum	<1.1		2.0	1.1	ug/L		10/14/20 08:37	10/15/20 13:35	1
Selenium	<1.0		5.0	1.0	ug/L		10/14/20 08:37	10/15/20 13:35	1
Thallium	<0.26		1.0	0.26	ug/L		10/14/20 08:37	10/15/20 13:35	1

Lab Sample ID: MB 310-295356/1-A
Matrix: Water
Analysis Batch: 295910

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 295356

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Cadmium	<0.049		0.10	0.049	ug/L		10/14/20 08:37	10/16/20 16:11	1

Lab Sample ID: LCS 310-295356/2-A
Matrix: Water
Analysis Batch: 295753

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 295356

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	200	201		ug/L		100	80 - 120
Barium	100	105		ug/L		105	80 - 120
Boron	200	186		ug/L		93	80 - 120
Calcium	2.00	1.80		mg/L		90	80 - 120

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QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192835-1

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

Lab Sample ID: LCS 310-295356/2-A
Matrix: Water
Analysis Batch: 295753

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 295356

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium	100	96.2		ug/L		96	80 - 120
Cobalt	100	99.7		ug/L		100	80 - 120
Lead	200	210		ug/L		105	80 - 120
Lithium	200	187		ug/L		93	80 - 120
Molybdenum	200	200		ug/L		100	80 - 120
Selenium	400	402		ug/L		101	80 - 120

Lab Sample ID: LCS 310-295356/2-A
Matrix: Water
Analysis Batch: 295910

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 295356

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	100	107		ug/L		107	80 - 120

Lab Sample ID: LCS 310-295356/2-A ^10
Matrix: Water
Analysis Batch: 295755

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 295356

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Thallium	200	187		ug/L		93	80 - 120

Lab Sample ID: 310-192835-1 MS
Matrix: Water
Analysis Batch: 295753

Client Sample ID: MW-301
Prep Type: Total/NA
Prep Batch: 295356

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	<0.51		200	225		ug/L		112	75 - 125
Arsenic	<0.88		200	231		ug/L		116	75 - 125
Barium	58		100	172		ug/L		114	75 - 125
Boron	650	F1	200	910	F1	ug/L		130	75 - 125
Calcium	94		2.00	99.0	4	mg/L		252	75 - 125
Chromium	<1.1		100	108		ug/L		108	75 - 125
Cobalt	0.41	J	100	110		ug/L		110	75 - 125
Lead	<0.11		200	215		ug/L		107	75 - 125
Lithium	23		200	214		ug/L		96	75 - 125
Molybdenum	<1.1		200	228		ug/L		114	75 - 125
Selenium	7.7		400	436		ug/L		107	75 - 125
Thallium	<0.26		200	198	E	ug/L		99	75 - 125

Lab Sample ID: 310-192835-1 MS
Matrix: Water
Analysis Batch: 295910

Client Sample ID: MW-301
Prep Type: Total/NA
Prep Batch: 295356

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cadmium	0.075	J	100	108		ug/L		108	75 - 125

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QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192835-1

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

Lab Sample ID: 310-192835-1 MSD
Matrix: Water
Analysis Batch: 295753

Client Sample ID: MW-301
Prep Type: Total/NA
Prep Batch: 295356

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Antimony	<0.51		200	222		ug/L		111	75 - 125	1	20
Arsenic	<0.88		200	226		ug/L		113	75 - 125	2	20
Barium	58		100	171		ug/L		114	75 - 125	0	20
Boron	650	F1	200	889		ug/L		120	75 - 125	2	20
Calcium	94		2.00	97.2	4	mg/L		163	75 - 125	2	20
Chromium	<1.1		100	106		ug/L		106	75 - 125	2	20
Cobalt	0.41	J	100	111		ug/L		111	75 - 125	1	20
Lead	<0.11		200	216		ug/L		108	75 - 125	1	20
Lithium	23		200	212		ug/L		95	75 - 125	1	20
Molybdenum	<1.1		200	221		ug/L		111	75 - 125	3	20
Selenium	7.7		400	433		ug/L		106	75 - 125	1	20
Thallium	<0.26		200	200	E	ug/L		100	75 - 125	1	20

Lab Sample ID: 310-192835-1 MSD
Matrix: Water
Analysis Batch: 295910

Client Sample ID: MW-301
Prep Type: Total/NA
Prep Batch: 295356

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Cadmium	0.075	J	100	107		ug/L		107	75 - 125	1	20

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

Lab Sample ID: MB 310-295296/1
Matrix: Water
Analysis Batch: 295296

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

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Dissolved Solids	<26		30	26	mg/L			10/13/20 15:15	1

Lab Sample ID: LCS 310-295296/2
Matrix: Water
Analysis Batch: 295296

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

Lab Sample ID: 310-192835-1 DU
Matrix: Water
Analysis Batch: 295296

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

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Dissolved Solids	660		664		mg/L		0.3	24

QC Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192835-1

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-294928/1
Matrix: Water
Analysis Batch: 294928

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

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QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192835-1

HPLC/IC

Analysis Batch: 296281

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192835-1	MW-301	Total/NA	Water	9056A	
310-192835-2	Field Blank	Total/NA	Water	9056A	
MB 310-296281/3	Method Blank	Total/NA	Water	9056A	
LCS 310-296281/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 295356

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192835-1	MW-301	Total/NA	Water	3010A	
310-192835-2	Field Blank	Total/NA	Water	3010A	
MB 310-295356/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-295356/2-A	Lab Control Sample	Total/NA	Water	3010A	
LCS 310-295356/2-A ^10	Lab Control Sample	Total/NA	Water	3010A	
310-192835-1 MS	MW-301	Total/NA	Water	3010A	
310-192835-1 MSD	MW-301	Total/NA	Water	3010A	

Analysis Batch: 295753

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192835-1	MW-301	Total/NA	Water	6020A	295356
310-192835-2	Field Blank	Total/NA	Water	6020A	295356
MB 310-295356/1-A	Method Blank	Total/NA	Water	6020A	295356
LCS 310-295356/2-A	Lab Control Sample	Total/NA	Water	6020A	295356
310-192835-1 MS	MW-301	Total/NA	Water	6020A	295356
310-192835-1 MSD	MW-301	Total/NA	Water	6020A	295356

Analysis Batch: 295755

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192835-1	MW-301	Total/NA	Water	6020A	295356
310-192835-2	Field Blank	Total/NA	Water	6020A	295356
MB 310-295356/1-A	Method Blank	Total/NA	Water	6020A	295356
LCS 310-295356/2-A ^10	Lab Control Sample	Total/NA	Water	6020A	295356
310-192835-1 MS	MW-301	Total/NA	Water	6020A	295356
310-192835-1 MSD	MW-301	Total/NA	Water	6020A	295356

Analysis Batch: 295910

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192835-1	MW-301	Total/NA	Water	6020A	295356
310-192835-2	Field Blank	Total/NA	Water	6020A	295356
MB 310-295356/1-A	Method Blank	Total/NA	Water	6020A	295356
LCS 310-295356/2-A	Lab Control Sample	Total/NA	Water	6020A	295356
310-192835-1 MS	MW-301	Total/NA	Water	6020A	295356
310-192835-1 MSD	MW-301	Total/NA	Water	6020A	295356

General Chemistry

Analysis Batch: 294928

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192835-1	MW-301	Total/NA	Water	SM 4500 H+ B	
310-192835-2	Field Blank	Total/NA	Water	SM 4500 H+ B	
LCS 310-294928/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

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QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192835-1

General Chemistry

Analysis Batch: 295296

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192835-1	MW-301	Total/NA	Water	SM 2540C	
310-192835-2	Field Blank	Total/NA	Water	SM 2540C	
MB 310-295296/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-295296/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-192835-1 DU	MW-301	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 296469

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192835-1	MW-301	Total/NA	Water	Field Sampling	

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- 14
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Lab Chronicle

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192835-1

Client Sample ID: MW-301

Lab Sample ID: 310-192835-1

Date Collected: 10/08/20 09:25

Matrix: Water

Date Received: 10/09/20 17:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	296281	10/18/20 19:27	ACJ	TAL CF
Total/NA	Prep	3010A			295356	10/14/20 08:37	HED	TAL CF
Total/NA	Analysis	6020A		1	295753	10/15/20 13:42	SAD	TAL CF
Total/NA	Prep	3010A			295356	10/14/20 08:37	HED	TAL CF
Total/NA	Analysis	6020A		1	295755	10/15/20 13:42	SAD	TAL CF
Total/NA	Prep	3010A			295356	10/14/20 08:37	HED	TAL CF
Total/NA	Analysis	6020A		1	295910	10/16/20 16:16	SAD	TAL CF
Total/NA	Analysis	SM 2540C		1	295296	10/13/20 15:15	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	294928	10/10/20 12:00	LBB	TAL CF
Total/NA	Analysis	Field Sampling		1	296469	10/08/20 09:25	SLD	TAL CF

Client Sample ID: Field Blank

Lab Sample ID: 310-192835-2

Date Collected: 10/08/20 15:10

Matrix: Water

Date Received: 10/09/20 17:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1	296281	10/18/20 19:43	ACJ	TAL CF
Total/NA	Prep	3010A			295356	10/14/20 08:37	HED	TAL CF
Total/NA	Analysis	6020A		1	295753	10/15/20 13:55	SAD	TAL CF
Total/NA	Prep	3010A			295356	10/14/20 08:37	HED	TAL CF
Total/NA	Analysis	6020A		1	295755	10/15/20 13:55	SAD	TAL CF
Total/NA	Prep	3010A			295356	10/14/20 08:37	HED	TAL CF
Total/NA	Analysis	6020A		1	295910	10/16/20 16:23	SAD	TAL CF
Total/NA	Analysis	SM 2540C		1	295296	10/13/20 15:15	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	294928	10/10/20 12:02	LBB	TAL CF

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192835-1

Laboratory: Eurofins TestAmerica, Cedar Falls

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

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

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Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192835-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	TAL CF
6020A	Metals (ICP/MS)	SW846	TAL CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL CF
SM 4500 H+ B	pH	SM	TAL CF
Field Sampling	Field Sampling	EPA	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF

Protocol References:

EPA = US Environmental Protection Agency

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

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

Laboratory References:

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



Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS</u>			
City/State:	CITY <u>Clive</u>	STATE <u>IA</u>	Project: <u>Ottumwa GS</u>
Receipt Information			
Date/Time Received:	DATE <u>0920</u>	TIME <u>1740</u>	Received By: <u>BLM</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Receipt			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____	<input type="checkbox"/> NONE	
Thermometer ID: <u>N</u>	Correction Factor (°C): <u>+0.0</u>		
Uncorrected Temp (°C): <u>3.3</u>	Corrected Temp (°C): <u>3.3</u>		
Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):	<u>3.3</u>		
Corrected Temp (°C):	<u>3.3</u>		
Exceptions Note			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Chain of Custody Record

TestAmerica Des Moines SC
 214

Client Information Client Contact: Tanten Buszka Phone: 764-943-0855 Company: SCS Engineers		Lab PM: Fredrick, Sandie E-Mail: sandra.fredrick@eurofinset.com		GOC No: 310-54605-16342.1 Page: 3 of 4 Job #:	
Due Date Requested: TAT Requested (days): PO #: 25219072 WO #:		Analysis Requested 903.0, 904.0 6020A - Metals (14) 2540C, Calcd, 9056A_ORGFM_28D, SM4500_H+ 2320B - Alkalinity - Carb/Bicarb 6020A - Metals (2)		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Address: 8450 Hickman Road, Suite 2021 City: Clive State, Zip: IA, 50325 Phone: 764-943-0855 Email: tbuszka@scsengineers.com Project Name: Ottumwa Generating Station 25220072 Site: 065		Field Filtered Sample (Yes or No) Perform MS/MSD (Yes or No) 903.0, 904.0 6020A - Metals (14) 2540C, Calcd, 9056A_ORGFM_28D, SM4500_H+ 2320B - Alkalinity - Carb/Bicarb 6020A - Metals (2)		Special Instructions/Note: - 1 Filtered metals bottle SEE ATTACHED Sampling points + parameters table for requested analyses	
Sample Identification MW-301 Field Blank		Sample Date: 10-8-20 Sample Time: 9:25 Sample Type (C=Comp, G=grab): G Matrix (W=water, S=solid, O=organic, BT=biological, BT=Tissue, A=Air): Water		Total Number of Containers:	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input checked="" type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological					
Deliverable Requested: I, II, III, IV, Other (specify)					
Empty Kit Relinquished by:					
Relinquished by: Matthew Cahalan Date/Time: 10/19/20 11:15 Company: SCS		Relinquished by: Pw Date/Time: 10/19/20 17:00 Company: G74		Relinquished by:	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Cooler Temperature(s) °C and Other Remarks:		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-192835-1

Login Number: 192835

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Bovy, Lorraine L

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

Table 1. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station / SCS Engineers Project No. 25220072.00
October 2020

Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmhos/cm)	ORP (mV)	Turbidity
MW-301	10/8/20 - 905	682.34	15.4	6.22	4.2	1035	163.6	0.02
MW-302	10/8/20 - 1245	655.80	14.4	7.00	0.14	2100	34.5	18.7
MW-303	10/8/20 - 1415	650.37	17.0	8.28	0.13	1602	-0.4	30.2
MW-304	10/8/20 - 1110	652.95	13.6	7.88	0.18	1675	-113.0	11.1
MW-305	10/9/20 - 1135	659.81	14	7.44	0.13	1810	-13.0	12.9
MW-305A	10/5/20 - 1108	648.01	14.2	7.46	0.19	11.02	11.0	NM
MW-306	10/9/20 - 910	670.18	13.4	6.54	0.12	1294	41.4	14
MW-307	10/7/20 - 1605	646.18	13.2	6.97	0.08	16.37	-62.2	4.56
MW-308	10/7/20 - 1330	642.85	13.2	7.24	0.11	1575	-56.5	1.15
MW-309	10/7/20 - 1150	641.50	13.3	7.57	0.09	1371	-71.1	7.7
MW-310	10/12/20 - 1000	638.46	13.9	7.07	0.16	1709	146.5	0.02
MW-310A	10/5/20 - 930	640.20	13.1	7.48	0.48	3122	89.7	NM
MW-311	10/12/20 - 1100	638.73	14.4	6.93	7.12	1024	-53.0	NM
MW-311A	10/6/20 - 1625	641.09	12.7	8.33	0.44	3177	39.6	NM

Abbreviations:

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

Notes:

none

Created by: KAK Date: 5/1/2017
 Last revision by: RM Date: 10/16/2020
 Checked by: NDK Date: 10/20/2020

C:\Users\FredrickS\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\22CB30DC\[OGS_CCR_Field_2020_October.xlsx]GW Field Parameters

ANALYTICAL REPORT

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

Laboratory Job ID: 310-192846-1

Client Project/Site: Ottumwa Generating Station 25220072

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:
10/21/2020 11:36:15 AM*

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

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	6
Definitions	8
QC Sample Results	9
QC Association	12
Chronicle	13
Certification Summary	14
Method Summary	15
Chain of Custody	16
Receipt Checklists	19

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192846-1

Job ID: 310-192846-1

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative
310-192846-1

Comments

No additional comments.

Receipt

The samples were received on 10/9/2020 5:40 PM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.3° C.

Metals

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

General Chemistry

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

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Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192846-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-192846-1	MW-301	Water	10/08/20 09:25	10/09/20 17:40	
310-192846-2	Field Blank	Water	10/08/20 15:10	10/09/20 17:40	

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Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192846-1

Client Sample ID: MW-301

Lab Sample ID: 310-192846-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	38000		500	100	ug/L	1		6020A	Total/NA
Manganese	14		10	4.0	ug/L	1		6020A	Total/NA
Potassium	1500		500	150	ug/L	1		6020A	Total/NA
Sodium	87000		1000	810	ug/L	1		6020A	Total/NA
Manganese	13		10	4.0	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	160		10	3.8	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3 to pH 4.5	160		10	3.8	mg/L	1		SM 2320B	Total/NA

Client Sample ID: Field Blank

Lab Sample ID: 310-192846-2

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192846-1

Client Sample ID: MW-301
 Date Collected: 10/08/20 09:25
 Date Received: 10/09/20 17:40

Lab Sample ID: 310-192846-1
 Matrix: Water

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<50		100	50	ug/L		10/14/20 09:12	10/16/20 21:19	1
Magnesium	38000		500	100	ug/L		10/14/20 09:12	10/16/20 21:19	1
Manganese	14		10	4.0	ug/L		10/14/20 09:12	10/16/20 21:19	1
Potassium	1500		500	150	ug/L		10/14/20 09:12	10/16/20 21:19	1
Sodium	87000		1000	810	ug/L		10/14/20 09:12	10/16/20 21:19	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<50		100	50	ug/L		10/14/20 08:37	10/15/20 14:11	1
Manganese	13		10	4.0	ug/L		10/14/20 08:37	10/16/20 16:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	160		10	3.8	mg/L			10/19/20 11:25	1
Carbonate Alkalinity as CaCO3	<3.8		10	3.8	mg/L			10/19/20 11:25	1
Total Alkalinity as CaCO3 to pH 4.5	160		10	3.8	mg/L			10/19/20 11:25	1

Client Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192846-1

Client Sample ID: Field Blank

Lab Sample ID: 310-192846-2

Date Collected: 10/08/20 15:10

Matrix: Water

Date Received: 10/09/20 17:40

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<50		100	50	ug/L		10/14/20 09:12	10/16/20 21:29	1
Magnesium	<100		500	100	ug/L		10/14/20 09:12	10/16/20 21:29	1
Manganese	<4.0		10	4.0	ug/L		10/14/20 09:12	10/16/20 21:29	1
Potassium	<150		500	150	ug/L		10/14/20 09:12	10/16/20 21:29	1
Sodium	<810		1000	810	ug/L		10/14/20 09:12	10/16/20 21:29	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<50		100	50	ug/L		10/14/20 08:37	10/15/20 14:14	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			10/19/20 14:29	1
Carbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			10/19/20 14:29	1
Bicarbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			10/19/20 14:29	1

Eurofins TestAmerica, Cedar Falls

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192846-1

Qualifiers

Metals

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

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192846-1

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-295356/1-A
Matrix: Water
Analysis Batch: 295753

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 295356

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<50		100	50	ug/L		10/14/20 08:37	10/15/20 13:35	1

Lab Sample ID: MB 310-295356/1-A
Matrix: Water
Analysis Batch: 295910

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 295356

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Manganese	<4.0		10	4.0	ug/L		10/14/20 08:37	10/16/20 16:11	1

Lab Sample ID: LCS 310-295356/2-A
Matrix: Water
Analysis Batch: 295753

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 295356

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	200	191		ug/L		96	80 - 120

Lab Sample ID: LCS 310-295356/2-A
Matrix: Water
Analysis Batch: 295910

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 295356

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Manganese	100	95.8		ug/L		96	80 - 120

Lab Sample ID: MB 310-295364/1-A
Matrix: Water
Analysis Batch: 295910

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 295364

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<50		100	50	ug/L		10/14/20 09:12	10/16/20 21:14	1
Magnesium	<100		500	100	ug/L		10/14/20 09:12	10/16/20 21:14	1
Manganese	<4.0		10	4.0	ug/L		10/14/20 09:12	10/16/20 21:14	1
Potassium	<150		500	150	ug/L		10/14/20 09:12	10/16/20 21:14	1
Sodium	<810		1000	810	ug/L		10/14/20 09:12	10/16/20 21:14	1

Lab Sample ID: LCS 310-295364/2-A
Matrix: Water
Analysis Batch: 295910

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 295364

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	200	214		ug/L		107	80 - 120
Magnesium	2000	2190		ug/L		110	80 - 120
Manganese	100	106		ug/L		106	80 - 120
Potassium	2000	2300		ug/L		115	80 - 120
Sodium	2000	2320		ug/L		116	80 - 120

Eurofins TestAmerica, Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192846-1

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

Lab Sample ID: 310-192846-1 MS
Matrix: Water
Analysis Batch: 295910

Client Sample ID: MW-301
Prep Type: Total/NA
Prep Batch: 295364
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Iron	<50		200	231		ug/L		115	75 - 125
Magnesium	38000		2000	39900	4	ug/L		87	75 - 125
Manganese	14		100	123		ug/L		109	75 - 125
Potassium	1500		2000	3800		ug/L		117	75 - 125
Sodium	87000		2000	87900	4	ug/L		60	75 - 125

Lab Sample ID: 310-192846-1 MSD
Matrix: Water
Analysis Batch: 295910

Client Sample ID: MW-301
Prep Type: Total/NA
Prep Batch: 295364
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Iron	<50		200	231		ug/L		115	75 - 125	0	20
Magnesium	38000		2000	39500	4	ug/L		66	75 - 125	1	20
Manganese	14		100	123		ug/L		110	75 - 125	0	20
Potassium	1500		2000	3720		ug/L		113	75 - 125	2	20
Sodium	87000		2000	88400	4	ug/L		86	75 - 125	1	20

Method: 2320B - Alkalinity (Low Level)

Lab Sample ID: MB 310-296101/1
Matrix: Water
Analysis Batch: 296101

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			10/19/20 14:29	1
Carbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			10/19/20 14:29	1
Bicarbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			10/19/20 14:29	1

Lab Sample ID: LCS 310-296101/2
Matrix: Water
Analysis Batch: 296101

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Total Alkalinity as CaCO3	1000	952		mg/L		95	90 - 110

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 310-296079/1
Matrix: Water
Analysis Batch: 296079

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	<1.9		5.0	1.9	mg/L			10/19/20 11:25	1
Carbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			10/19/20 11:25	1
Total Alkalinity as CaCO3 to pH 4.5	<1.9		5.0	1.9	mg/L			10/19/20 11:25	1

Eurofins TestAmerica, Cedar Falls

QC Sample Results

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192846-1

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCS 310-296079/2
Matrix: Water
Analysis Batch: 296079

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 to pH 4.5	1000	1030		mg/L		103	90 - 110

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QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192846-1

Metals

Prep Batch: 295356

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192846-1	MW-301	Dissolved	Water	3010A	
310-192846-2	Field Blank	Dissolved	Water	3010A	
MB 310-295356/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-295356/2-A	Lab Control Sample	Total/NA	Water	3010A	

Prep Batch: 295364

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192846-1	MW-301	Total/NA	Water	3010A	
310-192846-2	Field Blank	Total/NA	Water	3010A	
MB 310-295364/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-295364/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-192846-1 MS	MW-301	Total/NA	Water	3010A	
310-192846-1 MSD	MW-301	Total/NA	Water	3010A	

Analysis Batch: 295753

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192846-1	MW-301	Dissolved	Water	6020A	295356
310-192846-2	Field Blank	Dissolved	Water	6020A	295356
MB 310-295356/1-A	Method Blank	Total/NA	Water	6020A	295356
LCS 310-295356/2-A	Lab Control Sample	Total/NA	Water	6020A	295356

Analysis Batch: 295910

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192846-1	MW-301	Dissolved	Water	6020A	295356
310-192846-1	MW-301	Total/NA	Water	6020A	295364
310-192846-2	Field Blank	Total/NA	Water	6020A	295364
MB 310-295356/1-A	Method Blank	Total/NA	Water	6020A	295356
MB 310-295364/1-A	Method Blank	Total/NA	Water	6020A	295364
LCS 310-295356/2-A	Lab Control Sample	Total/NA	Water	6020A	295356
LCS 310-295364/2-A	Lab Control Sample	Total/NA	Water	6020A	295364
310-192846-1 MS	MW-301	Total/NA	Water	6020A	295364
310-192846-1 MSD	MW-301	Total/NA	Water	6020A	295364

General Chemistry

Analysis Batch: 296079

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192846-1	MW-301	Total/NA	Water	SM 2320B	
MB 310-296079/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-296079/2	Lab Control Sample	Total/NA	Water	SM 2320B	

Analysis Batch: 296101

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192846-2	Field Blank	Total/NA	Water	2320B	
MB 310-296101/1	Method Blank	Total/NA	Water	2320B	
LCS 310-296101/2	Lab Control Sample	Total/NA	Water	2320B	

Eurofins TestAmerica, Cedar Falls

Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192846-1

Client Sample ID: MW-301

Date Collected: 10/08/20 09:25

Date Received: 10/09/20 17:40

Lab Sample ID: 310-192846-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			295356	10/14/20 08:37	HED	TAL CF
Dissolved	Analysis	6020A		1	295753	10/15/20 14:11	SAD	TAL CF
Dissolved	Prep	3010A			295356	10/14/20 08:37	HED	TAL CF
Dissolved	Analysis	6020A		1	295910	10/16/20 16:28	SAD	TAL CF
Total/NA	Prep	3010A			295364	10/14/20 09:12	HED	TAL CF
Total/NA	Analysis	6020A		1	295910	10/16/20 21:19	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	296079	10/19/20 11:25	WJF	TAL CF

