

# 2021 Annual Groundwater Monitoring and Corrective Action Report

Ottumwa Generating Station – Ash Pond  
Ottumwa, Iowa

Prepared for:

Alliant Energy



**SCS ENGINEERS**

25221072.00 | January 31, 2022

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## OVERVIEW OF CURRENT STATUS

### Ottumwa Generating Station, Ash Pond 2021 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. Supporting information is provided in the text of the annual report.

Category	Rule Requirement	Site Status
<b>Monitoring Status – Start of Year</b>	(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
<b>Monitoring Status – End of Year</b>	(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
<b>Statistically Significant Increases (SSIs)</b>	(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	<p>SSIs initially determined on January 15, 2018, based on November 2017 monitoring results. In 2021, SSIs for semiannual events for compliance wells at waste boundary included the following; see Table 5 for complete results.</p> <p><u>April 2021</u>                      Boron: MW-302, MW-304, MW-305, MW-306                      Calcium: MW-302, MW-303, MW-304, MW-305                      Chloride: MW-302, MW-304, MW-305                      Fluoride: MW-304                      Field pH: MW-304, MW-305</p>

Category	Rule Requirement	Site Status
		Sulfate: MW-302, MW-304, MW-306 Total Dissolved Solids: MW-302, MW-303, MW-304, MW-305, MW-306 <u>October 2021</u> Boron: MW-302, MW-303, MW-304, MW-305 Calcium: MW-302, MW-303, MW-304, MW-305 Chloride: MW-302, MW-303, MW-304, MW-305, MW-306 Field pH: MW-304, MW-305 Sulfate: MW-302, MW-304, MW-306 Total Dissolved Solids: MW-302, MW-303, MW-304, MW-305, MW-306
	(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	July 16, 2018

Category	Rule Requirement	Site Status
<b>Statistically Significant Levels (SSL) Above Groundwater Protection Standard</b>	(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;	Cobalt: MW-305, MW-306 Determined to be at SSL above GPS in January 2019. In 2021, concentrations exceeding the GPS detected in April and October events at MW-305 and in October event at MW-306.  Lithium: MW-310A, MW-311A Determined to be at SSL above GPS on July 15, 2021. In 2021, concentrations exceeding the GPS detected in April and October events.
	(B) Provide the date when the assessment of corrective measures was initiated for the CCR unit;	Cobalt: April 15, 2019  Lithium: Alternative Source Demonstration completed October 13, 2021; no ACM required.
	(C) Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and	June 4, 2020  An additional public meeting was held on February 18, 2021
	(D) Provide the date when the assessment of corrective measures was completed for the CCR unit.	September 12, 2019 - Original ACM  November 25, 2020 – Addendum No. 1 to ACM
<b>Selection of Remedy</b>	(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 Selected (In Progress)
<b>Corrective Action</b>	(vi) Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.	Not Initiated

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## Table of Contents

Section	Page
<b>Overview of Current Status .....</b>	<b>i</b>
<b>1.0 Introduction.....</b>	<b>1</b>
<b>2.0 Background.....</b>	<b>1</b>
2.1 Geologic and Hydrogeologic Setting.....	1
2.1.1 Regional Information.....	1
2.1.2 Site Information .....	2
2.2 CCR Rule Monitoring System .....	3
<b>3.0 § 257.90(e) Annual Report Requirements.....</b>	<b>3</b>
3.1 §257.90(e)(1) Site Map.....	4
3.2 §257.90(e)(2) Monitoring System Changes.....	4
3.3 §257.90(e)(3) Summary of Sampling Events.....	4
3.4 § 257.90(E)(4) Monitoring Transition Narrative .....	5
3.5 § 257.90(e)(5) Other Requirements.....	6
3.5.1 § 257.90(e) General Requirements.....	6
3.5.2 § 257.94(d) Alternative Detection Monitoring Frequency.....	8
3.5.3 § 257.94(e)(2) Alternative Source Demonstration for Detection Monitoring .....	9
3.5.4 § 257.95(c) Alternative Assessment Monitoring Frequency.....	9
3.5.5 § 257.95(d)(3) Assessment Monitoring Results and Standards .....	9
3.5.6 § 257.95(g)(3)(ii) Alternative Source Demonstration for Assessment Monitoring .	9
3.5.7 § 257.96(a) Extension of Time for Corrective Measures Assessment .....	9
3.6 §257.90(e)(6) Overview.....	10
<b>4.0 References.....</b>	<b>10</b>

### Tables

Table 1	Groundwater Monitoring Well Network
Table 2	CCR Rule Groundwater Samples Summary
Table 3	Groundwater Elevation Summary
Table 4A	Horizontal Gradients and Flow Velocities
Table 4B	Vertical Gradients
Table 5	Groundwater Analytical Results Summary – 2021
Table 6	2021 Groundwater Field Data Summary

### Figures

Figure 1	Site Location Map
Figure 2	Site Plan and Monitoring Well Locations—Ash Pond
Figure 3	Shallow Potentiometric Surface, April 12-16, 2021
Figure 4	Deep Potentiometric Surface, April 12-16, 2021
Figure 5	Shallow Potentiometric Surface, October 6-8, 2021
Figure 6	Deep Potentiometric Surface, October 6-8, 2021

## Appendices

Appendix A	Regional Hydrogeologic Information
Appendix B	Boring Logs and Well Construction Documentation
Appendix C	Laboratory Reports
	C1 Assessment Monitoring, February 2021
	C2 Assessment Monitoring, April 2021
	C3 Assessment Monitoring, July 2021
	C4 Assessment Monitoring, October 2021
Appendix D	Historical Monitoring Results
Appendix E	Statistical Evaluation
Appendix F	Alternative Source Demonstration

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## 1.0 INTRODUCTION

This 2021 Annual Groundwater Monitoring and Corrective Action Report was prepared to support compliance with the groundwater monitoring requirements of the Coal Combustion Residuals (CCR) Rule [40 CFR 257.50-107]. Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.90(e). The applicable sections of the Rule are provided below in *italics*, followed by applicable information relative to the 2021 Annual Groundwater Monitoring and Corrective Action Report for the CCR Units. The Ottumwa Generating Station (OGS) site location is shown on **Figure 1**.

This report covers the period of groundwater monitoring from January 1, 2021, through December 31, 2021.

The groundwater monitoring system is designed to detect monitored constituents at the waste boundary of the OGS Ash Pond (existing CCR surface impoundment), as required by 40 CFR 257.91(d). The groundwater monitoring system currently consists of one upgradient monitoring well, five downgradient compliance monitoring wells at the waste boundaries, and seven additional downgradient delineation monitoring wells. Two of the delineation monitoring wells, MW-312 and MW-313, were installed in December 2021 and were not sampled during the period covered by this report.

A separate groundwater monitoring system evaluates groundwater conditions for the OGS Zero Liquid Discharge Pond (ZLDP) CCR unit. Monitoring results for the ZLDP monitoring system provide supplemental information for the Ash Pond evaluation. Complete documentation of the ZLDP groundwater monitoring in 2021 is provided in a separate annual report for the ZLDP CCR Unit.

## 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 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 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-306 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, well construction, and development documentation for MW-301 through MW-306 are included in **Appendix B**.

Monitoring wells MW-310 and MW-311 were installed in August 2019 as delineation wells to assess the downgradient extent of groundwater impacts. Both wells were installed along the Des Moines River. Both are screened in alluvial sands. The total boring depths were 23 feet at MW-310 and 16 feet at MW-311. Boring logs, well construction, and development documentation for MW-310 and MW-311 are included in **Appendix B**.

Monitoring wells MW-305A, MW-310A, and MW-311A were installed in February and March 2020 as additional delineation wells to assess the downgradient vertical extent of groundwater impacts. They were installed as nested wells with MW-305, MW-310, and MW-311. All three wells were screened in the Mississippian Dolomite. The bedrock at the MW-305A location was a combination of interbedded sandstone and dolomite. The total boring depths were 80 feet at MW-305A, 54 feet at MW-310A, and 46 feet at MW-311A. Boring logs, well construction, and development documentation for MW-305A, MW-310A, and MW-311A are included in **Appendix B**.

Monitoring wells MW-312 and MW-313 were installed in December 2021 as additional delineation wells to assess groundwater conditions between the compliance well network and delineation well MW-310. MW-312 is screened in weathered Mississippian Dolomite, and MW-313 is screened in alluvial sand. The total boring depths were 27.5 feet at MW-312 and 22.5 feet at MW-313. Boring logs, well construction, and development documentation for MW-312 and MW-313 are being finalized and will be added to the operating record when complete.

The Mississippian bedrock aquifer, including some overlying weathered bedrock and sand, is confined below the clay layer. To evaluate groundwater flow directions and rates, potentiometric

surface maps were developed for two depth intervals within the confined aquifer. The shallow potentiometric surface is based on monitoring wells installed near the top of the aquifer. The deep potentiometric surface is based on the deeper “A” wells.

The shallow and deep potentiometric surfaces and groundwater flow patterns based on April 2021 water level measurements are shown on **Figures 3** and **4**. The shallow and deep potentiometric surfaces and groundwater flow patterns for the October 2021 water level measurements are shown on **Figures 5** and **6**. 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 elevation data for the CCR monitoring wells are 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 4A**. Calculated vertical gradients for the nested wells are provided in **Table 4B**.

## **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 five downgradient monitoring for the OGS Ash Pond (**Table 1** and **Figure 2**). The background well is MW-301 and the five downgradient compliance wells include MW-302, MW-303, MW-304, MW-305, and MW-306. Seven additional wells, MW-305A, MW310/310A, MW311/311A, MW-312, and MW-313 were added as delineation wells following initiation of assessment monitoring and confirmation that cobalt concentrations in MW-305 and MW-306 exceeded the Groundwater Protection Standard. 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 14 to 80 feet.

The background well (MW-301) is located to the west of the site. The downgradient wells (MW-302 through MW-306) are located along the northeastern, eastern, and southeastern edges of the Ash Pond. The downgradient wells were installed as close as practicable to the pond boundaries considering the site layout.

Monitoring wells MW-307, MW-308, and MW-309 were installed to monitor the ZLDP CCR Unit, which has a separate monitoring system.

## **3.0 § 257.90(E) ANNUAL REPORT REQUIREMENTS**

*Annual groundwater monitoring and corrective action report.* For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than January 31 of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. 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:

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

### **3.2 §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;*

Two new monitoring wells, MW-312 and MW-313, were installed between December 14 and December 16, 2021, to characterize site conditions, evaluate the nature and extent of CCR impacts in groundwater, and support the selection of remedy process. The monitoring well logs and well construction forms are being finalized and will be added to the operating record when complete.

### **3.3 §257.90(E)(3) SUMMARY OF SAMPLING EVENTS**

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

Four groundwater sampling events were completed in 2021. 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 assessment monitoring programs is included in **Table 2**.

The two semiannual assessment monitoring rounds for the complete monitoring network were completed in April and October 2021. In addition to Appendix III and Appendix IV parameters, both semiannual events included parameters chosen to support the selection of remedy. Supplemental parameters included dissolved and total metals, general water quality parameters, and parameters used to evaluate feasibility of monitored natural attenuation (MNA).

Supplemental monitoring events performed in February and July 2021 were limited to a subset of the wells and parameters. During each of these sampling events, downgradient well MW-306 was sampled for cobalt and downgradient well MW-311A was sampled for fluoride.

The 2021 monitoring results are summarized in **Table 5**. Field parameter results for the 2021 sampling events are provided in **Table 6**. The analytical laboratory reports for 2021 are provided in **Appendix C**. Historical results for each monitoring well are summarized in **Appendix D**.

### 3.4 § 257.90(E)(4) MONITORING TRANSITION NARRATIVE

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

There was no monitoring program transition in 2021.

Assessment monitoring for the OGS Ash Pond was initiated in April 2018 and continued through 2021. An Assessment of Corrective Measures (ACM) was initiated for the OGS Ash Pond in April 2019 and completed in September 2019. Addendum No. 1 to the ACM was completed in November 2020. The selection of remedy is in progress. The ACM was initiated in response to the detection of cobalt at a statistically significant level (SSL) exceeding the Groundwater Protection Standards (GPS) in monitoring wells MW-305 and MW-306. Assessment monitoring continued during the ACM and will continue during the selection of remedy and implementation of the corrective action program.

In accordance with the Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at Resource Conservation and Recovery Act (RCRA) Facilities (USEPA, 2009), the comparison of assessment monitoring results to the GPS was based on the lower confidence limit (LCL) for the arithmetic mean. The LCL evaluation was completed for the Appendix IV parameters that have been detected at a concentration exceeding the GPS in at least one sample result since assessment monitoring was initiated, which include cobalt, fluoride, lithium, and radium. The LCLs were calculated with Sanitas™ groundwater statistical software using historical concentrations measured since assessment monitoring began in April 2018. The most recent LCL evaluation, completed for the October 2021 event, is provided in **Appendix E**.

The only parameters determined to be at an SSL above the GPS based on data collected through October 2021 were cobalt at MW-305 and lithium at MW-310A and MW-311A. Cobalt at MW-306 was previously identified as being at an SSL above the GPS, but in 2021 three of the four sample results for MW-306 were below the GPS, and the LCL for the mean was also below the GPS.

A trend analysis evaluation was completed for cobalt. Trend analyses were calculated with Sanitas™ using historical concentrations measured since assessment monitoring began for each well. The evaluation is provided in **Appendix E**. Based on the trend analysis, there are no statistically significant trends in cobalt concentrations at the monitoring wells.

In addition to the cobalt results above the GPS in the Ash Pond monitoring well samples, cobalt has also been detected above the GPS in samples from MW-307, which is part of the ZLDP CCR Unit monitoring network. Cobalt was determined to be at an SSL above the GPS at MW-307 on June 1, 2021, following statistical evaluation of the February 2021 monitoring event for the ZLDP. An ASD completed on August 30, 2021, concluded that the Ash Pond was the most likely source of cobalt concentrations at an SSL above the GPS at MW-307. MW-307 is located downgradient of both the Ash Pond and the ZLDP. The conclusion that the Ash Pond was the most likely source of cobalt was based on groundwater flow directions, distribution of cobalt in groundwater, and the historical use of the ponds. Cobalt concentrations at MW-307 will be addressed in the selection of remedy process for the Ash Pond. Complete information on the ZLDP monitoring in 2021 and the ASD for cobalt at MW-307 are included in the 2021 Annual Groundwater Monitoring and Corrective Action Report for the ZLDP.

The lithium detections above the GPS at delineation wells have been attributed to sources other than the Ash Pond. An Alternative Source Demonstration (ASD) for the April 2021 monitoring event was completed in October 2021 and is included in **Appendix F**. Lithium was determined to be at an SSL

above the GPS in two deep piezometers downgradient from the Ash Pond, but was not detected above the GPS in wells installed at the waste boundary. Based on regional and site information, the lithium SSLs are attributed to naturally occurring lithium in the Mississippian aquifer.

### **3.5 § 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 2021 Annual Groundwater Monitoring and Corrective Action Report.

#### **3.5.1 § 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 is currently in the selection of remedy process, with assessment monitoring continuing.

#### **Summary of Key Actions Completed.**

- Statistical evaluation and determination of any SSLs exceeding the GPS for the October 2020 monitoring event (January 2021).
- Completed 2021 Annual Groundwater Monitoring and Corrective Action Report (January 2021).
- Held public ACM Addendum meeting on February 18, 2021.
- Completed Semiannual Progress Report for the Selection of Remedy (March 2021).
- Two semiannual assessment monitoring events (April and October 2021).
- Supplemental monitoring events in February and July 2021 to characterize groundwater quality at selected wells installed to delineate the nature and extent of impacts.
- Completed groundwater monitoring results letter for February 2021 sampling event (June 2021).
- Submitted Joint Permit Application to the United States Army Corps of Engineers (USACE) and Iowa Department of Natural Resources (IDNR) for the installation of monitoring wells MW-312 and MW-313 (July 2021).

- Statistical evaluation and determination of any SSLs exceeding the GPS for the April 2021 monitoring event (July 2021).
- Completed groundwater monitoring results letter for April 2021 sampling event (July 2021).
- Submitted Notification of Groundwater Protection Standard Exceedance for lithium at MW-310A and MW-311A (July 2021).
- Completed Semiannual Progress Report for the Selection of Remedy (September 2021).
- Completion of an ASD for lithium SSLs at MW-310A and MW-311A (October 2021).
- Submitted Closure Permit Application for Main Ash Pond to IDNR Land Quality Bureau (October 2021).
- Received approval of Antidegradation Analysis from IDNR (October 2021).
- Received Closure Permit for Main Ash Pond from IDNR Land Quality Bureau (November 2021).
- Received approval letters from USACE (August 2021) and IDNR (November 2021) for installation of monitoring wells MW-312 and MW-313.
- Received Facility Plan Approval letter for new wastewater outfall to Des Moines River (November 2021).
- Submitted well permit application to Wapello County and received approval of permit (December 2021).
- Installation of two additional monitoring wells to characterize site conditions for the selection of remedy (December 2021).
- Prepared NPDES Wastewater Permit Amendment Request (November and December 2021).

#### **Description of Any Problems Encountered.**

- Monitoring well MW-311 could not be sampled in October 2021 because the well was dry. The well is screened in the alluvial sand unit close to the Des Moines River. Based on river elevation data available for the U.S. Army Corps of Engineers gauge at Eddyville, located approximately seven miles upstream of OGS, the river level was lower during the October 2021 sampling event than during any other event since monitoring began in 2016 and was also lower in October 2021 than during any October since at least 1997.
- There were no other problems encountered during 2021.

#### **Discussion of Actions to Resolve the Problems.**

- The water level at MW-311 will be assessed during the next semiannual sampling event, in April 2022.

### Projection of Key Activities for the Upcoming Year (2022):

- Statistical evaluation and determination of any SSLs exceeding the GPS for the October 2021 monitoring event (January 2022).
- Collect additional MNA parameters for ongoing MNA evaluation. Data collection will include:
  - Field parameters and both total and dissolved laboratory parameters to better define the downgradient chemistry and evolution with flow.
  - Dissolved cobalt and iron to assess potential adsorption of cobalt to colloidal iron.
  - Filtration of turbid groundwater produced by the monitoring wells and analysis of the solid filtrate for aluminum, iron and cobalt to determine the degree to which the cobalt is associated with suspended solids.
- Laboratory analyses of the degree of iron precipitation and cobalt coprecipitation and adsorption from MW-305 groundwater with aeration (i.e. redox increase) to better understand the degree to which cobalt adsorption and coprecipitation contributes to attenuation.
- Samples of the saturated sand will be collected to
  - Assess the potential for adsorption
  - Assess the degree to which cobalt has adsorbed or coprecipitated on to the sand matrix.
  - Prepare cobalt adsorption isotherms to assess capacity of the sand to absorb cobalt and determine maximum adsorption capacity.
- Update conceptual site model based on findings of nature and extent investigation.
- Statistical evaluation and determination of any SSLs exceeding the GPS for the April 2022 monitoring event (July 2022).
- Continued work on the selection of remedy in accordance with § 257.97.
- Semiannual progress reports for the Selection of Remedy process.
- Two semiannual assessment monitoring events (April and October 2022).
- Submittal of documentation for MW-312 and MW-313 into the operating record.

### 3.5.2 § 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 is no longer in detection monitoring program.

### **3.5.3 § 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 is no longer in the detection monitoring program.

### **3.5.4 § 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.

### **3.5.5 § 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 2021 assessment monitoring results, background upper prediction limits (UPLs), and GPSs established for the Ash Pond are provided in **Table 5**. The laboratory reports are provided in **Appendix C**. Historical monitoring results are summarized in **Appendix D**.

Supplemental groundwater quality parameters were included in the monitoring program in 2021 to support the selection of remedy process, including the evaluation of MNA. The results for the supplemental parameters are included in **Table 5** and in the laboratory reports in **Appendix C**.

### **3.5.6 § 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 lithium SSLs at MW-310A and MW-311A was completed in October 2021 and was certified by a qualified professional engineer. The ASD is included in **Appendix F**.

### **3.5.7 § 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.

The ACM was initiated on April 15, 2019. The certification demonstrating the need for a 90-day deadline extension was completed on July 10, 2019, and was included in the 2019 annual groundwater monitoring and corrective action report. The ACM was completed on September 12, 2019. Addendum No. 1 to the ACM was completed on November 25, 2020.

### **3.6 §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.

### **4.0 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 CCR Rule Groundwater Samples Summary
- 3 Groundwater Elevation Summary
- 4A Horizontal Gradients and Flow Velocities
- 4B Vertical Gradients
- 5 Groundwater Analytical Results Summary – 2021
- 6 2021 Groundwater Field Data Summary

**Table 1. Groundwater Monitoring Well Network  
Ottumwa Generating Station - Ash Pond / SCS Engineers Project #25221072.00**

<b>Monitoring Well</b>	<b>Location in Monitoring Network</b>	<b>Role in Monitoring Network</b>
MW-301	Upgradient	Background
MW-302	Downgradient	Compliance
MW-303	Downgradient	Compliance
MW-304	Downgradient	Compliance
MW-305	Downgradient	Compliance
MW-305A	Downgradient, deeper	Delineation
MW-306	Downgradient	Compliance
MW-310	Downgradient	Delineation
MW-310A	Downgradient, deeper	Delineation
MW-311	Downgradient	Delineation
MW-311A	Downgradient, deeper	Delineation
MW-312	Downgradient	Delineation
MW-313	Downgradient	Delineation

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

Date: 12/17/2021  
 Date: 12/17/2021  
 Date: 12/27/2021

**Table 2. CCR Rule Groundwater Samples Summary  
Ottumwa Generating Station - Ash Pond / SCS Engineers Project #25221072.00**

Sample Dates	Compliance Wells					Delineation Wells							Background Well
	MW-302	MW-303	MW-304	MW-305	MW-306	MW-305A	MW-310	MW-310A	MW-311 <sup>(1)</sup>	MW-311A	MW-312 <sup>(2)</sup>	MW-313 <sup>(2)</sup>	
2/23-25/2021	--	--	--	--	A	--	A	--	--	A	--	--	--
4/13-16/2021	A	A	A	A	A	A	A	A	A	A	--	--	A
7/6-7/2021	--	--	--	--	A	--	A	--	--	A	--	--	--
10/6-8/2021	A	A	A	A	A	A	A	A	--	A	--	--	A
Total Samples	2	2	2	2	4	2	4	2	1	4	--	--	2

Abbreviations:

A = Assessment Monitoring Program

-- = Not sampled

Notes:

(1) Insufficient amount of water for sampling at MW-311 during October 2021 sampling event

(2) MW-312 and MW-313 were installed in December 2021

Created by:     MDB     Date: 12/17/2021

Last revision by:     RM     Date: 12/27/2021

Checked by:     MDB     Date: 1/2/2022

I:\25221072.00\Deliverables\2021 Federal Annual Report - OGS AP\Tables\[Table 2\_GW\_Samples\_Summary\_Table\_OGS.xlsx]GW Summary

**Table 3. Groundwater Elevations - CCR Rule Monitoring Well Networks  
IPL - Ottumwa Generating Station / SCS Engineers Project #25221072.00**