Client Sample ID: Field Blank

Date Collected: 10/08/20 15:10

Date Received: 10/09/20 17:40

Lab Sample ID: 310-192846-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			295356	10/14/20 08:37	HED	TAL CF
Dissolved	Analysis	6020A		1	295753	10/15/20 14:14	SAD	TAL CF
Total/NA	Prep	3010A			295364	10/14/20 09:12	HED	TAL CF
Total/NA	Analysis	6020A		1	295910	10/16/20 21:29	SAD	TAL CF
Total/NA	Analysis	2320B		1	296101	10/19/20 14:29	WJF	TAL CF

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192846-1

Laboratory: Eurofins TestAmerica, Cedar Falls

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

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

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

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station 25220072

Job ID: 310-192846-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS)	SW846	TAL CF
2320B	Alkalinity (Low Level)	SM	TAL CF
SM 2320B	Alkalinity	SM	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF

Protocol References:

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

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

Laboratory References:

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



Environment Testing
TestAmerica



310-192846 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS</u>			
City/State: <u>Clive</u>	STATE: <u>IA</u>	Project: <u>Ottumwa BS</u>	
Receipt Information			
Date/Time Received: DATE <u>0.9.20</u> TIME <u>1740</u>	Received By: <u>BLM</u>		
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Receipt			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>N</u>	Correction Factor (°C): <u>+0.0</u>		
Temperature			
Uncorrected Temp (°C): <u>3.3</u>	Corrected Temp (°C): <u>3.3</u>		
Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C): <u>3.3</u>			
Corrected Temp (°C): <u>3.3</u>			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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

Eurofins TestAmerica, Cedar Falls

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

Chain of Custody Record

TestAmerica Des Moines SC
 214

Client Information
 Client Contact: **Tantien Buszka**
 Phone: **764-993-0855**
 Company: SCS Engineers
 Address: **8450 Hickman Road Suite 207**
 City: **Clive**
 State/Zip: **IA, 50325**
 Phone: **764-993-0855**
 Email: **tbuszka@scsengineers.com**
 Project Name: **Ottumwa Generating Station 25220072**
 Site: **065**

Due Date Requested:
 TAT Requested (days):
 PO #: **25219072**
 WO #:
 Project #: **31011020**
 SSOW#:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=water/soil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)		6020A - Metals (14)		2320B - Alkalinity - Carb/Bicarb		6020A - Metals (2)		Special Instructions/Note:
					D	N	D	N	D	N	D	N	D	N	
MW-301	10-8-20	9:25	G	Water											-1 Filtered metals bottle
Field Blank	10-8-20	15:10	G	Water											SEE ATTACHED SAMPLING POINTS + PARAMETERS TABLE FOR REQUESTED ANALYSIS

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

Deliverable Requested: I, II, III, IV, Other (specify)
 Empty Kit Relinquished by:
 Relinquished by: **Matthew Cahalan** Date: **10/16/20** Company: **SCS**
 Relinquished by: Date: Company:
 Relinquished by: Date: Company:
 Custody Seals Intact: Yes No
 Custody Seal No.:
 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return To Client Disposal By Lab Archive For _____ Months
 Special Instructions/QC Requirements:
 Received by: **pm** Date/Time: **10-9-20 17:40** Company: **SCS**
 Received by: Date/Time: Company:
 Received by: Date/Time: Company:
 Cooler Temperature(s) °C and Other Remarks:
 Ver: 01/16/2019

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-192846-1

Login Number: 192846

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Bovy, Lorraine L

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



ANALYTICAL REPORT

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

Laboratory Job ID: 310-192575-1

Client Project/Site: Ottumwa Generating Station - 25220072.00
Revision: 1

For:
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:
1/20/2021 12:14:16 PM

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

LINKS

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results through
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Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	7
Definitions	10
QC Sample Results	11
QC Association	13
Chronicle	14
Certification Summary	15
Method Summary	16
Chain of Custody	17
Receipt Checklists	22
Field Data Sheets	23

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192575-1

Job ID: 310-192575-1

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative 310-192575-1

Comments

No additional comments.

Revision

The report being provided is a revision of the original report sent on 10/21/2020. The report (revision 1) is being revised due to: Client requested an update to field data for sample MW-307..

Receipt

The samples were received on 10/8/2020 5:50 PM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.6° C.

HPLC/IC

Method 9056A: The following samples were diluted due to the nature of the sample matrix: MW-307 (310-192575-1), MW-308 (310-192575-2) and MW-309 (310-192575-3). 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

Method SM 2540C: The following samples were analyzed outside of analytical holding time due to login/review error: MW-307 (310-192575-1), MW-308 (310-192575-2) and MW-309 (310-192575-3).

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

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192575-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-192575-1	MW-307	Water	10/07/20 16:20	10/08/20 17:50	
310-192575-2	MW-308	Water	10/07/20 13:50	10/08/20 17:50	
310-192575-3	MW-309	Water	10/07/20 12:30	10/08/20 17:50	

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Detection Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192575-1

Client Sample ID: MW-307

Lab Sample ID: 310-192575-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	230		5.0	2.0	mg/L	5		9056A	Total/NA
Sulfate	100		5.0	3.6	mg/L	5		9056A	Total/NA
Barium	140		2.0	0.28	ug/L	1		6020A	Total/NA
Boron	260		100	80	ug/L	1		6020A	Total/NA
Calcium	240		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	18		0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	11		10	2.5	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1000	H	60	52	mg/L	1		SM 2540C	Total/NA
pH	6.9	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	646.18				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-62.2				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.08				mg/L	1		Field Sampling	Total/NA
pH, Field	6.97				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1637				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.2				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	4.56				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-308

Lab Sample ID: 310-192575-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	160		5.0	2.0	mg/L	5		9056A	Total/NA
Sulfate	290		5.0	3.6	mg/L	5		9056A	Total/NA
Barium	130		2.0	0.28	ug/L	1		6020A	Total/NA
Boron	270		100	80	ug/L	1		6020A	Total/NA
Calcium	220		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.14	J	0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	14		10	2.5	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1000	H	60	52	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	642.85				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-56.5				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.11				mg/L	1		Field Sampling	Total/NA
pH, Field	7.24				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1575				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.2				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	1.15				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-309

Lab Sample ID: 310-192575-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	68		5.0	2.0	mg/L	5		9056A	Total/NA
Sulfate	380		5.0	3.6	mg/L	5		9056A	Total/NA
Barium	42		2.0	0.28	ug/L	1		6020A	Total/NA
Boron	1200		100	80	ug/L	1		6020A	Total/NA
Calcium	120		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	2.0		0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	6.9	J	10	2.5	ug/L	1		6020A	Total/NA
Total Dissolved Solids	930	H	60	52	mg/L	1		SM 2540C	Total/NA
pH	7.4	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	641.50				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-71.1				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.09				mg/L	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192575-1

Client Sample ID: MW-309 (Continued)

Lab Sample ID: 310-192575-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
pH, Field	7.57				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1371				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.3				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	7.7				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192575-1

Client Sample ID: MW-307

Lab Sample ID: 310-192575-1

Date Collected: 10/07/20 16:20

Matrix: Water

Date Received: 10/08/20 17:50

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	230		5.0	2.0	mg/L			10/13/20 14:01	5
Fluoride	<0.23		0.50	0.23	mg/L			10/13/20 14:01	5
Sulfate	100		5.0	3.6	mg/L			10/13/20 14:01	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.88		2.0	0.88	ug/L		10/12/20 08:41	10/13/20 18:33	1
Barium	140		2.0	0.28	ug/L		10/12/20 08:41	10/13/20 18:33	1
Boron	260		100	80	ug/L		10/12/20 08:41	10/13/20 18:33	1
Calcium	240		0.50	0.19	mg/L		10/12/20 08:41	10/13/20 18:33	1
Chromium	<1.1		5.0	1.1	ug/L		10/12/20 08:41	10/13/20 18:33	1
Cobalt	18		0.50	0.091	ug/L		10/12/20 08:41	10/13/20 18:33	1
Lead	<0.11		0.50	0.11	ug/L		10/12/20 08:41	10/13/20 18:33	1
Lithium	11		10	2.5	ug/L		10/12/20 08:41	10/13/20 18:33	1
Molybdenum	<1.1		2.0	1.1	ug/L		10/12/20 08:41	10/13/20 18:33	1
Selenium	<1.0		5.0	1.0	ug/L		10/12/20 08:41	10/13/20 18:33	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1000	H	60	52	mg/L			10/15/20 17:38	1
pH	6.9	HF	0.1	0.1	SU			10/08/20 21:41	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	646.18				ft			10/07/20 16:20	1
Oxidation Reduction Potential	-62.2				millivolts			10/07/20 16:20	1
Oxygen, Dissolved, Client Supplied	0.08				mg/L			10/07/20 16:20	1
pH, Field	6.97				SU			10/07/20 16:20	1
Specific Conductance, Field	1637				umhos/cm			10/07/20 16:20	1
Temperature, Field	13.2				Degrees C			10/07/20 16:20	1
Turbidity, Field	4.56				NTU			10/07/20 16:20	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192575-1

Client Sample ID: MW-308

Lab Sample ID: 310-192575-2

Date Collected: 10/07/20 13:50

Matrix: Water

Date Received: 10/08/20 17:50

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	160		5.0	2.0	mg/L			10/13/20 14:48	5
Fluoride	<0.23		0.50	0.23	mg/L			10/13/20 14:48	5
Sulfate	290		5.0	3.6	mg/L			10/13/20 14:48	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.88		2.0	0.88	ug/L		10/12/20 08:41	10/13/20 18:35	1
Barium	130		2.0	0.28	ug/L		10/12/20 08:41	10/13/20 18:35	1
Boron	270		100	80	ug/L		10/12/20 08:41	10/13/20 18:35	1
Calcium	220		0.50	0.19	mg/L		10/12/20 08:41	10/13/20 18:35	1
Chromium	<1.1		5.0	1.1	ug/L		10/12/20 08:41	10/13/20 18:35	1
Cobalt	0.14	J	0.50	0.091	ug/L		10/12/20 08:41	10/13/20 18:35	1
Lead	<0.11		0.50	0.11	ug/L		10/12/20 08:41	10/13/20 18:35	1
Lithium	14		10	2.5	ug/L		10/12/20 08:41	10/13/20 18:35	1
Molybdenum	<1.1		2.0	1.1	ug/L		10/12/20 08:41	10/13/20 18:35	1
Selenium	<1.0		5.0	1.0	ug/L		10/12/20 08:41	10/13/20 18:35	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1000	H	60	52	mg/L			10/15/20 17:38	1
pH	7.1	HF	0.1	0.1	SU			10/08/20 21:42	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	642.85				ft			10/07/20 13:50	1
Oxidation Reduction Potential	-56.5				millivolts			10/07/20 13:50	1
Oxygen, Dissolved, Client Supplied	0.11				mg/L			10/07/20 13:50	1
pH, Field	7.24				SU			10/07/20 13:50	1
Specific Conductance, Field	1575				umhos/cm			10/07/20 13:50	1
Temperature, Field	13.2				Degrees C			10/07/20 13:50	1
Turbidity, Field	1.15				NTU			10/07/20 13:50	1

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192575-1

Client Sample ID: MW-309

Lab Sample ID: 310-192575-3

Date Collected: 10/07/20 12:30

Matrix: Water

Date Received: 10/08/20 17:50

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	68		5.0	2.0	mg/L			10/13/20 15:03	5
Fluoride	<0.23		0.50	0.23	mg/L			10/13/20 15:03	5
Sulfate	380		5.0	3.6	mg/L			10/13/20 15:03	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.88		2.0	0.88	ug/L		10/12/20 08:41	10/13/20 18:38	1
Barium	42		2.0	0.28	ug/L		10/12/20 08:41	10/13/20 18:38	1
Boron	1200		100	80	ug/L		10/12/20 08:41	10/13/20 18:38	1
Calcium	120		0.50	0.19	mg/L		10/12/20 08:41	10/13/20 18:38	1
Chromium	<1.1		5.0	1.1	ug/L		10/12/20 08:41	10/13/20 18:38	1
Cobalt	2.0		0.50	0.091	ug/L		10/12/20 08:41	10/13/20 18:38	1
Lead	<0.11		0.50	0.11	ug/L		10/12/20 08:41	10/13/20 18:38	1
Lithium	6.9 J		10	2.5	ug/L		10/12/20 08:41	10/13/20 18:38	1
Molybdenum	<1.1		2.0	1.1	ug/L		10/12/20 08:41	10/13/20 18:38	1
Selenium	<1.0		5.0	1.0	ug/L		10/12/20 08:41	10/13/20 18:38	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	930	H	60	52	mg/L			10/15/20 17:38	1
pH	7.4	HF	0.1	0.1	SU			10/08/20 21:44	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	641.50				ft			10/07/20 12:30	1
Oxidation Reduction Potential	-71.1				millivolts			10/07/20 12:30	1
Oxygen, Dissolved, Client Supplied	0.09				mg/L			10/07/20 12:30	1
pH, Field	7.57				SU			10/07/20 12:30	1
Specific Conductance, Field	1371				umhos/cm			10/07/20 12:30	1
Temperature, Field	13.3				Degrees C			10/07/20 12:30	1
Turbidity, Field	7.7				NTU			10/07/20 12:30	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192575-1

Qualifiers

HPLC/IC

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.

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
H	Sample was prepped or analyzed beyond the specified holding time
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192575-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-295631/3
Matrix: Water
Analysis Batch: 295631

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.40		1.0	0.40	mg/L			10/13/20 13:15	1
Fluoride	<0.046		0.10	0.046	mg/L			10/13/20 13:15	1
Sulfate	<0.71		1.0	0.71	mg/L			10/13/20 13:15	1

Lab Sample ID: LCS 310-295631/4
Matrix: Water
Analysis Batch: 295631

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	2.11		mg/L		106	90 - 110
Sulfate	10.0	10.3		mg/L		103	90 - 110

Lab Sample ID: 310-192575-1 MS
Matrix: Water
Analysis Batch: 295631

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	230		25.0	251	4	mg/L		72	80 - 120
Fluoride	<0.23		5.00	5.10		mg/L		102	80 - 120
Sulfate	100		25.0	125	4	mg/L		99	80 - 120

Lab Sample ID: 310-192575-1 MSD
Matrix: Water
Analysis Batch: 295631

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	230		25.0	251	4	mg/L		72	80 - 120	0	15
Fluoride	<0.23		5.00	5.24		mg/L		105	80 - 120	3	15
Sulfate	100		25.0	125	4	mg/L		99	80 - 120	0	15

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-295022/1-A
Matrix: Water
Analysis Batch: 295353

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 295022

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.00088		0.0020	0.00088	mg/L		10/12/20 08:41	10/13/20 17:39	1
Barium	<0.00028		0.0020	0.00028	mg/L		10/12/20 08:41	10/13/20 17:39	1
Boron	<0.080		0.10	0.080	mg/L		10/12/20 08:41	10/13/20 17:39	1
Calcium	<0.19		0.50	0.19	mg/L		10/12/20 08:41	10/13/20 17:39	1
Chromium	<0.0011		0.0050	0.0011	mg/L		10/12/20 08:41	10/13/20 17:39	1
Cobalt	<0.000091		0.00050	0.000091	mg/L		10/12/20 08:41	10/13/20 17:39	1
Lead	0.000316	J	0.00050	0.00011	mg/L		10/12/20 08:41	10/13/20 17:39	1
Lithium	<0.0025		0.010	0.0025	mg/L		10/12/20 08:41	10/13/20 17:39	1
Molybdenum	<0.0011		0.0020	0.0011	mg/L		10/12/20 08:41	10/13/20 17:39	1
Selenium	<0.0010		0.0050	0.0010	mg/L		10/12/20 08:41	10/13/20 17:39	1

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QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192575-1

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

Lab Sample ID: LCS 310-295022/2-A
Matrix: Water
Analysis Batch: 295353

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 295022

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.200	0.211		mg/L		106	80 - 120
Barium	0.100	0.113		mg/L		113	80 - 120
Boron	0.200	0.205		mg/L		103	80 - 120
Calcium	2.00	1.91		mg/L		96	80 - 120
Chromium	0.100	0.106		mg/L		106	80 - 120
Cobalt	0.100	0.112		mg/L		112	80 - 120
Lead	0.200	0.226		mg/L		113	80 - 120
Lithium	0.200	0.207		mg/L		103	80 - 120
Molybdenum	0.200	0.214		mg/L		107	80 - 120
Selenium	0.400	0.427		mg/L		107	80 - 120

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

Lab Sample ID: MB 310-295685/1
Matrix: Water
Analysis Batch: 295685

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		30	26	mg/L			10/15/20 17:38	1

Lab Sample ID: LCS 310-295685/2
Matrix: Water
Analysis Batch: 295685

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

Lab Sample ID: 310-192575-1 DU
Matrix: Water
Analysis Batch: 295685

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

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Total Dissolved Solids	1000	H	1030		mg/L		3	24

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-294755/1
Matrix: Water
Analysis Batch: 294755

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	6.9		SU		99	98 - 102

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QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192575-1

HPLC/IC

Analysis Batch: 295631

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192575-1	MW-307	Total/NA	Water	9056A	
310-192575-2	MW-308	Total/NA	Water	9056A	
310-192575-3	MW-309	Total/NA	Water	9056A	
MB 310-295631/3	Method Blank	Total/NA	Water	9056A	
LCS 310-295631/4	Lab Control Sample	Total/NA	Water	9056A	
310-192575-1 MS	MW-307	Total/NA	Water	9056A	
310-192575-1 MSD	MW-307	Total/NA	Water	9056A	

Metals

Prep Batch: 295022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192575-1	MW-307	Total/NA	Water	3010A	
310-192575-2	MW-308	Total/NA	Water	3010A	
310-192575-3	MW-309	Total/NA	Water	3010A	
MB 310-295022/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-295022/2-A	Lab Control Sample	Total/NA	Water	3010A	

Analysis Batch: 295353

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192575-1	MW-307	Total/NA	Water	6020A	295022
310-192575-2	MW-308	Total/NA	Water	6020A	295022
310-192575-3	MW-309	Total/NA	Water	6020A	295022
MB 310-295022/1-A	Method Blank	Total/NA	Water	6020A	295022
LCS 310-295022/2-A	Lab Control Sample	Total/NA	Water	6020A	295022

General Chemistry

Analysis Batch: 294755

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192575-1	MW-307	Total/NA	Water	SM 4500 H+ B	
310-192575-2	MW-308	Total/NA	Water	SM 4500 H+ B	
310-192575-3	MW-309	Total/NA	Water	SM 4500 H+ B	
LCS 310-294755/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 295685

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192575-1	MW-307	Total/NA	Water	SM 2540C	
310-192575-2	MW-308	Total/NA	Water	SM 2540C	
310-192575-3	MW-309	Total/NA	Water	SM 2540C	
MB 310-295685/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-295685/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-192575-1 DU	MW-307	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 296469

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192575-1	MW-307	Total/NA	Water	Field Sampling	
310-192575-2	MW-308	Total/NA	Water	Field Sampling	
310-192575-3	MW-309	Total/NA	Water	Field Sampling	

Eurofins TestAmerica, Cedar Falls

Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192575-1

Client Sample ID: MW-307

Date Collected: 10/07/20 16:20

Date Received: 10/08/20 17:50

Lab Sample ID: 310-192575-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	295631	10/13/20 14:01	ACJ	TAL CF
Total/NA	Prep	3010A			295022	10/12/20 08:41	HED	TAL CF
Total/NA	Analysis	6020A		1	295353	10/13/20 18:33	SAD	TAL CF
Total/NA	Analysis	SM 2540C		1	295685	10/15/20 17:38	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	294755	10/08/20 21:41	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	296469	10/07/20 16:20	SLD	TAL CF

Client Sample ID: MW-308

Date Collected: 10/07/20 13:50

Date Received: 10/08/20 17:50

Lab Sample ID: 310-192575-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	295631	10/13/20 14:48	ACJ	TAL CF
Total/NA	Prep	3010A			295022	10/12/20 08:41	HED	TAL CF
Total/NA	Analysis	6020A		1	295353	10/13/20 18:35	SAD	TAL CF
Total/NA	Analysis	SM 2540C		1	295685	10/15/20 17:38	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	294755	10/08/20 21:42	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	296469	10/07/20 13:50	SLD	TAL CF

Client Sample ID: MW-309

Date Collected: 10/07/20 12:30

Date Received: 10/08/20 17:50

Lab Sample ID: 310-192575-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	295631	10/13/20 15:03	ACJ	TAL CF
Total/NA	Prep	3010A			295022	10/12/20 08:41	HED	TAL CF
Total/NA	Analysis	6020A		1	295353	10/13/20 18:38	SAD	TAL CF
Total/NA	Analysis	SM 2540C		1	295685	10/15/20 17:38	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	294755	10/08/20 21:44	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	296469	10/07/20 12:30	SLD	TAL CF

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192575-1

Laboratory: Eurofins TestAmerica, Cedar Falls

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

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

1

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Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192575-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	TAL CF
6020A	Metals (ICP/MS)	SW846	TAL CF
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL CF
SM 4500 H+ B	pH	SM	TAL CF
Field Sampling	Field Sampling	EPA	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF

Protocol References:

EPA = US Environmental Protection Agency

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

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

Laboratory References:

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



Cooler/Sample Receipt and Temperature Log Form

Client Information		
Client: <u>SLS Engineers</u>		
City/State: <u>Clive</u> <small>CITY</small>	<u>OH</u> <small>STATE</small>	Project: <u>Ottawa Generating Station</u>
Receipt Information		
Date/Time Received: <u>10.02.20</u> <small>DATE</small> <u>1750</u> <small>TIME</small>	Received By: <u>BKM</u>	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
Temperature Record		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>N</u>	Correction Factor (°C): <u>0.0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>0.6</u>	Corrected Temp (°C): <u>0.6</u>	
• Sample Container Temperature		
Container(s) used:	CONTAINER 1	CONTAINER 2
Uncorrected Temp (°C):		
Corrected Temp (°C):		
Exceptions Noted		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
Additional Comments		

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

Eurofins TestAmerica, Cedar Falls

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

Chain of Custody Record 430495 eurofins

TestAmerica Des Moines SC
214

Environment Tr
TestAmerica

Address: _____ Regulatory Program: DW NPDES RCRA Other: _____ TAL

Client Contact
 Company Name: SCS Engineers
 Address: 8450 Hickman Road Suite 27
 City/State/Zip: Clive Iowa 50325
 Phone: 269-443-0855
 Fax: _____
 Project Name: Ottumwa Generating Station
 Site: _____
 PO # Z5220072.00

Project Manager: Meg Blaggett
Tel/Email: 608-345-9221

Site Contact: Tamara Buszka
Lab Contact: Sandra Friedrich
Carrier: _____

Analysis Turnaround Time
 CALENDAR DAYS WORKING DAYS
 TAT if different from Below _____
 2 weeks
 1 week
 2 days
 1 day

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	9056A-ORGM-280	254C-Calc TDS	CI/Sulfate/Fluoride-Smgso	60204-Metals (14)	Sample Specific Notes:
MW-307	10-7-20	16:20	G	water		Y		X	X	X	X	See attached
MW-308	10-7-20	13:50	G	water		Y		X	X	X	X	Sampling Points
MW-309	10-7-20	12:30	G	water		Y		X	X	X	X	+ Parameters table for requested analyses

Preservation Used: 1= Ice, 2= HCI, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other _____

Possible Hazard Identification:
 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
 Non-Hazard Flammable Skin Irritant Poison B Unknown

Special Instructions/QC Requirements & Comments:

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return to Client Disposal by Lab Archive for _____ Months

Custody Seal No.:	Company:	Date/Time:	Received by:	Therm ID No.:	Cooler Temp. (°C):	Obs'd:	Cor'd:
_____	SCS	10/8/20 1200	Mathew Cahalan	_____	_____	_____	_____
_____	ETA	10/8/20 1730	_____	_____	_____	_____	_____



Fredrick, Sandie

From: Kron, Nicole <NKron@scsengineers.com>
Sent: Tuesday, January 19, 2021 4:49 PM
To: Fredrick, Sandie
Cc: Blodgett, Meghan
Subject: OGS Ash Pond Lab Report revision needed
Attachments: J192934-1 UDS Level 2 Report Final Report - Ash Pond CCR.pdf; J192575-1 UDS Level 2 Report Final Report - ZLDP CCR.pdf

EXTERNAL EMAIL*

Hi Sandie,

Can you please revise the attached lab reports with the instructions below?