Ground Water or Surface Water Elevation in feet above mean sea level (amsl)																		
Well Number	MW-301	MW-302	MW-303	MW-304	MW-305	MW-305A	MW-306	MW-307	MW-308	MW-309	MW-310	MW-310A	MW-311	MW-311A	MW-312	MW-313	River at Intake	
<b>Top of Well Casing Elevation / Surface Water Reference Elevation (feet amsl)</b>	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	NS	NS	656.31	
<b>Screen Length (ft)</b>	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	5.00	5.00	NA	
<b>Total Depth (ft from top of casing)</b>	17.0	25.8	17.5	52.3	51.5	81.91	36.6	28.0	25.0	27.5	25.9	55.55	17.9	47.68	29.87	23.82	NA	
<b>Top of Well Screen Elevation (ft)</b>	679.63	653.10	648.57	635.54	637.41	607.12	651.87	634.56	635.39	632.44	637.76	607.38	641.24	610.86	NS	NS	NA	
<b>Measurement Date</b>																		
April 26, 2016	682.80	655.63	652.42	655.37	661.67	NI	670.86	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	
June 23, 2016	682.58	655.65	652.89	656.53	662.36	NI	670.64	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	
August 9, 2016	682.27	655.52	651.76	653.79	660.78	NI	670.35	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	
October 26-27, 2016	682.04	655.67	652.17	655.03	661.37	NI	670.21	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	
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	NI	NI	
April 19-20, 2017	682.15	656.35	654.57	657.48	663.27	NI	670.69	653.62	651.09	650.16	NI	NI	NI	NI	NI	NI	NI	
June 20-21, 2017	681.91	655.65	652.42	654.75	661.26	NI	669.94	649.85	648.26	647.60	NI	NI	NI	NI	NI	NI	NI	
August 21-23, 2017	681.28	655.13	650.58	652.39	659.00	NI	668.77	645.78	643.12	641.82	NI	NI	NI	NI	NI	NI	NI	
November 8, 2017	681.54	655.40	651.34	653.03	659.76	NI	669.04	647.37	644.99	644.20	NI	NI	NI	NI	NI	NI	NI	
April 18, 2018	681.53	655.71	652.47	655.55	660.99	NI	668.92	649.66	647.91	647.65	NI	NI	NI	NI	NI	NI	NI	
May 30, 2018	NM	NM	NM	NM	NM	NI	NM	652.45	651.05	650.98	NI	NI	NI	NI	NI	NI	NI	
June 28, 2018	NM	NM	NM	NM	NM	NI	NM	652.87	651.43	651.47	NI	NI	NI	NI	NI	NI	NI	
July 18, 2018	NM	NM	NM	NM	NM	NI	NM	652.27	650.67	650.69	NI	NI	NI	NI	NI	NI	NI	
August 14-15, 2018	680.91	656.05	652.57	656.35	661.56	NI	668.66	NM	NM	NM	NI	NI	NI	NI	NI	NI	NI	
August 29, 2018	681.09	655.89	655.07	657.82	NM	NI	NM	NM	NM	NM	NI	NI	NI	NI	NI	NI	NI	
October 16, 2018	682.50	656.91	656.17	658.20	663.37	NI	670.24	654.13	NM	651.61	NI	NI	NI	NI	NI	NI	NI	
January 8, 2019	682.22	656.03	654.65	656.28	662.13	NI	669.84	NM	NM	NM	NI	NI	NI	NI	NI	NI	NI	
April 8, 2019	682.69	657.23	655.55	659.33	664.01	NI	670.96	654.90	653.70	653.55	NI	NI	NI	NI	NI	NI	NI	
August 28, 2019	NM	NM	NM	NM	NM	NI	NM	NM	NM	NM	640.98	NI	642.10	NI	NI	NI	NI	
October 23-24, 2019	683.07	660.14	653.86	657.71	663.21	NI	671.28	651.89	651.31	651.28	649.31	NI	647.80	NI	NI	NI	NI	
December 11, 2019	NM	NM	NM	NM	NM	NI	NM	649.59	647.39	647.24	NM	NI	NM	NI	NI	NI	NI	
February 5, 2020	683.30	NM	NM	NM	NM	NI	NM	649.88	650.12	648.34	644.71	NI	645.00	NI	NI	NI	NI	
March 12-13, 2020	682.82	NM	NM	NM	661.41	651.64	NM	NM	NM	NM	645.45	617.84	644.18	624.11	NI	NI	NI	
April 1, 2020	683.27	657.00	655.89	658.57	660.59	655.05	671.13	653.76	651.88	651.23	651.09	649.16	649.35	648.27	NI	NI	649.71	
April 13-14, 2020	683.25	656.45	654.08	656.42	662.44	653.69	670.71	650.66	650.09	649.19	645.91	647.50	646.79	648.42	NI	NI	645.71	
May 4, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NI	NI	NM	
June 30, 2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	647.73	NI	NI	NM
October 5-12, 2020	682.34	655.80	650.37	652.95	659.81	648.01	670.18	646.18	642.85	641.50	638.46	640.20	638.73	641.09	NI	NI	638.16	
February 23, 2020	NM	NM	NM	NM	NM	NM	669.86	646.80	NM	NM	638.77	NM	NM	641.16	NI	NI	NM	
April 12 - 16, 2021	682.94	656.05	653.82	654.34	661.15	651.16	670.27	649.53	647.66	646.46	642.70	644.88	643.02	644.16	NI	NI	640.91	
July 6, 2021	NM	NM	NM	NM	NM	NM	661.87	647.03	NM	NM	639.32	NM	NM	642.38	NI	NI	NM	
October 6-8, 2021	681.95	654.86	649.80	649.53	654.83	645.57	662.27	644.49	641.81	640.71	638.19	639.57	Dry	640.58	NI	NI	NM	
January 11-12, 2022	681.58	NM	NM	NM	656.55	NM	NM	646.24	NM	NM	NM	NM	NM	NM	NS	NS	NM	
<b>Bottom of Well Elevation (ft)</b>	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	NS	NS	--	

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

Created by: NDK  
 Last rev. by: ACW  
 Checked by: RM  
 oj Mgr QA/QC: TK

Date: 1/15/20218  
 Date: 1/14/2022  
 Date: 1/14/2022  
 Date: 1/18/2022

**Table 4A. Horizontal Gradients and Flow Velocity  
Ottumwa Generating Station - Ash Pond /  
SCS Engineers Project #25221072.00  
January - December 2021**

Shallow					
Sampling Dates	h1 (ft)	h2 (ft)	Δl (ft)	Δh/Δl (ft/ft)	V (ft/d)
April 12-16, 2021	670.27	655.00	350	0.04	0.28
April 12-16, 2021	654.34	645.00	846	0.01	
April 12-16, 2021	665.00	645.00	2033	0.01	
October 6-8, 2021	662.27	645.00	379	0.05	0.29
October 6-8, 2021	649.53	640.00	783	0.01	
October 6-8, 2021	660.00	640.00	1838	0.01	

Deep					
Sampling Dates	h1 (ft)	h2 (ft)	Δl (ft)	Δh/Δl (ft/ft)	V (ft/d)
April 12-16, 2021	651.00	645.00	568	0.01	0.0001
October 6-8, 2021	645.00	640.00	528	0.01	0.0001

	Well	K Values (cm/sec)	K Values (ft/d)	
Upgradient Well	MW-301	4.6E-03	13	<b>Assumed Unconsolidated Porosity, n</b> 0.40
Shallow Wells	MW-302	3.2E-03	9.1	
	MW-303	1.2E-04	0.35	
	MW-304	3.5E-04	0.98	
	MW-305	2.5E-03	7.1	
	MW-306	2.8E-03	8.1	
	MW-310	2.9E-03	8.2	
	MW-311	2.3E-02	64	
	Geometric Mean	1.8E-03	5.1	
Deep Wells	MW-305A	5.6E-06	0.02	<b>Assumed Dolomite Porosity, n</b> 0.25
	MW-310A	4.2E-07	0.001	
	MW-311A	5.4E-07	0.002	
	Geometric Mean	1.1E-06	3.1E-03	

Note: Geometric mean calculations do not include upgradient well MW-301

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

Δl = distance between location 1 and 2

Δh/Δl = hydraulic gradient

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

Date: 12/29/2020  
Date: 1/10/2022  
Date: 1/11/2022

**Table 4B. Vertical Gradients**  
**IPL - Ottumwa Generating Station / SCS Engineers Project #25221072.00**  
**2021**

Vertical Hydraulic Gradients	MW-305/MW-305A		MW-310/MW-310A		MW-311/MW-311A	
	Shallow Well Screen midpoint (feet amsl)	MW-305 634.91		MW-310 635.26		MW-311 638.74
Deep Well Screen midpoint (feet amsl)	MW-305A 604.62		MW-310A 604.88		MW-311A 608.36	
Measurement Date	Distance between midpoints (ft)	Vertical Gradient (ft/ft)	Distance between midpoints (ft)	Vertical Gradient (ft/ft)	Distance between midpoints <sup>(2)</sup> (ft)	Vertical Gradient (ft/ft)
April 12-16, 2021	30.3	-0.330	30.4	0.072	30.4	0.038
October 6-8, 2021	30.3	-0.306	30.4	0.045	30.4	NM (MW-311 Dry)

Notes:

1: A positive vertical gradient indicates upward groundwater flow. A negative gradient indicates downward flow.

NM: Not Measured

NI: Not Installed

Last rev. by: MDB  
 Checked by: RM

Date: 1/4/2022  
 Date: 1/11/2022

**Table 5. Groundwater Analytical Results Summary - 2021**  
**Ottumwa Generating Station Ash Pond / SCS Engineers Project #25221072.00**

Parameter Name	UPL Method	UPL	GPS	Background Well		Compliance Wells						Delineation Well					
				MW-301		MW-302		MW-303		MW-304		MW-305		MW-305A			
				4/14/2021	10/7/2021	4/13/2021	10/7/2021	4/13/2021	10/7/2021	4/14/2021	10/8/2021	4/16/2021	10/6/2021	4/15/2021	10/8/2021		
<b>Appendix III</b>																	
Boron, ug/L	P	820		690	800	1,300	1200	420	860	990	990	860	880	190	200		
Calcium, mg/L	P	78.7		96	100	180	170	160	190	120	120	110	110	150	150		
Chloride, mg/L	P	86.8		150	180	190	200	29	140	240	260	240	230	140	130		
Fluoride, mg/L	P	0.484		<0.28	<0.28	0.33 J	<0.28	<0.28	<0.28	1.1	<0.28	0.37 J	<0.28	0.56	<0.28		
Field pH, Std. Units	P	6.87		6.26	6.26	6.44	6.49	6.67	6.7	6.94	6.97	6.92	6.94	7.05	6.9		
Sulfate, mg/L	P	199		140	180	360	850	140	170	200	230	120	150	150	140		
Total Dissolved Solids, mg/L	P	628		620	670	1,500	1300	720	720	1,000	760	900	680	780	730		
<b>Appendix IV</b>																	
		UPL	GPS														
Antimony, ug/L	P*	0.22	6	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1		
Arsenic, ug/L	P*	0.53	10	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	0.88 J	<0.75	0.75 J	<0.75	<0.75		
Barium, ug/L	P	68.8	2,000	52	61	22	18	63	80	80	79	130	120	80	84		
Beryllium, ug/L	DQ	DQ	4	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27		
Cadmium, ug/L	NP*	0.12	5	<0.051	0.057 J	0.26	0.23	0.12	0.28	<0.051	<0.051	0.12	<0.051	<0.051	<0.051		
Chromium, ug/L	P	1.07	100	<1.1	<1.1	3.0 J	1.3 J	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1		
Cobalt, ug/L	NP	4.1	6	0.29 J	0.48 J	5.5	2.2	0.43 J	4.0	0.43 J	0.42 J	18	18	0.50	0.94		
Fluoride, mg/L	P	0.48	4	<0.28	<0.28	0.33 J	<0.28	<0.28	<0.28	1.1	<0.28	0.37 J	<0.28	0.56	<0.28		
Lead, ug/L	NP*	0.10	15	<0.21	<0.21	0.59	0.22 J	<0.21	<0.21	<0.21	<0.21	<0.21	0.29 J	<0.21	<0.21		
Lithium, ug/L	P	34.2	40	23	26	10	11	4.1 J	5.8 J	3.3 J	4.0 J	2.6 J	3.1 J	17	17		
Mercury, ug/L	DQ	DQ	2	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15		
Molybdenum, ug/L	P	1.74	100	<1.3	<1.3	<1.3	1.7 J	2.9	1.4 J	1.7 J	2.0	8.2	8.1	5.5	4.2		
Selenium, ug/L	P	8.55	50	6.5	7.5	<0.96	1.2 J	5.1	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96	<0.96		
Thallium, ug/L	NP*	0.14	2	<0.26	<0.26	<0.26	0.56 J	<0.26	<0.26	<0.26	<0.26	0.36 J	0.37 J	<0.26	<0.26		
Radium 226/228 Combined, pCi/L	P	2.15	5	0.598	1.04	0.901	1.45	0.510	0.916	2.49	3.49	0.327	1.66	2.67	2.96		
<b>Additional Parameters - Selection of Remedy</b>																	
Cobalt - dissolved, #	UPL or GPS not applicable			--	--	--	--	--	--	--	--	20	17	--	--		
Lithium - dissolved, #				--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron, dissolved, # ug/L				<36	<36	<36	<36	<36	100	4,500	3,900	85 J	150	<36	<36		
Iron, ug/L				49 J	<36	350	65 J	44 J	120	4,500	3,700	170	75 J	<36	<36		
Magnesium				34000	36000	50,000	46,000	22,000	26,000	40,000	36,000	47,000	44000	29,000	26000		
Manganese, dissolved, # ug/L				10	15	110	110	340	1,800 ^2	3,800	3,400 ^2	3,800	3300 ^2	87	120		
Manganese, ug/L				14	18	200	120	330	1,900	3,600	3,000	3,500	3200	78	100		
Potassium, ug/L				1200	1300	1,500	1,400	800	800	8,200	6,800	7,900	7000	3,600	3400		
Sodium, ug/L				78000	88000	240,000	220,000	89,000	94,000	210,000	190,000	200,000	180000	68,000	52000		
Total Alkalinity, mg/L				170	210	72	120	440	490	360	470	470	500	300	300		
Carbonate Alkalinity, mg/L				<4.6	<4.6	<3.2	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.6	<4.2	<4.6		
Bicarbonate Alkalinity, mg/L				170	210	72	120	440	490	360	470	470	500	300	300		

4.4
30.8
17

Blue highlighted cell indicates the compliance well | Blue highlighted cell indicates the c  
 Yellow highlighted cell indicates the compliance we Yellow highlighted cell indicates the  
 Grayscale indicates Additional Parameters sampled Grayscale indicates Additional Parc



**Table 5. Groundwater Analytical Results Summary - 2021**  
**Ottumwa Generating Station Ash Pond / SCS Engineers Project #25221072.00**

Parameter Name	UPL Method	UPL	GPS	Background Well		Compliance Well				Delineation Wells												
				MW-301		MW-306				MW-310				MW-310A		MW-311	MW-311A					
				4/14/2021	10/7/2021	2/23/2021	4/13/2021	7/6/2021	10/8/2021	2/23/2021	4/13/2021	7/6/2021	10/6/2021	4/15/2021	10/8/2021	4/14/2021	2/25/2021	4/16/2021	7/7/2021	10/8/2021		
<b>Appendix III</b>																						
Boron, ug/L	P	820		690	800	--	1000	--	730	--	360	--	520	1,500	1500	64 J	--	1,500	--	1400		
Calcium, mg/L	P	78.7		96	100	--	74	--	130	--	210	--	130	82	80	160	--	42	--	40		
Chloride, mg/L	P	86.8		150	180	--	35	--	180	--	250	--	120	120	130	11	--	130	--	140		
Fluoride, mg/L	P	0.484		<0.28	<0.28	--	<0.28	--	<0.28	--	1.3	--	<0.28	1.9	0.28 J	<0.28	3.9	4.0	3.8	2		
Field pH, Std. Units	P	6.87		6.26	6.26	6.34	6.42	7.44	6.66	7.11	7.07	8.23	7.2	7.47	7.65	6.66	7.55	7.76	8.19	8.12		
Sulfate, mg/L	P	199		140	180	--	370	--	460	--	720	--	470	1,100	1200	75	--	1,100	--	1100		
Total Dissolved Solids, mg/L	P	628		620	670	--	880	--	1100	--	1,600	--	930	2,300	1800	590	--	2,200	--	2000		
<b>Appendix IV</b>																						
Antimony, ug/L	P*	0.22	6	<1.1	<1.1	--	<1.1	--	<1.1	--	<1.1	--	<1.1	<1.1	<1.1	<1.1	--	<1.1	--	<1.1		
Arsenic, ug/L	P*	0.53	10	<0.75	<0.75	--	<0.75	--	<0.75	--	0.97 J	--	1.1 J	<0.75	<0.75	<0.75	--	<0.75	--	<0.75		
Barium, ug/L	P	68.8	2,000	52	61	--	49	--	71	--	92	--	53	14	12	180	--	12	--	8.7		
Beryllium, ug/L	DQ	DQ	4	<0.27	<0.27	--	<0.27	--	<0.27	--	<0.27	--	<0.27	<0.27	<0.27	<0.27	--	<0.27	--	<0.27		
Cadmium, ug/L	NP*	0.12	5	<0.051	0.057 J	--	0.95	--	1.7	--	0.51	--	0.21	<0.051	<0.051	<0.051	--	<0.051	--	<0.051		
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	--	<1.1		
Cobalt, ug/L	NP	4.1	6	0.29 J	0.48 J	5.6	5.6	5.8	11	--	0.75	--	0.72	0.48 J	0.45 J	<0.091	--	0.13 J	--	<0.19		
Fluoride, mg/L	P	0.48	4	<0.28	<0.28	--	<0.28	--	<0.28	--	1.3	--	<0.28	1.9	0.28 J	<0.28	3.9	4.0	3.8	2.0		
Lead, ug/L	NP*	0.10	15	<0.21	<0.21	--	<0.21	--	<0.21	--	<0.21	--	<0.21	<0.21	<0.21	<0.21	--	<0.21	--	<0.21		
Lithium, ug/L	P	34.2	40	23	26	--	<2.5	--	<2.5	37	58	52	52	270	280	5.9 J	--	290	--	290		
Mercury, ug/L	DQ	DQ	2	<0.15	<0.15	--	<0.15	--	<0.15	--	<0.15	--	<0.15	<0.15	<0.15	<0.15	--	<0.15	--	<0.15		
Molybdenum, ug/L	P	1.74	100	<1.3	<1.3	--	5.1	--	6.1	--	83	--	70	5.0	1.9 J	<1.3	--	<1.3	--	<1.3		
Selenium, ug/L	P	8.55	50	6.5	7.5	--	<0.96	--	<0.96	--	2.4 J	--	2.3 J	<0.96	<0.96	2.1 J	--	<0.96	--	<0.96		
Thallium, ug/L	NP*	0.14	2	<0.26	<0.26	--	<0.26	--	<0.26	--	<0.26	--	<0.26	<0.26	<0.26	<0.26	--	<0.26	--	<0.26		
Radium 226/228 Combined, pCi/L	P	2.15	5	0.598	1.04	--	0.334	--	0.794	--	0.00	--	0.539	4.44	5.41	0.194	--	3.85	--	4.44		
<b>Additional Parameters - Selection of Remedy</b>																						
Cobalt - dissolved, #	UPL or GPS not applicable			--	--	--	6.1	--	9.9	--	--	--	NA	--	--	--	--	--	--	--		
Lithium - dissolved, #				--	--	--	--	--	NA	--	NA	--	63	--	45	300	240	--	--	330	--	250
Iron, dissolved, # ug/L				<36	<36	--	110	--	100	--	<36	--	<36	--	<36	<36	38 J	<36	--	<36	--	<36
Iron, ug/L				49 J	<36	--	220	--	<360	--	<36	--	<36	--	<36	<36	<140	<36	--	<36	--	<140
Magnesium				34000	36000	--	25,000	--	43000	--	100,000	--	55000	--	37,000	37,000	36,000	36,000	--	21,000	--	20000
Manganese, dissolved, # ug/L				10	15	--	15,000	--	31000	--	330	--	830 ^2	39	30	<4.4	--	6.2 J	--	5.5 J	--	5.5 J
Manganese, ug/L				14	18	--	15,000	--	30000	--	290	--	350	34	26 J	<4.4	--	6.1 J	--	<18	--	<18
Potassium, ug/L				1200	1300	--	3,500	--	3700 J	--	17,000	--	9900	9,200	8,900	650	--	8,300	--	7,700	--	7,700
Sodium, ug/L				78000	88000	--	170,000	--	170000	--	150,000	--	110000	600,000	570,000	5,200	--	720,000	--	670,000	--	670,000
Total Alkalinity, mg/L				170	210	--	270	--	270	--	130	--	250	340	370	450	--	370	--	380	--	380
Carbonate Alkalinity, mg/L				<4.6	<4.6	--	<4.6	--	<4.6	--	<4.6	--	<4.6	<4.6	<4.6	<4.6	--	<4.6	--	<4.6	--	<4.6
Bicarbonate Alkalinity, mg/L				170	210	--	270	--	270	--	130	--	250	340	370	450	--	370	--	380	--	380

4.4
30.8
17

4.4
30.8
17

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

**Table 5. Groundwater Analytical Results Summary - 2021**  
**Ottumwa Generating Station Ash Pond / SCS Engineers Project #25221072.00**

**Abbreviations:**

-- = Not Analyzed

mg/L = milligrams per liter

ug/L = micrograms per liter

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

# = Dissolved parameter samples collected for MNA data review

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

LOD = Limit of Detection

LOQ = Limit of Quantitation

GPS = Groundwater Protection Standard

UPL = Upper Prediction Limit

P = Parametric UPL with 1-of-2 retesting

DQ = Double Quantification Rule (not detected in background)

NP = Nonparametric UPL

**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. The cobalt GPS exceedances at MW-305 have been determined to be statistically significant. The cobalt GPS exceedance at MW-306 has been determined not to be statistically significant. Lithium and fluoride GPS exceedances have either been determined not to be statistically significant or the determination is ongoing. See the accompanying report text for additional information regarding determinations of statistical significance.
2. GPS is the United States Environmental Protection Agency (US EPA) Maximum Contamination Level (MCL), if established; otherwise, the values are 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: RM  
Checked by: JAO  
Proj Mgr QA/QC: TK

Date: 3/9/2021  
Date: 12/27/2021  
Date: 12/27/2021  
Date: 1/18/2022

**Table 6. 2021 Groundwater Field Data Summary**  
**Ottumwa Generating Station - Ash Pond / SCS Engineers Project #25221072.00**

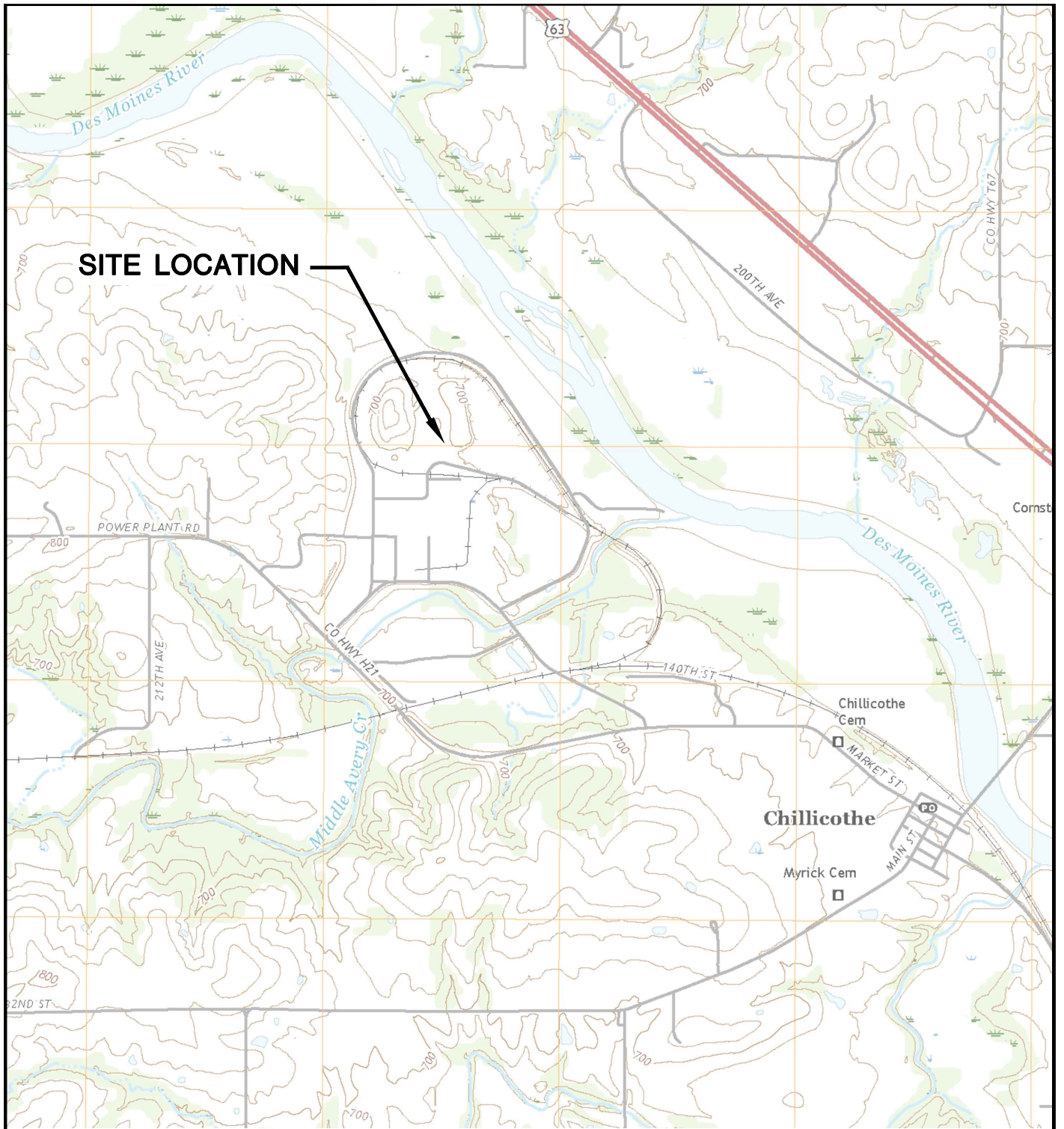
Well	Sample Date	Groundwater Elevation (feet)	Field Temperature (deg C)	Field pH (Std. Units)	Oxygen, Dissolved (mg/L)	Field Specific Conductance (umhos/cm)	Field Oxidation Potential (mV)	Turbidity (NTU)
MW-301	4/14/2021	682.94	9.1	6.26	5.99	1,062	232.5	1.61
	10/7/2021	681.95	17.9	6.26	4.17	1,062	207.3	8.9
MW-302	4/13/2021	656.05	11.9	6.44	0.37	2,087	198.2	22.9
	10/7/2021	654.86	14.9	6.49	0.30	1,920	211.5	15.6
MW-303	4/13/2021	653.82	9.7	6.67	2.83	1,118	184.7	4.31
	10/7/2021	649.80	17.6	6.70	0.32	1,343	66.5	11.1
MW-304	4/14/2021	654.34	13.1	6.94	0.20	1,797	-97.5	16.9
	10/8/2021	649.53	13.8	6.97	0.32	1,617	-78.7	7.3
MW-305	4/16/2021	661.15	12.9	6.92	0.16	1,799	43.6	8.17
	10/6/2021	654.83	13.7	6.94	0.44	1,629	46.9	3.8
MW-305A	4/15/2021	651.16	12.4	7.05	0.88	1,224	158.3	1.02
	10/8/2021	645.57	14.7	6.90	2.02	1,145	147.8	14.3
MW-306	2/23/2021	669.86	13.4	6.34	0.50	1,277	64.2	2.86
	4/13/2021	670.27	12.7	6.42	0.14	1,339	92.0	8.99
	7/6/2021	661.87	14.3	7.44	0.33	1,357	119.2	1.37
	10/8/2021	662.27	14.7	6.66	0.40	1,506	86.0	6.7
MW-310	2/23/2021	638.77	13.6	7.11	0.09	962	91.3	0.02
	4/13/2021	642.70	12.6	7.07	0.46	2,362	161.0	2.38
	7/6/2021	639.32	13.0	8.23	0.21	1,852	88.6	0.0
	10/6/2021	638.19	15.4	7.20	0.48	1,425	96.8	1.0
MW-310A	4/15/2021	644.88	12.5	7.47	0.98	3,106	160.2	2.25
	10/8/2021	639.57	15.6	7.65	6.21	2,808	143.1	15.0
MW-311	4/14/2021	643.02	9.3	6.66	1.18	945	179.8	0.78
	7/7/2021	642.38	14.2	8.19	0.42	3,381	80.8	0.0
	10/6/2021	Dry	NM	NM	NM	NM	NM	NM
MW-311A	2/25/2021	641.16	11.5	7.55	3.23	3,243	129.7	0.02
	4/16/2021	644.16	12.3	7.76	0.77	3,332	146.9	0.02
	10/8/2021	640.58	15.1	8.12	1.68	2,930	140.7	9.6

Created by: NDK  
 Last revision by: AJR  
 Checked by: MDB

Date: 3/9/2021  
 Date: 10/26/2021  
 Date: 12/17/2021

## Figures

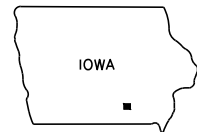
- 1 Site Location Map
- 2 Site Plan and Monitoring Well Locations—Ash Pond
- 3 Shallow Potentiometric Surface, April 12-16, 2021
- 4 Deep Potentiometric Surface, April 12-16, 2021
- 5 Shallow Potentiometric Surface, October 6-8, 2021
- 6 Deep Potentiometric Surface, October 6-8, 2021



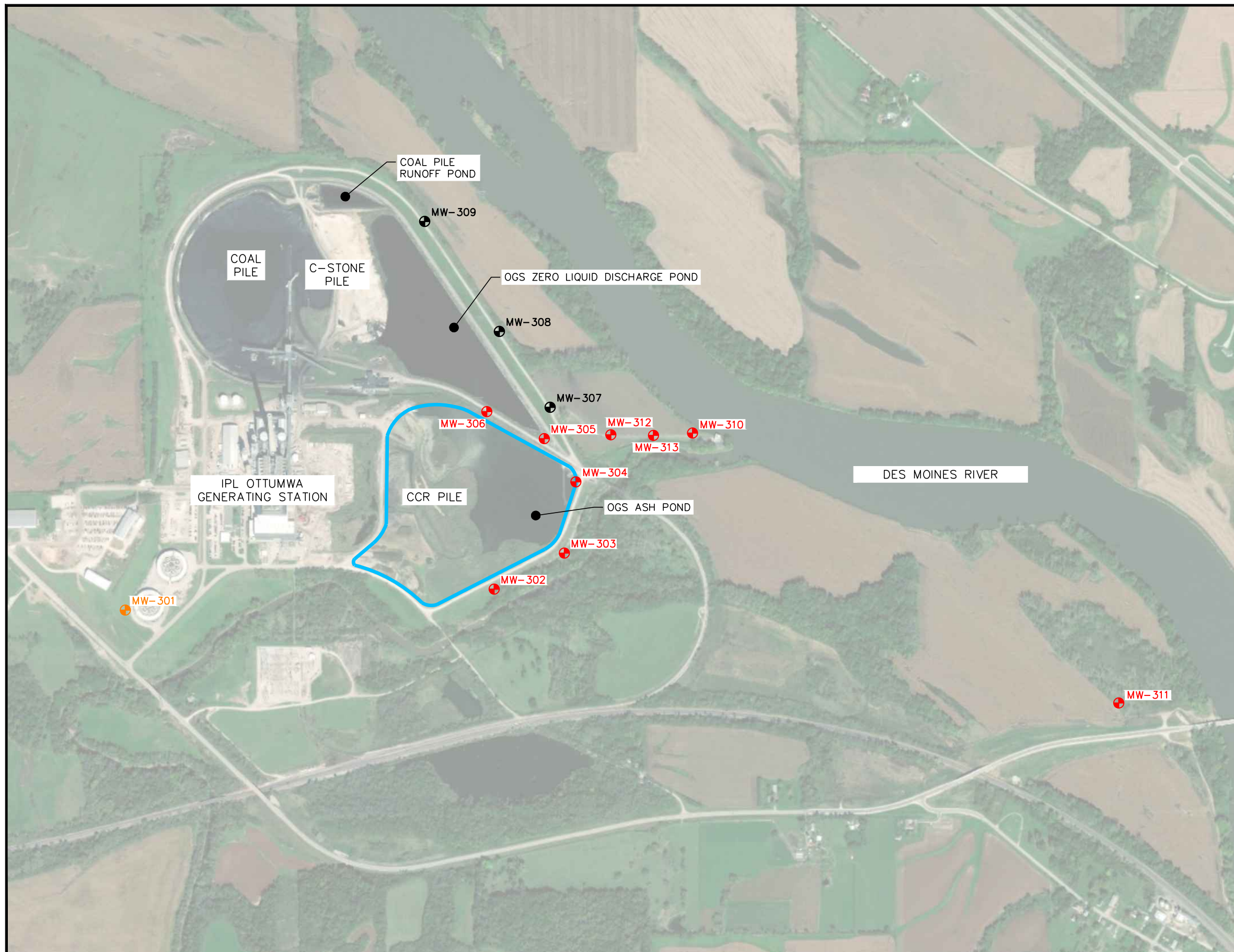
**SITE LOCATION**



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	APPROVED BY:	TK 01/30/2020			
REVISED:	01/10/2020							



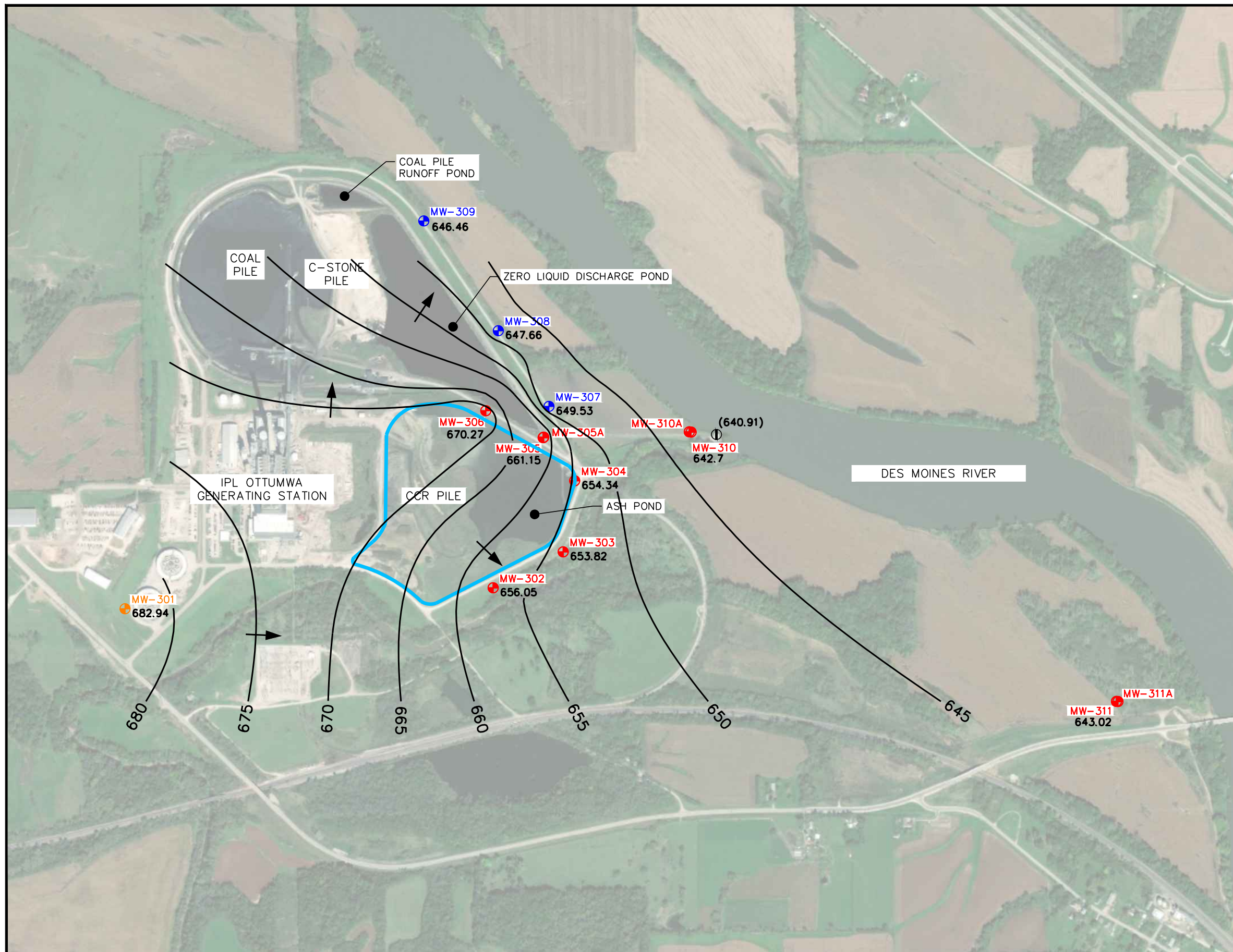
LEGEND

	CCR UNIT
	CCR MONITORING WELL
	CCR BACKGROUND MONITORING WELL
	ADDITIONAL MONITORING WELL

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

PROJECT NO. 25220072.00	DRAWN BY: 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	SITE PLAN AND MONITORING WELL LOCATIONS-ASH POND	FIGURE
DRAWN: 11/15/2019	CHECKED BY: MDB					2
REVISED: 01/24/2020	APPROVED BY: TK 01/28/2022					

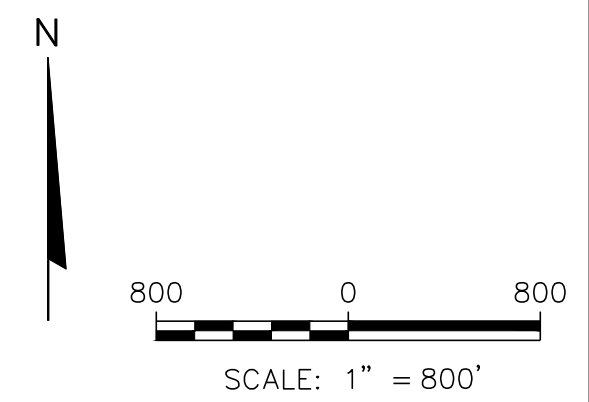
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LEGEND	
	CCR UNIT
	CCR ZLDP MONITORING WELL
	CCR ASH POND MONITORING WELL
	CCR BACKGROUND MONITORING WELL
	RIVER ELEVATION MEASUREMENT LOCATION
<b>(640.91)</b>	RIVER ELEVATION (APRIL 16, 2021)
<b>651.09</b>	POTENTIOMETRIC ELEVATION AT WELL (APRIL 12-16, 2021)
	POTENTIOMETRIC SURFACE CONTOUR
	APPROXIMATE GROUNDWATER FLOW DIRECTION

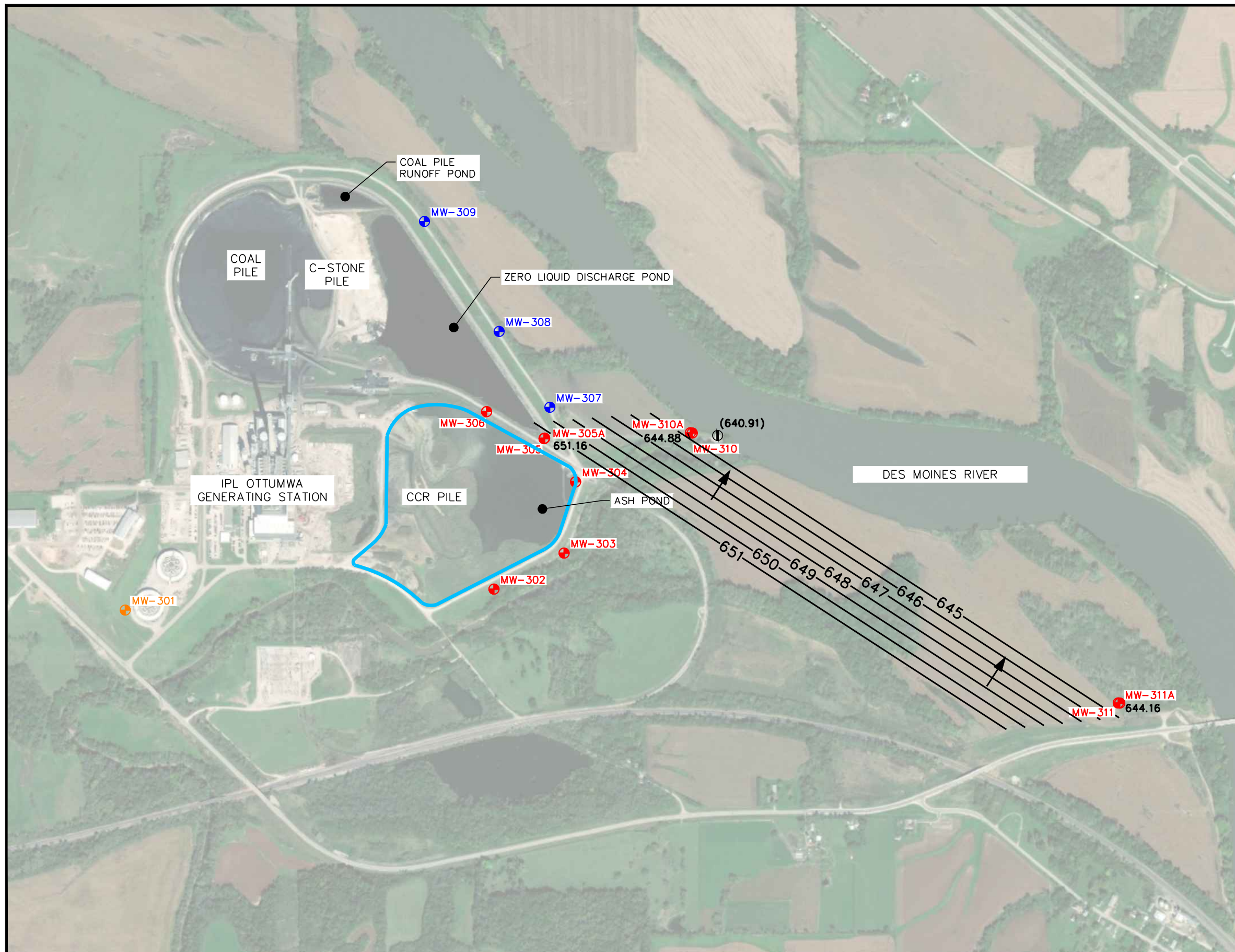
NOTE:

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



PROJECT NO. 25221072.00	DRAWN BY: KP	<b>SCS ENGINEERS</b> 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 12-16, 2021	FIGURE
DRAWN: 05/26/2021	CHECKED BY: NDK					3
REVISED: 08/11/2021	APPROVED BY: TK 1/7/2022					

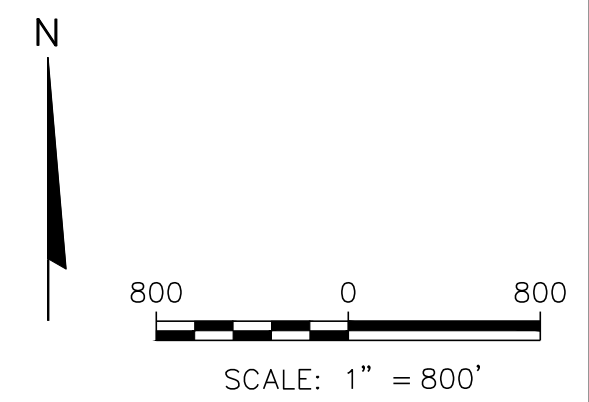
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- LEGEND
- CCR UNIT
  - ⊕ CCR ZLDP MONITORING WELL
  - ⊕ CCR ASH POND MONITORING WELL
  - ⊕ CCR BACKGROUND MONITORING WELL
  - ⊕ RIVER ELEVATION MEASUREMENT LOCATION
  - (640.91)** RIVER ELEVATION (APRIL 16, 2021)
  - 651.09** POTENTIOMETRIC ELEVATION AT WELL (APRIL 12-16, 2021)
  - POTENTIOMETRIC SURFACE CONTOUR
  - APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTE:

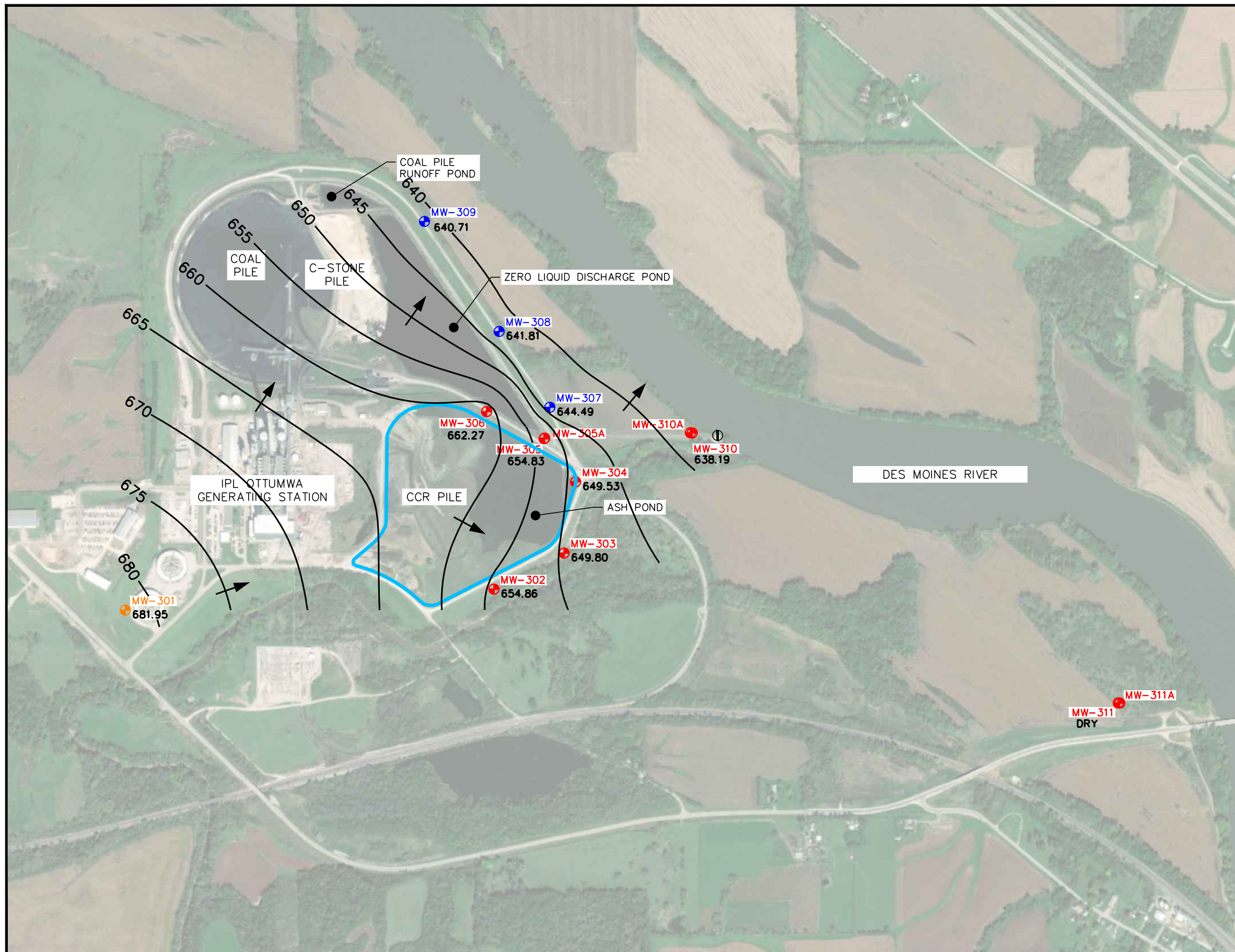
- THE BACKGROUND MONITORING WELL FOR THE OGS ASH POND IS MW-301.



PROJECT NO.	25221072.00	DRAWN BY:	KP	<b>SCS ENGINEERS</b> 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 4
DRAWN:	05/26/2021	CHECKED BY:	NDK				
REVISED:	08/11/2021	APPROVED BY:	TK 1/7/2022				

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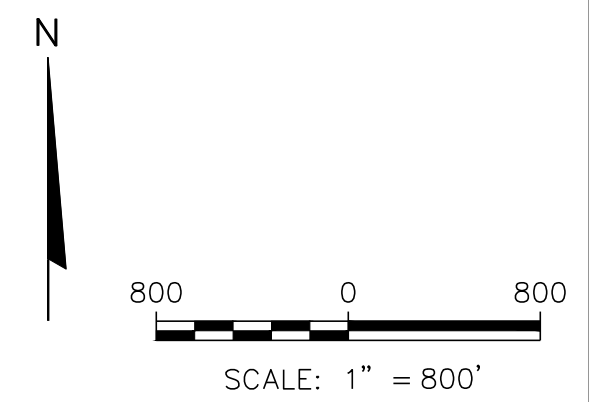




LEGEND	
	CCR UNIT
	CCR ZLDP MONITORING WELL
	CCR ASH POND MONITORING WELL
	CCR BACKGROUND MONITORING WELL
	RIVER ELEVATION MEASUREMENT LOCATION
<b>651.09</b>	POTENTIOMETRIC ELEVATION AT WELL (OCTOBER 6-8, 2021)
	POTENTIOMETRIC SURFACE CONTOUR
	APPROXIMATE GROUNDWATER FLOW DIRECTION

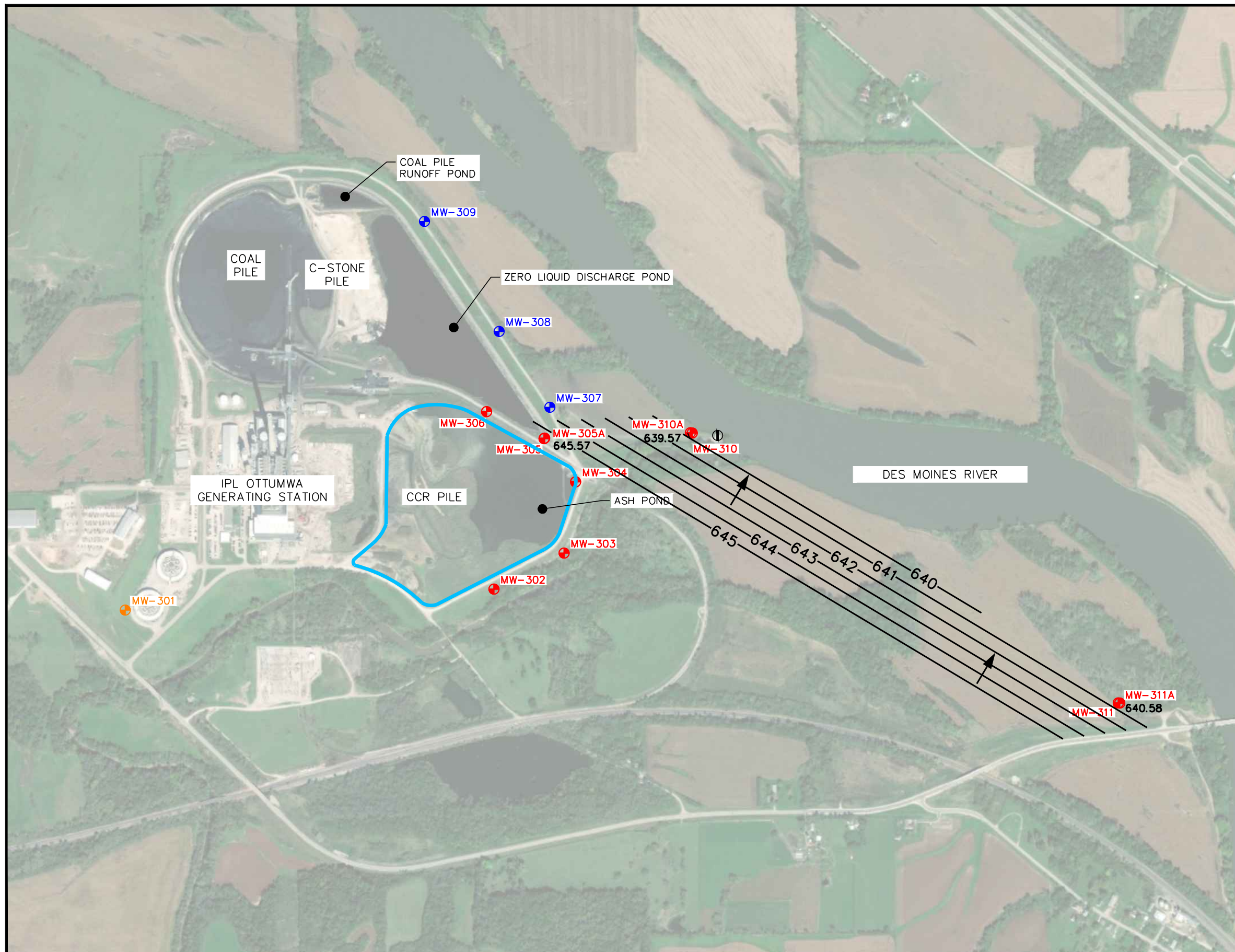
NOTE:

- THE BACKGROUND MONITORING WELL FOR THE OGS ASH POND IS MW-301.