MW-305A (OGS ASH – 310-192934-1)
Specific Conductance, Field – 11.02 $\mu\text{mhos/cm}$ **Please update to → 1102 $\mu\text{mhos/cm}$**

MW-307 (OGS ZLDP – 310-1925757-1)
Specific Conductance, Field – 16.37 $\mu\text{mhos/cm}$ **Please update to → 1637 $\mu\text{mhos/cm}$**

Can you have the 310-192934-1 lab report revised by this Friday? The second lab report is less of a time crunch. If you can get that one updated by the end of January that would be very helpful.

Thank you,
Nicole

Nicole Kron
Hydrogeologist

SCS ENGINEERS
2830 Dairy Drive
Madison, WI 53718
Cell: 608.354.5274
www.scsengineers.com

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- 9
- 10
- 11
- 12
- 13**
- 14
- 15

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-192575-1

Login Number: 192575

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Marzen, Brita K

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. 25220072.00
October 2020

Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmhos/cm)	ORP (mV)	Turbidity
MW-301	10/8/20 - 905	682.34	15.4	6.22	4.2	1035	163.6	0.02
MW-302	10/8/20 - 1245	655.80	14.4	7.00	0.14	2100	34.5	18.7
MW-303	10/8/20 - 1415	650.37	17.0	8.28	0.13	1602	-0.4	30.2
MW-304	10/8/20 - 1110	652.95	13.6	7.88	0.18	1675	-113.0	11.1
MW-305	10/9/20 - 1135	659.81	14	7.44	0.13	1810	-13.0	12.9
MW-305A	10/5/20 - 1108	648.01	14.2	7.46	0.19	11.02	11.0	NM
MW-306	10/9/20 - 910	670.18	13.4	6.54	0.12	1294	41.4	14
MW-307	10/7/20 - 1605	646.18	13.2	6.97	0.08	16.37	-62.2	4.56
MW-308	10/7/20 - 1330	642.85	13.2	7.24	0.11	1575	-56.5	1.15
MW-309	10/7/20 - 1150	641.50	13.3	7.57	0.09	1371	-71.1	7.7
MW-310	10/12/20 - 1000	638.46	13.9	7.07	0.16	1709	146.5	0.02
MW-310A	10/5/20 - 930	640.20	13.1	7.48	0.48	3122	89.7	NM
MW-311	10/12/20 - 1100	638.73	14.4	6.93	7.12	1024	-53.0	NM
MW-311A	10/6/20 - 1625	641.09	12.7	8.33	0.44	3177	39.6	NM

Abbreviations:

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

Notes:

none

Created by: KAK Date: 5/1/2017
 Last revision by: RM Date: 10/16/2020
 Checked by: NDK Date: 10/20/2020

C:\Users\FredrickS\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\22CB30DC\[OGS_CCR_Field_2020_October.xlsx]GW Field Parameters

ANALYTICAL REPORT

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

Laboratory Job ID: 310-192602-1

Client Project/Site: Ottumwa Generating Station - 25220072.00

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:
10/16/2020 1:44:04 PM*

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

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

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



Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	6
Definitions	9
QC Sample Results	10
QC Association	13
Chronicle	15
Certification Summary	16
Method Summary	17
Chain of Custody	18
Receipt Checklists	21

Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192602-1

Job ID: 310-192602-1

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative
310-192602-1

Comments

No additional comments.

Receipt

The samples were received on 10/8/2020 5:50 PM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.6° C.

Metals

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

General Chemistry

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

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

Sample Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192602-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-192602-1	MW-307	Water	10/07/20 16:20	10/08/20 17:50	
310-192602-2	MW-308	Water	10/07/20 13:50	10/08/20 17:50	
310-192602-3	MW-309	Water	10/07/20 12:30	10/08/20 17:50	

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Detection Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192602-1

Client Sample ID: MW-307

Lab Sample ID: 310-192602-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	3500		100	50	ug/L	1		6020A	Total/NA
Magnesium	27000		500	100	ug/L	1		6020A	Total/NA
Manganese	290	F1	10	4.0	ug/L	1		6020A	Total/NA
Potassium	1900		500	150	ug/L	1		6020A	Total/NA
Sodium	100000		1000	810	ug/L	1		6020A	Total/NA
Cobalt	19		0.50	0.091	ug/L	1		6020A	Dissolved
Iron	3600		100	50	ug/L	1		6020A	Dissolved
Manganese	350		10	4.0	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	480		10	3.8	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3 to pH 4.5	480		10	3.8	mg/L	1		SM 2320B	Total/NA

Client Sample ID: MW-308

Lab Sample ID: 310-192602-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	3800		100	50	ug/L	1		6020A	Total/NA
Magnesium	23000		500	100	ug/L	1		6020A	Total/NA
Manganese	1200		10	4.0	ug/L	1		6020A	Total/NA
Potassium	4000		500	150	ug/L	1		6020A	Total/NA
Sodium	100000		1000	810	ug/L	1		6020A	Total/NA
Iron	4000		100	50	ug/L	1		6020A	Dissolved
Manganese	1400		10	4.0	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	390		10	3.8	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3 to pH 4.5	390		10	3.8	mg/L	1		SM 2320B	Total/NA

Client Sample ID: MW-309

Lab Sample ID: 310-192602-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	890		100	50	ug/L	1		6020A	Total/NA
Magnesium	18000		500	100	ug/L	1		6020A	Total/NA
Manganese	620		10	4.0	ug/L	1		6020A	Total/NA
Potassium	670		500	150	ug/L	1		6020A	Total/NA
Sodium	180000		1000	810	ug/L	1		6020A	Total/NA
Iron	690		100	50	ug/L	1		6020A	Dissolved
Manganese	660		10	4.0	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	290		5.0	1.9	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3 to pH 4.5	290		5.0	1.9	mg/L	1		SM 2320B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192602-1

Client Sample ID: MW-307

Lab Sample ID: 310-192602-1

Date Collected: 10/07/20 16:20

Matrix: Water

Date Received: 10/08/20 17:50

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	3500		100	50	ug/L		10/12/20 08:48	10/15/20 16:52	1
Magnesium	27000		500	100	ug/L		10/12/20 08:48	10/15/20 00:09	1
Manganese	290	F1	10	4.0	ug/L		10/12/20 08:48	10/15/20 00:09	1
Potassium	1900		500	150	ug/L		10/12/20 08:48	10/15/20 00:09	1
Sodium	100000		1000	810	ug/L		10/12/20 08:48	10/15/20 00:09	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	19		0.50	0.091	ug/L		10/12/20 08:45	10/14/20 23:14	1
Iron	3600		100	50	ug/L		10/12/20 08:45	10/15/20 16:26	1
Manganese	350		10	4.0	ug/L		10/12/20 08:45	10/14/20 23:14	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	480		10	3.8	mg/L			10/16/20 09:56	1
Carbonate Alkalinity as CaCO3	<3.8		10	3.8	mg/L			10/16/20 09:56	1
Total Alkalinity as CaCO3 to pH 4.5	480		10	3.8	mg/L			10/16/20 09:56	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192602-1

Client Sample ID: MW-308

Lab Sample ID: 310-192602-2

Date Collected: 10/07/20 13:50

Matrix: Water

Date Received: 10/08/20 17:50

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	3800		100	50	ug/L		10/12/20 08:48	10/15/20 16:59	1
Magnesium	23000		500	100	ug/L		10/12/20 08:48	10/15/20 00:22	1
Manganese	1200		10	4.0	ug/L		10/12/20 08:48	10/15/20 00:22	1
Potassium	4000		500	150	ug/L		10/12/20 08:48	10/15/20 00:22	1
Sodium	100000		1000	810	ug/L		10/12/20 08:48	10/15/20 00:22	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	4000		100	50	ug/L		10/12/20 08:45	10/15/20 16:39	1
Manganese	1400		10	4.0	ug/L		10/12/20 08:45	10/14/20 23:27	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	390		10	3.8	mg/L			10/16/20 09:56	1
Carbonate Alkalinity as CaCO3	<3.8		10	3.8	mg/L			10/16/20 09:56	1
Total Alkalinity as CaCO3 to pH 4.5	390		10	3.8	mg/L			10/16/20 09:56	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192602-1

Client Sample ID: MW-309
 Date Collected: 10/07/20 12:30
 Date Received: 10/08/20 17:50

Lab Sample ID: 310-192602-3
 Matrix: Water

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	890		100	50	ug/L		10/12/20 08:48	10/15/20 17:02	1
Magnesium	18000		500	100	ug/L		10/12/20 08:48	10/15/20 00:24	1
Manganese	620		10	4.0	ug/L		10/12/20 08:48	10/15/20 00:24	1
Potassium	670		500	150	ug/L		10/12/20 08:48	10/15/20 00:24	1
Sodium	180000		1000	810	ug/L		10/12/20 08:48	10/15/20 00:24	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	690		100	50	ug/L		10/12/20 08:45	10/15/20 16:42	1
Manganese	660		10	4.0	ug/L		10/12/20 08:45	10/14/20 23:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	290		5.0	1.9	mg/L			10/16/20 09:56	1
Carbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			10/16/20 09:56	1
Total Alkalinity as CaCO3 to pH 4.5	290		5.0	1.9	mg/L			10/16/20 09:56	1

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- 12
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- 14

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192602-1

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F1	MS and/or MSD recovery exceeds control limits.

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192602-1

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-295023/1-A
Matrix: Water
Analysis Batch: 295528

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 295023

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.091		0.50	0.091	ug/L		10/12/20 08:45	10/14/20 22:14	1
Manganese	<4.0		10	4.0	ug/L		10/12/20 08:45	10/14/20 22:14	1

Lab Sample ID: MB 310-295023/1-A
Matrix: Water
Analysis Batch: 295753

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 295023

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<50		100	50	ug/L		10/12/20 08:45	10/15/20 16:08	1

Lab Sample ID: LCS 310-295023/2-A
Matrix: Water
Analysis Batch: 295528

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 295023

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cobalt	100	102		ug/L		102	80 - 120
Manganese	100	98.1		ug/L		98	80 - 120

Lab Sample ID: LCS 310-295023/2-A
Matrix: Water
Analysis Batch: 295753

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 295023

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	200	213		ug/L		107	80 - 120

Lab Sample ID: MB 310-295024/1-A
Matrix: Water
Analysis Batch: 295528

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 295024

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Magnesium	<100		500	100	ug/L		10/12/20 08:48	10/14/20 23:51	1
Manganese	<4.0		10	4.0	ug/L		10/12/20 08:48	10/14/20 23:51	1
Potassium	<150		500	150	ug/L		10/12/20 08:48	10/14/20 23:51	1
Sodium	<810		1000	810	ug/L		10/12/20 08:48	10/14/20 23:51	1

Lab Sample ID: MB 310-295024/1-A
Matrix: Water
Analysis Batch: 295753

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 295024

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<50		100	50	ug/L		10/12/20 08:48	10/15/20 16:47	1

Lab Sample ID: LCS 310-295024/2-A
Matrix: Water
Analysis Batch: 295528

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 295024

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Magnesium	2000	2160		ug/L		108	80 - 120
Manganese	100	97.4		ug/L		97	80 - 120
Potassium	2000	2180		ug/L		109	80 - 120

Eurofins TestAmerica, Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192602-1

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

Lab Sample ID: LCS 310-295024/2-A
Matrix: Water
Analysis Batch: 295528

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 295024

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sodium	2000	2180		ug/L		109	80 - 120

Lab Sample ID: LCS 310-295024/2-A
Matrix: Water
Analysis Batch: 295753

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 295024

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	200	207		ug/L		104	80 - 120

Lab Sample ID: 310-192602-1 MS
Matrix: Water
Analysis Batch: 295528

Client Sample ID: MW-307
Prep Type: Total/NA
Prep Batch: 295024

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Magnesium	27000		2000	29000	4	ug/L		75	75 - 125
Manganese	290	F1	100	380		ug/L		94	75 - 125
Potassium	1900		2000	3990		ug/L		104	75 - 125
Sodium	100000		2000	99300	4	ug/L		-56	75 - 125

Lab Sample ID: 310-192602-1 MS
Matrix: Water
Analysis Batch: 295753

Client Sample ID: MW-307
Prep Type: Total/NA
Prep Batch: 295024

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	3500		200	3610	4	ug/L		80	75 - 125

Lab Sample ID: 310-192602-1 MSD
Matrix: Water
Analysis Batch: 295528

Client Sample ID: MW-307
Prep Type: Total/NA
Prep Batch: 295024

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Magnesium	27000		2000	31600	4	ug/L		208	75 - 125	9	20
Manganese	290	F1	100	419	F1	ug/L		132	75 - 125	10	20
Potassium	1900		2000	4370		ug/L		123	75 - 125	9	20
Sodium	100000		2000	108000	4	ug/L		387	75 - 125	9	20

Lab Sample ID: 310-192602-1 MSD
Matrix: Water
Analysis Batch: 295753

Client Sample ID: MW-307
Prep Type: Total/NA
Prep Batch: 295024

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Iron	3500		200	3850	4	ug/L		199	75 - 125	6	20

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192602-1

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 310-295768/1
Matrix: Water
Analysis Batch: 295768

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	<1.9		5.0	1.9	mg/L			10/16/20 09:56	1
Carbonate Alkalinity as CaCO3	<1.9		5.0	1.9	mg/L			10/16/20 09:56	1
Total Alkalinity as CaCO3 to pH 4.5	<1.9		5.0	1.9	mg/L			10/16/20 09:56	1

Lab Sample ID: LCS 310-295768/2
Matrix: Water
Analysis Batch: 295768

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 to pH 4.5	1000	1000		mg/L		100	90 - 110



QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192602-1

Metals

Prep Batch: 295023

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192602-1	MW-307	Dissolved	Water	3010A	
310-192602-2	MW-308	Dissolved	Water	3010A	
310-192602-3	MW-309	Dissolved	Water	3010A	
MB 310-295023/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-295023/2-A	Lab Control Sample	Total/NA	Water	3010A	

Prep Batch: 295024

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192602-1	MW-307	Total/NA	Water	3010A	
310-192602-2	MW-308	Total/NA	Water	3010A	
310-192602-3	MW-309	Total/NA	Water	3010A	
MB 310-295024/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-295024/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-192602-1 MS	MW-307	Total/NA	Water	3010A	
310-192602-1 MSD	MW-307	Total/NA	Water	3010A	

Analysis Batch: 295528

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192602-1	MW-307	Dissolved	Water	6020A	295023
310-192602-1	MW-307	Total/NA	Water	6020A	295024
310-192602-2	MW-308	Dissolved	Water	6020A	295023
310-192602-2	MW-308	Total/NA	Water	6020A	295024
310-192602-3	MW-309	Dissolved	Water	6020A	295023
310-192602-3	MW-309	Total/NA	Water	6020A	295024
MB 310-295023/1-A	Method Blank	Total/NA	Water	6020A	295023
MB 310-295024/1-A	Method Blank	Total/NA	Water	6020A	295024
LCS 310-295023/2-A	Lab Control Sample	Total/NA	Water	6020A	295023
LCS 310-295024/2-A	Lab Control Sample	Total/NA	Water	6020A	295024
310-192602-1 MS	MW-307	Total/NA	Water	6020A	295024
310-192602-1 MSD	MW-307	Total/NA	Water	6020A	295024

Analysis Batch: 295753

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192602-1	MW-307	Dissolved	Water	6020A	295023
310-192602-1	MW-307	Total/NA	Water	6020A	295024
310-192602-2	MW-308	Dissolved	Water	6020A	295023
310-192602-2	MW-308	Total/NA	Water	6020A	295024
310-192602-3	MW-309	Dissolved	Water	6020A	295023
310-192602-3	MW-309	Total/NA	Water	6020A	295024
MB 310-295023/1-A	Method Blank	Total/NA	Water	6020A	295023
MB 310-295024/1-A	Method Blank	Total/NA	Water	6020A	295024
LCS 310-295023/2-A	Lab Control Sample	Total/NA	Water	6020A	295023
LCS 310-295024/2-A	Lab Control Sample	Total/NA	Water	6020A	295024
310-192602-1 MS	MW-307	Total/NA	Water	6020A	295024
310-192602-1 MSD	MW-307	Total/NA	Water	6020A	295024

General Chemistry

Analysis Batch: 295768

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192602-1	MW-307	Total/NA	Water	SM 2320B	

Eurofins TestAmerica, Cedar Falls

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192602-1

General Chemistry (Continued)

Analysis Batch: 295768 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192602-2	MW-308	Total/NA	Water	SM 2320B	
310-192602-3	MW-309	Total/NA	Water	SM 2320B	
MB 310-295768/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-295768/2	Lab Control Sample	Total/NA	Water	SM 2320B	

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Lab Chronicle

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192602-1

Client Sample ID: MW-307

Lab Sample ID: 310-192602-1

Date Collected: 10/07/20 16:20

Matrix: Water

Date Received: 10/08/20 17:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			295023	10/12/20 08:45	HED	TAL CF
Dissolved	Analysis	6020A		1	295528	10/14/20 23:14	SAD	TAL CF
Dissolved	Prep	3010A			295023	10/12/20 08:45	HED	TAL CF
Dissolved	Analysis	6020A		1	295753	10/15/20 16:26	SAD	TAL CF
Total/NA	Prep	3010A			295024	10/12/20 08:48	HED	TAL CF
Total/NA	Analysis	6020A		1	295528	10/15/20 00:09	SAD	TAL CF
Total/NA	Prep	3010A			295024	10/12/20 08:48	HED	TAL CF
Total/NA	Analysis	6020A		1	295753	10/15/20 16:52	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	295768	10/16/20 09:56	WJF	TAL CF

Client Sample ID: MW-308

Lab Sample ID: 310-192602-2

Date Collected: 10/07/20 13:50

Matrix: Water

Date Received: 10/08/20 17:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			295023	10/12/20 08:45	HED	TAL CF
Dissolved	Analysis	6020A		1	295528	10/14/20 23:27	SAD	TAL CF
Dissolved	Prep	3010A			295023	10/12/20 08:45	HED	TAL CF
Dissolved	Analysis	6020A		1	295753	10/15/20 16:39	SAD	TAL CF
Total/NA	Prep	3010A			295024	10/12/20 08:48	HED	TAL CF
Total/NA	Analysis	6020A		1	295528	10/15/20 00:22	SAD	TAL CF
Total/NA	Prep	3010A			295024	10/12/20 08:48	HED	TAL CF
Total/NA	Analysis	6020A		1	295753	10/15/20 16:59	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	295768	10/16/20 09:56	WJF	TAL CF

Client Sample ID: MW-309

Lab Sample ID: 310-192602-3

Date Collected: 10/07/20 12:30

Matrix: Water

Date Received: 10/08/20 17:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			295023	10/12/20 08:45	HED	TAL CF
Dissolved	Analysis	6020A		1	295528	10/14/20 23:30	SAD	TAL CF
Dissolved	Prep	3010A			295023	10/12/20 08:45	HED	TAL CF
Dissolved	Analysis	6020A		1	295753	10/15/20 16:42	SAD	TAL CF
Total/NA	Prep	3010A			295024	10/12/20 08:48	HED	TAL CF
Total/NA	Analysis	6020A		1	295528	10/15/20 00:24	SAD	TAL CF
Total/NA	Prep	3010A			295024	10/12/20 08:48	HED	TAL CF
Total/NA	Analysis	6020A		1	295753	10/15/20 17:02	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	295768	10/16/20 09:56	WJF	TAL CF

Laboratory References:

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

Eurofins TestAmerica, Cedar Falls

Accreditation/Certification Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192602-1

Laboratory: Eurofins TestAmerica, Cedar Falls

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

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

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Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192602-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS)	SW846	TAL CF
SM 2320B	Alkalinity	SM	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF

Protocol References:

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

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

Laboratory References:

TAL CF = Eurofins TestAmerica, 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: <u>SLC Engineers</u>			
City/State:	CITY <u>Clive</u>	STATE <u>IA</u>	Project: <u>Ottumwa Generating Station</u>
Receipt Information			
Date/Time Received:	DATE <u>10.8.20</u>	TIME <u>1:50</u>	Received By: <u>BKM</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____	<input type="checkbox"/> NONE	
Thermometer ID:	<u>N</u>	Correction Factor (°C): <u>+0.0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>0.6</u>	Corrected Temp (°C): <u>0.6</u>	
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-192602-1

Login Number: 192602

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Marzen, Brita K

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



ANALYTICAL REPORT

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

Laboratory Job ID: 310-192603-1

Client Project/Site: Ottumwa Generating Station - 25220072.00

For:

SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:
11/17/2020 10:14:03 AM*

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

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

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

Table of Contents

Cover Page	1
Table of Contents	2
Case Narrative	3
Sample Summary	4
Detection Summary	5
Client Sample Results	6
Definitions	9
QC Sample Results	10
QC Association	12
Chronicle	13
Certification Summary	14
Method Summary	15
Chain of Custody	16
Receipt Checklists	19
Tracer Carrier Summary	21



Case Narrative

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192603-1

Job ID: 310-192603-1

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative 310-192603-1

Comments

No additional comments.

Receipt

The samples were received on 10/8/2020 5:50 PM; the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.6° C.

RAD

Methods 903.0, 9315: 903/9315 prep batch 160-485829 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 (310-192603-1), MW-308 (310-192603-2) and MW-309 (310-192603-3)

Methods 904.0, 9320: 904 prep batch 485913 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 (310-192603-1), MW-308 (310-192603-2) and MW-309 (310-192603-3)

Methods 904.0, 9320: 904/9320 prep batch 485913 The LCS recovery (127%) for Ra228 was outside the upper QC limits of 75-125. It was within our statistical upper limit of 138%. The LCSD recovered at 114% of the true value and the RER/RPD was acceptable. Original results will be qualified and reported. (LCS 160-485913/1-A)

Method PrecSep_0: Radium 228 Prep Batch 160-485913: Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-307 (310-192603-1), MW-308 (310-192603-2) and MW-309 (310-192603-3). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep-21: Radium 226 Prep Batch 160-485829: Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-307 (310-192603-1), MW-308 (310-192603-2) and MW-309 (310-192603-3). 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: Ottumwa Generating Station - 25220072.00

Job ID: 310-192603-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-192603-1	MW-307	Water	10/07/20 16:20	10/08/20 17:50	
310-192603-2	MW-308	Water	10/07/20 13:50	10/08/20 17:50	
310-192603-3	MW-309	Water	10/07/20 12:30	10/08/20 17:50	

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Detection Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192603-1

Client Sample ID: MW-307

Lab Sample ID: 310-192603-1

No Detections.

Client Sample ID: MW-308

Lab Sample ID: 310-192603-2

No Detections.

Client Sample ID: MW-309

Lab Sample ID: 310-192603-3

No Detections.

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This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192603-1

Client Sample ID: MW-307

Lab Sample ID: 310-192603-1

Date Collected: 10/07/20 16:20

Matrix: Water

Date Received: 10/08/20 17:50

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.47		0.399	0.421	1.00	0.362	pCi/L	10/15/20 14:39	11/11/20 18:54	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	89.7		40 - 110					10/15/20 14:39	11/11/20 18:54	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.885	*	0.339	0.348	1.00	0.474	pCi/L	10/16/20 06:54	11/11/20 12:09	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	89.7		40 - 110					10/16/20 06:54	11/11/20 12:09	1
Y Carrier	77.0		40 - 110					10/16/20 06:54	11/11/20 12:09	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	2.36		0.524	0.546	5.00	0.474	pCi/L		11/17/20 09:55	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192603-1

Client Sample ID: MW-308

Lab Sample ID: 310-192603-2

Date Collected: 10/07/20 13:50

Matrix: Water

Date Received: 10/08/20 17:50

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.53		0.406	0.429	1.00	0.331	pCi/L	10/15/20 14:39	11/11/20 18:55	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.3		40 - 110					10/15/20 14:39	11/11/20 18:55	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	1.14	*	0.372	0.387	1.00	0.493	pCi/L	10/16/20 06:54	11/11/20 12:09	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.3		40 - 110					10/16/20 06:54	11/11/20 12:09	1
Y Carrier	74.4		40 - 110					10/16/20 06:54	11/11/20 12:09	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	2.67		0.551	0.578	5.00	0.493	pCi/L		11/17/20 09:55	1

Client Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192603-1

Client Sample ID: MW-309

Lab Sample ID: 310-192603-3

Date Collected: 10/07/20 12:30

Matrix: Water

Date Received: 10/08/20 17:50

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.863		0.327	0.336	1.00	0.368	pCi/L	10/15/20 14:39	11/11/20 18:55	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.2		40 - 110					10/15/20 14:39	11/11/20 18:55	1

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.906	*	0.312	0.323	1.00	0.412	pCi/L	10/16/20 06:54	11/11/20 12:09	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.2		40 - 110					10/16/20 06:54	11/11/20 12:09	1
Y Carrier	77.8		40 - 110					10/16/20 06:54	11/11/20 12:09	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	1.77		0.452	0.466	5.00	0.412	pCi/L		11/17/20 09:55	1

Definitions/Glossary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192603-1

Qualifiers

Rad

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
U	Result is less than the sample detection limit.