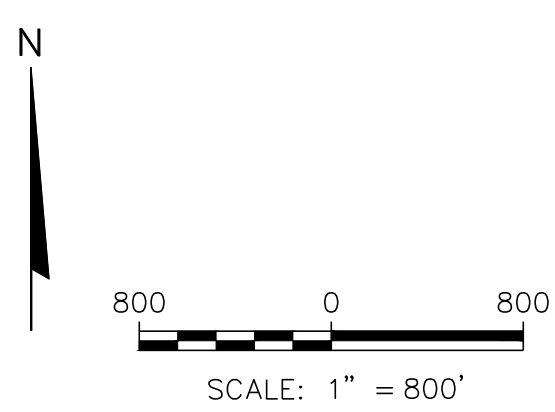
PROJECT NO. 25221072.00	DRAWN BY: KP	<b>SCS ENGINEERS</b> 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA	SHALLOW POTENTIOMETRIC SURFACE OCTOBER 6-8, 2021	FIGURE
DRAWN: 10/28/2021	CHECKED BY: NDK					5
REVISED: 01/05/2022	APPROVED BY: TK 1/7/2022					

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LEGEND	
	CCR UNIT
	CCR ZLP MONITORING WELL
	CCR ASH POND MONITORING WELL
	CCR BACKGROUND MONITORING WELL
	RIVER ELEVATION MEASUREMENT LOCATION
<b>651.09</b>	POTENTIOMETRIC ELEVATION AT WELL (OCTOBER 6-8, 2021)
	POTENTIOMETRIC SURFACE CONTOUR
	APPROXIMATE GROUNDWATER FLOW DIRECTION

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



PROJECT NO. 25221072.00	DRAWN BY: KP	<b>SCS ENGINEERS</b> 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 6-8, 2021	FIGURE
DRAWN: 10/28/2021	CHECKED BY: NDK					6
REVISED: 10/28/2021	APPROVED BY: TK 1/7/2022					

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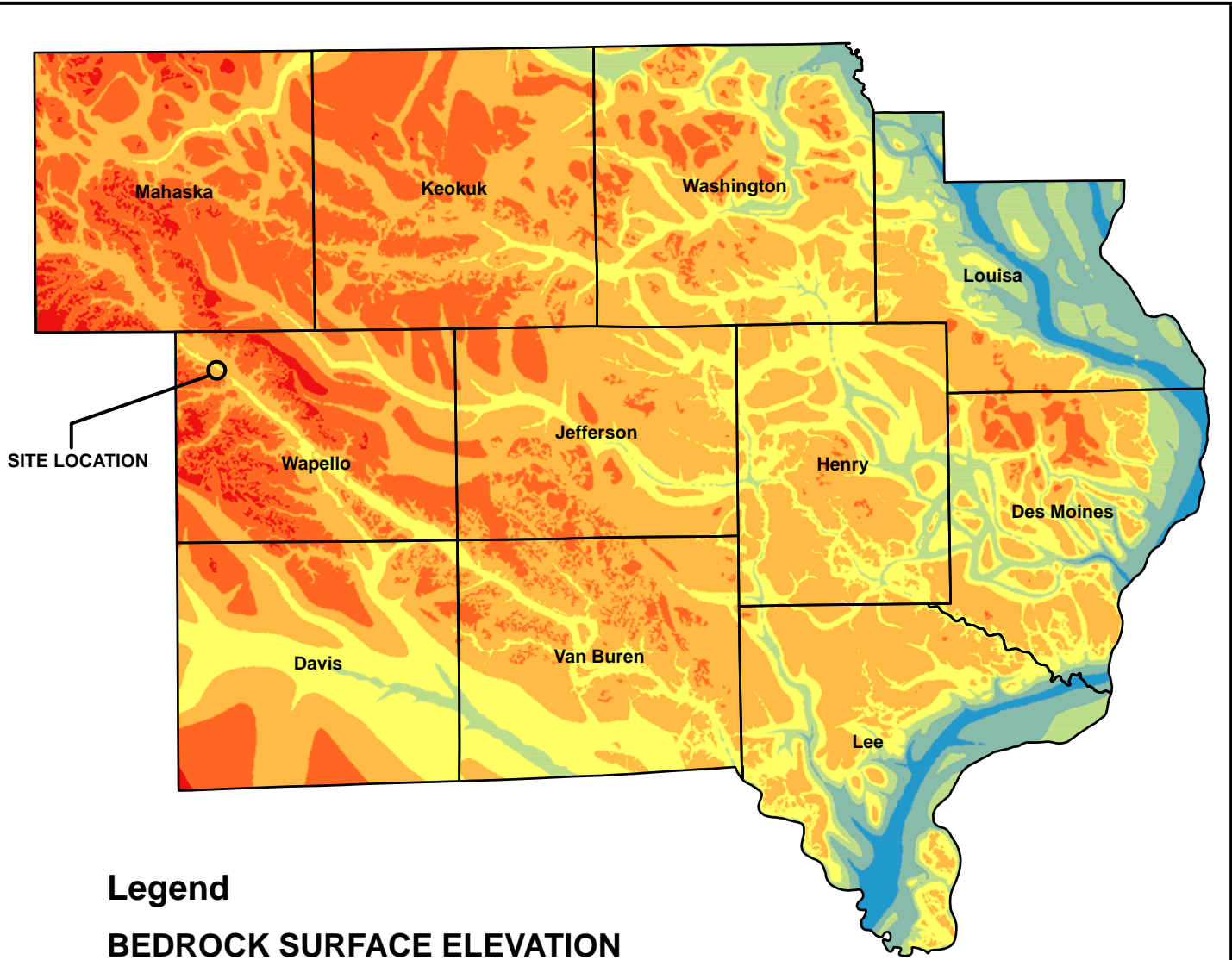
Appendix A  
Regional Hydrogeologic Information

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

\*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.

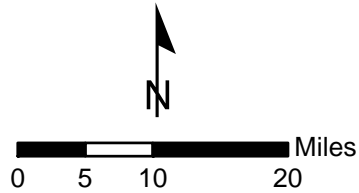


**Legend**

**BEDROCK SURFACE ELEVATION**

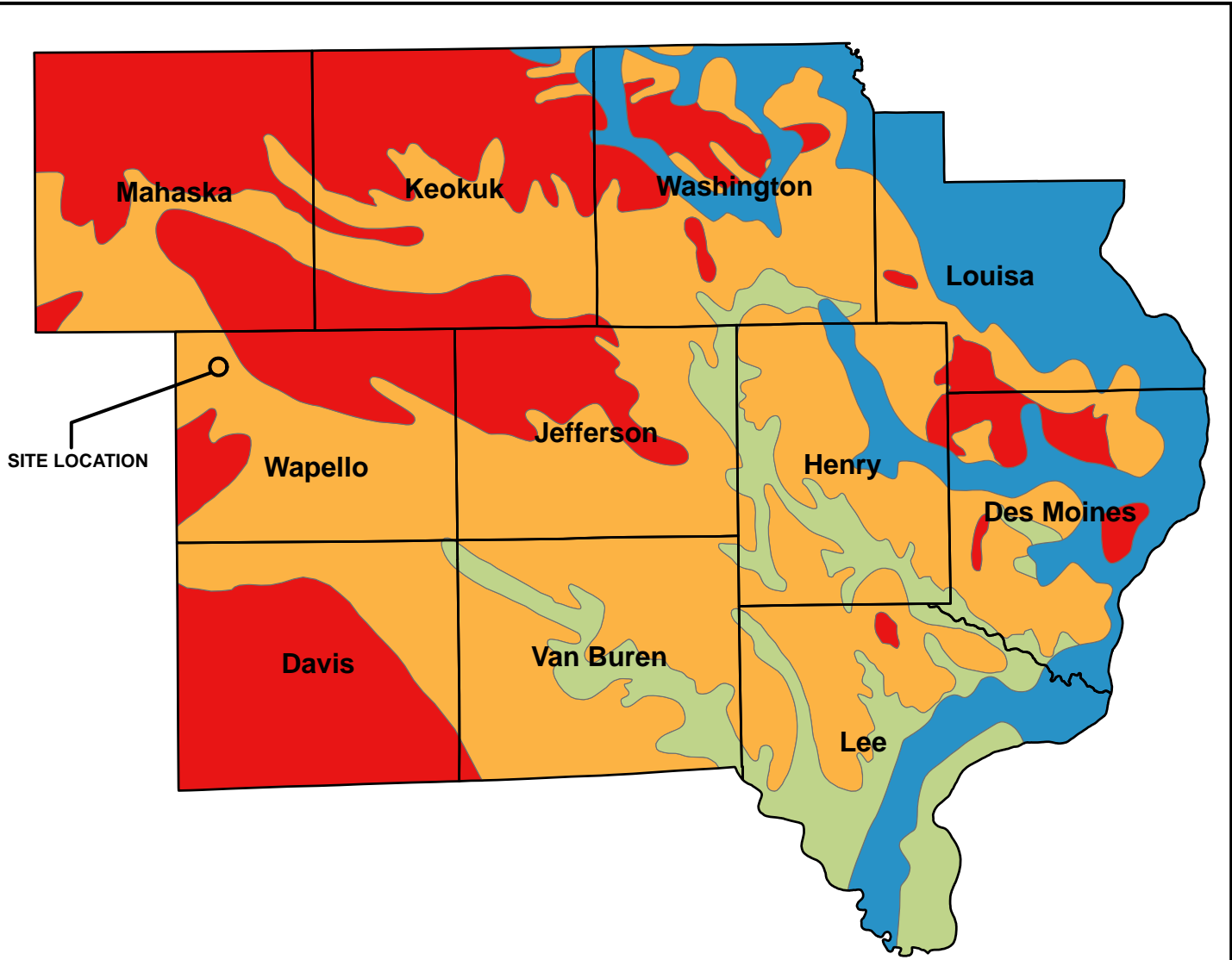
ELEVATION ABOVE MEAN SEA LEVEL IN FEET

- 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

<b>CLIENT</b>	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	<b>SITE</b>	OTTUMWA GENERATING STATION OTTUMWA, IOWA	<b>SE IOWA REGIONAL BEDROCK SURFACE ELEVATION</b>		
	PROJECT NO. 25215053.03		DRAWN BY: JB	<b>ENGINEER</b>	<b>SCS ENGINEERS</b>	<b>FIGURE</b>
	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				

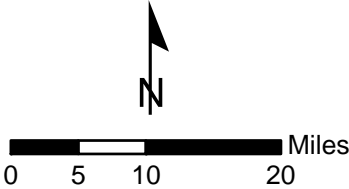


**Legend**

**MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE**

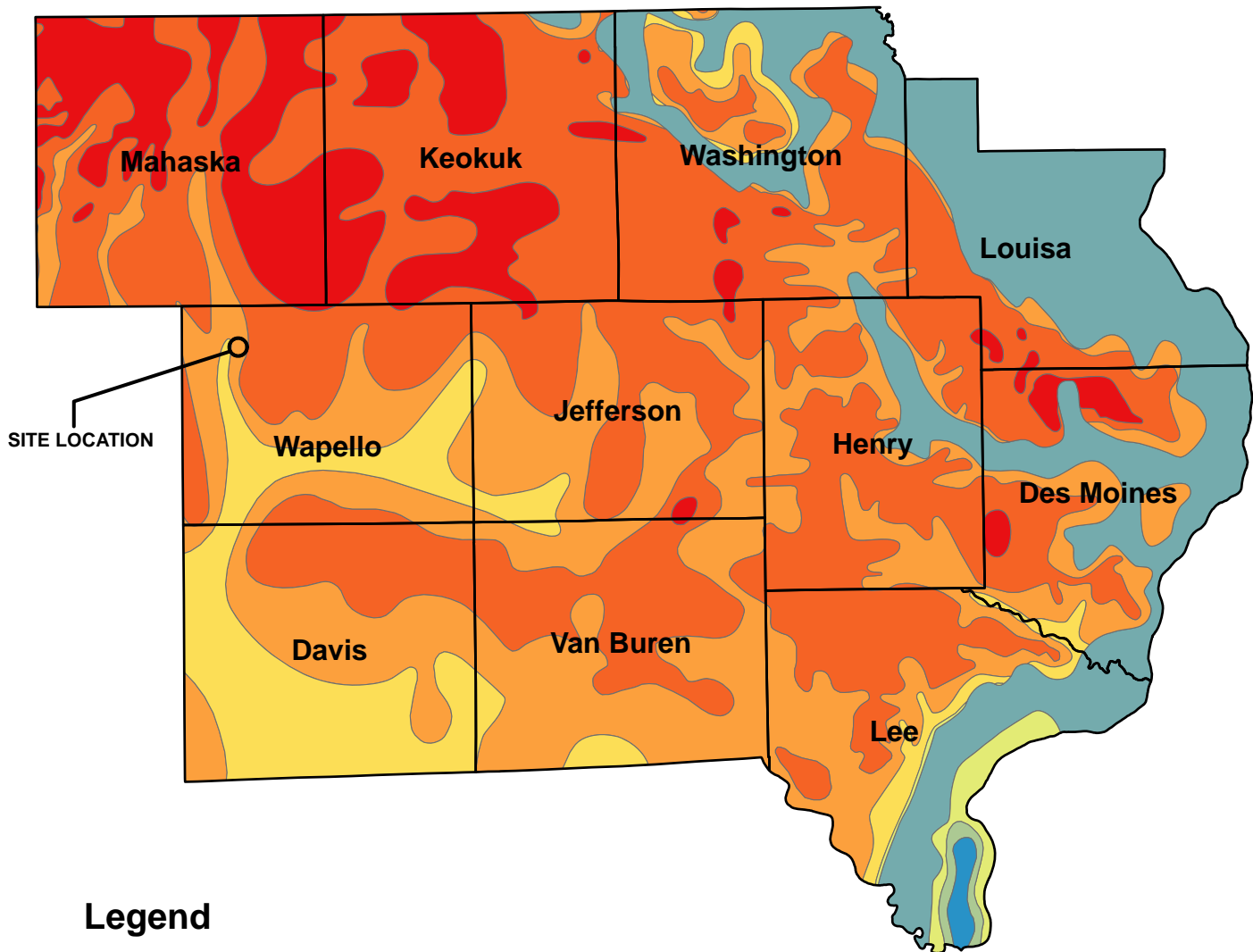
ELEVATION ABOVE MEAN SEA LEVEL IN FEET

- 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

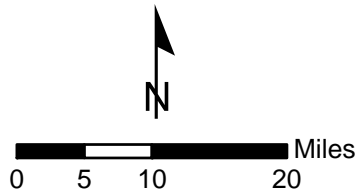
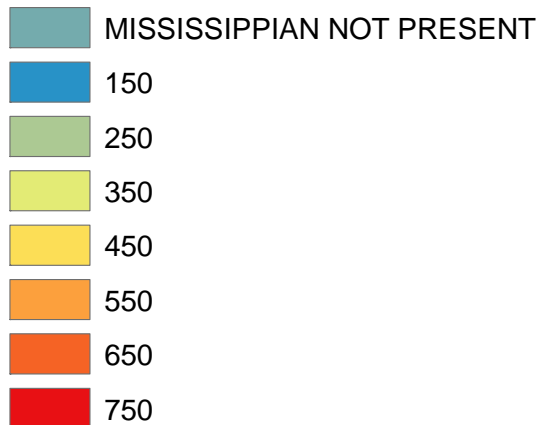
<b>CLIENT</b>	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	<b>SITE</b>	OTTUMWA GENERATING STATION OTTUMWA, IOWA	<b>SE IOWA REGIONAL MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE ELEVATION</b>
PROJECT NO.	25215053.03	DRAWN BY:	JB	<b>SCS ENGINEERS</b> <small>2830 DAIRY DRIVE MADISON, 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:		
				<b>FIGURE</b>



**Legend**


**MISSISSIPPIAN AQUIFER ELEVATION**

ELEVATION ABOVE MEAN SEA LEVEL IN FEET



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

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



Appendix B  
Boring Logs and Well Construction Documentation

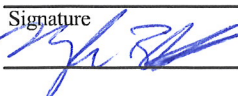


Route To: Watershed/Wastewater  Waste Management   
 Remediation/Redevelopment  Other

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

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  for Kyle Kramer

Firm **SCS Engineers**  
2830 Dairy Drive Madison, WI 53718

Tel: (608) 224-2830  
Fax:

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

Facility/Project Name <b>IPL- Ottumwa Generating Station</b> SCS#: 25215135.40		License/Permit/Monitoring Number		Boring Number <b>MW-302</b>	
Boring Drilled By: Name of crew chief (first, last) and Firm <b>Todd Schmalfeld Cascade Drilling</b>			Date Drilling Started <b>11/10/2015</b>		Date Drilling Completed <b>11/10/2015</b>
Unique Well No.	DNR Well ID No.	Common Well Name <b>MW-302</b>	Final Static Water Level <b>Feet</b>		Surface Elevation <b>671.6 Feet</b>
					Borehole Diameter <b>8.5 in</b>
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input checked="" type="checkbox"/> State Plane <b>400,267 N, 1,902,625 E S/C/N</b>			Lat <input type="checkbox"/> N <input type="checkbox"/> E Long <input type="checkbox"/> S <input type="checkbox"/> W		Local Grid Location Feet <input type="checkbox"/> N <input type="checkbox"/> E Feet <input type="checkbox"/> S <input type="checkbox"/> W
Facility ID		County <b>Wapello</b>		Civil Town/City/ or Village <b>Ottumwa</b>	

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									
			2	LEAN CLAY WITH SAND, dark gray (10YR 4/1).										
			3											
			4											
			5											
			6											
			7											
			8		CL									
			9											
			10											
S1	19	14 57	11								M			
			12											
S2	19	24 711	13								M			
			14	LEAN CLAY WITH SAND, very dark gray (5Y 3/1).										
			15		CL									
			16											

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

Signature <i>Kyle Kamer</i>	Firm <b>SCS Engineers</b> 2830 Dairy Drive Madison, WI 53718	Tel: (608) 224-2830 Fax:
--------------------------------	---	-----------------------------



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

Facility/Project Name <b>IPL- Ottumwa Generating Station</b> SCS#: 25215135.40		License/Permit/Monitoring Number		Boring Number <b>MW-303</b>	
Boring Drilled By: Name of crew chief (first, last) and Firm <b>Todd Schmalfeld Cascade Drilling</b>		Date Drilling Started <b>12/8/2015</b>		Date Drilling Completed <b>12/8/2015</b>	
Unique Well No.		DNR Well ID No.		Common Well Name <b>MW-303</b>	
Final Static Water Level <b>Feet</b>		Surface Elevation <b>659.0 Feet</b>		Borehole Diameter <b>8.5 in</b>	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input checked="" type="checkbox"/>		State Plane <b>400,583 N, 1,903,215 E S/C/N</b>		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		Lat _____ ' _____ "		Long _____ ' _____ "	
Facility ID		County <b>Wapello</b>		Civil Town/City/ or Village <b>Ottumwa</b>	

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	FILL, boring location was cleared to 9' bgs by hydrovac, then back filled.	FILL									
			2											
			3											
			4											
			5											
			6											
			7											
			8											
			9											
			10	WEATHERED SANDSTONE, medium grained, brown (10YR 5/4).	SANDSTONE									
S1	1	50	11											
			12											
			13											
S2	NR		14											
			14.5	End of Boring at 14.5 ft bgs.										

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

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

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

Facility/Project Name <b>IPL- Ottumwa Generating Station</b> SCS#: 25215135.40		License/Permit/Monitoring Number		Boring Number <b>MW-304</b>	
Boring Drilled By: Name of crew chief (first, last) and Firm <b>Todd Schmalfeld Cascade Drilling</b>		Date Drilling Started <b>11/11/2015</b>		Date Drilling Completed <b>11/11/2015</b>	
Unique Well No.		DNR Well ID No.		Common Well Name <b>MW-304</b>	
Final Static Water Level <b>Feet</b>		Surface Elevation <b>680.1 Feet</b>		Borehole Diameter <b>8.5 in</b>	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input checked="" type="checkbox"/> State Plane <b>401,152 N, 1,903,287 E S/C/N</b>		Lat _____ " _____ "		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
SE 1/4 of NE 1/4 of Section <b>26, T 73 N, R 15 W</b>		Long _____ " _____ "		Feet <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID		County <b>Wapello</b>		Civil Town/City/ or Village <b>Ottumwa</b>	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well	Diagram	PID/FID	Soil Properties					RQD/ Comments
										Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
			1	TOPSOIL.	TOPSOIL										
			2	FAT CLAY, black (10YR 2/1).											
			3												
			4												
			5												
			6												
			7		CH										
			8												
			9												
			10												
S1	23	4 5 4 5	11									M			
			12												
			13	FAT CLAY, yellowish brown (10YR 5/4).											
S2	19.5	4 4 5 5	14		CH							M			
			15	FAT CLAY, yellowish brown (10YR 3/4).											
			16		CH										

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:

Boring Number MW-304

Page 2 of 3

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	12	33 45	17	FAT CLAY, yellowish brown (10YR 3/4). (continued)											
S4	22	43 712	18 19												
S5	23	27 89	20 21 22												
S6	23	34 86	23 24												
S7	23	511 1511	25 26 27												CH
S8	15	44 56	28 29												
S9	18	46 99	30 31 32												
S10	24	46 76	33 34												
S11	16	22 46	35 36 37												FAT CLAY, DARK OLIVE BROWN (2.5Y 3/3).
S12	24	43 55	38 39												CH
S13	18	23 33	40 41 42												



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

Facility/Project Name <b>IPL- Ottumwa Generating Station</b> SCS#: 25215135.40		License/Permit/Monitoring Number		Boring Number <b>MW-305</b>	
Boring Drilled By: Name of crew chief (first, last) and Firm <b>Todd Schmalfeld Cascade Drilling</b>		Date Drilling Started <b>12/7/2015</b>		Date Drilling Completed <b>12/8/2015</b>	
Unique Well No.		DNR Well ID No.		Common Well Name <b>MW-305</b>	
Final Static Water Level <b>Feet</b>		Surface Elevation <b>681.5 Feet</b>		Borehole Diameter <b>8.5 in</b>	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input checked="" type="checkbox"/> State Plane <b>401,473 N, 1,903,023 E S/C/N</b>		Lat _____ ° _____ ' _____ "		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
SE 1/4 of NE 1/4 of Section 26, T 73 N, R 15 W		Long _____ ° _____ ' _____ "		Feet _____ Feet _____	
Facility ID		County <b>Wapello</b>		Civil Town/City/ or Village <b>Ottumwa</b>	

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			
			0	TOPSOIL	TOPSOIL											
			1	GRAVEL	GP											
			2	FAT CLAY												
			3													
			4													
			5													
			6													
			7													
			8													
			9		CH											
			10													
			11	FAT CLAY, very dark grayish brown (10YR 3/2).												
S1	18	36 9 11	11													
			12													
			13													
			14	same as above except, brown (10YR 4/3).												
S2	22	37 14 22	14													
			15													
			16													

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

Signature 	Firm <b>SCS Engineers</b> 2830 Dairy Drive Madison, WI 53718	Tel: (608) 224-2830 Fax:
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Boring Number MW-305

Page 2 of 3

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	22	5 15 14 15	17	FAT CLAY (continued)										
S4	20	3 5 13 15	18 19		CH									
S5	24	4 5 7 11	20 21 22	FAT CLAY WITH SILT, dark gray (10YR 4/1).					M					
S6	20	7 11 15 20	23 24	same as above except, very dark brown (10YR 2/2).					M					
S7	24	4 8 11 12	25 26 27	same as above except, very dark gray (10YR 3/1).	CH				M					
S8	24	8 12 16 21	28 29						M					
S9	13	4 4 7 12	30 31 32						M					
S10	24	5 6 9	33 34	LEAN CLAY, very dark brown (10YR 2/2).					W					
S11	24	4 4 5 7	35 36 37		CL				W					
S12	22	2 2 3 5	38 39	same as above except, very dark grayish brown (10YR 3/2).					W					
S13	6	3 9 11	40 41 42	POORLY GRADED SANDY GRAVEL, fine, brown (10YR 4/3).	GPS				W				water @ 41.0 ft bgs.	