Glossary

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

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192603-1

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-485829/23-A
Matrix: Water
Analysis Batch: 488915

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 485829

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.004364	U	0.145	0.145	1.00	0.301	pCi/L	10/15/20 14:39	11/11/20 21:01	1
Carrier	MB %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	84.8		40 - 110		10/15/20 14:39	11/11/20 21:01	1			

Lab Sample ID: LCS 160-485829/1-A
Matrix: Water
Analysis Batch: 488915

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 485829

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	10.88		1.42	1.00	0.287	pCi/L	96	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Ba Carrier	77.7		40 - 110						

Lab Sample ID: LCSD 160-485829/2-A
Matrix: Water
Analysis Batch: 488915

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 485829

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	Limit
				Uncert. (2σ+/-)							
Radium-226	11.3	8.714		1.21	1.00	0.293	pCi/L	77	75 - 125	0.82	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	81.2		40 - 110								

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-485913/23-A
Matrix: Water
Analysis Batch: 488916

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 485913

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.4431		0.280	0.283	1.00	0.429	pCi/L	10/16/20 06:54	11/11/20 12:30	1
Carrier	MB %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	84.8		40 - 110		10/16/20 06:54	11/11/20 12:30	1			
Y Carrier	86.4		40 - 110		10/16/20 06:54	11/11/20 12:30	1			

Euromins TestAmerica, Cedar Falls

QC Sample Results

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192603-1

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

Lab Sample ID: LCS 160-485913/1-A
Matrix: Water
Analysis Batch: 488918

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 485913

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	7.66	9.698	*	1.20	1.00	0.528	pCi/L	127	75 - 125
LCS LCS									
Carrier	%Yield	Qualifier	Limits						
Ba Carrier	77.7		40 - 110						
Y Carrier	77.0		40 - 110						

Lab Sample ID: LCSD 160-485913/2-A
Matrix: Water
Analysis Batch: 488918

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 485913

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228	7.66	8.740		1.08	1.00	0.457	pCi/L	114	75 - 125	0.42	1
LCSD LCSD											
Carrier	%Yield	Qualifier	Limits								
Ba Carrier	81.2		40 - 110								
Y Carrier	81.5		40 - 110								

QC Association Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192603-1

Rad

Prep Batch: 485829

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192603-1	MW-307	Total/NA	Water	PrecSep-21	
310-192603-2	MW-308	Total/NA	Water	PrecSep-21	
310-192603-3	MW-309	Total/NA	Water	PrecSep-21	
MB 160-485829/23-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-485829/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-485829/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 485913

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-192603-1	MW-307	Total/NA	Water	PrecSep_0	
310-192603-2	MW-308	Total/NA	Water	PrecSep_0	
310-192603-3	MW-309	Total/NA	Water	PrecSep_0	
MB 160-485913/23-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-485913/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-485913/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192603-1

Client Sample ID: MW-307

Lab Sample ID: 310-192603-1

Date Collected: 10/07/20 16:20

Matrix: Water

Date Received: 10/08/20 17:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			485829	10/15/20 14:39	AVB	TAL SL
Total/NA	Analysis	903.0		1	488915	11/11/20 18:54	SCB	TAL SL
Total/NA	Prep	PrecSep_0			485913	10/16/20 06:54	AVB	TAL SL
Total/NA	Analysis	904.0		1	488918	11/11/20 12:09	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	489293	11/17/20 09:55	SCB	TAL SL

Client Sample ID: MW-308

Lab Sample ID: 310-192603-2

Date Collected: 10/07/20 13:50

Matrix: Water

Date Received: 10/08/20 17:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			485829	10/15/20 14:39	AVB	TAL SL
Total/NA	Analysis	903.0		1	488915	11/11/20 18:55	SCB	TAL SL
Total/NA	Prep	PrecSep_0			485913	10/16/20 06:54	AVB	TAL SL
Total/NA	Analysis	904.0		1	488918	11/11/20 12:09	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	489293	11/17/20 09:55	SCB	TAL SL

Client Sample ID: MW-309

Lab Sample ID: 310-192603-3

Date Collected: 10/07/20 12:30

Matrix: Water

Date Received: 10/08/20 17:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			485829	10/15/20 14:39	AVB	TAL SL
Total/NA	Analysis	903.0		1	488915	11/11/20 18:55	SCB	TAL SL
Total/NA	Prep	PrecSep_0			485913	10/16/20 06:54	AVB	TAL SL
Total/NA	Analysis	904.0		1	488918	11/11/20 12:09	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	489293	11/17/20 09:55	SCB	TAL SL

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192603-1

Laboratory: Eurofins TestAmerica, 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	05-06-22
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-20
California	Los Angeles County Sanitation Districts	10259	06-30-21
California	State	2886	06-30-21
Connecticut	State	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-21
HI - RadChem Recognition	State	n/a	06-30-21
Illinois	NELAP	004553	11-30-20
Iowa	State	373	12-01-20
Kentucky (DW)	State	KY90125	12-31-20
Louisiana	NELAP	04080	06-30-21
Louisiana (DW)	State	LA011	12-31-20
Maryland	State	310	09-30-21
MI - RadChem Recognition	State	9005	06-30-21
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-21
New Jersey	NELAP	MO002	06-30-21
New York	NELAP	11616	04-01-21
North Dakota	State	R-207	06-30-21
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-21
Oregon	NELAP	4157	09-01-21
Pennsylvania	NELAP	68-00540	02-28-21
South Carolina	State	85002001	06-30-21
Texas	NELAP	T104704193-19-13	07-31-21
US Fish & Wildlife	US Federal Programs	058448	07-31-21
USDA	US Federal Programs	P330-17-00028	03-11-23
Utah	NELAP	MO000542019-11	07-31-21
Virginia	NELAP	10310	06-14-21
Washington	State	C592	08-30-21
West Virginia DEP	State	381	10-31-21

Method Summary

Client: SCS Engineers
Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192603-1

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

Protocol References:

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

Laboratory References:

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



Environment Testing
TestAmerica



310-192603 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SLS Engineers</u>			
City/State:	CITY <u>Clive</u>	STATE <u>OH</u>	Project: <u>Ottawa Generating Station</u>
Receipt Information			
Date/Time Received:	DATE <u>10.02</u>	TIME <u>1750</u>	Received By: <u>BKM</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>N</u>	Correction Factor (°C): <u>+0.0</u>		
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>0.6</u>	Corrected Temp (°C): <u>0.6</u>		
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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

Eurofins TestAmerica, Cedar Falls

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

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Address:

TAL-8210

Regulatory Program: DW NPDES RCRA Other:

Client Contact
Company Name: SCS Engineers
Address: 8450 Hickman Road Suite 27
City/State/Zip: Clive Iowa 50325
Phone: 261-943-0855
Fax:
Project Name: Ottumwa Generating Station
Site:
P O # 25220072.00

Project Manager: Meg Blodgett
Tel/Email: 608-345-9221
Analysis Turnaround Time
 CALENDAR DAYS WORKING DAYS
TAT if different from Below
 2 weeks
 1 week
 2 days
 1 day

Site Contact: Tanten Busck
Lab Contact: Sandra Friedrich
Carrier:
COC No: 1 of 3 COCs
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Sample Specific Notes:	
MW-307	10-7-20	16:20	G	water		N	X		
MW-308	10-7-20	13:50	G	water		N	X		
MW-309	10-7-20	12:30	G	water		N	X		
									See attached Sampling Points + Parameters table for requested analysis

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other
Possible Hazard Identification: Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
 Non-Hazard Flammable Skin Irritant Unknown Poison B
Special Instructions/QC Requirements & Comments:

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return to Client Disposal by Lab Archive for _____ Months

Cooler Temp. (°C): Obs'd: _____ Corrd: _____ Therm ID No.: _____
Received by: *BM* Company: *BIT* Date/Time: 10/8/20 17:50
Received by: _____ Company: _____ Date/Time: _____
Received in Laboratory by: _____ Company: _____ Date/Time: _____

Custody Seal No.: _____
Relinquished by: *Matthew Cahalon* Company: *SCS* Date/Time: 10/16/20 12:00
Relinquished by: _____ Company: _____ Date/Time: _____
Relinquished by: _____ Company: _____ Date/Time: _____



Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25216072

Parameter	COC Set #1 (Background)		COC Set #2 (Ash Pond)										COC Set #3 (ZLDP)			
	MW- 301	Field 302	MW- 303	MW- 304	MW- 305	MW- 306	MW- 307	MW- 308	MW- 309	MW- 310	MW- 311	MW- 312	MW- 313	MW- 314	MW- 315	TOTAL
Appendix III Parameters	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Boron	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Calcium	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	X	X	X	X	15
Fluoride	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
pH	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sulfate	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
TDS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Appendix IV Parameters	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	12
Antimony	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Arsenic	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Barium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Beryllium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0
Cadmium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	12
Chromium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Fluoride	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lead	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lithium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Mercury	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0
Molybdenum	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Selenium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Thallium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	12
Radium	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Additional Lab Parameters - REPORT SEPARATELY	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Bicarbonate (total)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Carbonate (total)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Iron (total)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Magnesium (total)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Manganese (total)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Potassium (total)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sodium (total)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Cobalt (filtered)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	3
Iron (filtered)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Lithium (filtered)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	3
Manganese (filtered)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	14
Field Parameters	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Total Iron (CHEMets)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Ferrous Iron (CHEMets)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Sulfide (CHEMets)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Groundwater Elevation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Well Depth	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
pH (field)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Specific Conductance	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Dissolved Oxygen	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
ORP	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Temperature	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Turbidity	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Color	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15
Odor	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	15

Notes: All samples are unfiltered (total).

I:\25216072_00\Data and Calculations\Field Work Requests\OGS_CCR_Rule_Sampling_2010.xls\$Sheet1



Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-192603-1

Login Number: 192603

List Source: Eurofins TestAmerica, Cedar Falls

List Number: 1

Creator: Marzen, Brita K

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: 310-192603-1

Login Number: 192603

List Number: 2

Creator: Boyd, Jacob C

List Source: Eurofins TestAmerica, St. Louis

List Creation: 10/10/20 11:30 AM

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

Tracer/Carrier Summary

Client: SCS Engineers
 Project/Site: Ottumwa Generating Station - 25220072.00

Job ID: 310-192603-1

Method: 903.0 - Radium-226 (GFPC)

Matrix: Water

Prep Type: Total/NA


		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba	
		(40-110)	
310-192603-1	MW-307	89.7	
310-192603-2	MW-308	83.3	
310-192603-3	MW-309	91.2	
LCS 160-485829/1-A	Lab Control Sample	77.7	
LCSD 160-485829/2-A	Lab Control Sample Dup	81.2	
MB 160-485829/23-A	Method Blank	84.8	
Tracer/Carrier Legend			
Ba = Ba Carrier			

Method: 904.0 - Radium-228 (GFPC)

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba	Y
		(40-110)	(40-110)
310-192603-1	MW-307	89.7	77.0
310-192603-2	MW-308	83.3	74.4
310-192603-3	MW-309	91.2	77.8
LCS 160-485913/1-A	Lab Control Sample	77.7	77.0
LCSD 160-485913/2-A	Lab Control Sample Dup	81.2	81.5
MB 160-485913/23-A	Method Blank	84.8	86.4
Tracer/Carrier Legend			
Ba = Ba Carrier			
Y = Y Carrier			



Appendix D
Historical Monitoring Results

Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-301		Number of Sampling Dates: 20																	
Parameter Name	Units	GPS	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
Boron	ug/L	--	574	612	597	620	599	565	657	779	488	480	735	--	410	--	380	680	540
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
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
Fluoride	mg/L	4	0.22	0.2 J	0.44	0.27	0.17 J	0.24	0.26	0.34	0.27	0.22	--	0.27	0.3	--	0.44 J	<0.23 U	--
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
Sulfate	mg/L	--	150	157	159	169	171	190	166	162	178	186	--	181	164	--	81	130	130
Total Dissolved Solids	mg/L	--	500	531	576	545	545	499	490	557	448	514	--	532	392	--	340	510	570
Antimony	ug/L	6	<0.058 U	0.13 J	0.12 J	<0.058 U	0.11 J	<0.026 U	0.054 J	0.063 J	--	<0.026 U	0.2 J	--	<0.078 U	--	<0.53 U	<0.53 U	--
Arsenic	ug/L	10	0.38 J	0.38 J	0.26 J	0.14 J	0.23 J	0.22 J	0.15 J	0.14 J	--	0.074 J	0.29 J	--	0.16 J	--	<0.75 U	<0.75 U	<0.88 U
Barium	ug/L	2000	51.6	55.8	52.3	53.3	42.4	35.5	39.9	44	--	31.6	44.5	--	28.1	--	25	56	43
Beryllium	ug/L	4	<0.08 U	<0.08 U	<0.08 U	<0.08 U	<0.08 U	<0.012 U	<0.012 U	<0.012 U	--	<0.012 U	0.14 J	--	<0.089 U	--	<0.27 U	<0.27 U	--
Cadmium	ug/L	5	<0.029 U	<0.029 U	0.12 J	0.038 J	<0.029 U	0.035 J	0.044 J	0.037 J	--	0.023 J	0.16 J	--	<0.033 U	--	<0.077 U	0.04 J	<0.039 U
Chromium	ug/L	100	0.59 J	0.74 J	0.64 J	<0.34 U	0.59 J	0.49 J	0.25 J	0.39 J	--	<0.054 U	0.25 J	--	0.11 J	--	<0.98 U	<0.98 U	<1.1 U
Cobalt	ug/L	6	4.1	3.1	1.8	1.8	1.3	0.97 J	1 J	0.96 J	--	0.46 J	1.4	--	0.36 J	--	0.44 J	0.6	1.1
Lead	ug/L	15	<0.19 U	<0.19 U	<0.19 U	<0.19 U	<0.19 U	0.06 J	0.1 J	0.049 J	--	0.041 J	0.18 J	--	<0.13 U	--	<0.27 U	<0.27 U	<0.27 U
Lithium	ug/L	40	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
Mercury	ug/L	2	<0.039 U	<0.039 U	<0.039 U	<0.039 U	<0.039 U	<0.046 U	<0.046 U	<0.046 U	--	<0.09 U	<0.083 U	--	--	<0.09 U	<0.1 U	<0.1 U	--
Molybdenum	ug/L	100	1.2	1.2	0.89 J	1	0.76 J	0.54 J	0.79 J	1.3	--	0.67 J	1.3	--	0.72 J	--	<1.1 U	1.1 J	--
Selenium	ug/L	50	4.7	5.4	6.1	6.5	5.9	4.2	5.5	7.2	--	4.3	6.3	--	3.4	--	3.1 J	6.2	--
Thallium	ug/L	2	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.14 J	<0.036 U	0.067 J	--	<0.036 U	0.16 J	--	<0.099 U	--	<0.27 U	<0.27 U	--
Total Radium	pCi/L	5	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
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
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
Collected By		--	--	--	0	--	0	0	0	0	--	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	--	572	777	807	853	834	742	758	1107	743	770	867	781	599	310	501	902	966
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
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
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
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
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
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
Manganese	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

06/10/2021 - Classification: Internal - ECRM12608563

Location ID: MW-301
 Number of Sampling Dates: 20

Parameter Name	Units	GPS	3/12/2020	4/14/2020	10/8/2020
Boron	ug/L	--	--	700	650
Calcium	mg/L	--	--	84	94
Chloride	mg/L	--	--	140	170
Fluoride	mg/L	4	--	<0.23 U	<0.23 U
Field pH	Std. Units	--	6.48	6.58	6.22
Sulfate	mg/L	--	--	140	140
Total Dissolved Solids	mg/L	--	--	550	660
Antimony	ug/L	6	--	<0.58 U	<0.51 U
Arsenic	ug/L	10	--	<0.88 U	<0.88 U
Barium	ug/L	2000	--	54	58
Beryllium	ug/L	4	--	<0.27 U	--
Cadmium	ug/L	5	--	<0.039 U	0.075 J
Chromium	ug/L	100	--	<1.1 U	<1.1 U
Cobalt	ug/L	6	0.43 J	0.52	0.41 J
Lead	ug/L	15	--	<0.27 U	<0.11 U
Lithium	ug/L	40	21	24	23
Mercury	ug/L	2	--	<0.1 U	--
Molybdenum	ug/L	100	--	1.2 J	<1.1 U
Selenium	ug/L	50	--	6.8	7.7
Thallium	ug/L	2	--	<0.26 U	<0.26 U
Total Radium	pCi/L	5	--	0.315	0.407
Radium-226	pCi/L	--	--	0.0921	0.324
Radium-228	pCi/L	--	--	0.223	0.0831
Collected By		--	--	--	--
Field Specific Conductance	umhos/cm	--	962	939	1035
Field Temperature	deg C	--	6.9	8.7	15.4
Groundwater Elevation	feet	--	682.82	683.25	682.34
Oxygen, Dissolved	mg/L	--	5.31	5.14	4.2
Turbidity	NTU	--	1.33	0.87	0.02
pH at 25 Degrees C	Std. Units	--	--	6.6	6.4
Field Oxidation Potential	millivolts	--	258.5	176.3	163.6
Manganese	ug/L	--	16	--	--

06/10/2021 - Classification: Internal - ECRM12608563

Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-307																	
Number of Sampling Dates: 16																	
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
Boron	ug/L	207	205	197	197	214	200	--	210	--	195	240	200	190	200	240	260
Calcium	mg/L	230	241	229	221	227	220	--	239	--	222	240	230	230	210	240	240
Chloride	mg/L	210	201	213	219	217	224	--	--	223	293	220	220	200	220	230	230
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
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
Sulfate	mg/L	105	105	110	102	102	103	--	--	105	104	100	95	92	100	99	100
Total Dissolved Solids	mg/L	1050	1100	1070	1050	1030	--	1100	--	1070	1070	1000	1000	1000	970	980	1000
Antimony	ug/L	0.1	<0.026	<0.026	<0.026	<0.026	<0.026	--	<0.15	--	<0.078	--	--	<0.53	--	<0.58	--
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
Barium	ug/L	127	139	132	128	131	126	--	147	--	145	--	--	140	130	140	140
Beryllium	ug/L	<0.08	0.029	0.016	<0.012	<0.012	<0.012	--	<0.12	--	<0.089	--	--	<0.27	--	<0.27	--
Cadmium	ug/L	<0.029	0.025	<0.018	<0.018	0.018	<0.018	--	<0.07	--	<0.033	--	--	<0.039	<0.039	<0.039	--
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
Cobalt	ug/L	0.62	1.6	1.1	1.1	1.3	1.3	--	2.9	--	4.8	--	--	11	13	20	18
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
Lithium	ug/L	10	9.4	11.2	15.2	12.9	9.3	--	13.2	--	11.6	--	--	12	9.1	13	11
Mercury	ug/L	<0.039	<0.046	<0.046	<0.046	<0.046	<0.09	--	<0.037	--	<0.09	--	--	<0.1	--	<0.1	--
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
Selenium	ug/L	<0.18	0.12	0.11	0.11	0.13	<0.086	--	0.25	--	0.13	--	--	<1	--	<1	<1
Thallium	ug/L	<0.5	<0.036	<0.036	<0.036	0.065	<0.036	--	<0.14	--	<0.099	--	--	<0.27	--	<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
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
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
Collected By		0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	1640	1648	1557	2193	1656	1674	1710	1686	1718	1697	1599	1684	1576	1681	1554	1637
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
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 ft	649.59	649.88	650.66	646.18
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
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
Collected Time		--	--	--	--	--	--	--	13	--	--	--	--	--	--	--	--
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
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
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	520	480
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1.9	<3.8
Total Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	520	480
Iron, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3800	3500
Magnesium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28000	27000
Manganese, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	350
Potassium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1900	1900
Sodium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	97000	100000
Cobalt, Dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19	19
Iron, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3100	3600
Manganese, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	290

Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-308		Number of Sampling Dates: 16																
Parameter Name	Units	GPS	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
Boron	ug/L	--	218	146	182	214	240	210	--	153	--	162	190 J	220	160 J	220	210	270
Calcium	mg/L	--	212	222	209	218	212	229	--	215	--	209	240	240	220	210	240	220
Chloride	mg/L	--	151	149	146	151	156	153	--	--	158	158	160	160	150	160	170	160
Fluoride	mg/L	4	0.11 J	0.12 J	0.12 J	0.23	0.12 J	0.1 J	--	--	0.12 J	<0.19 U	<0.23 U	<0.23 U	<0.23 U	--	<0.23 U	<0.23 U
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
Sulfate	mg/L	--	296	283	303	294	297	305	--	--	310	311	300	300	280	300	290	290
Total Dissolved Solids	mg/L	--	1060	1100	1050	1020	1120	--	1090	--	1080	1110	1200	1100	1100	1100	1000	1000
Antimony	ug/L	6	0.11 J	<0.026 U	0.039 J	<0.026 U	<0.026 U	<0.026 U	--	<0.15 U	--	<0.078 U	--	--	<0.53 U	--	<0.58 U	--
Arsenic	ug/L	10	0.44 J	0.34 J	0.14 J	0.32 J	0.32 J	0.29 J	--	0.39 J	--	0.44 J	--	--	<0.75 U	<0.88 U	<0.88 U	<0.88 U
Barium	ug/L	2000	118	118	125	132	133	123	--	134	--	143	--	--	130	130	140	130
Beryllium	ug/L	4	<0.08 U	<0.012 U	<0.012 U	<0.012 U	<0.012 U	<0.012 U	--	<0.12 U	--	<0.089 U	--	--	<0.27 U	--	<0.27 U	--
Cadmium	ug/L	5	<0.029 U	<0.018 U	<0.018 U	<0.018 U	<0.018 U	<0.018 U	--	<0.07 U	--	<0.033 U	--	--	<0.039 U	<0.039 U	<0.039 U	--
Chromium	ug/L	100	0.57 J	0.44 J	0.34 J	0.49 J	0.45 J	0.17 J	--	0.42 J	--	0.27 J	--	--	5.9	<1.1 U	<1.1 U	<1.1 U
Cobalt	ug/L	6	0.52 J	0.43 J	0.25 J	0.26 J	0.23 J	0.18 J	--	0.19 J	--	0.15 J	--	--	0.26 J	0.14 J	0.14 J	0.14 J
Lead	ug/L	15	<0.19 U	0.066 J	<0.033 U	<0.033 U	<0.033 U	0.043 J	--	<0.12 U	--	<0.13 U	--	--	0.52	<0.27 U	<0.27 U	<0.11 U
Lithium	ug/L	40	10.3	13.3	12.7	19.1	12.6	12.3	--	17.6	--	13.7	--	--	16	12	17	14
Mercury	ug/L	2	<0.039 U	<0.046 U	<0.046 U	<0.046 U	<0.046 U	<0.09 U	--	<0.037 U	--	<0.09 U	--	--	<0.1 U	--	<0.1 U	--
Molybdenum	ug/L	100	0.95 J	0.53 J	0.5 J	0.61 J	0.75 J	0.6 J	--	0.46 J	--	<0.57 U	--	--	<1.1 U	--	<1.1 U	<1.1 U
Selenium	ug/L	50	<0.18 U	<0.086 U	<0.086 U	<0.086 U	<0.086 U	<0.086 U	--	<0.16 U	--	<0.085 U	--	--	<1 U	--	<1 U	<1 U
Thallium	ug/L	2	<0.5 U	<0.036 U	<0.036 U	<0.036 U	<0.036 U	<0.036 U	--	<0.14 U	--	<0.099 U	--	--	<0.27 U	--	<0.26 U	--
Total Radium	pCi/L	5	1.45	0.496	3.3	2.17	1.47	1.63	--	1.88	--	2.85	--	--	2.73	2.13	1.69	2.67
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
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
Collected By		--	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	--	1559	1509	1467	2042	1577	1577	1611	1584	1628	1594	1539	1637	1532	1630	1502	1575
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
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
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
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
Collected Time		--	--	--	--	--	--	--	--	--	14	--	--	--	--	--	--	--
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
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