**SCS ENGINEERS**

Environmental Consultants and Contractors

**SOIL BORING LOG INFORMATION**

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

Facility/Project Name <b>IPL- Ottumwa Generating Station</b> SCS#: 25215135.40		License/Permit/Monitoring Number		Boring Number <b>MW-306</b>	
Boring Drilled By: Name of crew chief (first, last) and Firm <b>Todd Schmalfeld Cascade Drilling</b>		Date Drilling Started <b>11/12/2015</b>		Date Drilling Completed <b>11/12/2015</b>	
Unique Well No.		DNR Well ID No.		Common Well Name <b>MW-306</b>	
Final Static Water Level <b>Feet</b>		Surface Elevation <b>681.1 Feet</b>		Borehole Diameter <b>8.5 in</b>	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input checked="" type="checkbox"/> State Plane <b>401,666 N, 1,902,629 E</b> S/C/N		Lat _____ ° _____ ' _____ "		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
SE      1/4 of NE      1/4 of Section <b>26,</b> T <b>73</b> N, R <b>15</b> W		Long _____ ° _____ ' _____ "		Feet      Feet      Feet	
Facility ID		County <b>Wapello</b>		Civil Town/City/ or Village <b>Ottumwa</b>	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
			1	TOPSOIL.	TOPSOIL									
			2-10	FAT CLAY, dark olive brown (2.5Y 3/3).	CH									
S1	18	36 9 11	11									M		
S2	22	56 79	13	FAT CLAY, gray (10YR 5/1).	CH							M		
			14-16											

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

Signature 	Firm <b>SCS Engineers</b> 2830 Dairy Drive Madison, WI 53718	Tel: (608) 224-2830 Fax:
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Route To:  Watershed/Wastewater  Waste Management   
 Remediation/Redevelopment  Other

<b>Facility/Project Name</b> IPL - Ottumwa Generating Station SCS#: 25219028.00		<b>License/Permit/Monitoring Number</b>		<b>Boring Number</b> MW-310	
<b>Boring Drilled By: Name of crew chief (first, last) and Firm</b> Eric Wetzel Roberts Environmental Drilling, Inc.			<b>Date Drilling Started</b> 8/27/2019		<b>Date Drilling Completed</b> 8/27/2019
<b>Drilling Method</b> 4 1/4 hollow stem auger	<b>WI Unique Well No.</b>	<b>DNR Well ID No.</b>	<b>Common Well Name</b> MW-310		<b>Final Static Water Level</b> Feet MSL
<b>Surface Elevation</b> 655.76 Feet MSL	<b>Borehole Diameter</b> 8.5 in.	<b>Local Grid Origin</b> <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or <b>Boring Location</b> <input checked="" type="checkbox"/>	<b>Local Grid Location</b>	<b>State Plane</b> 401,502 N, 1,904,206 E S/C/N	<b>Lat</b> _____ "
<b>1/4 of</b> _____	<b>1/4 of Section</b> _____	<b>T</b> _____	<b>N, R</b> _____	<b>Long</b> _____ "	<b>Feet</b> <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W
<b>Facility ID</b>		<b>County</b> Wapello		<b>County Code</b>	
				<b>Civil Town/City/ or Village</b> Ottumwa	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID/FTD	Soil Properties					RQD/ Comments			
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200				
			1	Hydrovac through clay for utility clearances.													
			2														
			3														
			4														
			5														
			6														
			7														
			8														
S1	11	WOR 10 3 10	9	LEAN CLAY, brown, massive.													
			10	Some reddish brown and grey mottling, some silt.													
S2	15	22 3 2	11		CL												
			12														
S3	20	11 1 9	13														
			14														
			15	SILT, brown, with clay.	ML												

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

<b>Signature</b> 	<b>Firm</b> SCS Engineers 2830 Dairy Drive Madison, WI 53718	<b>Tel:</b> 608-224-2850 <b>Fax:</b>
---	---	---

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. **NOTE:** See instructions for more information, including where the completed form should be sent.




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

Facility/Project Name IPL - Ottumwa Generating Station SCS#: 25219028.00		License/Permit/Monitoring Number		Boring Number MW-311	
Boring Drilled By: Name of crew chief (first, last) and Firm Eric Wetzel Roberts Environmental Drilling, Inc.			Date Drilling Started 8/27/2019	Date Drilling Completed 8/27/2019	Drilling Method 4 1/4 hollow stem auger
WI Unique Well No.	DNR Well ID No.	Common Well Name MW-311	Final Static Water Level Feet MSL	Surface Elevation 651.24 Feet MSL	Borehole Diameter 8.5 in.
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input checked="" type="checkbox"/>			Local Grid Location		
State Plane 399,350 N, 1,907,603 E S/C/N			Lat _____"	Feet <input type="checkbox"/> N <input type="checkbox"/> S	Feet <input type="checkbox"/> E <input type="checkbox"/> W
1/4 of _____ 1/4 of Section _____ T _____ N, R _____			Long _____"		
Facility ID		County Wapello	County Code	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	14	23 46	1 2	LEAN CLAY, brown, massive, trace fine to medium sand, roots, 1" sand seam at 1.5'	CL													
S2	14	33 46	3 4		CL													
S3	6	23 46	5 6	SILT, brown, massive.	ML													
S4	20	23 43	7 8	LEAN CLAY, brown, massive.	CL													
S5	12	23 45	9 10	POORLY GRADED SAND, fine to medium, brown, massive.														
S6	14	12 42	11 12	2" clay seam at 10.5'	SF													
S7	14	12 33	13 14															

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: \_\_\_\_\_

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.





Facility/Project Name IPL-Ottumwa Generating Station SCS#: 25220056.00		License/Permit/Monitoring Number		Boring Number MW-305A	
Boring Drilled By: Name of crew chief (first, last) and Firm Jeff Crank Roberts Environmental Services		Date Drilling Started 2/25/2020		Date Drilling Completed 2/27/2020	
DNR Well ID No.		Common Well Name MW-305A		Final Static Water Level 32.7 Feet	
				Surface Elevation 681.76 Feet	
				Borehole Diameter 10" and 6" in.	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input checked="" type="checkbox"/>			Local Grid Location		
State Plane 401,461 N, 1,903,028 E S/C/N			Lat _____ ° _____ ' _____ "		
SE 1/4 of NE 1/4 of Section 26, T 73 N, R 15 W			Long _____ ° _____ ' _____ "		
Facility ID		County Wapello		County Code	
				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	Hydrovaced to 9.5 feet for utility clearance.			▨							Drilled using hollow stem augers to 55 feet
			2											
			3											
			4											
			5											
			6											
			7											
			8											
			9											
			10											
			10	Blind drilled to 46 feet. See boring log MW-305 for lithology.										
			11											
			12											
			13											
			14											
			15											

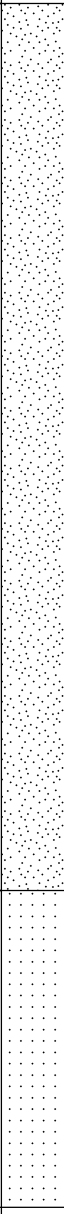

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm <b>scs engineers</b>	Tel: Fax:
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This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.



Boring Number **MW-305A** Use only as an attachment to Form 4400-122. Page **3** of **4**

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	
S1	5	50/5	41	<p>POORLY GRADED SAND, fine, light brown, (weathered sandstone bedrock).</p> <p>SP</p> <p>Same as above but very fine, light brown to light gray, with pieces of rock.</p> <p>SANDSTONE, fine to medium, light brown, trace gravel and light gray to gray limestone, (bedrock).</p>										<p>Bagged auger samples to ~40 feet</p> <p>Switched to mud rotary drilling at 45 feet</p> <p>Switched to air rotary drilling at 55 feet</p> <p>Driller noted rock became more compitant at 59' bgs.</p>
			42											
			43											
			44											
			45											
			46											
			47											
			48											
			49											
			50											
			51											
			52											
			53											
			54											
			55											
			56											
			57											
			58											
			59											
60														
61														
62														
63														
64														
65														



Facility/Project Name IPL-Ottumwa Generating Station      SCS#: 25220056.00		License/Permit/Monitoring Number		Boring Number MW-310A	
Boring Drilled By: Name of crew chief (first, last) and Firm Jeff Crank Roberts Environmental Services		Date Drilling Started 2/27/2020		Date Drilling Completed 3/2/2020	
DNR Well ID No.		Common Well Name MW-310A		Final Static Water Level 12.0 Feet	
				Surface Elevation 655.26 Feet	
				Borehole Diameter 10" and 6" in.	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input checked="" type="checkbox"/>		State Plane 401,504 N, 1,904,191 E    S/C/N		Local Grid Location	
SW    1/4 of NW    1/4 of Section 25,    T 73 N, R 15 W		Lat _____ ° _____ ' _____ "		Feet <input type="checkbox"/> N      Feet <input type="checkbox"/> E	
		Long _____ ° _____ ' _____ "		<input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID		County Wapello		County Code	
				Civil Town/City/ or Village Ottumwa	

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	
			1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	Hydrovaced to 8 feet for utility clearance.										Drilled using hollow stem augers to 40 feet
				Blind drilled to 24 feet. See boring log MW-310 for lithology.										

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

Signature	Firm    scs engineers	Tel: Fax:
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Boring Number **MW-310A** Use only as an attachment to Form 4400-122. Page **2** of **3**

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	
			16											
			17											
			18											
			19											
			20											
			21											
			22											
			23											
			24											
S1	14	7 20 23 21	25	POORLY GRADED SAND, fine to coarse, brown, trace gravel and lenses of lean clay.	SP									
			26											
			27	POORLY GRADED SAND, fine, light gray, trace lean clay, (weathered sandstone bedrock).										
S2	17	9 11 12 13	28	Same as above but brown with small gravel.										
			29											
S3	13	14 36 50/5	30	Same as above but brown with small gravel.										
			31											
S4	5	50/5	32	Same as above but fine to medium and brown to light gray.										
			33											
S5	5	50/5	34	Same as above but fine and light gray.	SP									
			35											
S6	5	50/5	36											
			37											
S7	5	50/5	38											
			39											
S8	4	50/4	39											
			40	Same as above but much more competent.										

Began collecting split spoon samples at 24 feet

Auger refusal at 39 feet

Boring Number **MW-310A** Use only as an attachment to Form 4400-122. Page **3** of **3**

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													
S9			41	LIMESTONE, light brownish gray, with fine to medium light gray sandstone, (bedrock).	SP																					
			42																							
			43	Same as above but with gravel and very little sand.																						
			44																							
			45																							
			46																							
			47																							
			48																							
			49																							
			50																							
			51																							
			52																							
			53																							
		54	End of boring at 54 feet below ground surface.																							

W

Switching to air rotary drilling at 40 feet  
 Intermittent gravel between 43 to 54 feet

Facility/Project Name IPL-Ottumwa Generating Station      SCS#: 25220056.00		License/Permit/Monitoring Number		Boring Number MW-311A	
Boring Drilled By: Name of crew chief (first, last) and Firm Jeff Crank Roberts Environmental Services		Date Drilling Started 3/2/2020		Date Drilling Completed 3/3/2020	
DNR Well ID No.		Common Well Name MW-311A		Final Static Water Level 8.9 Feet	
				Surface Elevation 651.16 Feet	
				Borehole Diameter 10" and 6" in.	
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/> ) or Boring Location <input checked="" type="checkbox"/>			Local Grid Location		
State Plane      399,349 N, 1,907,615 E      S/C/N			Lat _____ ° _____ ' _____ "		
SW    1/4 of SE    1/4 of Section 25,    T 73 N, R 15 W			Long _____ ° _____ ' _____ "		
Feet <input type="checkbox"/> N      Feet <input type="checkbox"/> E				Feet <input type="checkbox"/> S      Feet <input type="checkbox"/> W	
Facility ID		County Wapello		County Code	
				Civil Town/City/ or Village Ottumwa	

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	
			1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	Blind drilled to 16 feet. See boring log MW-311 for lithology.									Drilled using hollow stem augers to 28 feet	

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

Signature	Firm    scs engineers	Tel: Fax:
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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 ( $\pm 0.5$ ft): _____ Specify corner of site: <u>SE of Parcel 003052640340000</u> Distance & direction along boundary: <u>106' W</u> Distance & direction from boundary to wall: <u>306' N</u> Elevations ( $\pm 0.01$ ft MSL): _____ Ground Surface: <u>684.28</u> Top of protective casing: <u>687.12</u> Top of well casing: _____ <u>686.63</u> Benchmark elevation: _____ Benchmark description: _____	Name & Address of Construction Company: <u>Cascade Drilling, LP</u> <u>301 Alderson St</u> <u>Schofield, WI 54476</u> Name of Driller: <u>Todd Schmalfeld</u> Drilling Method: <u>HSA</u> Drilling Fluid: <u>NA</u> Bore Hole Diameter: <u>8 inch</u> Soil Sampling Method: <u>Spoon</u> Depth of Boring: <u>15 ft</u>

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

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

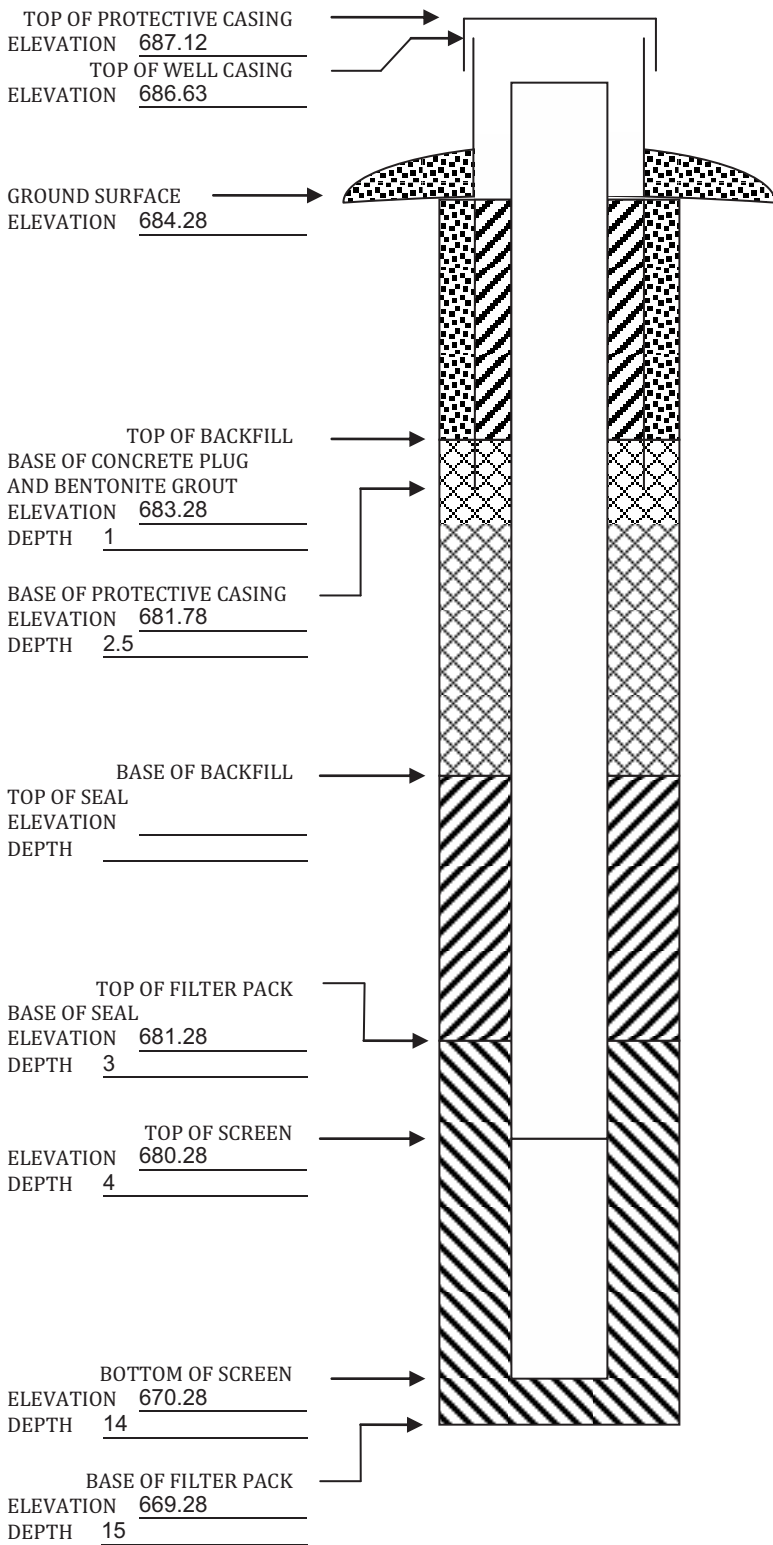
**Attachments: Driller's log, Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.**

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

**Questions? Call or Email:** Nina Koger, Environmental Engineer Sr., 515-281-8986, [Nina.Koger@dnr.iowa.gov](mailto:Nina.Koger@dnr.iowa.gov)

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

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





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

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

Well or Piezometer No: MW-302

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

A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations ( $\pm 0.5$ ft): _____ Specify corner of site: <u>NW of Parcel 003052630215000</u> Distance & direction along boundary: <u>844' NE</u> Distance & direction from boundary to wall: <u>4.5' S</u> Elevations ( $\pm 0.01$ ft MSL): _____ Ground Surface: <u>671.55</u> Top of protective casing: <u>674.39</u> Top of well casing: _____ <u>673.90</u> Benchmark elevation: _____ Benchmark description: _____	Name & Address of Construction Company: _____ <u>Cascade Drilling, LP</u> <u>301 Alderson St</u> <u>Schofield, WI 54476</u> Name of Driller: <u>Todd Schmalfeld</u> Drilling Method: <u>HSA</u> Drilling Fluid: <u>NA</u> Bore Hole Diameter: <u>8 inch</u> Soil Sampling Method: <u>Spoon</u> Depth of Boring: <u>24 ft</u>

C. MONITORING WELL INSTALLATION	
Casing material: _____ <u>PVC sch 40</u> Length of casing: _____ <u>13 ft</u> Outside casing diameter: _____ <u>2.38"</u> Inside casing diameter: _____ <u>2"</u> Casing joint type: _____ <u>threaded</u> Casing/screen joint type: <u>threaded</u> Screen material: _____ <u>PVC</u> Screen opening size: <u>0.010</u> Screen length: _____ <u>10 ft</u> Depth of well: _____ <u>23 ft</u> Filter Pack: _____ Material: _____ <u>Red Flint</u> Grain size: _____ <u>#40</u> Volume: _____ <u>3.5 cu. ft</u> Seal (minimum 3 ft length above filter pack): _____ Material: <u>3/8" bentonite chips</u>	Placement method: <u>Gravity</u> Volume: <u>2.6 cu. ft</u> Backfill (if different from seal): _____ Material: <u>3/8" bentonite chips</u> Placement method: <u>Gravity</u> Volume: <u>1 cu. ft.</u> Surface seal design: _____ Material of protective casing: <u>Steel</u> Material of grout between protective casing and well casing: <u>sand</u> Protective cap: _____ Material: <u>Steel, vented</u> Vented: <input type="checkbox"/> Yes <input type="checkbox"/> No      Locking: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Well Cap: _____ Material: <u>PVC</u> Vented: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

D. GROUNDWATER MEASUREMENT ( $\pm 0.01$ ft below top of inner well casing)	
Water level: <u>18.19</u> Well development method: <u>Surged with block and pumped to remove turbidity. 183 gallons purged</u> Average depth of frostline: <u>3.5'</u>	Stabilization Time: <u>&lt; 5 min</u>

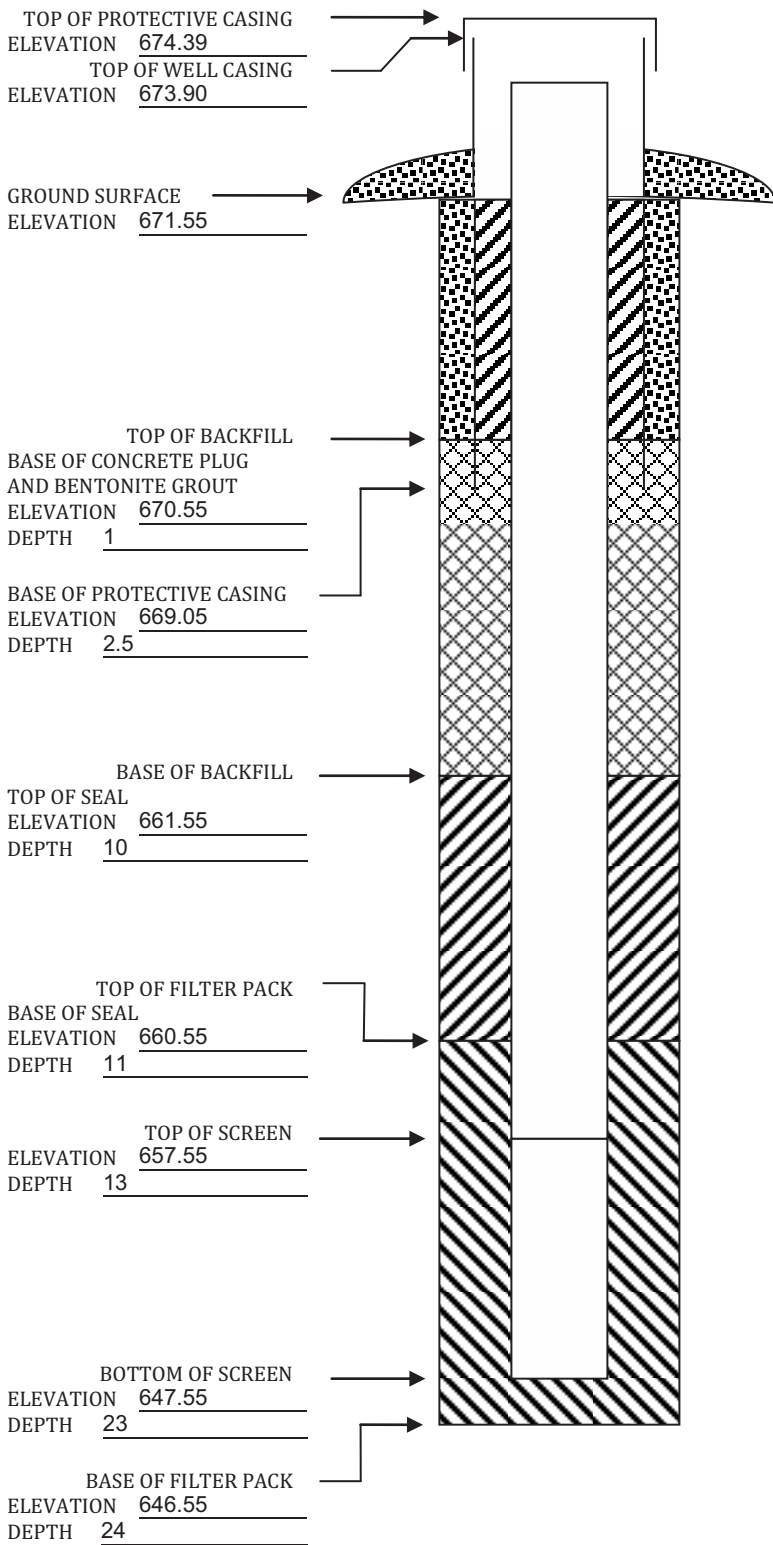
**Attachments: Driller's log, Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.**

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

**Questions? Call or Email:** Nina Koger, Environmental Engineer Sr., 515-281-8986, [Nina.Koger@dnr.iowa.gov](mailto:Nina.Koger@dnr.iowa.gov)

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

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





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

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

Well or Piezometer No: MW-303

Dates Started: 12/8/15 Date Completed: 12/8/15

A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations ( $\pm 0.5$ ft): _____ Specify corner of site: <u>SE of parcel 003052630207000</u> Distance & direction along boundary: <u>181' NW</u> Distance & direction from boundary to wall: <u>0</u> Elevations ( $\pm 0.01$ ft MSL): _____ Ground Surface: <u>658.95</u> Top of protective casing: <u>661.67</u> Top of well casing: _____ <u>661.07</u> Benchmark elevation: _____ Benchmark description: _____	Name & Address of Construction Company: <u>Cascade Drilling, LP</u> <u>301 Alderson St</u> <u>Schofield, WI 54476</u> Name of Driller: <u>Todd Schmalfeld</u> Drilling Method: <u>HSA</u> Drilling Fluid: <u>NA</u> Bore Hole Diameter: <u>8 inch</u> Soil Sampling Method: <u>Spoon</u> Depth of Boring: <u>14.5 ft</u>

C. MONITORING WELL INSTALLATION	
Casing material: _____ <u>PVC sch 80</u> Length of casing: _____ <u>3 ft</u> Outside casing diameter: _____ <u>2.38"</u> Inside casing diameter: _____ <u>2"</u> Casing joint type: _____ <u>threaded</u> Casing/screen joint type: <u>threaded</u> Screen material: _____ <u>PVC</u> Screen opening size: <u>0.010</u> Screen length: _____ <u>10 ft</u> Depth of well: _____ <u>14 ft</u> Filter Pack: _____ Material: _____ <u>Red Flint</u> Grain size: _____ <u>#40</u> Volume: _____ <u>7.5 cu. ft.</u> Seal (minimum 3 ft length above filter pack): _____ Material: <u>3/8" bentonite chips</u>	Placement method: <u>Gravity</u> Volume: <u>10 cu. ft.</u> Backfill (if different from seal): _____ Material: _____ Placement method: _____ Volume: _____ Surface seal design: _____ Material of protective casing: <u>Steel 6 inch</u> Material of grout between protective casing and well casing: <u>sand</u> Protective cap: _____ Material: <u>Steel, vented</u> Vented: <input type="checkbox"/> Yes <input type="checkbox"/> No      Locking: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Well Cap: _____ Material: <u>PVC</u> Vented: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

D. GROUNDWATER MEASUREMENT ( $\pm 0.01$ ft below top of inner well casing)	
Water level: <u>7.71'</u> Well development method: <u>Bailed dry 3 times to reduce turbidity</u> Average depth of frostline: <u>3.5'</u>	Stabilization Time: <u>~ 1 day (bails dry)</u>

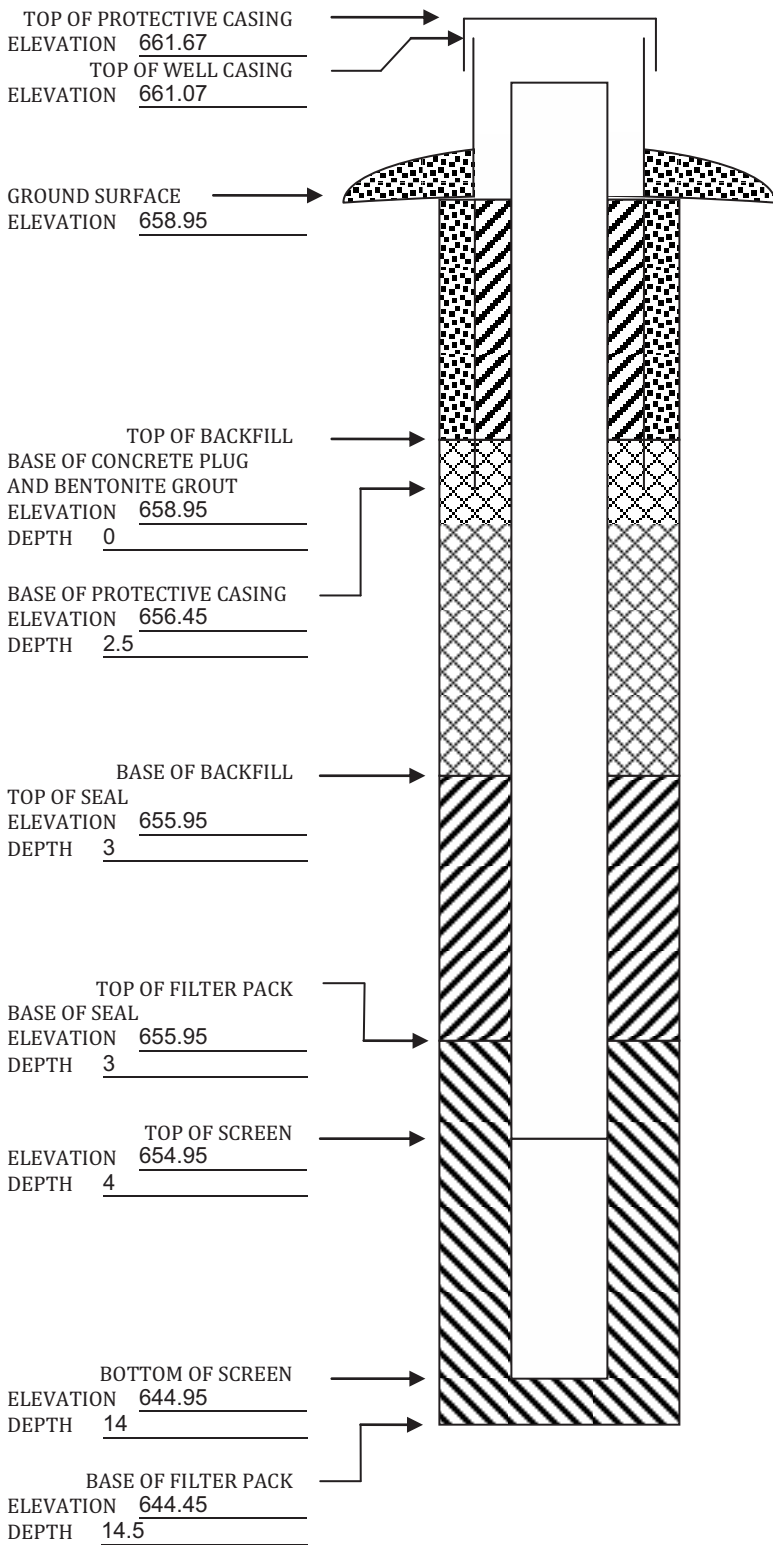
**Attachments: Driller's log, Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.**

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

**Questions? Call or Email:** Nina Koger, Environmental Engineer Sr., 515-281-8986, [Nina.Koger@dnr.iowa.gov](mailto:Nina.Koger@dnr.iowa.gov)

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

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







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

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

Well or Piezometer No: MW-304

Dates Started: 11/11/15 Date Completed: 11/12/15

A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations ( $\pm 0.5$ ft): _____ Specify corner of site: <u>SE of Parcel 003052620200000</u> Distance & direction along boundary: <u>502' W</u> Distance & direction from boundary to wall: <u>44' N</u> Elevations ( $\pm 0.01$ ft MSL): _____ Ground Surface: <u>680.09</u> Top of protective casing: <u>683.36</u> Top of well casing: _____ <u>682.84</u> Benchmark elevation: _____ Benchmark description: _____	Name & Address of Construction Company: <u>Cascade Drilling, LP</u> <u>301 Alderson St</u> <u>Schofield, WI 54476</u> Name of Driller: <u>Todd Schmalfeld</u> Drilling Method: <u>HSA</u> Drilling Fluid: <u>NA</u> Bore Hole Diameter: <u>8 inch</u> Soil Sampling Method: <u>Spoon</u> Depth of Boring: <u>52 ft</u>

C. MONITORING WELL INSTALLATION	
Casing material: _____ <u>PVC sch 40</u> Length of casing: _____ <u>40 ft</u> Outside casing diameter: _____ <u>2.38"</u> Inside casing diameter: _____ <u>2"</u> Casing joint type: _____ <u>threaded</u> Casing/screen joint type: <u>threaded</u> Screen material: _____ <u>PVC</u> Screen opening size: <u>0.010"</u> Screen length: _____ <u>5 ft</u> Depth of well: _____ <u>50 ft</u> Filter Pack: _____ Material: _____ <u>Red Flint</u> Grain size: _____ <u>#40</u> Volume: _____ <u>2 cu. ft.</u> Seal (minimum 3 ft length above filter pack): _____ Material: <u>3/8" bentonite chips</u>	Placement method: <u>gravity</u> Volume: <u>.3 cu. ft.</u> Backfill (if different from seal): _____ Material: <u>AquaGuard Grout</u> Placement method: <u>tremie</u> Volume: <u>75 gallons</u> Surface seal design: _____ Material of protective casing: <u>Steel</u> Material of grout between protective casing and well casing: <u>sand</u> Protective cap: _____ Material: <u>Steel, vented</u> Vented: <input type="checkbox"/> Yes <input type="checkbox"/> No      Locking: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Well Cap: _____ Material: <u>PVC</u> Vented: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

D. GROUNDWATER MEASUREMENT ( $\pm 0.01$ ft below top of inner well casing)	
Water level: <u>24.5 ft</u> Well development method: <u>bailed dry 3 times to reduce turbidity</u> Average depth of frostline: <u>3.5'</u>	Stabilization Time: <u>~1 day (bails dry)</u>

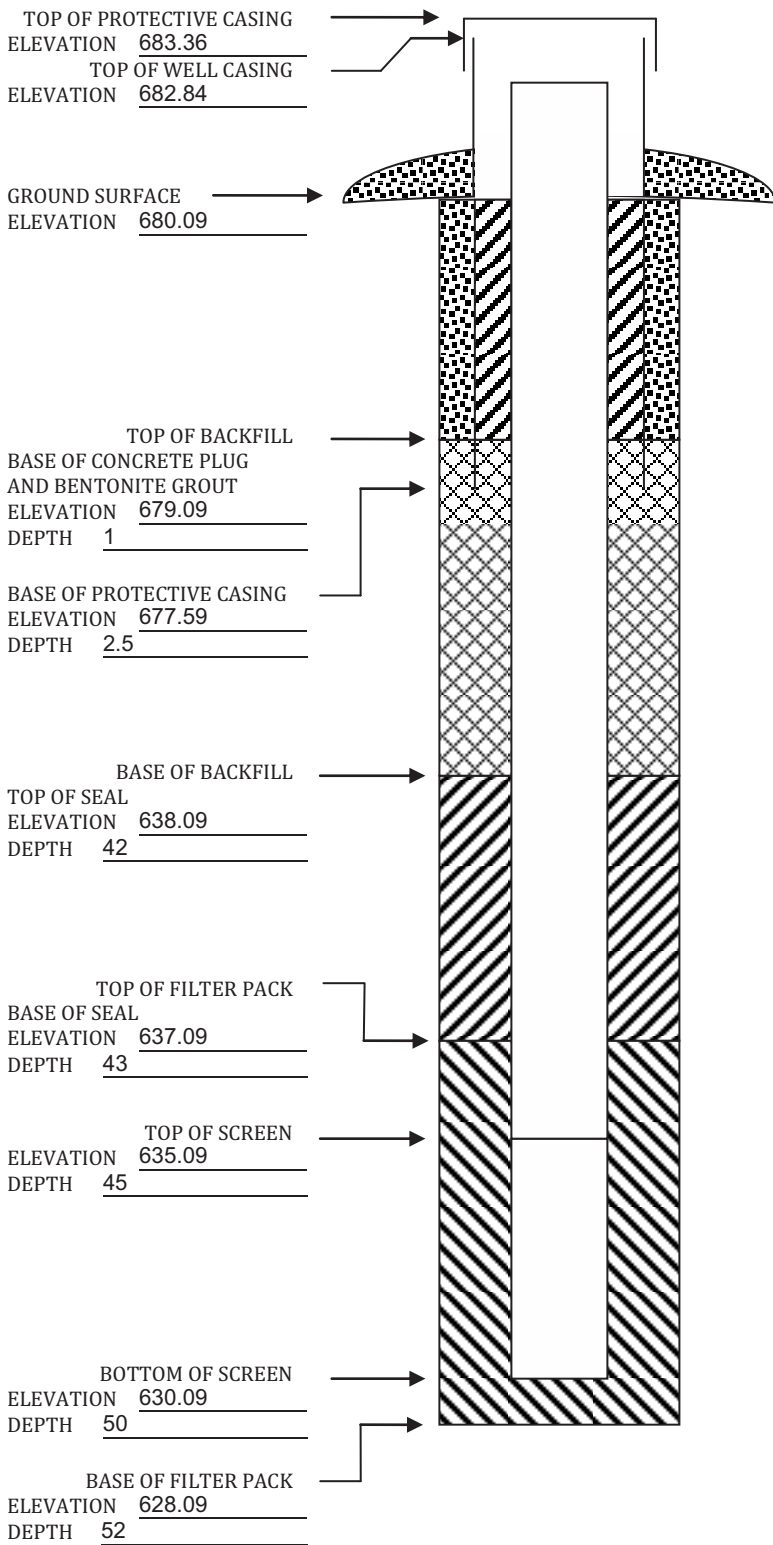
**Attachments: Driller's log. Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.**

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

**Questions? Call or Email:** Nina Koger, Environmental Engineer Sr., 515-281-8986, [Nina.Koger@dnr.iowa.gov](mailto:Nina.Koger@dnr.iowa.gov)

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

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





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

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

Well or Piezometer No: MW-305

Dates Started: 12/7/15 Date Completed: 12/8/15

A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations ( $\pm 0.5$ ft): _____ Specify corner of site: <u>SW of Parcel 003052620200000</u> Distance & direction along boundary: <u>539' E</u> Distance & direction from boundary to wall: <u>404' N</u> Elevations ( $\pm 0.01$ ft MSL): _____ Ground Surface: <u>681.54</u> Top of protective casing: <u>684.53</u> Top of well casing: _____ <u>683.91</u> Benchmark elevation: _____ Benchmark description: _____	Name & Address of Construction Company: _____ <u>Cascade Drilling, LP</u> <u>301 Alderson St</u> <u>Schofield, WI 54476</u> Name of Driller: <u>Todd Schmalfeld</u> Drilling Method: <u>HSA</u> Drilling Fluid: <u>NA</u> Bore Hole Diameter: <u>8 inch</u> Soil Sampling Method: <u>Spoon</u> Depth of Boring: <u>50 ft</u>

C. MONITORING WELL INSTALLATION	
Casing material: _____ <u>PVC sch 80</u> Length of casing: _____ <u>44 ft</u> Outside casing diameter: _____ <u>2.38"</u> Inside casing diameter: _____ <u>2"</u> Casing joint type: _____ <u>threaded</u> Casing/screen joint type: <u>threaded</u> Screen material: _____ <u>PVC</u> Screen opening size: <u>0.010</u> Screen length: _____ <u>5 ft</u> Depth of well: _____ <u>49 ft</u> Filter Pack: _____ Material: _____ <u>Red Flint</u> Grain size: _____ <u>#40</u> Volume: _____ <u>2 cu. ft.</u> Seal (minimum 3 ft length above filter pack): _____ Material: <u>3/8" bentonite chips</u>	Placement method: <u>gravity</u> Volume: <u>.3 cu. ft.</u> Backfill (if different from seal): _____ Material: <u>AquaGuard grou</u> Placement method: <u>tremie</u> Volume: <u>80 gallons</u> Surface seal design: _____ Material of protective casing: <u>Steel</u> Material of grout between protective casing and well casing: <u>sand</u> Protective cap: _____ Material: <u>Steel, vented</u> Vented: <input type="checkbox"/> Yes <input type="checkbox"/> No      Locking: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Well Cap: _____ Material: <u>PVC</u> Vented: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

D. GROUNDWATER MEASUREMENT ( $\pm 0.01$ ft below top of inner well casing)	
Water level: <u>22.02</u> Well development method: <u>Surged with block and pumped to reduce turbidity</u> Average depth of frostline: <u>3.5'</u>	Stabilization Time: <u>&lt; 5 min</u>

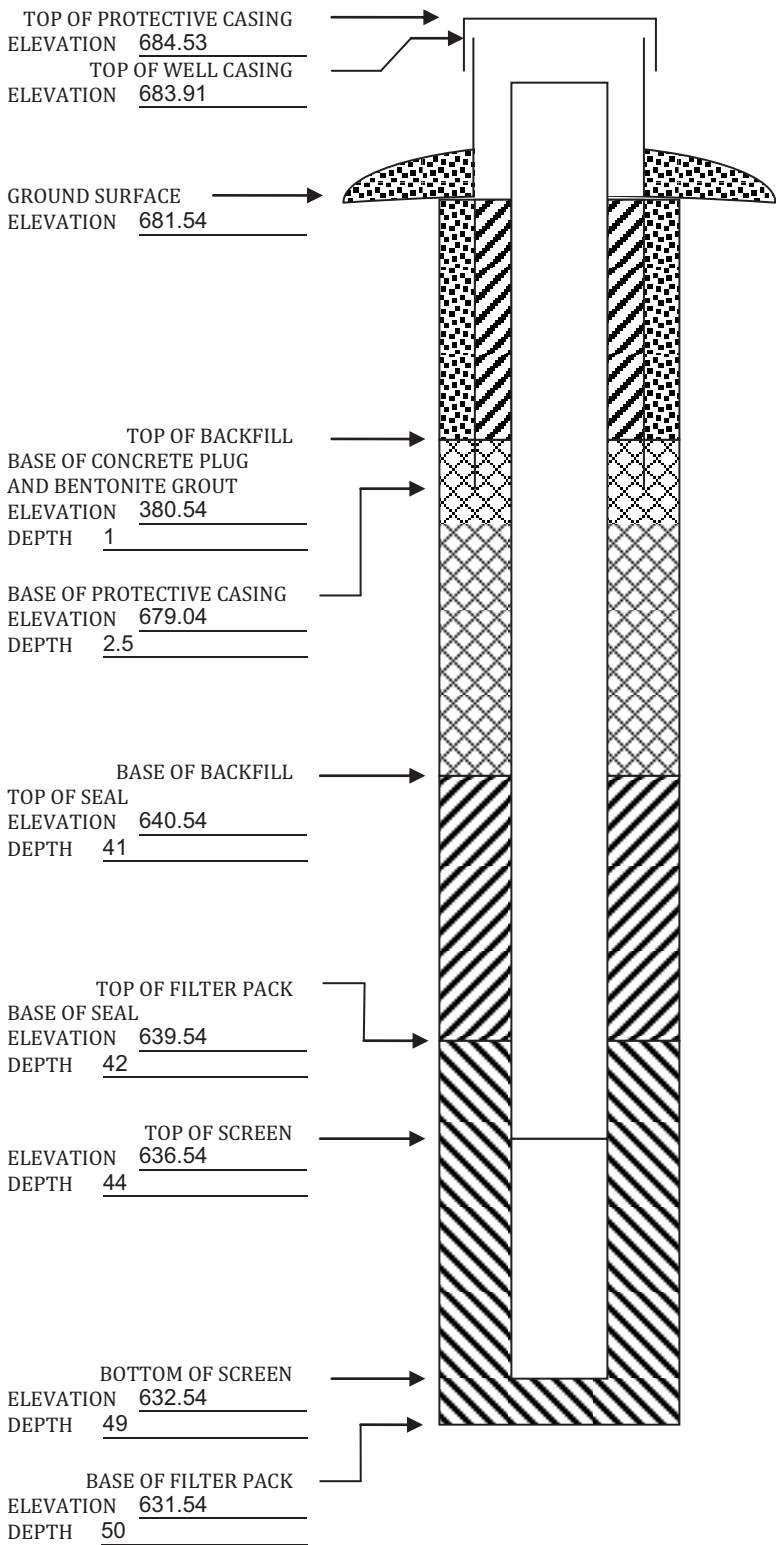
**Attachments: Driller's log, Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.**

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

**Questions? Call or Email:** Nina Koger, Environmental Engineer Sr., 515-281-8986, [Nina.Koger@dnr.iowa.gov](mailto:Nina.Koger@dnr.iowa.gov)

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

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





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

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

Well or Piezometer No: MW-306

Dates Started: 11/12/15 Date Completed: 11/12/15

A. SURVEYED LOCATIONS AND ELEVATIONS	B. SOIL BORING INFORMATION
Locations ( $\pm 0.5$ ft): _____	Name & Address of Construction Company: _____
Specify corner of site: <u>NW of Parcel 003052620200000</u>	<u>Cascade Drilling, LP</u>
Distance & direction along boundary: <u>137.5' E</u>	<u>301 Alderson St</u>
Distance & direction from boundary to wall: <u>321' S</u>	<u>Schofield, WI 54476</u>
Elevations ( $\pm 0.01$ ft MSL): _____	Name of Driller: <u>Todd Schmalfeld</u>
Ground Surface: <u>681.05</u>	Drilling Method: <u>HSA</u>
Top of protective casing: <u>683.98</u>	Drilling Fluid: <u>NA</u>
Top of well casing: _____ <u>683.47</u>	Bore Hole Diameter: <u>8 inch</u>
Benchmark elevation: _____	Soil Sampling Method: <u>Spoon</u>
Benchmark description: _____	Depth of Boring: <u>34.5 ft</u>

C. MONITORING WELL INSTALLATION	
Casing material: _____ <u>PVC sch 80</u>	Placement method: <u>Gravity</u>
Length of casing: _____ <u>29 ft</u>	Volume: <u>10.5 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</u>
Screen length: _____ <u>5 ft</u>	Material of grout between protective casing and well casing: <u>sand</u>
Depth of well: _____ <u>34 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>2 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" bentonite chips</u>	

D. GROUNDWATER MEASUREMENT ( $\pm 0.01$ ft below top of inner well casing)	
Water level: <u>12.96'</u>	Stabilization Time: <u>&lt; 5 min</u>
Well development method: <u>Surged with block and pumped. 193 gallons purged.</u>	
Average depth of frostline: <u>3.5'</u>	

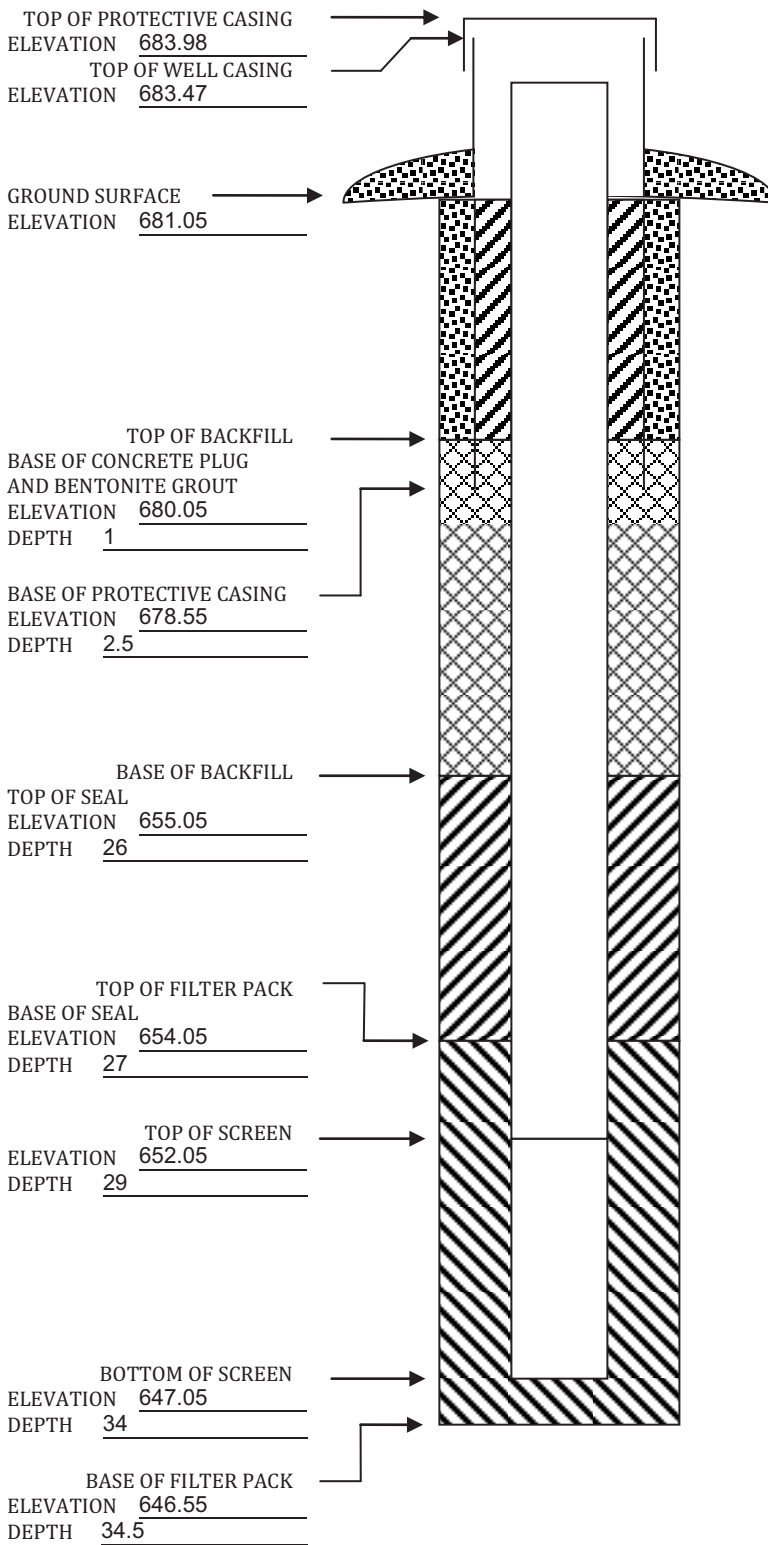
**Attachments: Driller's log. Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.**

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

**Questions? Call or Email:** Nina Koger, Environmental Engineer Sr., 515-281-8986, [Nina.Koger@dnr.iowa.gov](mailto:Nina.Koger@dnr.iowa.gov)

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

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



# MONITORING WELL / PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name IPL - Ottumwa Generating Station Permit No. \_\_\_\_\_  
Well or Piezometer No. MW-310 Dates Started 8/27/2019 Date Completed 8/27/2019

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

Specify corner of site Middle Avery Creek @  
Des Moines River Distance and direction along boundary 340' NW  
Distance and direction from boundary to surface monitoring well 45' SW  
Elevation (+0.01 ft. MSL) \_\_\_\_\_  
Ground Surface 655.76 Top of protective casing 658.97  
Top of well casing 658.63 Benchmark elevation \_\_\_\_\_  
Benchmark description \_\_\_\_\_

## B. SOIL BORING INFORMATION

Construction Company Name Roberts Environmental Drilling Inc.  
Address 1107 South Mulberry Street City, State, Zip Code Millstadt, IL, 62260  
Name of driller Eric Wetzel  
Drilling method 4 1/4" HSA Drilling fluid \_\_\_\_\_ Bore Hole diameter 8.5"  
Soil sampling method Split Spoon Depth of boring 24'

## C. MONITORING WELL INSTALLATION

Casing material PVC - Sch. 40 Placement method Gravity  
Length of casing 20.87 Volume 4 cubic feet  
Outside casing diameter 2.4" Backfill (if different from seal): \_\_\_\_\_  
Inside casing diameter 2.0" Material \_\_\_\_\_  
Casing joint type Threaded Placement method \_\_\_\_\_  
Casing/screen joint type Threaded Volume \_\_\_\_\_  
Screen material PVC - Sch. 40 Surface seal design: Concrete  
Screen opening size 0.01' Material of protective casing: Steel  
Material of grout between  
protective casing and well casing: Bentonite/Filter Sand  
Screen length 5' Protective cap: \_\_\_\_\_  
Depth of Well 23' Material Steel  
Filter Pack: \_\_\_\_\_ Vented?:  Y  N Locking?:  Y  N  
Material Filter Sand Well cap: \_\_\_\_\_  
Grain Size #5 Material Plastic  
Volume 1.25 cubic feet Vented?:  Y  N  
Seal (minimum 3 ft. length above filter pack): \_\_\_\_\_  
Material 3/8" Bentonite Chips

## D. GROUNDWATER MEASUREMENT ( $\pm 0.01$ foot below top of inner well casing)

Water level 16.67 Stabilization time 5 min  
Well development method surge and purge with pump to remove turbidity  
Average depth of frost line 3.5'

## DRILLER'S CERTIFICATION

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

Signature  Certification # 11509 Date 10.3.19

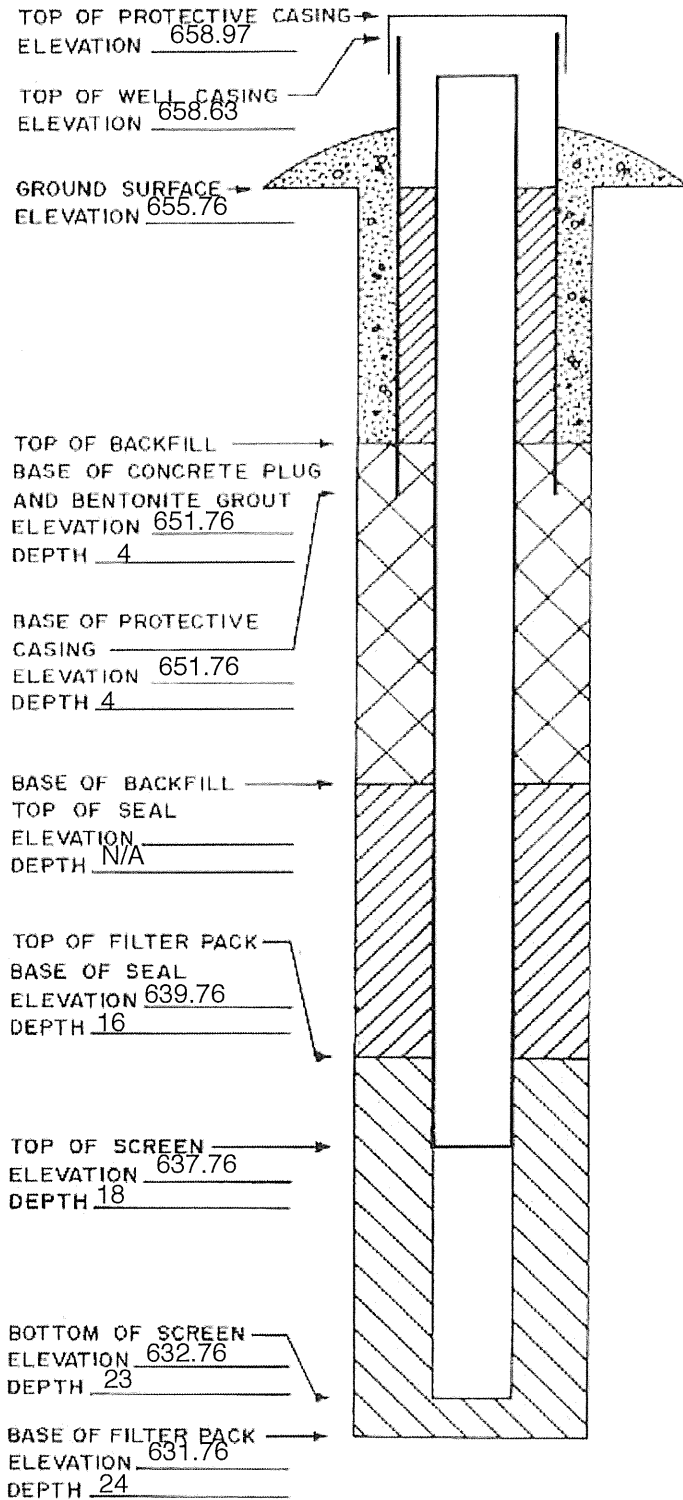
Attachments: Driller's log. Pipe schedules and grouting schedules. 8 1/2 inch x 11 inch map showing locations of all monitoring wells and piezometers.