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Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-309		Number of Sampling Dates: 16																
Parameter Name	Units	GPS	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
Boron	ug/L	--	1300	1280	1250	1320	1360	1340	--	1360	--	1280	1500	1300	1100	1300	1400	1200
Calcium	mg/L	--	134	152	136	135	135	150	--	181	--	139	160	150	150	130	150	120
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
Fluoride	mg/L	4	0.12 J	0.13 J	0.16 J	0.19 J	0.14 J	0.094 J	--	--	0.13 J	<0.19 U	0.27 J	<0.23 U	<0.23 U	--	0.36 J	<0.23 U
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
Sulfate	mg/L	--	406	393	415	395	402	373	--	--	417	453	410	400	370	370	390	380
Total Dissolved Solids	mg/L	--	1030	1030	1020	1010	1010	--	1050	--	1030	1040	1100	1100	980	990	1000	930
Antimony	ug/L	6	0.095 J	<0.026 U	0.041 J	0.029 J	<0.026 U	0.079 J	--	<0.15 U	--	<0.078 U	--	--	<0.53 U	--	<0.58 U	--
Arsenic	ug/L	10	0.66 J	1.1	0.52 J	0.44 J	0.45 J	0.62 J	--	2	--	0.74 J	--	--	1.1 J	<0.88 U	0.88 J	<0.88 U
Barium	ug/L	2000	48.7	62.4	48.7	46.1	46	53.7	--	82.1	--	54.5	--	--	54	46	50	42
Beryllium	ug/L	4	<0.08 U	0.073 J	0.025 J	<0.012 U	0.016 J	0.056 J	--	0.28 J	--	<0.089 U	--	--	<0.27 U	--	<0.27 U	--
Cadmium	ug/L	5	<0.029 U	0.042 J	0.033 J	0.018 J	<0.018 U	0.052 J	--	0.15 J	--	<0.033 U	--	--	0.09 J	<0.039 U	<0.039 U	--
Chromium	ug/L	100	1.4	3.2	1.8	1.2	1.2	2.7	--	5.4	--	1.6	--	--	1.7 J	<1.1 U	1.3 J	<1.1 U
Cobalt	ug/L	6	2	3.1	2.4	2.1	2	2.4	--	4.7	--	2.7	--	--	3.7	2.3	3.2	2
Lead	ug/L	15	<0.19 U	1	0.5 J	0.096 J	0.057 J	0.95 J	--	3.1	--	0.46 J	--	--	2.8	0.63	1.6	<0.11 U
Lithium	ug/L	40	5.8 J	9.3 J	7.3 J	9.4 J	6.9 J	8 J	--	16.2	--	8.8 J	--	--	8.2 J	6.3 J	9.6 J	6.9 J
Mercury	ug/L	2	<0.039 U	<0.046 U	<0.046 U	<0.046 U	<0.046 U	<0.09 U	--	<0.037 U	--	<0.09 U	--	--	<0.1 U	--	<0.1 U	--
Molybdenum	ug/L	100	0.57 J	0.32 J	0.28 J	0.28 J	0.37 J	0.29 J	--	0.33 J	--	<0.57 U	--	--	<1.1 U	--	<1.1 U	<1.1 U
Selenium	ug/L	50	<0.18 U	0.22 J	<0.086 U	<0.086 U	<0.086 U	<0.086 U	--	1	--	0.24 J	--	--	<1 U	--	<1 U	<1 U
Thallium	ug/L	2	<0.5 U	<0.036 U	<0.036 U	<0.036 U	<0.036 U	<0.036 U	--	<0.14 U	--	<0.099 U	--	--	<0.27 U	--	<0.26 U	--
Total Radium	pCi/L	5	0.606	2.23	1.63	1.65	1.11	1.59	--	2.36	--	2.2	--	--	1.77	1.02	0.957	1.77
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
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
Collected By		--	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	--	1426	1430	1363	1821	1431	1445	1484	1477	1501	1464	1396	1461	1350	1433	1322	1371
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
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
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
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
Collected Time		--	--	--	--	--	--	--	--	--	16	--	--	--	--	--	--	--
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
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

06/10/2021 - Classification: Internal - ECRM12608563



Appendix E
Alternative Source Demonstration Report

Alternative Source Demonstration April 2020 Assessment Monitoring

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

25220072.00 October 12, 2020

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

Table of Contents

Section	Page
PE Certification	iii
1.0 Introduction	1
1.1 §257.95(g)(3) Alternative Source Demonstration Requirements.....	1
1.2 Site Information and Map.....	1
1.3 Statistically Significant Levels Above GPS Identified.....	2
1.4 Overview of Alternative Source Demonstration Approach.....	2
2.0 Background	3
2.1 Geologic and Hydrogeologic Setting.....	3
2.1.1 Regional Information.....	3
2.1.2 Site Information.....	4
2.2 CCR Rule Monitoring System.....	4
2.3 Other Monitoring Wells.....	4
2.4 Groundwater Flow Direction.....	4
3.0 Methodology and Analysis Review	5
3.1 Sampling and Field Analysis Review.....	5
3.2 Laboratory Analysis Review.....	5
3.3 Statistical Evaluation Review.....	5
3.4 Summary of the Methodology and Analysis Review Findings.....	6
4.0 Alternative Sources	6
4.1 Potential Causes of Statistically Significant Increase.....	6
4.1.1 Natural Variation.....	6
4.1.2 Man-Made Alternative Sources.....	6
4.2 Lines of Evidence.....	6
4.2.1 Groundwater Flow Direction.....	7
4.2.2 Cobalt Distribution in Groundwater.....	7
4.2.3 Historical Impoundment Use.....	7
5.0 Alternative Source Demonstration Conclusions	8
6.0 Site Groundwater Monitoring Recommendations	8
7.0 References	8

Tables

Table 1.	Groundwater Analytical Results Summary – Assessment Monitoring
Table 2.	Historical Analytical Results of Constituents with SSIs
Table 3.	Groundwater Elevations - CCR Rule Monitoring Well Networks

Figures


- Figure 1. Site Location Map
- Figure 2. Site Plan and Monitoring Well Locations
- Figure 3. Shallow Potentiometric Surface – April 13-14, 2020

Appendices

- Appendix A CCR Well Trend Plots
- Appendix B Regional Geologic and Hydrogeologic Background Information
- Appendix C Boring Logs
- Appendix D Ash Pond CCR Unit Cobalt Data

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PE CERTIFICATION

	<p>I, Eric J. Nelson, hereby certify that that the information in this alternative source demonstration is accurate and meets the requirements of 40 CFR 257.95(g)(3)(ii). This certification is based on my review of the groundwater data and related site information available for the Ottumwa Generating Station. I am a duly licensed Professional Engineer under the laws of the State of Iowa.</p>
	<p style="text-align: center;"><i>Eric J. Nelson</i></p> <p style="text-align: right;">October 12, 2020</p>
	<p>(signature) (date)</p>
	<p>Eric J. Nelson (printed or typed name)</p> <p>License number 23136</p> <p>My license renewal date is December 31, 2020.</p>
	<p>Pages or sheets covered by this seal: Alternative Source Demonstration, April 2020 Assessment Monitoring, Zero Liquid Discharge Pond, Ottumwa Generating Station, Ottumwa, Iowa</p>

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1.0 INTRODUCTION

This Alternative Source Demonstration (ASD) 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 (USEPA) in the Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, dated April 17, 2015 (USEPA, 2015), and subsequent amendments. Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.95(g)(3)(ii). The applicable sections of the Rule are provided below in *italics*.

This report was prepared to also fulfill the requirements of 40 CFR 257.100 for inactive CCR surface impoundments.

1.1 §257.95(G)(3) ALTERNATIVE SOURCE DEMONSTRATION REQUIREMENTS

(3) Within 90 days of finding that any of the constituents listed in appendix IV to this part have been detected at a statistically significant level exceeding the groundwater protection standards the owner or operator must either:

(i) Initiate an assessment of corrective measures as required by § 257.96; or

(ii) Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Any such demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified to be accurate by a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority. If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to this section, and may return to detection monitoring if the constituents in Appendix III and Appendix IV of this part are at or below background as specified in paragraph (e) of this section. 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 or the approval from the Participating State Director or the approval from EPA where EPA is the permitting authority.

An ASD is completed when there are exceedances of one or more benchmarks established within the groundwater monitoring program. The ASD is completed to determine if any other sources are likely causes of the identified exceedance(s) of established benchmark(s) at the site. This ASD was performed in response to results showing cobalt at concentrations exceeding the groundwater protection standard (GPS) during assessment monitoring under the CCR Rule. Cobalt was detected above the GPS in samples collected from monitoring well MW-307 in December 2019, February 2020, and April 2020.

1.2 SITE INFORMATION AND MAP

Ottumwa Generating Station (OGS) is located at 20775 Power Plant Road in Ottumwa, Wapello County, Iowa (**Figure 1**). OGS is an active, coal-powered generating station. In addition to the ZLDP, which is an inactive CCR surface impoundment, there is one active existing CCR surface

impoundment at OGS (OGS Ash Pond). There are no existing or closed CCR landfills or closed CCR surface impoundments at the site.

The CCR surface impoundments at OGS are monitored using single-unit groundwater monitoring systems. The single-unit system for the ZLDP is designed to detect monitored constituents at the waste boundary of the facility as required by 40 CFR 257.91(d). The groundwater monitoring system consists of one upgradient and three downgradient monitoring wells. A separate single-unit groundwater monitoring system is used to monitor the OGS Ash Pond CCR Unit, consisting of one upgradient well (shared with the ZLDP monitoring system) and five downgradient wells at the Ash Pond compliance boundary. Five additional downgradient monitoring wells have been installed as part of an Assessment of Corrective Measures (ACM) and Selection of Remedy (SOR) process for the Ash Pond CCR Unit.

A map showing the CCR Units and all background (or upgradient) and downgradient monitoring wells with identification numbers for the CCR groundwater monitoring program is provided as **Figure 2**.

1.3 STATISTICALLY SIGNIFICANT LEVELS ABOVE GPS IDENTIFIED

The Appendix IV parameters were compared to the Groundwater Protection Standard (GPS) values established under 40 CFR 257.95(h) in **Table 1**. The only assessment monitoring parameter for which a monitoring result exceeded the GPS was cobalt in the sample from MW-307. Cobalt exceeded the GPS in the samples from MW-307 for all three sampling events. The cobalt levels also exceeded the upper prediction limit (UPL) established based on background monitoring at the upgradient well.

USEPA's Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (EPA 530-R-09-007, March 2009) recommends the use of confidence intervals for comparison of assessment monitoring data to fixed GPS values. Specifically, the suggested approach for comparing assessment groundwater monitoring data to GPS values based on long-term chronic health risk, such as drinking water Maximum Contaminant Levels (MCLs), is to compare the lower confidence limit around the arithmetic mean with the fixed GPS. Although a confidence interval approach is recommended, a minimum of four samples are required for this approach, and only three assessment monitoring compliance samples have been collected to date; therefore, this initial evaluation is based on a direct comparison of the results to the GPS values. A confidence interval approach will be used in future evaluations once a fourth sample is obtained.

1.4 OVERVIEW OF ALTERNATIVE SOURCE DEMONSTRATION APPROACH

This ASD report includes:

- Background information (**Section 2.0**)
- Evaluation of potential that GPS exceedances are due to methodology or analysis (**Section 3.0**)
- Evaluation of potential that GPS exceedances are due to natural sources or man-made sources other than the ZLDP CCR Unit (**Section 4.0**)
- ASD conclusions (**Section 5.0**)
- Monitoring recommendations (**Section 6.0**)

Historical monitoring results from background and compliance sampling for cobalt in the ZLDP monitoring wells are provided in **Table 2**, and the concentration trends are shown in **Appendix A**. Laboratory reports for the eight background monitoring events were included in the 2018 Annual Groundwater Monitoring and Corrective Action Report submitted in August 2019 (SCS, 2019). The laboratory report for the December 2019 assessment monitoring event was included in the 2019 Annual Groundwater Monitoring and Corrective Action Report submitted in August 2020. The laboratory report for the February and April 2020 assessment monitoring events will be included in the 2020 Annual Groundwater Monitoring and Corrective Action Report which will be submitted in August 2021.

2.0 BACKGROUND

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

- Geologic and hydrogeologic setting
- CCR Rule monitoring system
- Other monitoring wells

2.1 GEOLOGIC AND HYDROGEOLOGIC SETTING

2.1.1 Regional 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 B**.

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

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

Underlying the Pennsylvanian shales are Mississippian limestone and dolomite, with some shale and sandstone. A map showing the elevation of the top of the Mississippian limestone in Southeastern Iowa is included in **Appendix B**. The Mississippian unit is the shallowest regional bedrock aquifer. The available boring logs from the site indicate that the Mississippian limestone is the uppermost bedrock unit at the site.

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 B**.

2.1.2 Site Information

Site boring logs indicate that the unconsolidated material at the site is fairly thin (approximately 20 to 30 feet or less) and consists of a clay layer overlying clay and sand. Monitoring wells MW-301 through MW-309 were installed to intersect the bedrock aquifer or unconsolidated material in contact with the bedrock aquifer at the site. 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 14.5 and 52 feet and weathered bedrock was encountered at depths between 7 and 44 feet below ground surface. Boring logs for the monitoring wells used to evaluate the ZLDP (MW-301, MW-307, MW-308, and MW-309) are included in **Appendix C**.

2.2 CCR RULE MONITORING SYSTEM

The groundwater monitoring system established in accordance with the CCR Rule consists of one upgradient (background) monitoring well and three downgradient monitoring for the OGS ZLDP. The background well is MW-301, and the three downgradient wells include MW-307, MW-308, and MW-309. 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 28 to 30 feet, measured from the top of the well casing.

The background well (MW-301) is located to the west of the site. The downgradient wells (MW-307, MW-308, and MW-309) are located along the eastern edge of the ZLDP. The downgradient wells were installed as close as practicable to the pond boundaries considering the site layout (**Figure 2**).

2.3 OTHER MONITORING WELLS

Additional groundwater monitoring wells currently exist at OGS as part of the single-unit monitoring system developed for the OGS Ash Pond CCR Unit.

The additional monitoring wells include five compliance wells at the Ash Pond boundary (MW-302 through MW-306), two downgradient well nests (MW-310/MW-310A and MW-311/MW-311A), and a piezometer added in a nest with one of the existing compliance wells (MW-305A). The wells added to the Ash Pond monitoring system beyond the original background and compliance wells have been installed as part of an Assessment of Corrective Measures (ACM) and Selection of Remedy (SOR) process for the Ash Pond CCR Unit.

For monitoring wells installed to date, the total boring depths were between 14.5 and 82 feet. Weathered bedrock was encountered at depths between 7 and 44 feet below ground surface. The existing Ash Pond and the inactive ZLDP share the same upgradient (background) monitoring well, MW-301.

2.4 GROUNDWATER FLOW DIRECTION

Groundwater flow in the area of the ZLDP is generally to the east, following the same flow patterns observed in regional flow maps of the area. The potentiometric surface for the April 2020 water level measurements is shown on **Figure 3**. The potentiometric surface map shows groundwater flow

moving to the east. The groundwater elevation data for the CCR monitoring wells are provided in **Table 3**.

3.0 METHODOLOGY AND ANALYSIS REVIEW

To evaluate the potential that the GPS exceedance is due to a source other than the regulated CCR Unit, SCS Engineers (SCS) used a two-step evaluation process. First, the sample collection, field and laboratory analysis, and statistical evaluation were reviewed to identify any potential error or analysis that led to an exceedance of the benchmark. Second, potential alternative sources, including natural variation and man-made sources other than the CCR Unit, were evaluated. This section of the report provides the findings of the methodology and analysis review. **Section 4.0** of the report addresses the potential alternative sources.

3.1 SAMPLING AND FIELD ANALYSIS REVIEW

Field notes and sampling results were reviewed to determine if any sampling error may have caused or contributed to the observed GPS exceedances. Potential field sampling errors or issues could include mislabeling of samples, improper sample handling, missed holding times, cross contamination during sampling, or other field error. Field blank sample results were also reviewed for any indication of potential contamination from sampling equipment or containers. Based on the review of the field notes and results, SCS did not identify any indication that the concentrations exceeding the GPS were due to a sampling error.

Because cobalt is a laboratory parameter, there is little potential for a field analysis error to contribute to a GPS exceedance for this parameter.

3.2 LABORATORY ANALYSIS REVIEW

The laboratory reports for the December 2019, February 2020, and April 2020 assessment monitoring event were reviewed to determine if any laboratory analysis error or issue may have caused or contributed to the observed cobalt concentrations above the GPS. The laboratory report review included reviewing the laboratory quality control flags and narrative, verifying that correct methods were used and desired detection limits were achieved, and checking the field and laboratory blank sample results.

Based on the review of the laboratory reports, SCS did not identify any indication that the GPS exceedances were due to a laboratory analysis error. There were no laboratory quality control flags or issues identified in the laboratory reports that affect the usability of the data for assessment monitoring.

A time series plot of the cobalt analytical data was also reviewed for any anomalous results that might indicate a possible sampling or laboratory error (e.g., dilution error or incorrect sample labeling). The time series plot is provided in **Appendix A**. Cobalt at MW-307 has followed an increasing trend since the start of assessment monitoring in the December 2019 sampling event, but no single result is clearly anomalous based on the data collected to date.

3.3 STATISTICAL EVALUATION REVIEW

As noted above, USEPA's Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities (EPA 530-R-09-007, March 2009) recommends the use of confidence intervals for comparison of assessment monitoring data to fixed GPS values. Specifically, the suggested approach

for comparing assessment groundwater monitoring data to GPS values based on long-term chronic health risk, such as drinking water Maximum Contaminant Levels (MCLs), is to compare the lower confidence limit around the arithmetic mean with the fixed GPS. Although a confidence interval approach is recommended, a minimum of four samples are required for this approach, and only three assessment monitoring compliance samples have been collected to date; therefore, this initial evaluation is based on a direct comparison of the results to the GPS values. A confidence interval approach will be used in future evaluations once a fourth sample is obtained.

3.4 SUMMARY OF THE METHODOLOGY AND ANALYSIS REVIEW FINDINGS

In summary, there were no changes to the determination that cobalt concentrations exceeded the GPS at MW-307 based on the methodology and analysis review, and no errors or issues causing or contributing to the reported GPS exceedance were identified.

4.0 ALTERNATIVE SOURCES

This section of the report discusses the potential alternative sources for the cobalt GPS exceedance at MW-307, identifies the mostly alternative source(s), and presents lines of evidences indicating that an alternative source is most likely the cause of the observed GPS exceedance for cobalt.

4.1 POTENTIAL CAUSES OF STATISTICALLY SIGNIFICANT INCREASE

4.1.1 Natural Variation

If concentrations of a constituent that is naturally present in the aquifer vary spatially, then the potential exists that the downgradient concentrations may be higher than upgradient concentrations due to natural variation. Although natural variation is likely present in the aquifer, SCS has not identified evidence that natural variation is the likely primary source causing the cobalt GPS exceedance at MW-307.

4.1.2 Man-Made Alternative Sources

Man-made alternative sources that could potentially contribute to the cobalt GPS exceedances could include the active Ash Pond CCR Unit, c-stone pile, coal pile runoff pond, and coal storage area, impacts associated with roads or rail lines, or other on-site or off-site sources

Based on the groundwater flow directions and on previous investigations at the site, the Ash Pond CCR Unit appears to be the most likely cause of the cobalt GPS exceedances for well MW-307.

4.2 LINES OF EVIDENCE

The lines of evidence indicating that the GPS exceedances for cobalt in compliance well MW-307 are due to the Ash Pond include:

1. Monitoring well MW-307 is downgradient of the OGS Ash Pond CCR Unit and is downgradient from the Ash Pond monitoring wells with GPS exceedances for cobalt (MW-305 and MW-306).
2. The distribution of cobalt in groundwater based on the site monitoring wells is consistent with the Ash Pond as a source and is not consistent with the ZLDP as a source.

3. Based on historical use and the quantity and types of materials discharged to ponds, the Ash Pond is a more likely source of cobalt in groundwater than the ZLDP.

4.2.1 Groundwater Flow Direction

As shown on **Figure 3**, groundwater flow in the area of the Ash Pond and ZLDP is generally to the east, following the same flow patterns observed in regional flow maps of the area. MW-307 is located downgradient from a small portion of the ZLDP and is also downgradient from a larger portion of the Ash Pond. MW-307 is also downgradient from the area of the Ash Pond monitoring system where cobalt impacts attributed to the Ash Pond have been identified, including monitoring wells MW-305 and MW-306.

Water level data from the Ash Pond and ZLDP indicate that the water level in the Ash Pond is higher than the water level in the ZLDP (Hard Hat Services, 2016); therefore, shallow groundwater flow within the berm separating the two ponds is also to the east.

4.2.2 Cobalt Distribution in Groundwater

The distribution of cobalt in groundwater is consistent with an Ash Pond source and is not consistent with the ZLDP as a source. The three wells with cobalt concentrations exceeding the GPS are all downgradient from the northeast boundary of the Ash Pond. Cobalt concentrations for the ZLDP monitoring wells are shown in **Table 2**, and cobalt results for all monitoring wells at OGS are summarized in **Appendix D**.

The other downgradient monitoring wells for the ZLDP, MW-308 and MW-309, have consistently lower cobalt concentrations. All cobalt concentrations at MW-308 are J flagged values below the laboratory's limit of quantitation. All cobalt concentrations for samples from MW-308 and MW-309, including background and compliance monitoring events, have been below the cobalt GPS (6 micrograms per liter [$\mu\text{g/L}$]) (**Table 2**).

The OGS Ash Pond is currently in the corrective action process in response to the cobalt concentrations observed at the Ash Pond downgradient wells.

4.2.3 Historical Impoundment Use

As described in the History of Construction report for the OGS surface impoundments (Hard Hat Services, 2016), the Ash Pond has been the primary receiver of bottom ash and economizer ash sluiced from the generating plant. The bottom ash and economizer ash were originally discharged in the northwest corner of the ash pond. In addition to the sluiced CCR, the OGS Ash Pond was also a primary receiver of process water flows from the plant, including flows from an oil separation basin (inclusive of miscellaneous plant floor drains, flash evaporator blowdown, sodium softener regeneration waste, condensate polisher regeneration waste), an ash water pit (inclusive of steam cycle blowdown), cooling tower blowdown, boiler blowdown, sluiced pyrites from the pyrites hopper, as well as other miscellaneous flows. Cobalt in coal is commonly associated with sulfide minerals such as pyrite; therefore, the sluiced pyrites are a potential source of cobalt in groundwater downgradient from the Ash Pond.

The historical use of the ZLDP was to collect storm water runoff from dry fly ash stored on the west side of the ZLDP, north of the plant, as well as storm water from the surrounding embankments. Based on the location of the former fly ash storage along the northern portion of the ZLDP, impacts from the fly ash storage or runoff would be expected to be similar or greater in the northern ZLDP

wells (MW-308 and MW-309) rather than the southern well (MW-307), which is located furthest from the source and downgradient from the narrowest width of the ZLDP.

5.0 ALTERNATIVE SOURCE DEMONSTRATION CONCLUSIONS

Based on the available data, the most likely source of the GPS exceedance for cobalt at MW-307 is the adjacent Ash Pond, and not the OGS ZLDP.

6.0 SITE GROUNDWATER MONITORING RECOMMENDATIONS

In accordance with section 257.94(e)(2) of the CCR Rule, the OGS ZLDP CCR Unit may continue with assessment monitoring based on this ASD. The ASD report will be included in the 2020 Annual Report due in August 2021.

7.0 REFERENCES

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

Hard Hat Services, 2016, History of Construction, CCR Surface Impoundment, Alliant Energy, Interstate Power and Light Company, Ottumwa Generating Station, issued September 29, 2016.

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SCS Engineers, 2019, 2018 Annual Groundwater Monitoring and Corrective Action Report, Ottumwa Generating Station, Ottumwa, IA, 2019.

U.S. Environmental Protection Agency, 2015, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, April 2015.

Tables

- 1 Groundwater Analytical Results Summary - Assessment Monitoring
- 2 Historical Analytical Results of Constituents with SSIs
- 3 Groundwater Elevations – CCR Monitoring Well Networks

Table 1. Groundwater Analytical Results Summary - Assessment Monitoring
Ottumwa Generating Station - Zero Liquid Discharge Pond (ZLDP) / SCS Engineers Project #25220072.00

Parameter Name	UPL Method	UPL	GPS	Background Well		Compliance Wells								
				MW-301		MW-307			MW-308			MW-309		
				2/5/2020	4/14/2020	12/11/2019	2/5/2020	4/14/2020	12/11/2019	2/5/2020	4/14/2020	12/11/2019	2/5/2020	4/14/2020
Appendix III														
Boron, ug/L	P	820		540	700	190 J	200	240	160 J	220	210	1,100	1300	1400
Calcium, mg/L	P	78.7		68	84	230	210	240	220	210	240	150	130	150
Chloride, mg/L	P	86.8		120	140	200	220	230	150	160	170	66	68	69
Fluoride, mg/L	P	0.484		NA	<0.23	<0.23	NA	<0.23	<0.23	NA	<0.23	<0.23	NA	0.36 J
Field pH, Std. Units	P	6.87		6.39	6.58	6.37	6.67	6.76	6.55	6.78	6.90	6.67	7.09	7.21
Sulfate, mg/L	P	199		130	140	92	100	99	280	300	290	370	370	390
Total Dissolved Solids, mg/L	P	628		570	550	1,000	970	980	1,100	1100	1,000	980	990	1000
Appendix IV														
Antimony, ug/L	P*	0.22	6	NA	<0.58	<0.53	NA	<0.58	<0.53	NA	<0.58	<0.53	NA	<0.58
Arsenic, ug/L	P*	0.53	10	<0.88	<0.88	<0.75	<0.88	<0.88	<0.75	<0.88	<0.88	1.1 J	<0.88	0.88 J
Barium, ug/L	P	68.8	2,000	43	54	140	130	140	130	130	140	54	46	50
Beryllium, ug/L	DQ	DQ	4	NA	<0.27	<0.27	NA	<0.27	<0.27	NA	<0.27	<0.27	NA	<0.27
Cadmium, ug/L	NP*	0.12	5	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	<0.039	0.090 J	<0.039	<0.039
Chromium, ug/L	P	1.07	100	<1.1	<1.1	<0.98	<1.1	<1.1	5.9	<1.1	<1.1	1.7 J	<1.1	1.3 J
Cobalt, ug/L	NP	4.10	6	1.1	0.52	11	13	20	0.26 J	0.14 J	0.14 J	3.7	2.3	3.2
Fluoride, mg/L	P*	0.484	4	NA	<0.23	<0.23	NA	<0.23	<0.23	NA	<0.23	<0.23	NA	0.36 J
Lead, ug/L	NP*	0.10	15	<0.27	<0.27	0.71	<0.27	0.31 J	0.52	<0.27	<0.27	2.8	0.63	1.6
Lithium, ug/L	P	34.2	40	17	24	12	9.1 J	13	16	12	17	8.2 J	6.3 J	9.6 J
Mercury, ug/L	DQ	DQ	2	NA	<0.10	<0.10	NA	<0.10	<0.10	NA	<0.10	<0.10	NA	<0.10
Molybdenum, ug/L	P	1.74	100	NA	1.2 J	<1.1	NA	<1.1	<1.1	NA	<1.1	<1.1	NA	<1.1
Selenium, ug/L	P	8.55	50	NA	6.8	<1.0	NA	<1.0	<1.0	NA	<1.0	<1.0	NA	<1.0
Thallium, ug/L	NP*	0.14	2	NA	<0.26	<0.27	NA	<0.26	<0.27	NA	<0.26	<0.27	NA	<0.26
Radium 226/228 Combined, pCi/L	P	2.15	5	0.228	0.315	2.46	2.23	2.06	2.73	2.13	1.69	1.77	1.02	0.957

 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.

See additional notes on Page 2.

**Table 1. Groundwater Analytical Results Summary - Assessment Monitoring
Ottumwa Generating Station - Zero Liquid Discharge Pond (ZLDP) / SCS Engineers Project #25220072.00**

Abbreviations:

UPL = Upper Prediction Limit

NA = Not Analyzed

P = Parametric UPL with 1-of-2 retesting

GPS = Groundwater Protection Standard

DQ = Double Quantification Rule (not detected in background)

NP = Nonparametric UPL (highest background value)

J = Estimated concentration at or above the LOD
and below the LOQ.

mg/L = milligrams per liter

ug/L = micrograms per liter

LOD = Limit of Detection

LOQ = Limit of Quantitation

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

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 letter text for identification of statistically significant results.
2. GPS is the United States Environmental Protection Agency (USEPA) Maximum Contamination Level (MCL), if established; otherwise, the values from 40 CFR 257.95(h)(2).
3. Interwell UPLs calculated based on results from background well MW-301.

Created by: <u>NDK</u>	Date: <u>6/12/2019</u>
Last revision by: <u>NDK</u>	Date: <u>7/5/2020</u>
Checked by: <u>SCC</u>	Date: <u>7/6/2020</u>
Proj Mgr QA/QC: <u>TK</u>	Date: <u>7/6/2020</u>

I:\25220072.00\Data and Calculations\Tables\[CCR GW Screening Summary_OGS ZLDP.xlsx]Table - Current Event

06/10/2021 - Classification: Internal - ECRM12608563

**Table 2. Historical Analytical Results of Constituents with SSIs
Ottumwa Generating Station, Zero Liquid Discharge Pond**

Well Group	Well	Collection Date	Cobalt (µg/L)
Background	MW-301	4/26/2016	4.10
		6/23/2016	3.10
		8/10/2016	1.80
		10/26/2016	1.80
		1/18/2017	1.30
		4/19/2017	0.97 J
		6/20/2017	1.00 J
		8/23/2017	0.96 J
		4/18/2018	0.46 J
		8/14/2018	1.40
		10/16/2018	0.36 J
		4/8/2019	0.44 J
		10/24/2019	0.60
		2/5/2020	1.10
		3/12/2020	0.43 J
4/14/2020	0.52		
Compliance	MW-307	1/19/2017	0.62 J
		4/20/2017	1.60
		6/21/2017	1.10
		8/21/2017	1.10
		11/8/2017	1.30
		4/16/2018	1.30
		6/28/2018	2.90
		10/16/2018	4.80
		12/11/2019	11.0
		2/5/2020	13.0
		4/14/2020	20.0
	MW-308	1/19/2017	0.52 J
		4/20/2017	0.43 J
		6/21/2017	0.25 J
		8/21/2017	0.26 J
		11/8/2017	0.23 J
		4/16/2018	0.18 J
		6/28/2018	0.19 J
		10/16/2018	0.15 J
		12/11/2019	0.26 J
		2/5/2020	0.14 J
		4/14/2020	0.14 J

**Table 2. Historical Analytical Results of Constituents with SSIs
Ottumwa Generating Station, Zero Liquid Discharge Pond**

Well Group	Well	Collection Date	Cobalt (µg/L)
Compliance (cont.)	MW-309	1/19/2017	2.00
		4/20/2017	3.10
		6/21/2017	2.40
		8/21/2017	2.10
		11/8/2017	2.00
		4/16/2018	2.40
		6/28/2018	4.70
		10/16/2018	2.70
		12/11/2019	3.70
		2/5/2020	2.30
		4/14/2020	3.20

Abbreviations:

µg/L = micrograms per liter or parts per billion (ppb)

Notes:

(1) Complete laboratory reports included in the Annual Groundwater Monitoring and Corrective Action Reports.

J = Estimated concentrations at or above the limit of detection and the limit of quantitation.

Created by:	<u>NDK</u>	Date:	<u>9/2/2020</u>
Last revision by:	<u>ZTW</u>	Date:	<u>9/2/2020</u>
Checked by:	<u>JSN</u>	Date:	<u>9/3/2020</u>
Scientist check by:	<u>NDK</u>	Date:	<u>9/29/2020</u>

I:\25220072.00\Data and Calculations\Tables\ZLDP ASD Tables\[3 OGS ZLDP April 2020 ASD-Assessment.xlsx]Table 2. Analy. Rslts- CCR

**Table 3. Groundwater Elevations - CCR Rule Monitoring Well Networks
IPL - Ottumwa Generating Station / SCS Engineers Project #25220072.00**

Ground Water or Surface Water Elevation in feet above mean sea level (amsl)															
Well Number	MW-301	MW-302	MW-303	MW-304	MW-305	MW-305A	MW-306	MW-307	MW-308	MW-309	MW-310	MW-310A	MW-311	MW-311A	River at Intake
Top of Well Casing Elevation / Surface Water Reference Elevation (feet amsl)	686.63	673.90	661.07	682.84	683.91	684.03	683.47	657.56	655.39	654.94	658.63	657.93	654.18	653.54	656.31
Screen Length (ft)	10.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	NA
Total Depth (ft from top of casing)	17.0	25.8	17.5	52.3	51.5	81.91	36.6	28.0	25.0	27.5	25.9	55.55	17.9	47.68	NA
Top of Well Screen Elevation (ft)	679.63	653.10	648.57	635.54	637.41	607.12	651.87	634.56	635.39	632.44	637.76	607.38	641.24	610.86	NA
Measurement Date															
April 26, 2016	682.80	655.63	652.42	655.37	661.67	NI	670.86	NI	NI	NI	NI	NI	NI	NI	NI
June 23, 2016	682.58	655.65	652.89	656.53	662.36	NI	670.64	NI	NI	NI	NI	NI	NI	NI	NI
August 9, 2016	682.27	655.52	651.76	653.79	660.78	NI	670.35	NI	NI	NI	NI	NI	NI	NI	NI
October 26-27, 2016	682.04	655.67	652.17	655.03	661.37	NI	670.21	NI	NI	NI	NI	NI	NI	NI	NI
January 18-19, 2017	681.67	655.46	651.74	654.50	660.87	NI	669.89	648.81	647.42	646.66	NI	NI	NI	NI	NI
April 19-20, 2017	682.15	656.35	654.57	657.48	663.27	NI	670.69	653.62	651.09	650.16	NI	NI	NI	NI	NI
June 20-21, 2017	681.91	655.65	652.42	654.75	661.26	NI	669.94	649.85	648.26	647.60	NI	NI	NI	NI	NI
August 21-23, 2017	681.28	655.13	650.58	652.39	659.00	NI	668.77	645.78	643.12	641.82	NI	NI	NI	NI	NI
November 8, 2017	681.54	655.40	651.34	653.03	659.76	NI	669.04	647.37	644.99	644.20	NI	NI	NI	NI	NI
April 18, 2018	681.53	655.71	652.47	655.55	660.99	NI	668.92	649.66	647.91	647.65	NI	NI	NI	NI	NI
May 30, 2018	NM	NM	NM	NM	NM	NI	NM	652.45	651.05	650.98	NI	NI	NI	NI	NI
June 28, 2018	NM	NM	NM	NM	NM	NI	NM	652.87	651.43	651.47	NI	NI	NI	NI	NI
July 18, 2018	NM	NM	NM	NM	NM	NI	NM	652.27	650.67	650.69	NI	NI	NI	NI	NI
August 14-15, 2018	680.91	656.05	652.57	656.35	661.56	NI	668.66	NM	NM	NM	NI	NI	NI	NI	NI
August 29, 2018	681.09	655.89	655.07	657.82	NM	NI	NM	NM	NM	NM	NI	NI	NI	NI	NI
October 16, 2018	682.50	656.91	656.17	658.20	663.37	NI	670.24	654.13	NM	651.61	NI	NI	NI	NI	NI
January 8, 2019	682.22	656.03	654.65	656.28	662.13	NI	669.84	NM	NM	NM	NI	NI	NI	NI	NI
April 8, 2019	682.69	657.23	655.55	659.33	664.01	NI	670.96	654.90	653.70	653.55	NI	NI	NI	NI	NI
August 28, 2019	NM	NM	NM	NM	NM	NI	NM	NM	NM	NM	640.98	NI	642.10	NI	NI
October 23-24, 2019	683.07	660.14	653.86	657.71	663.21	NI	671.28	651.89	651.31	651.28	649.31	NI	647.80	NI	NI
December 11, 2019	NM	NM	NM	NM	NM	NI	NM	649.59	647.39	647.24	NM	NI	NM	NI	NI
February 5, 2020	683.30	NM	NM	NM	NM	NI	NM	649.88	650.12	648.34	644.71	NI	645.00	NI	NI
March 12-13, 2020	682.82	NM	NM	NM	661.41	651.64	NM	NM	NM	NM	645.45	617.84	644.18	624.11	NI
April 1, 2020	683.27	657.00	655.89	658.57	660.59	655.05	671.13	653.76	651.88	651.23	651.09	649.16	649.35	648.27	649.71
April 13-14, 2020	683.25	656.45	654.08	656.42	662.44	653.69	670.71	650.66	650.09	649.19	645.91	647.50	646.79	648.42	645.71
May 4, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
June 30, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	647.73	NM
Bottom of Well Elevation (ft)	669.63	648.10	643.57	630.54	632.41	602.12	646.87	629.56	630.39	627.44	632.76	602.38	636.24	605.86	--

Notes:

NM = not measured

NI = not installed

Created by: KAK
 Last rev. by: NDK
 Checked by: AJR
 Proj Mgr QA/QC: TK

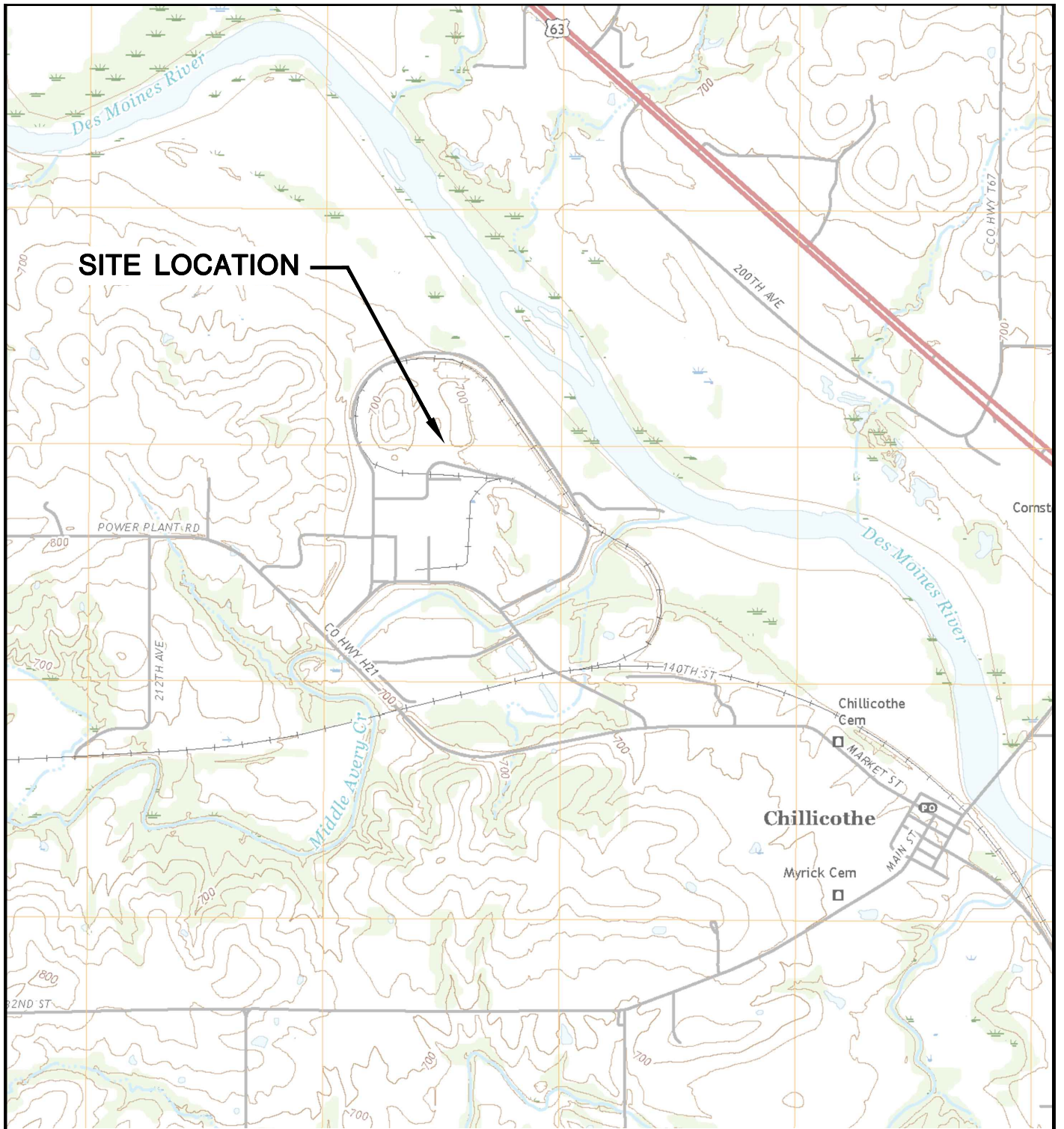
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 Date: 7/22/2020
 Date: 9/30/2020

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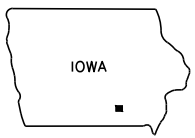
06/10/2021 - Classification: Internal - ECRM12608563

Figures

- 1 Site Location Map
- 2 Site Plan and Monitoring Well Locations
- 3 Shallow Potentiometric Surface –
April 13-14, 2020

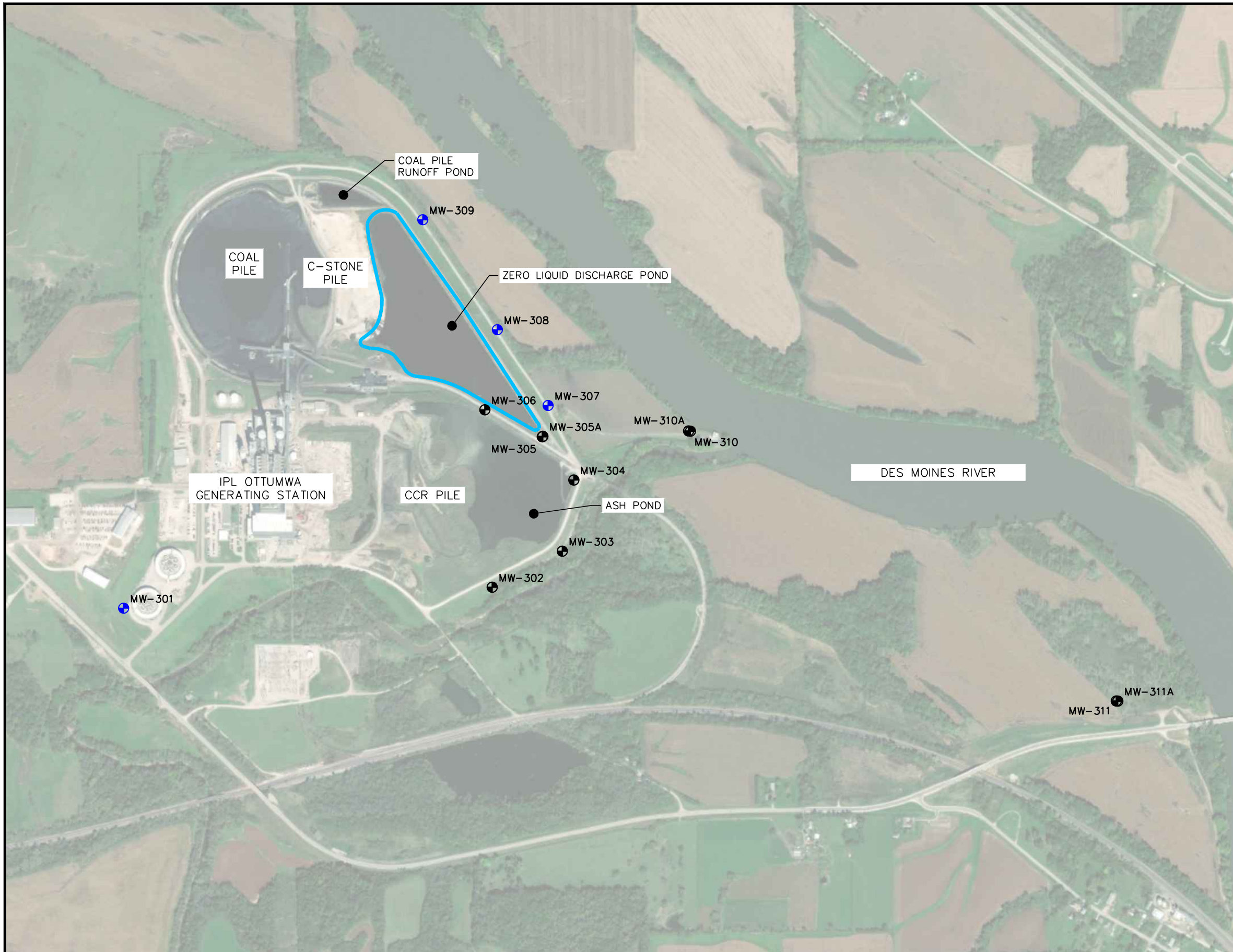


CHILLICOTHE QUADRANGLE
 IOWA—WAPELLO CO.
 7.5 MINUTE SERIES (TOPOGRAPHIC)
 2018
 SCALE: 1" = 2,000'

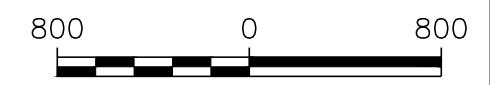


CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501		SITE	ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA		ENGINEER	SITE LOCATION MAP	
	PROJECT NO.	25219072.00		DRAWN BY:	BSS		SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	FIGURE
	DRAWN: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

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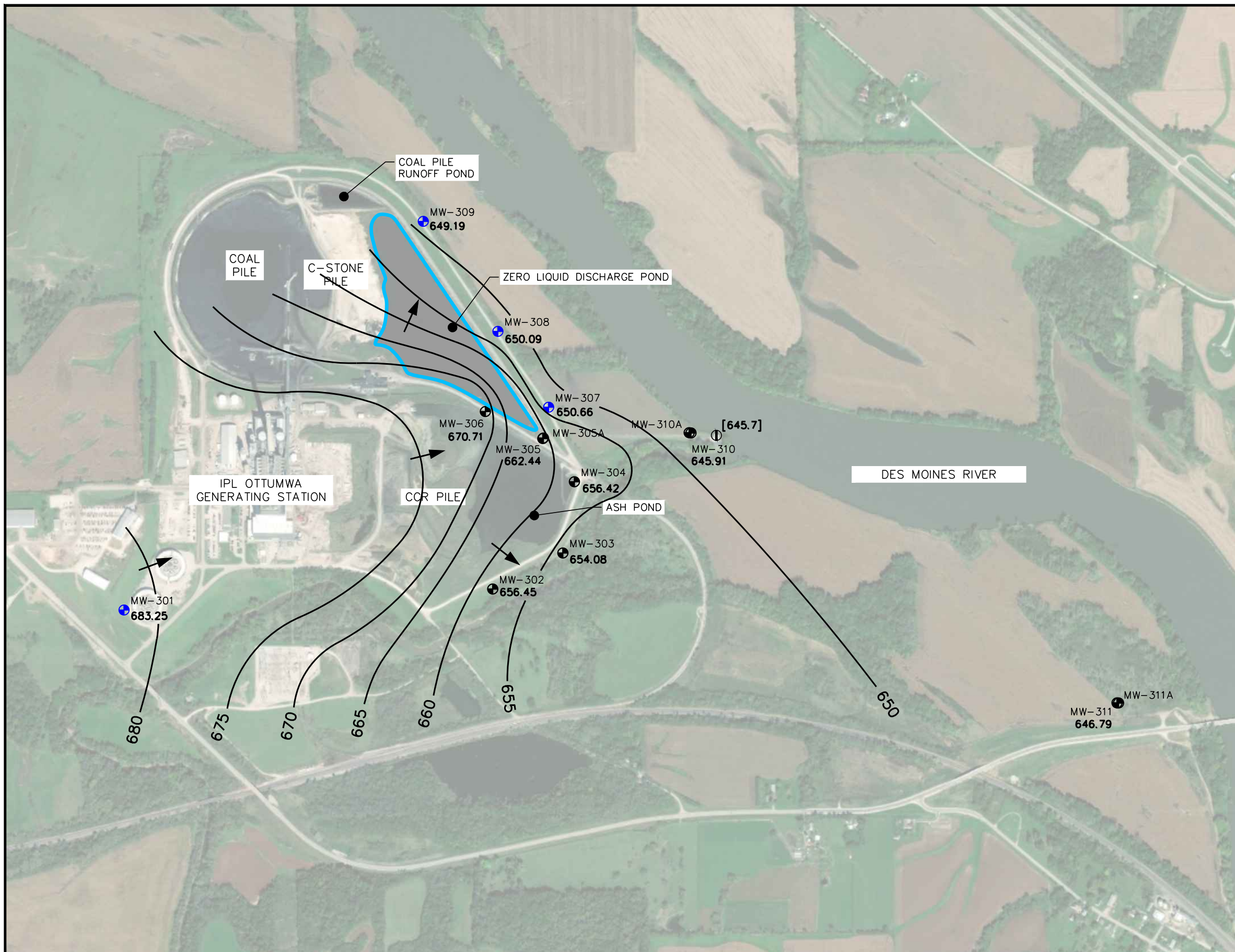
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	CCR UNIT
	OGS ZLDP CCR MONITORING WELL
	ADDITIONAL MONITORING WELL