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

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

ELEVATIONS: ± 0.01 FT. MSL  
DEPTHS: ± 0.1 FT. FROM  
GROUND SURFACE

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





# MONITORING WELL / PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name IPL - Ottumwa Generating Station Permit No. \_\_\_\_\_  
Well or Piezometer No. MW-311 Dates Started 8/27/2019 Date Completed 8/27/2019

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

Specify corner of site SE Distance and direction along boundary 730' W  
Distance and direction from boundary to surface monitoring well 160' N  
Elevation (+0.01 ft. MSL) \_\_\_\_\_  
Ground Surface 651.24 Top of protective casing 654.49  
Top of well casing 654.18 Benchmark elevation \_\_\_\_\_  
Benchmark description \_\_\_\_\_

## B. SOIL BORING INFORMATION

Construction Company Name Roberts Environmental Drilling Inc.  
Address 1107 South Mulberry Street City, State, Zip Code Millstadt, IL, 62260  
Name of driller Eric Wetzel  
Drilling method 4 1/4" HSA Drilling fluid \_\_\_\_\_ Bore Hole diameter 8.5"  
Soil sampling method Split Spoon Depth of boring 16'

## C. MONITORING WELL INSTALLATION

Casing material <u>PVC - Sch. 40</u>	Placement method <u>Gravity</u>
Length of casing <u>12.94'</u>	Volume <u>2 cubic feet</u>
Outside casing diameter <u>2.4"</u>	Backfill (if different from seal): _____
Inside casing diameter <u>2.0"</u>	Material _____
Casing joint type <u>Threaded</u>	Placement method _____
Casing/screen joint type <u>Threaded</u>	Volume _____
Screen material <u>PVC - Sch. 40</u>	Surface seal design: <u>Concrete</u>
Screen opening size <u>0.01'</u>	Material of protective casing: <u>Steel</u>
Screen length <u>5'</u>	Material of grout between protective casing and well casing: <u>Bentonite/Filter Sand</u>
Depth of Well <u>15'</u>	Protective cap: _____
Filter Pack: _____	Material <u>Steel</u>
Material <u>Filter Sand</u>	Vented?: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Locking?: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N
Grain Size <u>#5</u>	Well cap: _____
Volume <u>1.5 cubic feet</u>	Material <u>Plastic</u>
Seal (minimum 3 ft. length above filter pack): _____	Vented?: <input type="checkbox"/> Y <input checked="" type="checkbox"/> N
Material <u>3/8" Bentonite Chips</u>	

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

Water level 12.04 Stabilization time 5 min  
Well development method surge and purge with pump to remove turbidity  
Average depth of frost line 3.5'

## DRILLER'S CERTIFICATION

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

Signature [Signature] Certification # 11509 Date 10.3.19

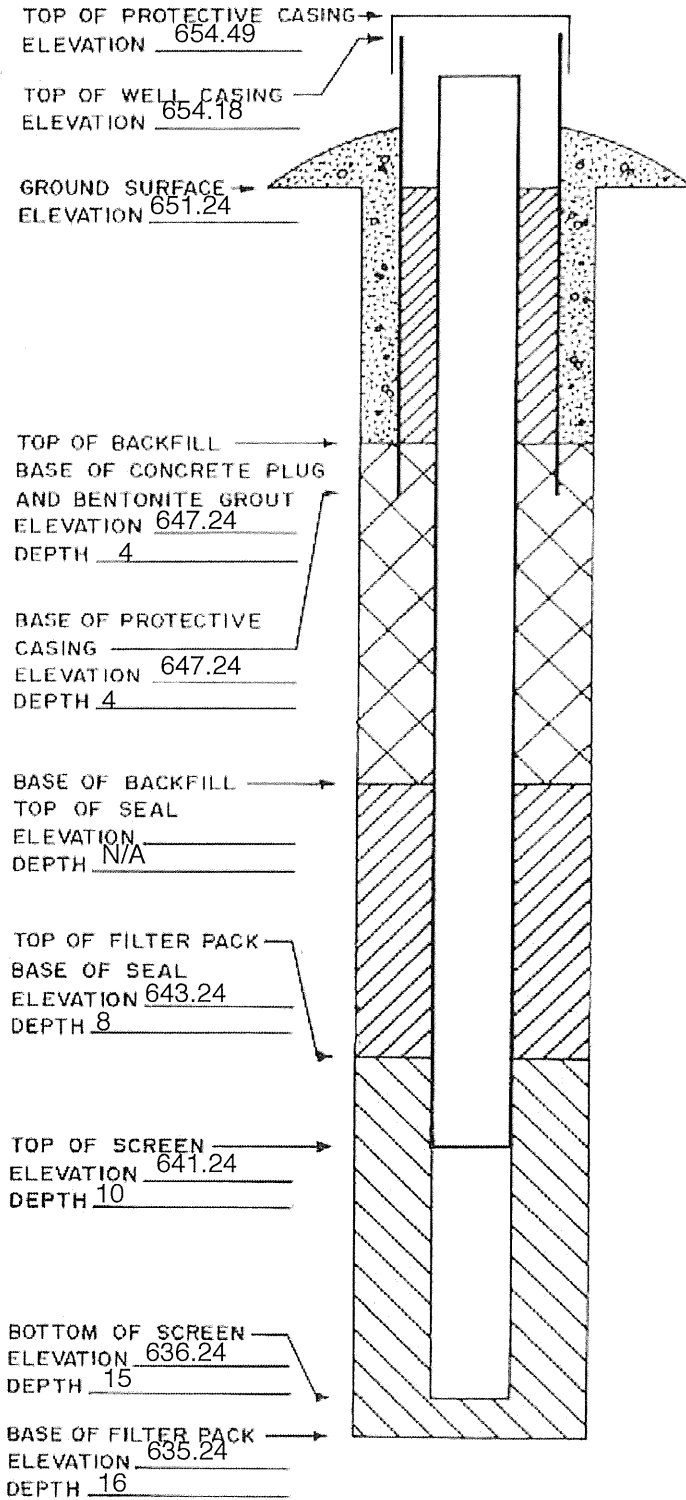
Attachments: Driller's log. Pipe schedules and grouting schedules. 8 1/2 inch x 11 inch map showing locations of all monitoring wells and piezometers.

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

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

ELEVATIONS: ± 0.01 FT. MSL  
DEPTHS: ± 0.1 FT. FROM  
GROUND SURFACE

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



# MONITORING WELL / PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name IPL-Ottumwa Generating Station Permit No. \_\_\_\_\_  
Well or Piezometer No. MW-305A Dates Started 2/25/2020 Date Completed 3/4/2020

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

Specify corner of site SW of Parcel 00305262020 Distance and direction along boundary 539' E  
Distance and direction from boundary to surface monitoring well 404' N  
Elevation (+0.01 ft. MSL) \_\_\_\_\_  
Ground Surface 681.76' Top of protective casing 684.35'  
Top of well casing 684.03' Benchmark elevation 654.48'  
Benchmark description Intake Structure Mag-Nail

## B. SOIL BORING INFORMATION

Construction Company Name Roberts Environmental Services  
Address 1107 South Mulberry Street City, State, Zip Code Millstadt, IL 62260  
Name of driller Jeff Crank  
Drilling method 6 1/4" HSA, 6" Air Rotary Drilling fluid \_\_\_\_\_ Bore Hole diameter 10"/6"  
Soil sampling method Split spoon/Sample catch from augers Depth of boring 80'

## C. MONITORING WELL INSTALLATION

Casing material PVC-Sch. 80 Placement method Gravity  
Length of casing 82' Volume 2 cu. ft.  
Outside casing diameter 2.4" Backfill (if different from seal): \_\_\_\_\_  
Inside casing diameter 1.9 Material Bentonite grout  
Casing joint type Threaded Placement method pumped  
Casing/screen joint type Threaded Volume 300 gallons  
Screen material PVC-Sch. 80 Surface seal design: \_\_\_\_\_  
Screen opening size 0.01" Material of protective casing: Steel  
Material of grout between  
protective casing and well casing: Sand  
Protective cap: \_\_\_\_\_  
Material Steel  
Vented?:  Y  N Locking?:  Y  N  
Well cap: \_\_\_\_\_  
Material Plastic  
Vented?:  Y  N  
Filter Pack: \_\_\_\_\_  
Material Filter sand  
Grain Size #18  
Volume 3 bags (50 lbs bags, Sil filter sand)  
Seal (minimum 3 ft. length above filter pack): \_\_\_\_\_  
Material 3/8" Bentonite chips

## D. GROUNDWATER MEASUREMENT ( $\pm 0.01$ foot below top of inner well casing)

Water level 32.7' Stabilization time ~ 1 day  
Well development method Pump and surge  
Average depth of frost line 40"

## DRILLER'S CERTIFICATION

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

Signature Jeff Crank Certification # 8515 Date 9-16-20

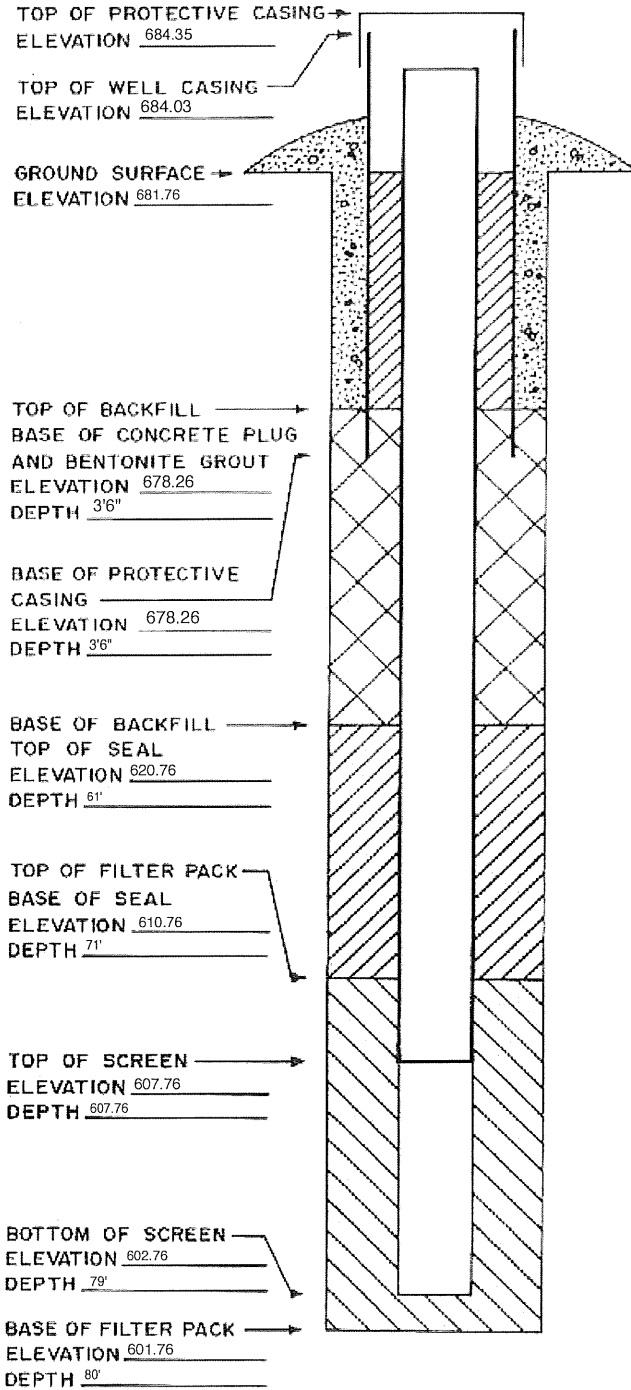
Attachments: Driller's log, Pipe schedules and grouting schedules. 8 1/2 inch x 11 inch map showing locations of all monitoring wells and piezometers.

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

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

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

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



# MONITORING WELL / PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name IPL-Ottumwa Generating Station Permit No. \_\_\_\_\_  
Well or Piezometer No. MW-310A Dates Started 2/27/2020 Date Completed 3/4/2020

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

Specify corner of site \_\_\_\_\_ Distance and direction along boundary 340' NW  
Distance and direction from boundary to surface monitoring well 45' SW  
Elevation (+0.01 ft. MSL) \_\_\_\_\_  
Ground Surface 655.26' Top of protective casing 658.25'  
Top of well casing 657.93' Benchmark elevation 654.48'  
Benchmark description Intake Structure Mag-Nail

## B. SOIL BORING INFORMATION

Construction Company Name Roberts Environmental Services  
Address 1107 South Mulberry Street City, State, Zip Code Millstadt, IL 62260  
Name of driller Jeff Crank  
Drilling method 6 1/4" HSA, 6" Air Rotary Drilling fluid \_\_\_\_\_ Bore Hole diameter 10"/6"  
Soil sampling method Split spoon/Sample catch from augers Depth of boring 54'

## C. MONITORING WELL INSTALLATION

Casing material <u>PVC-Sch. 80</u>	Placement method <u>Gravity</u>
Length of casing <u>55.5'</u>	Volume <u>2 cu. ft.</u>
Outside casing diameter <u>2.4"</u>	Backfill (if different from seal): _____
Inside casing diameter <u>1.9"</u>	Material <u>Bentonite grout</u>
Casing joint type <u>Threaded</u>	Placement method <u>pumped</u>
Casing/screen joint type <u>Threaded</u>	Volume <u>200 gallons</u>
Screen material <u>PVC-Sch. 80</u>	Surface seal design: _____
Screen opening size <u>0.1</u>	Material of protective casing: <u>Steel</u>
Screen length <u>5'</u>	Material of grout between protective casing and well casing: <u>Sand</u>
Depth of Well <u>53'</u>	Protective cap: _____
Filter Pack: _____	Material <u>Steel</u>
Material <u>Filter sand</u>	Vented?: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Locking?: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N
Grain Size <u>#18</u>	Well cap: _____
Volume <u>3 bags (50 lbs bags, Sil filter sand)</u>	Material <u>Plastic</u>
Seal (minimum 3 ft. length above filter pack): _____	Vented?: <input type="checkbox"/> Y <input checked="" type="checkbox"/> N
Material <u>3/8" Bentonite chips</u>	

## D. GROUNDWATER MEASUREMENT ( $\pm 0.01$ foot below top of inner well casing)

Water level 12' Stabilization time ~ 1 week  
Well development method Pump and surge  
Average depth of frost line 40"

## DRILLER'S CERTIFICATION

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

Signature Jeff Crank Certification # 8515 Date 9-16-20

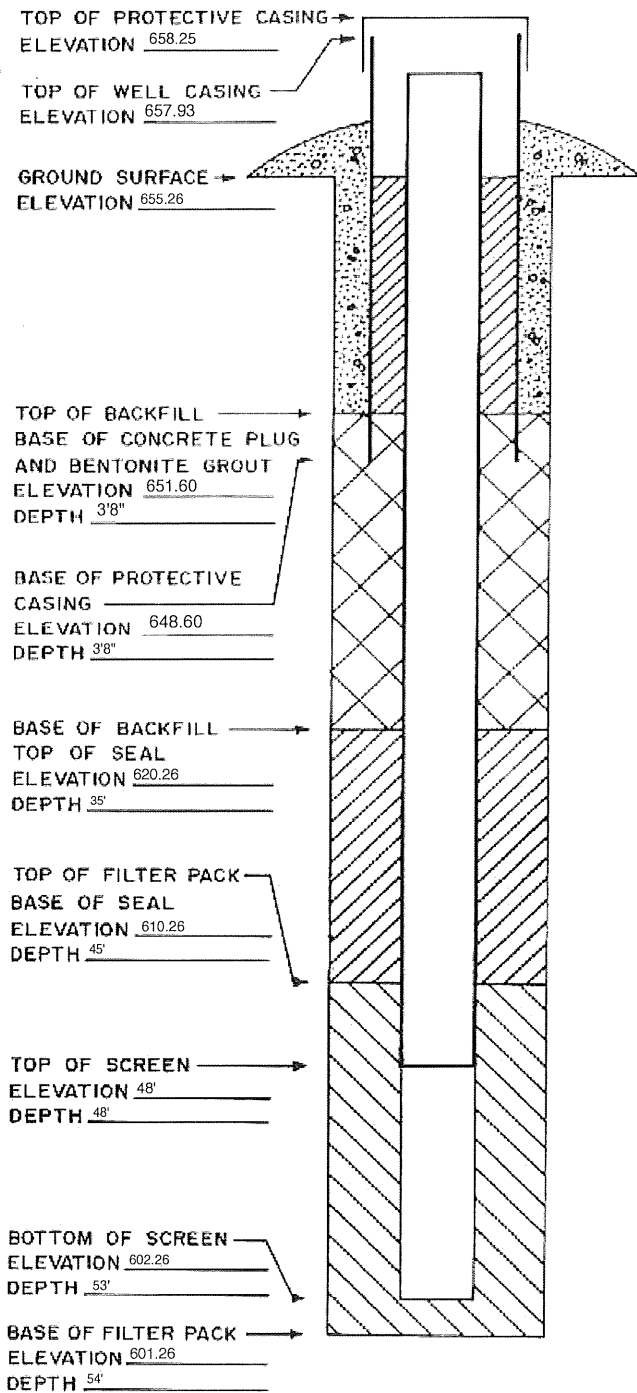
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ELEVATIONS:  $\pm$  0.01 FT. MSL  
DEPTHS:  $\pm$  0.1 FT. FROM  
GROUND SURFACE

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



# MONITORING WELL / PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name IPL-Ottumwa Generating Station Permit No. \_\_\_\_\_  
Well or Piezometer No. MW-311A Dates Started 3/2/2020 Date Completed 3/4/2020

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

Specify corner of site SE Distance and direction along boundary 730' W  
Distance and direction from boundary to surface monitoring well 160' N  
Elevation (+0.01 ft. MSL) \_\_\_\_\_  
Ground Surface 651.16' Top of protective casing 653.88  
Top of well casing 653.54' Benchmark elevation 654.48  
Benchmark description Intake Structure Mag-Nail

## B. SOIL BORING INFORMATION

Construction Company Name Roberts Environmental Services  
Address 1107 South Mulberry Street City, State, Zip Code Millstadt, IL 62260  
Name of driller Jeff Crank  
Drilling method 6 1/4" HSA, 6" Air Rotary Drilling fluid \_\_\_\_\_ Bore Hole diameter 10"/6"  
Soil sampling method Split spoon/Sample catch from augers Depth of boring 46'

## C. MONITORING WELL INSTALLATION

Casing material <u>PVC-Sch. 40</u>	Placement method <u>Gravity</u>
Length of casing <u>47.68'</u>	Volume <u>2 cu. ft.</u>
Outside casing diameter <u>2.4"</u>	Backfill (if different from seal): _____
Inside casing diameter <u>2.1"</u>	Material <u>Bentonite grout</u>
Casing joint type <u>Threaded</u>	Placement method <u>pumped</u>
Casing/screen joint type <u>Threaded</u>	Volume <u>200 gallons</u>
Screen material <u>PVC-Sch. 40</u>	Surface seal design: _____
Screen opening size <u>0.1</u>	Material of protective casing: <u>Steel</u>
Screen length <u>5'</u>	Material of grout between protective casing and well casing: <u>Sand</u>
Depth of Well <u>45'</u>	Protective cap: _____
Filter Pack: _____	Material <u>Steel</u>
Material <u>Filter sand</u>	Vented?: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N Locking?: <input checked="" type="checkbox"/> Y <input type="checkbox"/> N
Grain Size <u>#18</u>	Well cap: _____
Volume <u>3 bags (50 lbs bags, Sil filter sand)</u>	Material <u>Plastic</u>
Seal (minimum 3 ft. length above filter pack): _____	Vented?: <input type="checkbox"/> Y <input checked="" type="checkbox"/> N
Material <u>3/8" Bentonite chips</u>	

## D. GROUNDWATER MEASUREMENT ( $\pm 0.01$ foot below top of inner well casing)

Water level 8.89' Stabilization time ~ 1 week  
Well development method Pump and surge  
Average depth of frost line 40"

## DRILLER'S CERTIFICATION

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

Signature Jeff Crank Certification # 8515 Date 9-16-20

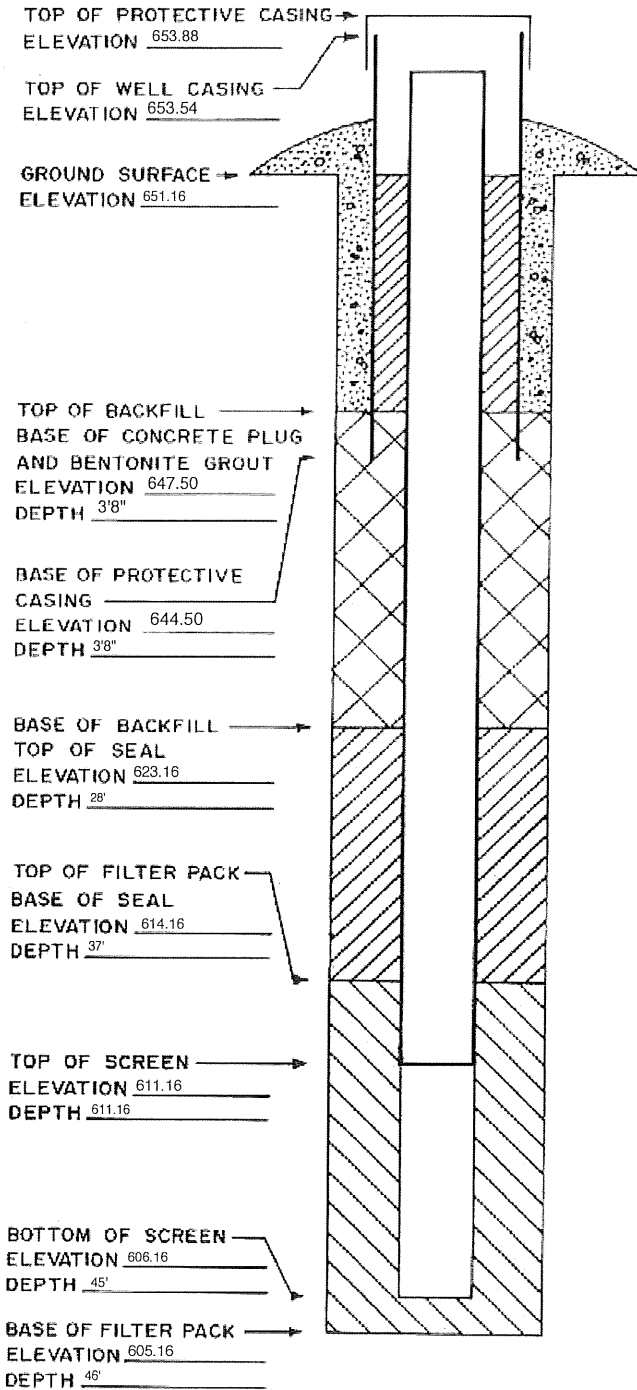
Attachments: Driller's log. Pipe schedules and grouting schedules. 8 1/2 inch x 11 inch map showing locations of all monitoring wells and piezometers.