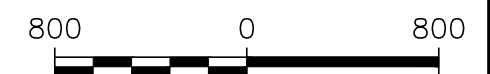
SCALE: 1" = 800'

PROJECT NO. 25220072.00	DRAWN BY: KP/BSS/RJG	 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA	SITE PLAN AND MONITORING WELL LOCATIONS	FIGURE
DRAWN: 04/28/2020	CHECKED BY: NDK/SCC					2
REVISED: 10/09/2020	APPROVED BY: TK 10/09/2020					

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LEGEND	
	CCR UNIT
	OGS ZLDP CCR MONITORING WELL
	ADDITIONAL CCR MONITORING WELL
	RIVER ELEVATION MEASUREMENT LOCATION
645.91	POTENTIOMETRIC ELEVATION AT WELL (APRIL 13-14, 2020)
[645.7]	SURFACE WATER ELEVATION (APRIL 13, 2020)
	POTENTIOMETRIC SURFACE CONTOUR
	APPROXIMATE GROUNDWATER FLOW DIRECTION



SCALE: 1" = 800'

PROJECT NO.	25220072.00	DRAWN BY:	KP/BSS/RJC/ZTW
DRAWN:	04/28/2020	CHECKED BY:	NDK/SCC
REVISED:	07/30/2020	APPROVED BY:	SCC 09/25/2020

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

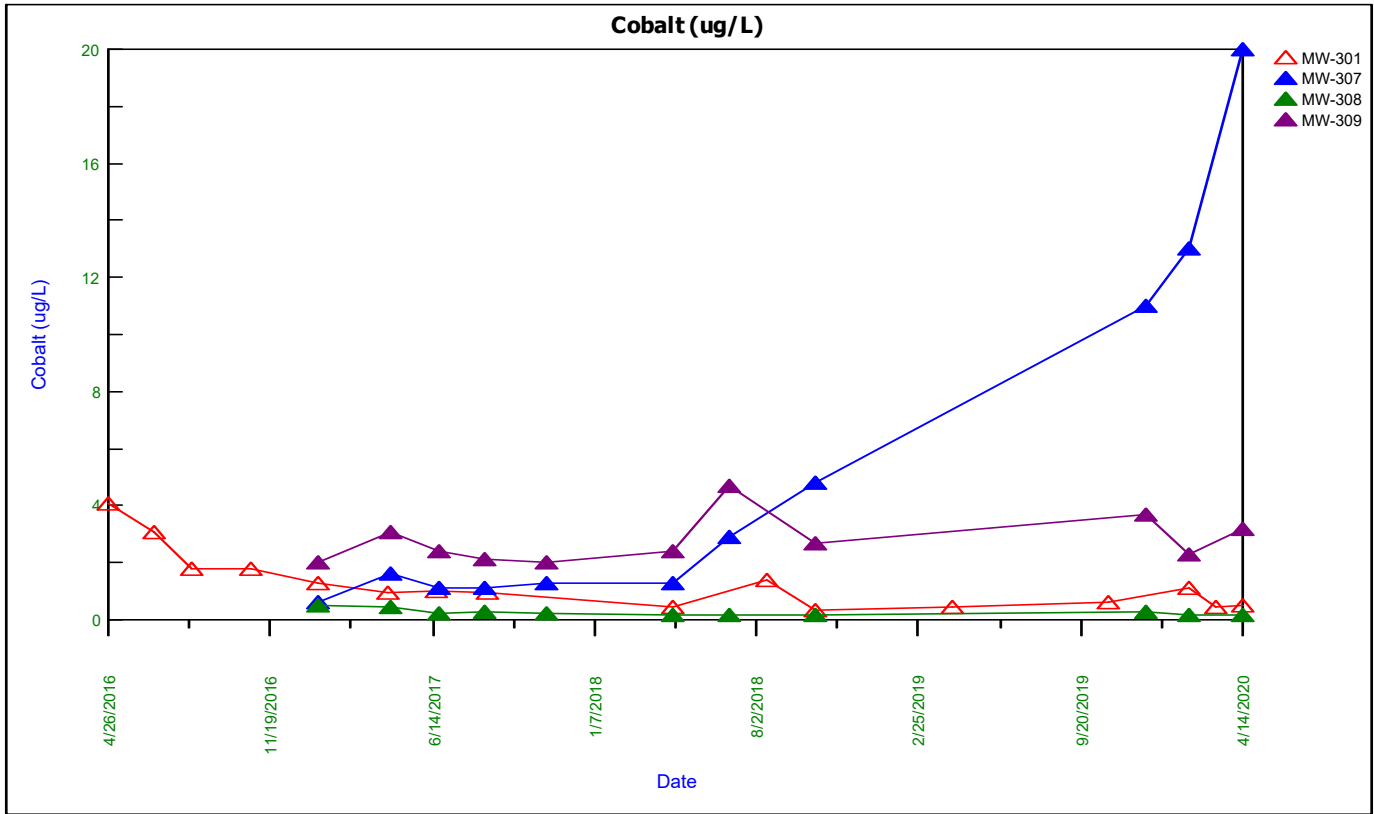
SITE
 ALLIANT ENERGY
 OTTUMWA GENERATING STATION
 OTTUMWA, IOWA


SHALLOW POTENTIOMETRIC SURFACE
 APRIL 13-14, 2020

FIGURE
 3

\\Mad:\s01\data\Projects\25220072.00\Drawings\Potentiometric Surface 2020.dwg, 9/25/2020 11:43:41 AM

Appendix A
CCR Well Trend Plot





Appendix B
Regional Geologic and Hydrogeologic Background Information

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

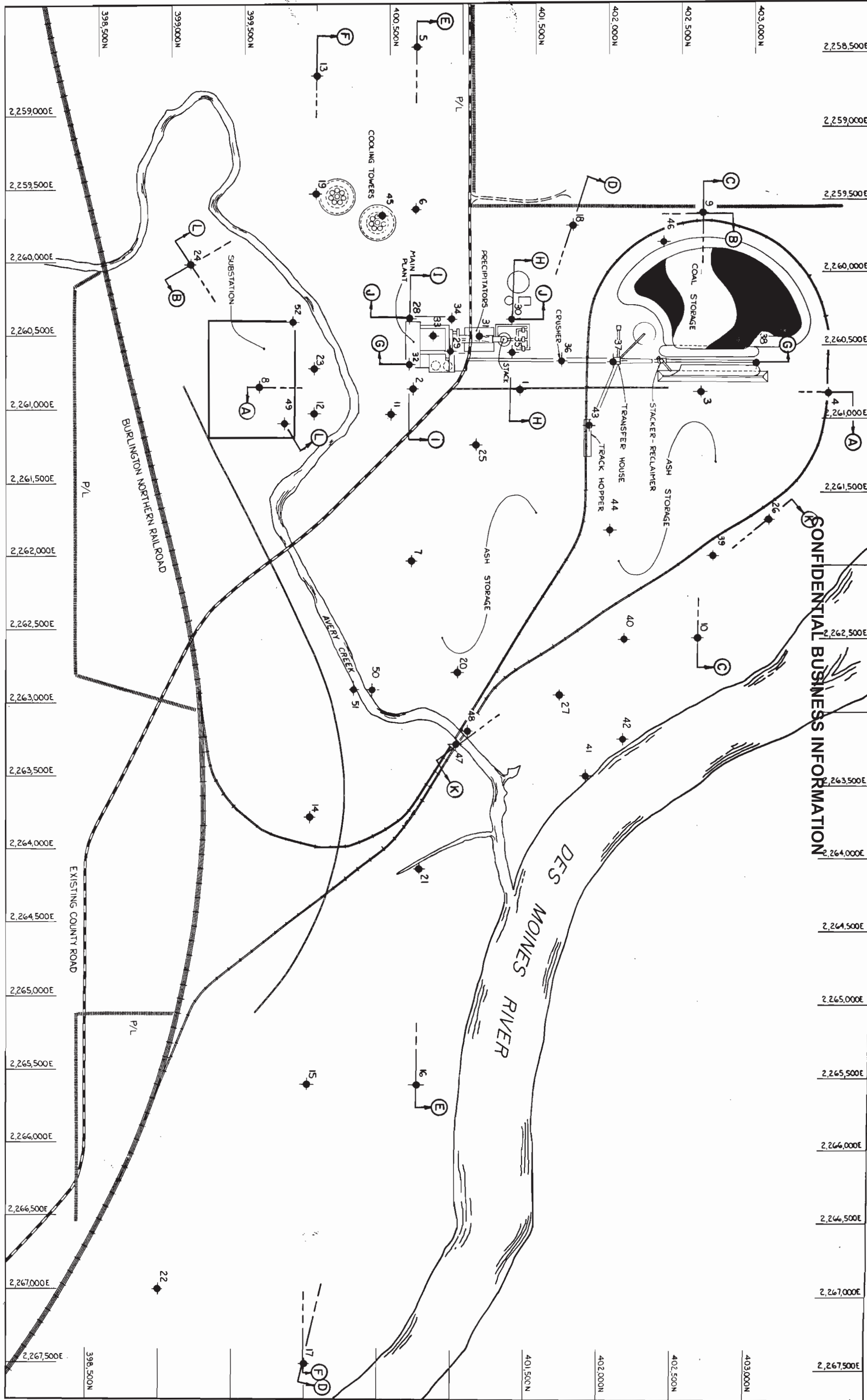
Age of Rocks	Hydrogeologic Unit	General Thickness (feet)	Name of Rock Unit*	Type of Rock
Quaternary (0-1 million years old)	Surficial Aquifers • Alluvial • Buried-Channel • Drift	0 to 320	Undifferentiated	<ul style="list-style-type: none"> • Sand, gravel, silt, and clay • Sand, gravel, silt, and clay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

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

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

2,258,500N
2,259,000E
2,259,500E
2,260,000E
2,260,500E
2,261,000E
2,261,500E
2,262,000E
2,262,500E
2,263,000E
2,263,500E
2,264,000E
2,264,500E
2,265,000E
2,265,500E
2,266,000E
2,266,500E
2,267,000E
2,267,500E

CONFIDENTIAL BUSINESS INFORMATION



ATEC ASSOCIATES
06/10/2021 - Classification: Internal - ECRM12608563



OTUMWA GENERATING STATION-UNIT 1
CHILLICOTHE, IOWA FIGURE 2

PLAN OF BORINGS

LOG OF BORING NO. 7 CONFIDENTIAL BUSINESS INFORMATION

Ottumwa Generating Station-Unit 1
Chillicothe, Iowa

N 400,675

BORING METHOD: HSA

DATE: 5-30-75

LOCATION: E 2,262,000

DEPTH SCALE, FT.	STRATUM DEPTH FT.	STANDARD PENETRATION		☒ Unconfined Compressive Strength, TSF					SHELBY TUBE	
		SAMPLE DEPTH	RECOVERY, %	○ Natural Dry Density, PCF						
				☐ Water Content, % ☑ Plast. Lim., % ☑ Liq. Lim., %						
				● Standard Penetration, Blows/Ft.						
		BLOWS/6 in. 3-6 in. INCREMENTS	RECOVERY, %	1	2	3	4	5		
SURFACE ELEVATION-- 676										
	Dark Brown moist stiff SILTY CLAY (CL)	2.5	4 6/7	25						
5	Brown moist stiff SILTY CLAY (CL)		6 7/9	25						
10	-medium stiff		3 5/7	100						
15	-very stiff		3 5/8	90						
	-very stiff		7 11/12	100						
		18.0	6 9/18	90						
20	Brown very moist soft SILTY CLAY (CL) w/trace Sand	19.0	3	100						
	Brown wet soft SANDY CLAYEY SILT (ML)	20.3	2/50	100						
25	Gray fine grained LIMESTONE w/ several partings and Glauconitic Clay seams with Limestone rock fragments		RC 1 RQD 18	96						
		28.7	RC 2 RQD 21	66						
30	Gray SANDY LIMESTONE	30.3	RC 3 RQD 42	76						
	Gray LIMEY SANDSTONE									
35	Gray fine to medium grained friable Quartz SANDSTONE with partially filled vugs	34.5	RC 4 RQD 38	100						
40										
45			RC 5 RQD 20	92						
		48.5								

COMPLETION DEPTH: (cont'd on next page)

ROCK CORE DIAMETER: 2 1/8"

GROUND WATER: NOTED ON RODS AT COMPLETION AFTER HRS. FT. FT.

CONFIDENTIAL BUSINESS INFORMATION

Ottumwa Generating Station-Unit 1
Chillicothe, Iowa

N 401,000

BORING METHOD: HSA

DATE: 6-13-75

LOCATION: E 2,262,750

DEPTH SCALE, FT.	SURFACE ELEVATION— 658	STRATUM DEPTH FT.	STANDARD PENETRATION		⊗ Unconfined Compressive Strength, TSF					SHELBY TUBE	
			SAMPLE DEPTH	BLOWS/6 in. 3-6 in. INCREMENTS	RECOVERY, %	1	2	3	4		5
						○ Natural Dry Density, PCF					
						□ Water Content, % ▣ Plast. Lim., % ▤ Liq. Lim., %					
5		5.5	6 7/9	50							
			5 5/4	10							
			2 2/3	100							
10		10.5	2 1/1								
			50/.2								
15		14.3	50/.3								
			RC 1 RQD	82							
			36								
20			RC 2 RQD	77							
			17								
25											
30											
			RC 3 RQD	99							
			95								
35											
40			RC 4 RQD	100							

COMPLETION DEPTH: 40.0'

GROUND WATER: NOTED ON RODS 8.0 FT. AT COMPLETION

ROCK CORE DIAMETER: 1 7/8" 06/10/2021 - Classification: Internal - ECRM12608563 HRS.

CONFIDENTIAL BUSINESS INFORMATION

Ottumwa Generating Station-Unit 1
Chillicothe, Iowa

N 402,725

BORING METHOD: HSA

DATE: 10-3-75

LOCATION: E 2,261,050

DEPTH SCALE, FT.	SURFACE ELEVATION-- 654	STRATUM DEPTH FT.	STANDARD PENETRATION		* Unconfined Compressive Strength, TSF					SHELBY TUBE	
			SAMPLE DEPTH	BLOWS/6 in. 3-6 in. INCREMENTS	RECOVERY, %	O Natural Dry Density, PCF					
						1	2	3	4		5
						90	100	110	120		130
					□ Water Content, % ▣ Plast. Lim., % ▢ Liq. Lim., %						
					* Standard Penetration, Blows/ft.						
					10	20	30	40	50		
5											
	Dark Gray medium stiff CLAY(CH) w/trace organic material		3 3/5	100							
			3 4/4	100							
			2 3/4	100							
10		10.5	3 3/5	100							
	Dark Gray soft to very soft SILTY CLAY(CL) with trace Sand and fine Gravel		2 2/3	75							
			1 1/2	75							
15		15.5	3 3/21	100							
	Dark Gray wet loose to medium dense SILTY SAND(SM)w/some f-m Gravel	17.0									
	Light Gray very moist very dense SILTY SAND(SM-ML) w/soft Rock frag. (calcareous)	18.0	100/.3	100							
20											
	Note: Auger refusal at 18.0 ft										

COMPLETION DEPTH: 18.0'

GROUND WATER: NOTED ON RODS 15.0 FT.
AT COMPLETION FT.
AFTER HRS. FT.

ROCK CORE DIAMETER:

CONFIDENTIAL BUSINESS INFORMATION

Ottumwa Generating Station-Unit 1
Chillicothe, Iowa

N 402,130

BORING METHOD: HSA

DATE: 10-3-75

LOCATION: E 2,260,530

DEPTH SCALE, FT.	SURFACE ELEVATION-- 652	STRATUM DEPTH FT.	STANDARD PENETRATION		⊗ Unconfined Compressive Strength, TSF					SHELBY TUBE	
			SAMPLE DEPTH	BLOWS/6 in. 3-6 in. INCREMENTS	RECOVERY, %	1	2	3	4		5
						○ Natural Dry Density, PCF					
						90	100	110	120		130
5	Dark Gray moist stiff CLAY(CH) w/ trace organic material -medium stiff		2 4/7	75							
			3 4/6	75							
			5 8/11	100							
10	Dark Gray very moist loose SANDY SILT (ML) w/trace Clay	9.0 11.0	3 3/4	100							
			4 4/5	100							
15	Brown wet loose to medium dense fine to medium SAND (SP) with trace Silt -trace coarse sand		4 9/8	100							
			6 6/7	75							
20	Note: Piezometer installed at 18.5 ft	18.8	50/1.3	0							

COMPLETION DEPTH: 18.8'

GROUND WATER: NOTED ON RODS 12.0 FT.
AT COMPLETION FT.
AFTER HRS. FT.

ROCK CORE DIAMETER:

06/10/2021 Classification: Internal ECRM12608563

CONFIDENTIAL BUSINESS INFORMATION

Ottumwa Generating Station-Unit 1
Chillicothe, Iowa

N 402,020

BORING METHOD: HSA

DATE: 10-7-75

LOCATION: E 2,261,780

DEPTH SCALE, FT.	STRATUM DEPTH FT.	STANDARD PENETRATION		Unconfined Compressive Strength, TSF					SHELBY TUBE										
		SAMPLE DEPTH	BLOWS/6 in. 3-6 in. INCREMENTS	RECOVERY, %	Natural Dry Density, PCF														
					Water Content, %														
					Standard Penetration, Blows/Ft.														
					1	2	3	4	5										
					90	100	110	120	130										
					10	20	30	40	50										
					10	20	30	40	50										
	SURFACE ELEVATION-- 662																		
	Dark Gray slightly moist very stiff SILTY CLAY (CL)	10	11/12																
5	Brown moist stiff SANDY CLAY (CL-SC)	5.0	8/10																
	Brown moist med. dense fine SAND (SP)	6.5	5																
		8.2	9/6																
10	Brown wet loose fine to medium SAND (SP) w/trace Silt -very loose	13.0	3/3																
	Brown wet very loose CLAYEY SAND (SW-SC) w/little fine to med. Gvl	15.5	1/2																
15	Brown very moist med. stiff CLAYEY SILT (ML) w/tr. Sand & fine Gvl	18.0	2/2																
	Brown wet very loose SANDY SILT (ML)	20.5	2/2																
20	Dark Gray very wet soft CLAY (CL-CH) with trace coarse Gravel	24.0	34																
		25.0	25/16																
25	Brown wet dense fine to coarse SAND (SW) w/trace Silt & Gravel	26.2	50/.2																
	Gray very moist very dense fine SAND (SP) w/trace Silt	26.3																	
30	Note: SPT from 23.5 to 25.0' driven on a boulder																		
	* Caved to 11.8 ft at completion																		

COMPLETION DEPTH: 26.3

ROCK CORE DIAMETER:

GROUND WATER: NOTED ON RODS 10.5 FT.
AT COMPLETION 8.2 FT.*
AFTER HRS. FT.

LOG OF BORING NO. 48
CONFIDENTIAL BUSINESS INFORMATION

Ottumwa Generating Station-Unit 1
 Chillicothe, Iowa

N 401,070

BORING METHOD: HSA

DATE: 10-7-75

LOCATION: E 2,263,160

DEPTH SCALE, FT.	STRATUM DEPTH FT.	STANDARD PENETRATION		⊗ Unconfined Compressive Strength, TSF					SHELBY TUBE	
		SAMPLE DEPTH	BLOWS/6 in. 3-6 in. INCREMENTS	RECOVERY, %	○ Natural Dry Density, PCF					
					□ Water Content, % □ Plast. Lim., % □ Liq. Lim., %					
					⊙ Standard Penetration, Blows/Ft.					
					1	2	3	4	5	
					90	100	110	120	130	
					10	20	30	40	50	
					10	20	30	40	50	
5	SURFACE ELEVATION- 655									
10	Dark Gray to Brown moist stiff CLAY (CL-CH)	6 6/7	100	100						
15	Brown moist loose SILTY fine SAND (SM) -wet below 13.0'	4 7/10	100	100						
20	Dark Gray very moist soft CLAY (CH)	5 8/7	100	100						
25	Dark Gray wet very loose SILTY fine SAND (SP-SM)	2 4/8	100	100						
30	Gray very loosely cemented fine grained LIMEY QUARTZ SANDSTONE -friable below 27.9' -limestone fragments 30.3 to 31.1' -white fine grained limestone w/ irregular clay filled seams 31.1 to 31.8'	2 4/6	75	75						
35	*Caved to 12.1 ft at completion	0 1/1	50	50						
		2 1/3	50	50						
		1 1/4	50	50						
		50/.2	50	50						
		RC 1 RQD	33	33						
		0								
		RC 2 RQD	100	100						
		38								

COMPLETION DEPTH: 31.8'

ROCK CORE DIAMETER: 2 1/8"

NOTED ON RODS 13.0 FT.
 GROUND WATER: AT COMPLETION 12.1 FT. *
 AFTER HRS. FT.

LOG OF BORING NO. 50 CONFIDENTIAL BUSINESS INFORMATION

Ottumwa Generating Station-Unit 1
Chillicothe, Iowa

N 400,410

BORING METHOD: HSA

DATE: 10-8-75

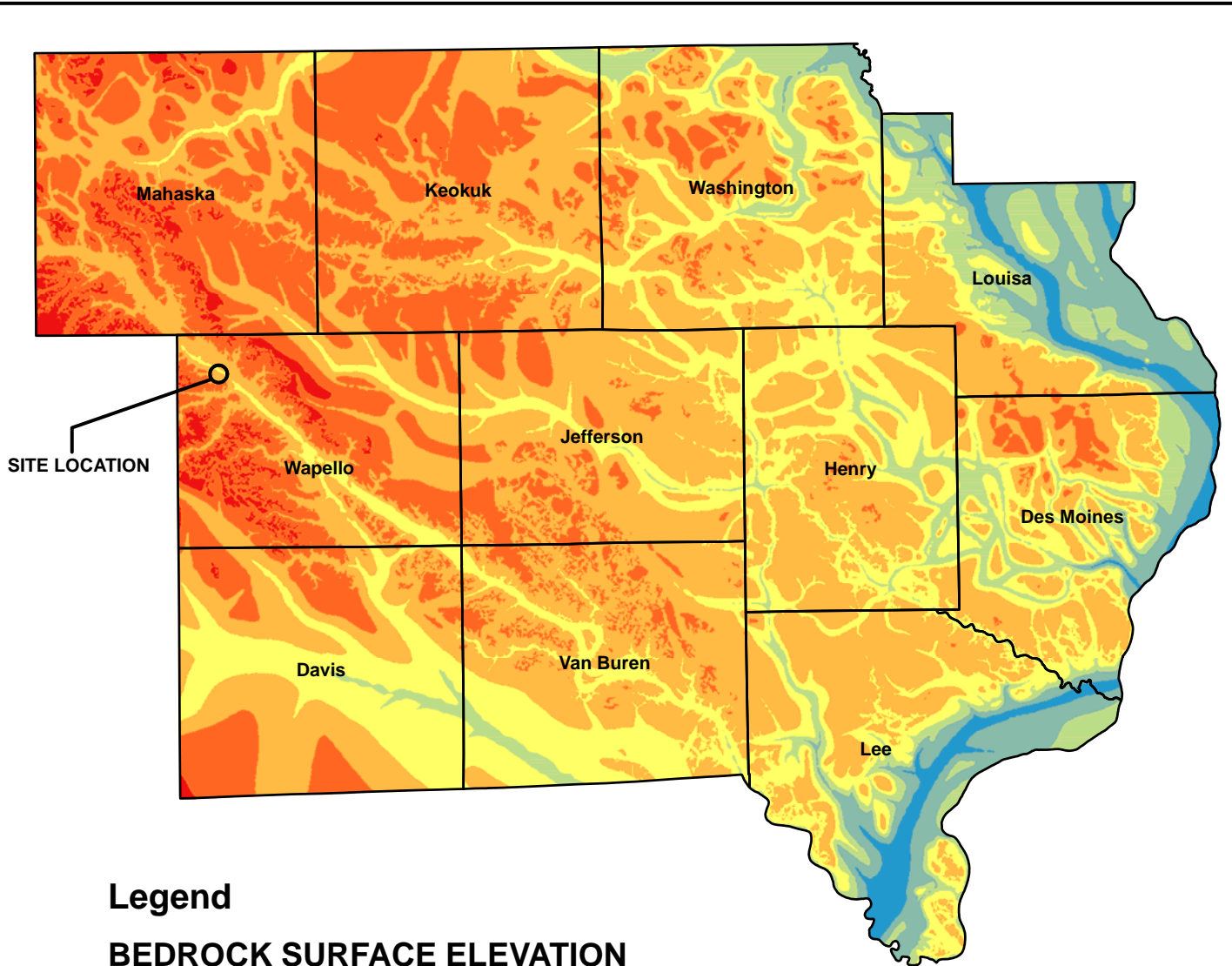
LOCATION: E 2,262,880

DEPTH SCALE, FT.	STRATUM DEPTH FT.	STANDARD PENETRATION		Unconfined Compressive Strength, TSF					SHELBY TUBE	
		SAMPLE DEPTH	BLOWS/6 in. 3-5 in. INCREMENTS	RECOVERY, %	Natural Dry Density, PCF					
					Water Content, % Plast. Lim., % Liq. Lim., %					
					Standard Penetration, Blows/Ft.					
SURFACE ELEVATION-- 654										
5			9 10/13	100						
10			4 6/7	100						
15			2 3/3	75						
20			2 2/2	75						
25			18 50/.5	75						
30			RC 1 ROD 36	55						
35			RC 2 ROD 92	100						

COMPLETION DEPTH: 34.5

ROCK CORE DIAMETER: 2 1/8"

GROUND WATER: NOTED ON RODS 11.5 FT.
AT COMPLETION 14.8 * FT.
AFTER HRS. FT.

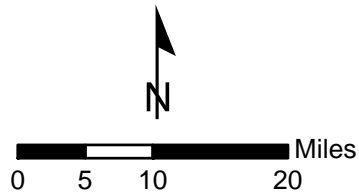


Legend

BEDROCK SURFACE ELEVATION

ELEVATION ABOVE MEAN SEA LEVEL IN FEET

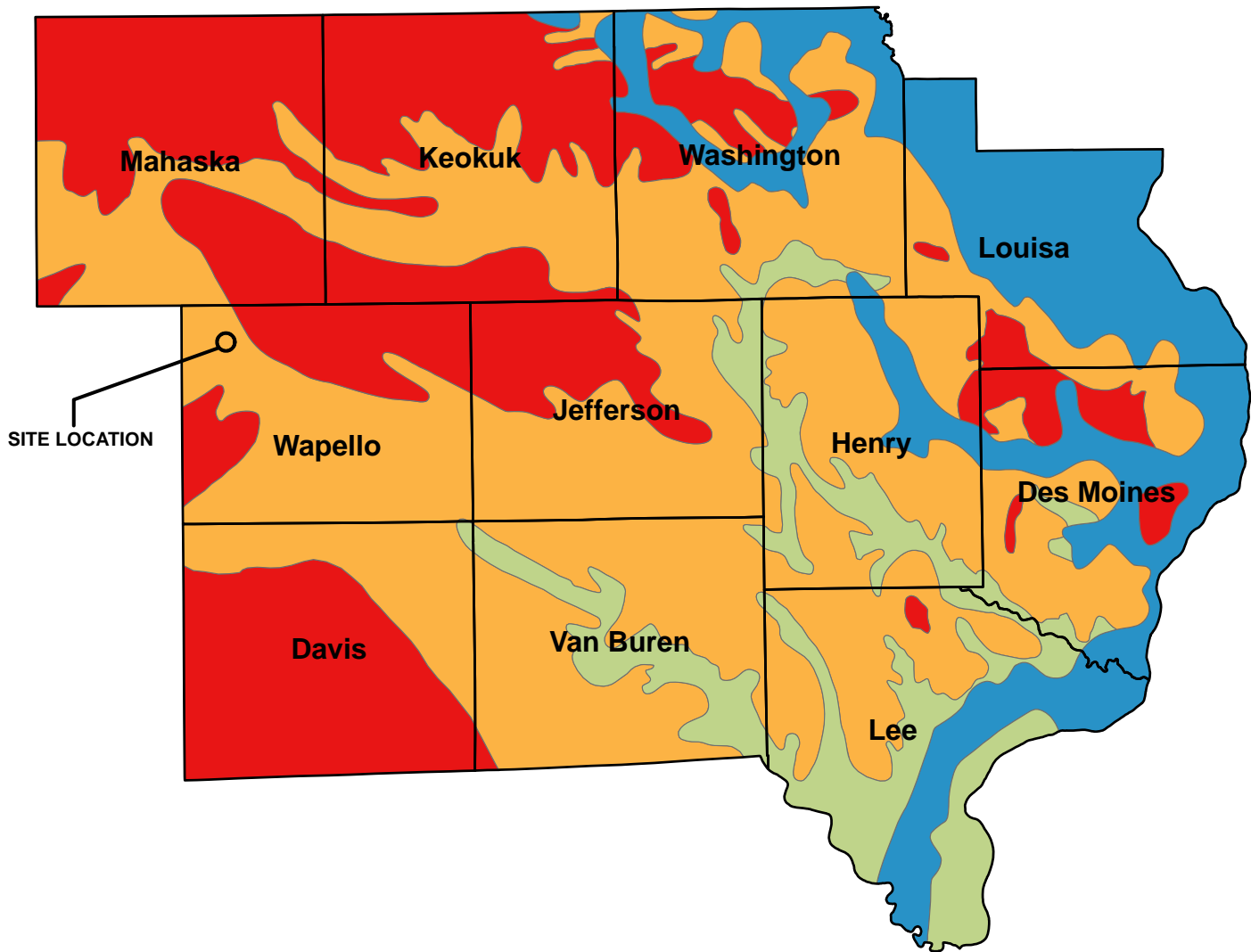
- BELOW 300
- 300 TO 400
- 400 TO 500
- 500 TO 600
- 600 TO 700
- 700 TO 800
- 800 TO 900



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

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

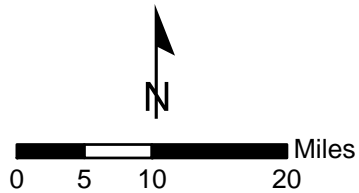
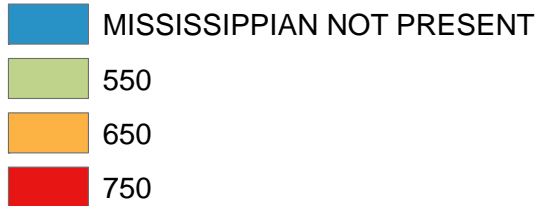
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Legend

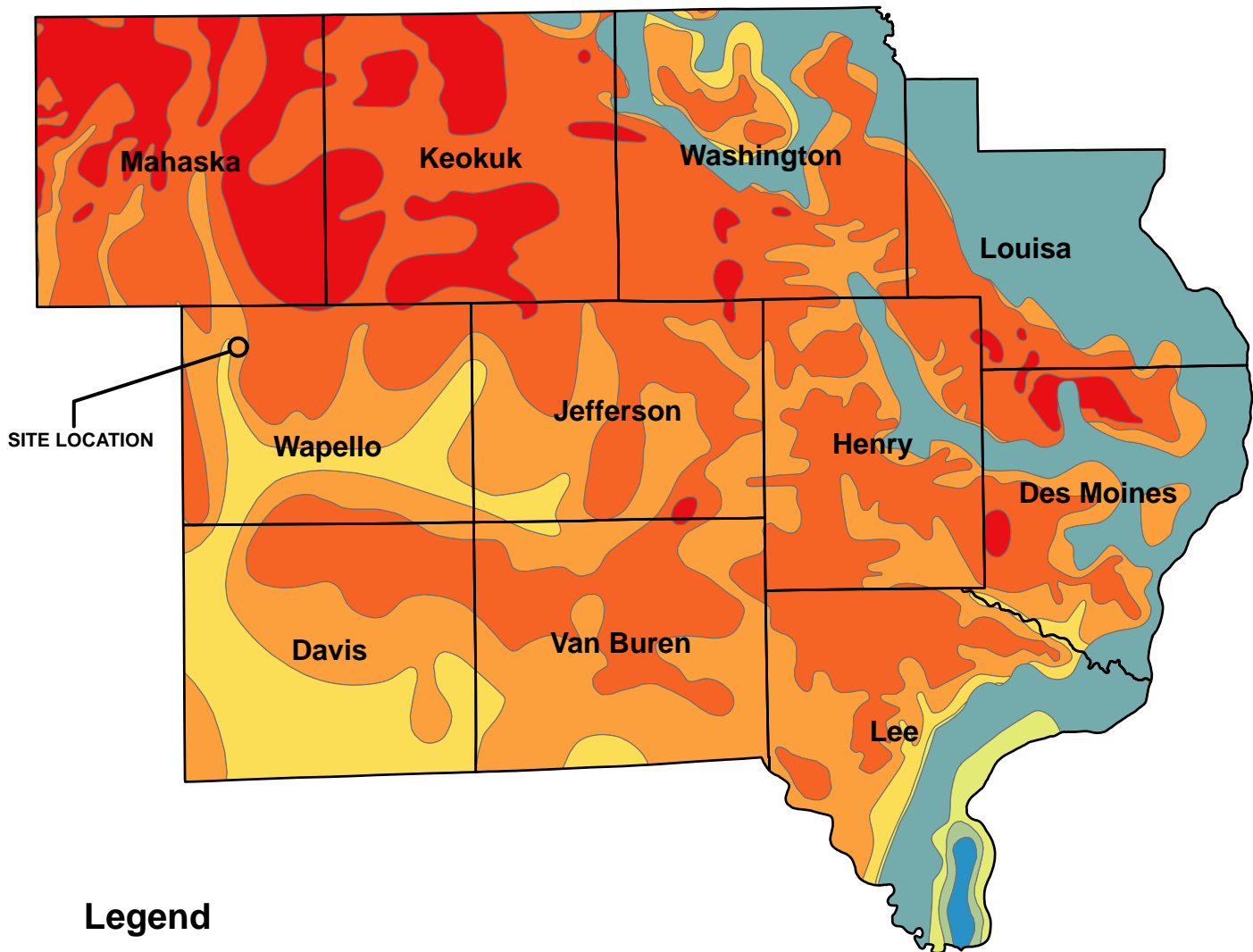
MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE

ELEVATION ABOVE MEAN SEA LEVEL IN FEET



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

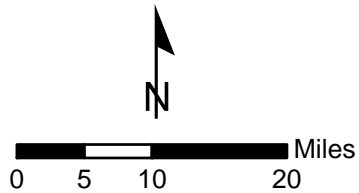
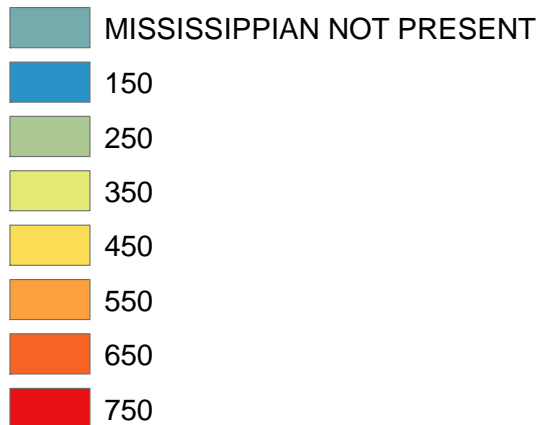
CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE	OTTUMWA GENERATING STATION OTTUMWA, IOWA	SE IOWA REGIONAL MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE ELEVATION	
	PROJECT NO. 25215053.03		DRAWN BY: JB	SCS ENGINEERS	FIGURE
DRAWN: 07/29/13	CHECKED BY: MDB				
REVISED: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



Legend

MISSISSIPPIAN AQUIFER ELEVATION

ELEVATION ABOVE MEAN SEA LEVEL IN FEET



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

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

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Appendix C

Boring Logs

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

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

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

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

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

SCS ENGINEERS

Environmental Consultants and Contractors

SOIL BORING LOG INFORMATION

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

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

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

water level 6.5 ft bgs.

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

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

Boring Number MW-307

Page 2 of 2

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S3	24	1 2	16	LEAN CLAY, dark yellowish brown (10YR 4/4), slightly dense. <i>(continued)</i>	CL									
		2 4	17	SILT, dark yellowish brown (10YR 3/4), fine to medium sand.					W					
S4	17	3 3	18		ML									
		3	19						W			Bedrock @19.5 ft bgs.		
S5	5	50/0.5	20	SANDSTONE, dark brown (10YR 3/3),										
			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 IPL-Ottumwa Generating Station SCS#: 25216148.00		License/Permit/Monitoring Number		Boring Number MW-308	
Boring Drilled By: Name of crew chief (first, last) and Firm Mike Mueller Cascade Drilling			Date Drilling Started 10/25/2016	Date Drilling Completed 10/25/2016	Drilling Method HSA
Unique Well No.	DNR Well ID No.	Common Well Name MW-308	Final Static Water Level Feet	Surface Elevation 652.9 Feet	Borehole Diameter 8.5 in
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/> State Plane 402,312 N, 1,902,665 E S/C/N			Local Grid Location		
NE 1/4 of SE 1/4 of Section 26, T 73 N, R 15 W			Lat _____ " _____ "	<input type="checkbox"/> N <input type="checkbox"/> E	<input type="checkbox"/> S <input type="checkbox"/> W
Facility ID		County Wapello	Civil Town/City/ or Village Ottumwa		

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

water @ 6.5 ft bgs.

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

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

Page 2 of 2

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
Number and Type	Length Att. & Recovered (in)								Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S3	18	1 2	16	SILT, brown (10YR 4/3), some clay. <i>(continued)</i>	ML									
		1 3		SILTY SAND, brown (10YR 4/3).	SM					W				
			17	POORLY GRADED SAND, brown (10YR 4/3), fine grained.	SP									
S4	13	4 12	18	WELL GRADED SAND AND GRAVEL, dark grayish brown (10YR 3/2), fine to coarse grained, (weathered bedrock).	SW						W			
		13 3	19	SANDSTONE, dark grayish brown (10YR 4/2), weathered bedrock.										
S5	6	12 26	20	Same as above except, brown (10YR 4/3).							W			
		50/0.4	21											
S6	4		22											
			23											
		50/0.4	24	Same as above except, dark grayish brown (10YR 4/2).							W			
			25	End of boring at 25 ft bgs.										


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

Facility/Project Name IPL-Ottumwa Generating Station SCS#: 25216148.00		License/Permit/Monitoring Number		Boring Number MW-309	
Boring Drilled By: Name of crew chief (first, last) and Firm Mike Mueller Cascade Drilling		Date Drilling Started 10/27/2016		Date Drilling Completed 10/27/2016	
Unique Well No.		DNR Well ID No.		Common Well Name MW-309	
Final Static Water Level Feet		Surface Elevation 652.5 Feet		Borehole Diameter 8.5 in	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input checked="" type="checkbox"/>		State Plane 403,189 N, 1,902,070 E S/C/N		Local Grid Location	
NE 1/4 of SE 1/4 of Section 26, T 73 N, R 15 W		Lat _____ ° _____ ' _____ "		Feet <input type="checkbox"/> N <input type="checkbox"/> E Feet <input type="checkbox"/> S <input type="checkbox"/> W	
Long _____ ° _____ ' _____ "		Civil Town/City/ or Village Ottumwa			

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

Environmental Consultants and Contractors

SOIL BORING LOG INFORMATION

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

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

Facility ID	County Wapello	Civil Town/City/ or Village Ottumwa
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Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S1	12	13 34	1	POORLY GRADED SAND WITH GRAVEL, tan, fine to coarse sand and gravel, (construction fill sand to fill in hydrovac hole cleared to 9 ft bgs).	SP									
			2											
			3											
S2	18	33 33	4	LEAN CLAY, dark brown (10YR 3/3), medium dense.	CL									
			5											
			6											
			7	SILT, dark brown (10YR 3/3), some clay.	ML									Water at 6.5 ft bgs
			8											
			9											

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

Signature 	Firm SCS Engineers 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:
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Boring Number B-309X

Page 2 of 2


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

Appendix D
Ash Pond CCR Unit Cobalt Data

Cobalt Results for Ash Pond and ZLDP Wells IPL - Ottumwa Generating Station

Parameter: Cobalt
 Number of Sampling Dates: 32
 Units: ug/L

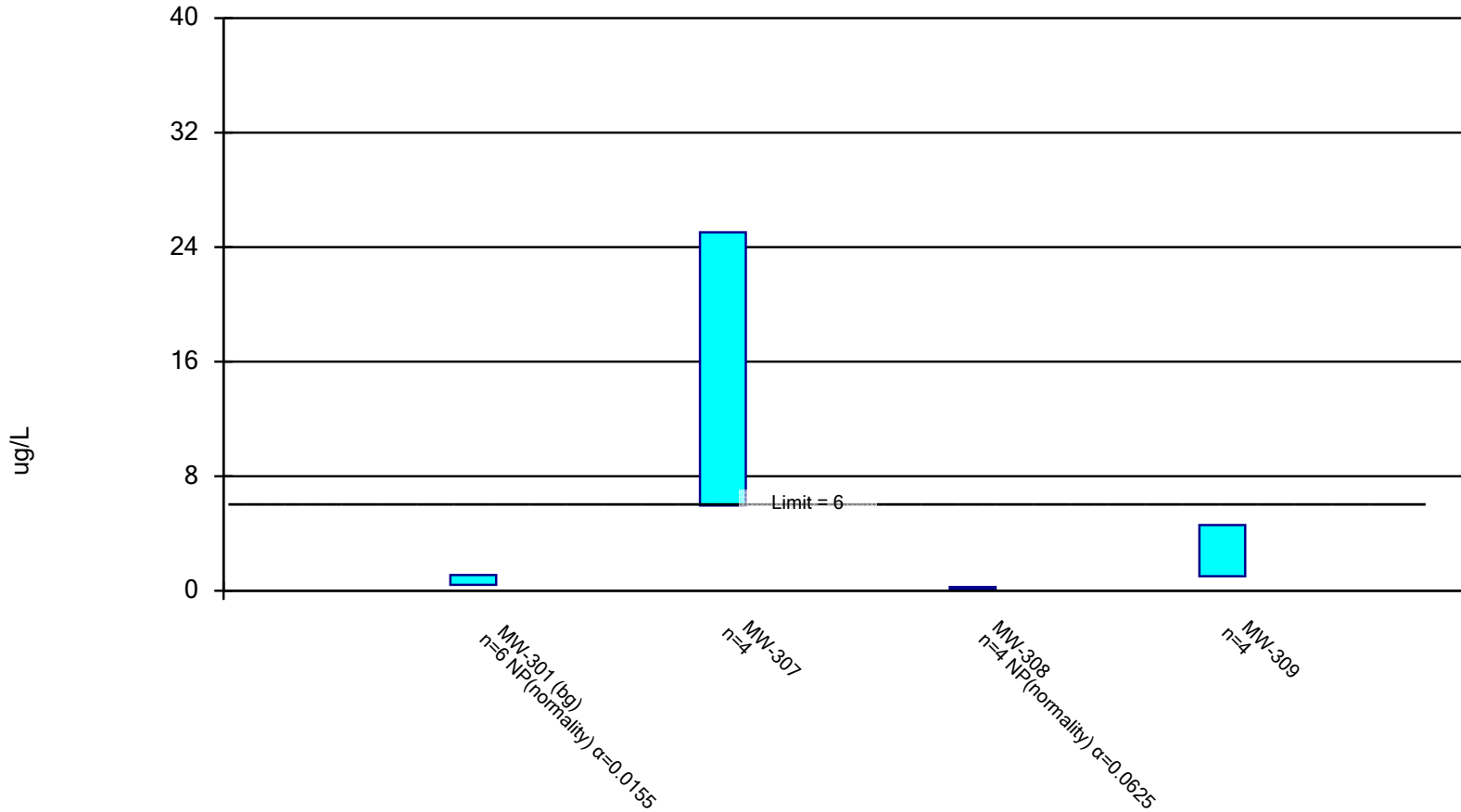
Location ID	Background	Compliance - Ash Pond					Compliance - ZLDP			Additional Wells for ACM/SOR - Ash Pond				
	MW-301	MW-302	MW-303	MW-304	MW-305	MW-306	MW-307	MW-308	MW-309	MW-310	MW-311	MW-305A	MW-310A	MW-311A
4/26/2016	4.1	2.6	2.2	0.89	14.8	8.3	--	--	--	--	--	--	--	--
6/23/2016	3.1	1.4	2.5	1.1	15.1	7.7	--	--	--	--	--	--	--	--
8/10/2016	1.8	1.1	2.6	--	--	--	--	--	--	--	--	--	--	--
8/11/2016	--	--	--	<0.5	13.7	6.4	--	--	--	--	--	--	--	--
10/26/2016	1.8	1	3.1	--	--	--	--	--	--	--	--	--	--	--
10/27/2016	--	--	--	<0.5	14.8	6.6	--	--	--	--	--	--	--	--
1/18/2017	1.3	0.94	2.6	<0.5	15.2	6	--	--	--	--	--	--	--	--
1/19/2017	--	--	--	--	--	--	0.62	0.52	2	--	--	--	--	--
4/19/2017	0.97	0.95	1.8	0.37	14.6	5.7	--	--	--	--	--	--	--	--
4/20/2017	--	--	--	--	--	--	1.6	0.43	3.1	--	--	--	--	--
6/20/2017	1	0.86	1.9	--	--	--	--	--	--	--	--	--	--	--
6/21/2017	--	--	--	0.36	14.4	5.2	1.1	0.25	2.4	--	--	--	--	--
8/21/2017	--	--	--	--	--	--	1.1	0.26	2.1	--	--	--	--	--
8/22/2017	--	0.88	2.8	0.3	--	--	--	--	--	--	--	--	--	--
8/23/2017	0.96	--	--	--	14.7	5	--	--	--	--	--	--	--	--
11/8/2017	--	--	--	--	--	--	1.3	0.23	2	--	--	--	--	--
4/16/2018	--	--	--	--	--	--	1.3	0.18	2.4	--	--	--	--	--
4/18/2018	0.46	0.9	2.1	0.39	14.5	4.8	--	--	--	--	--	--	--	--
6/28/2018	--	--	--	--	--	--	2.9	0.19	4.7	--	--	--	--	--
8/14/2018	1.4	1.5	2.2	--	--	--	--	--	--	--	--	--	--	--
8/15/2018	--	--	--	0.92	15.6	5.5	--	--	--	--	--	--	--	--
10/16/2018	0.36	4	1.7	0.45	17.2	6.4	4.8	0.15	2.7	--	--	--	--	--
1/8/2019	--	--	--	--	16.4	6.2	--	--	--	--	--	--	--	--
4/8/2019	0.44	1.2	0.42	0.4	17	6.9	--	--	--	--	--	--	--	--
10/23/2019	--	--	--	0.5	17	6.2	--	--	--	--	--	--	--	--
10/24/2019	0.6	2.7	1.2	--	--	--	--	--	--	0.57	0.78	--	--	--
12/11/2019	--	--	--	--	--	--	11	0.26	3.7	--	--	--	--	--
2/5/2020	1.1	--	--	--	--	--	13	0.14	2.3	0.32	0.11	--	--	--
3/12/2020	0.43	--	--	--	--	--	--	--	--	0.32	--	--	--	--
3/13/2020	--	--	--	--	18	--	--	--	--	--	<0.091	2.4	0.63	0.19
4/13/2020	--	--	--	0.57	16	--	--	--	--	0.24	<0.091	--	--	0.13
4/14/2020	0.52	5.3	0.87	--	--	5.5	20	0.14	3.2	--	--	2.7	0.39	--



Appendix F
Statistical Evaluation

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt Analysis Run 5/6/2021 3:23 PM View: OGS - Ash Pond
Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122

Confidence Interval

Constituent: Cobalt (ug/L) Analysis Run 5/6/2021 3:24 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
4/8/2019	0.44 (J)			
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)			
Mean	0.5833	15.5	0.17	2.8
Std. Dev.	0.2628	4.203	0.06	0.7874
Upper Lim.	1.1	25.04	0.26	4.588
Lower Lim.	0.41	5.957	0.14	1.012

Confidence Interval

Ottumwa Generating Station Client: SCS Engineers Data: OGS_CP_Export_201122 Printed 5/6/2021, 3:24 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Cobalt (ug/L)	MW-301 (bg)	1.1	0.41	6	No	6	0	None	No	0.0155	NP (normality)
Cobalt (ug/L)	MW-307	25.04	5.957	6	No	4	0	None	No	0.01	Param.
Cobalt (ug/L)	MW-308	0.26	0.14	6	No	4	0	None	No	0.0625	NP (normality)
Cobalt (ug/L)	MW-309	4.588	1.012	6	No	4	0	None	No	0.01	Param.

06/10/2021 - Classification: Internal - ECRM12608563