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


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

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

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







Appendix C  
Laboratory Reports

## C1 Assessment Monitoring, February 2021

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-201013-1

Client Project/Site: Ottumwa Generating Station 25221072

**For:**

SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:  
3/5/2021 1:49:49 PM

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

### LINKS

Review your project  
results through  
**Total Access**

Have a Question?



Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

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

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



# 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 . . . . .	11
Chronicle . . . . .	12
Certification Summary . . . . .	13
Method Summary . . . . .	14
Chain of Custody . . . . .	15
Receipt Checklists . . . . .	17

# Case Narrative

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201013-1

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## Job ID: 310-201013-1

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Laboratory: Eurofins TestAmerica, Cedar Falls

### Narrative

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Job Narrative  
310-201013-1

### Comments

No additional comments.

### Receipt

The samples were received on 2/24/2021 6:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.4° C.

### HPLC/IC

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

### Metals

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

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# Sample Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201013-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-201013-1	MW-306	Water	02/23/21 12:02	02/24/21 18:00	
310-201013-2	MW-310	Water	02/23/21 14:06	02/24/21 18:00	
310-201013-3	Field Blank	Water	02/23/21 13:20	02/24/21 18:00	

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- 13
- 14

## Detection Summary

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201013-1

### Client Sample ID: MW-306

### Lab Sample ID: 310-201013-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Cobalt	5.6		0.50	0.091	ug/L		1		6020A	Total/NA
Ground Water Elevation	669.86				ft		1		Field Sampling	Total/NA
Oxidation Reduction Potential	64.2				millivolts		1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.50				mg/L		1		Field Sampling	Total/NA
pH, Field	6.34				SU		1		Field Sampling	Total/NA
Specific Conductance, Field	1277				umhos/cm		1		Field Sampling	Total/NA
Temperature, Field	13.4				Degrees C		1		Field Sampling	Total/NA
Turbidity, Field	2.86				NTU		1		Field Sampling	Total/NA

### Client Sample ID: MW-310

### Lab Sample ID: 310-201013-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Lithium	37		10	2.5	ug/L		1		6020A	Total/NA
Ground Water Elevation	638.77				ft		1		Field Sampling	Total/NA
Oxidation Reduction Potential	91.3				millivolts		1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.09				mg/L		1		Field Sampling	Total/NA
pH, Field	7.11				SU		1		Field Sampling	Total/NA
Specific Conductance, Field	962				umhos/cm		1		Field Sampling	Total/NA
Temperature, Field	13.6				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: 310-201013-3

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 25221072

Job ID: 310-201013-1

**Client Sample ID: MW-306**

**Lab Sample ID: 310-201013-1**

Date Collected: 02/23/21 12:02

Matrix: Water

Date Received: 02/24/21 18:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	5.6		0.50	0.091	ug/L		03/01/21 09:00	03/02/21 19:58	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	669.86				ft			02/23/21 12:02	1
Oxidation Reduction Potential	64.2				millivolts			02/23/21 12:02	1
Oxygen, Dissolved, Client Supplied	0.50				mg/L			02/23/21 12:02	1
pH, Field	6.34				SU			02/23/21 12:02	1
Specific Conductance, Field	1277				umhos/cm			02/23/21 12:02	1
Temperature, Field	13.4				Degrees C			02/23/21 12:02	1
Turbidity, Field	2.86				NTU			02/23/21 12:02	1



# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201013-1

**Client Sample ID: MW-310**

**Lab Sample ID: 310-201013-2**

Date Collected: 02/23/21 14:06

Matrix: Water

Date Received: 02/24/21 18:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	37		10	2.5	ug/L		03/01/21 09:00	03/02/21 20:01	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	638.77				ft			02/23/21 14:06	1
Oxidation Reduction Potential	91.3				millivolts			02/23/21 14:06	1
Oxygen, Dissolved, Client Supplied	0.09				mg/L			02/23/21 14:06	1
pH, Field	7.11				SU			02/23/21 14:06	1
Specific Conductance, Field	962				umhos/cm			02/23/21 14:06	1
Temperature, Field	13.6				Degrees C			02/23/21 14:06	1
Turbidity, Field	0.02				NTU			02/23/21 14:06	1

# Client Sample Results

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201013-1

**Client Sample ID: Field Blank**

**Lab Sample ID: 310-201013-3**

Date Collected: 02/23/21 13:20

Matrix: Water

Date Received: 02/24/21 18:00

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	<0.055		0.10	0.055	mg/L			02/26/21 08:33	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.091		0.50	0.091	ug/L		03/01/21 09:00	03/02/21 20:04	1
Lithium	<2.5		10	2.5	ug/L		03/01/21 09:00	03/02/21 20:04	1

## Definitions/Glossary

Client: SCS Engineers

Job ID: 310-201013-1

Project/Site: Ottumwa Generating Station 25221072

### 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 25221072

Job ID: 310-201013-1

## Method: 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 310-308256/3**  
**Matrix: Water**  
**Analysis Batch: 308256**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	<0.055		0.10	0.055	mg/L			02/26/21 08:15	1

**Lab Sample ID: LCS 310-308256/4**  
**Matrix: Water**  
**Analysis Batch: 308256**

**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	1.98		mg/L		99	90 - 110

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

**Lab Sample ID: MB 310-308092/1-A**  
**Matrix: Water**  
**Analysis Batch: 308465**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 308092**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.091		0.50	0.091	ug/L		03/01/21 09:00	03/02/21 19:28	1
Lithium	<2.5		10	2.5	ug/L		03/01/21 09:00	03/02/21 19:28	1

**Lab Sample ID: LCS 310-308092/2-A**  
**Matrix: Water**  
**Analysis Batch: 308465**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 308092**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cobalt	200	210		ug/L		105	80 - 120
Lithium	400	380		ug/L		95	80 - 120

# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201013-1

## HPLC/IC

### Analysis Batch: 308256

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-201013-3	Field Blank	Total/NA	Water	9056A	
MB 310-308256/3	Method Blank	Total/NA	Water	9056A	
LCS 310-308256/4	Lab Control Sample	Total/NA	Water	9056A	

## Metals

### Prep Batch: 308092

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-201013-1	MW-306	Total/NA	Water	3010A	
310-201013-2	MW-310	Total/NA	Water	3010A	
310-201013-3	Field Blank	Total/NA	Water	3010A	
MB 310-308092/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-308092/2-A	Lab Control Sample	Total/NA	Water	3010A	

### Analysis Batch: 308465

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-201013-1	MW-306	Total/NA	Water	6020A	308092
310-201013-2	MW-310	Total/NA	Water	6020A	308092
310-201013-3	Field Blank	Total/NA	Water	6020A	308092
MB 310-308092/1-A	Method Blank	Total/NA	Water	6020A	308092
LCS 310-308092/2-A	Lab Control Sample	Total/NA	Water	6020A	308092

## Field Service / Mobile Lab

### Analysis Batch: 308123

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-201013-1	MW-306	Total/NA	Water	Field Sampling	
310-201013-2	MW-310	Total/NA	Water	Field Sampling	

# Lab Chronicle

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201013-1

**Client Sample ID: MW-306**

**Lab Sample ID: 310-201013-1**

Date Collected: 02/23/21 12:02

Matrix: Water

Date Received: 02/24/21 18:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			308092	03/01/21 09:00	HED	TAL CF
Total/NA	Analysis	6020A		1	308465	03/02/21 19:58	SAD	TAL CF
Total/NA	Analysis	Field Sampling		1	308123	02/23/21 12:02	SLD	TAL CF

**Client Sample ID: MW-310**

**Lab Sample ID: 310-201013-2**

Date Collected: 02/23/21 14:06

Matrix: Water

Date Received: 02/24/21 18:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			308092	03/01/21 09:00	HED	TAL CF
Total/NA	Analysis	6020A		1	308465	03/02/21 20:01	SAD	TAL CF
Total/NA	Analysis	Field Sampling		1	308123	02/23/21 14:06	SLD	TAL CF

**Client Sample ID: Field Blank**

**Lab Sample ID: 310-201013-3**

Date Collected: 02/23/21 13:20

Matrix: Water

Date Received: 02/24/21 18:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1	308256	02/26/21 08:33	SAD	TAL CF
Total/NA	Prep	3010A			308092	03/01/21 09:00	HED	TAL CF
Total/NA	Analysis	6020A		1	308465	03/02/21 20:04	SAD	TAL CF

**Laboratory References:**

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

# Accreditation/Certification Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201013-1

## 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 25221072

Job ID: 310-201013-1

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

**Protocol References:**

EPA = US Environmental Protection Agency

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

**Laboratory References:**

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







Environment Testing  
TestAmerica



310-201013 Chain of Custody

### Cooler/Sample Receipt and Temperature Log Form

<b>Client Information</b>			
Client: <u>SCS Engineers</u>			
City/State: <u>Madison</u>	CITY	STATE <u>WI</u>	Project: <u>Ottumwa Generating Station</u>
<b>Receipt Information</b>			
Date/Time Received: <u>2-24-21</u>	DATE	<u>1800</u>	TIME
Received By: <u>ER</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: _____			
<b>Condition of Cooler/Containers</b>			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____	
Multiple Coolers?	<input 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 type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
<b>Temperature Record</b>			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>0</u>	Correction Factor (°C): <u>0</u>		
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>3.4</u>	Corrected Temp (°C): <u>3.4</u>		
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
<b>Exceptions Noted</b>			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
<b>Additional Comments</b>			

<b>Client Information</b>		Lab PM: <b>Fredrick, Sandie</b>		Carrier Tracking No(s):		COC No: 310-58023-17086.1					
Client Contact: <b>Meghan Bloodgett</b>		E-Mail: <b>sandra.fredrick@eurofins.com</b>		State of Origin:		Page: Page 1 of 1					
Company: <b>SCS Engineers</b>		PWSID:		Job #:							
Address: <b>2830 Dairy Drive</b>		Due Date Requested:		Analysis Requested		Preservation Codes:					
City: <b>Madison</b>		TAT Requested (days):		Analysis Requested		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: <b>WI, 53718</b>		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		Analysis Requested		M - Hexane N - None O - AsNaO2 P - Na2CO3 Q - Na2SO3 R - H2SO4 S - TSP Dodecahydrate T - Acetone U - MCAA V - pH 4-5 W - EDTA Z - other (Specify)					
Phone: <b>269-943-0855</b>		PO #: <b>25221072</b>		Analysis Requested							
Email: <b>mrbloodgett@scsengineers.com</b>		WO #: <b>31011020</b>		Analysis Requested							
Project Name: <b>Citumwa Generating Station 25221072</b>		Project #: <b>31011020</b>		Analysis Requested							
Site: <b>350W#:</b>		SSOW#:		Analysis Requested							
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=soil, B=biological, T=tissue)	Field Filtered Sample (Yes or No)	Perform MS/MS (Yes or No)	6029A - Cobalt	6020A - Lithium	5025A ORGFM 28D - Fluoride	Total Number of Containers	Special Instructions/Note:
MW-306	2-23-21	12:00	G	Water	N	N	X				
MW-310	2-23-21	14:06	G	Water	N	N	X				
MW-311A	2-23-21	13:20	G	Water	N	N	X				
Field Blank											

**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: **Tynten Buszka** Date: **2-24-21** Time: **12:30** Company: **SCS**

Relinquished by: Date/Time: Company:

Relinquished by: Date/Time: 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: **EB** Date/Time: **2-24-21 10:00** Company:

Received by: Date/Time: Company:

Received by: Date/Time: Company:

Cooler Temperature(s) °C and Other Remarks:

## Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-201013-1

**Login Number: 201013**

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

**List Number: 1**

**Creator: Homolar, Dana J**

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: 310-201130-1

Client Project/Site: Ottumwa Generating Station 25221072

**For:**

SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:  
3/5/2021 4:14:35 PM*

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

### LINKS

Review your project  
results through  
**Total Access**

Have a Question?



Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

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

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

# 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 . . . . .	9
Chronicle . . . . .	10
Certification Summary . . . . .	11
Method Summary . . . . .	12
Chain of Custody . . . . .	13
Receipt Checklists . . . . .	15



# Case Narrative

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201130-1

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## Job ID: 310-201130-1

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Laboratory: Eurofins TestAmerica, Cedar Falls

### Narrative

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Job Narrative  
310-201130-1

### Comments

No additional comments.

### Receipt

The sample was received on 2/25/2021 5:25 PM. Unless otherwise noted below, the sample arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 5.3° C.

### HPLC/IC

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 25221072

Job ID: 310-201130-1

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-201130-1	MW-311A	Water	02/25/21 09:13	02/25/21 17:25	

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

# Detection Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201130-1

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-201130-1**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	3.9		0.50	0.28	mg/L	5		9056A	Total/NA
Ground Water Elevation	641.16				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	129.7				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	3.23				mg/L	1		Field Sampling	Total/NA
pH, Field	7.55				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	3243				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	11.5				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	0.02				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls



# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201130-1

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-201130-1**

Date Collected: 02/25/21 09:13

Matrix: Water

Date Received: 02/25/21 17:25

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	3.9		0.50	0.28	mg/L			03/01/21 16:40	5

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	641.16				ft			02/25/21 09:13	1
Oxidation Reduction Potential	129.7				millivolts			02/25/21 09:13	1
Oxygen, Dissolved, Client Supplied	3.23				mg/L			02/25/21 09:13	1
pH, Field	7.55				SU			02/25/21 09:13	1
Specific Conductance, Field	3243				umhos/cm			02/25/21 09:13	1
Temperature, Field	11.5				Degrees C			02/25/21 09:13	1
Turbidity, Field	0.02				NTU			02/25/21 09:13	1

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

# Definitions/Glossary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201130-1

## Glossary

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

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201130-1

## Method: 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 310-308745/3**  
**Matrix: Water**  
**Analysis Batch: 308745**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	<0.055		0.10	0.055	mg/L			03/01/21 11:13	1

**Lab Sample ID: LCS 310-308745/4**  
**Matrix: Water**  
**Analysis Batch: 308745**

**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	1.93		mg/L		96	90 - 110



# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201130-1

## HPLC/IC

### Analysis Batch: 308745

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-201130-1	MW-311A	Total/NA	Water	9056A	
MB 310-308745/3	Method Blank	Total/NA	Water	9056A	
LCS 310-308745/4	Lab Control Sample	Total/NA	Water	9056A	

## Field Service / Mobile Lab

### Analysis Batch: 308123

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-201130-1	MW-311A	Total/NA	Water	Field Sampling	

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

# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201130-1

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-201130-1**

**Date Collected: 02/25/21 09:13**

**Matrix: Water**

**Date Received: 02/25/21 17:25**

<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	308745	03/01/21 16:40	CTB	TAL CF
Total/NA	Analysis	Field Sampling		1	308123	02/25/21 09:13	SLD	TAL CF

**Laboratory References:**

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

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

# Accreditation/Certification Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201130-1

## 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

# Method Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station 25221072

Job ID: 310-201130-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	TAL CF
Field Sampling	Field Sampling	EPA	TAL CF

**Protocol References:**

EPA = US Environmental Protection Agency

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

**Laboratory References:**

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





Environment Testing  
TestAmerica



310-201130 Chain of Custody

### Cooler/Sample Receipt and Temperature Log Form

<b>Client Information</b>		
Client: <u>SCS Engineers</u>		
City/State: <u>Madison</u>	STATE: <u>WI</u>	Project: <u>offensive Genotoxicity</u>
<b>Receipt Information</b>		
Date/Time Received: DATE <u>2-25-21</u> TIME <u>1725</u>	Received By: <u>ER</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: _____		
<b>Condition of Cooler/Containers</b>		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
<b>Temperature Record</b>		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>0</u>	Correction Factor (°C): <u>0</u>	
• <b>Temp Blank Temperature</b> – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>5.3</u>	Corrected Temp (°C): <u>5.3</u>	
• <b>Sample Container Temperature</b>		
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):		
Corrected Temp (°C):		
<b>Exceptions Noted</b>		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
<b>Additional Comments</b>		



<b>Client Information</b>		Sampler: <u>Tanter Busck</u>		Lab P/N: <u>Fredrick, Sandie</u>		Carrier Tracking No(s):		COC No: <u>310-58026-17088.1</u>	
Client Contact: <u>Meghan Blodgett</u>		Phone: <u>269-943-0855</u>		E-Mail: <u>sandra.fredrick@eurofins.com</u>		State of Origin:		Page: <u>Page 1 of 1</u>	
Company: <u>SCS Engineers</u>		FWSID:		Analysis Requested		Job #:		Preservation Codes:	
Address: <u>2830 Dairy Drive</u>		Due Date Requested:		Perform MS/MSD (Yes or No)		Total Number of Containers		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
City: <u>Madison</u>		TAT Requested (days):		Field Filtered Sample (Yes or No)		6020A - Cobalt		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSC4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
State, Zip: <u>WI, 53718</u>		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		Matrix		9056A - ORGM_28D - Fluoride		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Phone: <u>269-943-0855</u>		PO #: <u>25221072</u>		Sample Type (C=Comp, G=grab)		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Email: <u>mbloodgett@scsengineers.com</u>		WO #: <u>31011020</u>		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Project Name: <u>Ottumwa Generating Station 25221072</u>		Project #: <u>31011020</u>		Sample Date		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Site: <u>SSOW#</u>		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
<b>Sample Identification</b>		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Field Blank		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
<u>MMW - 311A</u>		<u>2-25-20</u>		<u>9:13</u>		<u>Water</u>		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
<b>Possible Hazard Identification</b>		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
<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		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Deliverable Requested: I, II, III, IV, Other (specify)		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Empty Kit Relinquished by		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Relinquished by: <u>Tanter Busck</u>		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Relinquished by: <u>Tanter Busck</u>		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Relinquished by:		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Custody Seal No.:		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Cooler Temperature(s) °C and Other Remarks:		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Special Instructions/QC Requirements:		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
<input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Method of Shipment:		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Received by: <u>MB</u>		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Received by:		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Received by:		Sample Date		Sample Time		6020A - Cobalt		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	



# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-201130-1

**Login Number: 201130**

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

**List Number: 1**

**Creator: Homolar, Dana J**

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



## C2 Assessment Monitoring, April 2021

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-204549-1

Client Project/Site: Ottumwa Generating Station - 25221072  
Revision: 1

For:  
SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:  
5/14/2021 9:18:06 AM

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

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

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

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



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Sample Summary . . . . .	4
Detection Summary . . . . .	5
Client Sample Results . . . . .	10
Definitions . . . . .	20
QC Sample Results . . . . .	21
QC Association . . . . .	26
Chronicle . . . . .	30
Certification Summary . . . . .	34
Method Summary . . . . .	35
Chain of Custody . . . . .	36
Receipt Checklists . . . . .	43
Field Data Sheets . . . . .	44

# Case Narrative

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

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## Job ID: 310-204549-1

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### Laboratory: Eurofins TestAmerica, Cedar Falls

#### Narrative

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#### Job Narrative 310-204549-1

#### Comments

No additional comments.

#### Revision

The report being provided is a revision of the original report sent on 4/28/2021. The report (revision 1) is being revised due to: Updated field data for MW-305 ORP.

#### Receipt

The samples were received on 4/16/2021 5:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 5 coolers at receipt time were 0.8° C, 1.2° C, 1.6° C, 1.9° C and 3.1° C.

#### HPLC/IC

Method 9056A: The following samples were diluted due to the nature of the sample matrix: MW-303 (310-204549-2), MW-306 (310-204549-6) and MW-311 (310-204549-9). 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 - 25221072

Job ID: 310-204549-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-204549-1	MW-302	Water	04/13/21 18:15	04/16/21 17:00	
310-204549-2	MW-303	Water	04/13/21 16:50	04/16/21 17:00	
310-204549-3	MW-304	Water	04/14/21 16:50	04/16/21 17:00	
310-204549-4	MW-305	Water	04/16/21 10:15	04/16/21 17:00	
310-204549-5	MW-305A	Water	04/15/21 13:45	04/16/21 17:00	
310-204549-6	MW-306	Water	04/13/21 15:00	04/16/21 17:00	
310-204549-7	MW-310	Water	04/13/21 13:25	04/16/21 17:00	
310-204549-8	MW-310A	Water	04/15/21 14:20	04/16/21 17:00	
310-204549-9	MW-311	Water	04/14/21 08:55	04/16/21 17:00	
310-204549-10	MW-311A	Water	04/16/21 11:30	04/16/21 17:00	

# Detection Summary

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

## Client Sample ID: MW-302

## Lab Sample ID: 310-204549-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	190		5.0	2.2	mg/L	5		9056A	Total/NA
Fluoride	0.33	J	0.50	0.28	mg/L	5		9056A	Total/NA
Sulfate	360		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	22		2.0	0.30	ug/L	1		6020A	Total/NA
Boron	1300		100	58	ug/L	1		6020A	Total/NA
Cadmium	0.26		0.10	0.051	ug/L	1		6020A	Total/NA
Calcium	180		0.50	0.19	mg/L	1		6020A	Total/NA
Chromium	3.0	J	5.0	1.1	ug/L	1		6020A	Total/NA
Cobalt	5.5		0.50	0.091	ug/L	1		6020A	Total/NA
Lead	0.59		0.50	0.21	ug/L	1		6020A	Total/NA
Lithium	10		10	2.5	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1500		30	26	mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	656.05				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	198.2				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.37				mg/L	1		Field Sampling	Total/NA
pH, Field	6.44				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	2087				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	11.9				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	22.9				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-303

## Lab Sample ID: 310-204549-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	29		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	140		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	63		2.0	0.30	ug/L	1		6020A	Total/NA
Boron	420		100	58	ug/L	1		6020A	Total/NA
Cadmium	0.12		0.10	0.051	ug/L	1		6020A	Total/NA
Calcium	160		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.43	J	0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	4.1	J	10	2.5	ug/L	1		6020A	Total/NA
Molybdenum	2.9		2.0	1.3	ug/L	1		6020A	Total/NA
Selenium	5.1		5.0	0.96	ug/L	1		6020A	Total/NA
Total Dissolved Solids	720		30	26	mg/L	1		SM 2540C	Total/NA
pH	7.0	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	653.82				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	184.7				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	2.83				mg/L	1		Field Sampling	Total/NA
pH, Field	6.67				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1118				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	9.7				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	4.31				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-304

## Lab Sample ID: 310-204549-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	240		5.0	2.2	mg/L	5		9056A	Total/NA
Fluoride	1.1		0.50	0.28	mg/L	5		9056A	Total/NA
Sulfate	200		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	80		2.0	0.30	ug/L	1		6020A	Total/NA
Boron	990		100	58	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 - 25221072

Job ID: 310-204549-1

## Client Sample ID: MW-304 (Continued)

## Lab Sample ID: 310-204549-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	120		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.43	J	0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	3.3	J	10	2.5	ug/L	1		6020A	Total/NA
Molybdenum	1.7	J	2.0	1.3	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1000		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	654.34				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-97.5				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.20				mg/L	1		Field Sampling	Total/NA
pH, Field	6.94				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1797				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.1				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	16.9				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-305

## Lab Sample ID: 310-204549-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	240		5.0	2.2	mg/L	5		9056A	Total/NA
Fluoride	0.37	J	0.50	0.28	mg/L	5		9056A	Total/NA
Sulfate	120		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	130		2.0	0.30	ug/L	1		6020A	Total/NA
Boron	860		100	58	ug/L	1		6020A	Total/NA
Cadmium	0.12		0.10	0.051	ug/L	1		6020A	Total/NA
Calcium	110		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	18		0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	2.6	J	10	2.5	ug/L	1		6020A	Total/NA
Molybdenum	8.2		2.0	1.3	ug/L	1		6020A	Total/NA
Thallium	0.36	J	1.0	0.26	ug/L	1		6020A	Total/NA
Total Dissolved Solids	900		150	130	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	661.15				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	43.6				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.16				mg/L	1		Field Sampling	Total/NA
pH, Field	6.92				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1799				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	12.9				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	8.17				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-305A

## Lab Sample ID: 310-204549-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	140		5.0	2.2	mg/L	5		9056A	Total/NA
Fluoride	0.56		0.50	0.28	mg/L	5		9056A	Total/NA
Sulfate	150		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	80		2.0	0.30	ug/L	1		6020A	Total/NA
Boron	190		100	58	ug/L	1		6020A	Total/NA
Calcium	150		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.50		0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	17		10	2.5	ug/L	1		6020A	Total/NA
Molybdenum	5.5		2.0	1.3	ug/L	1		6020A	Total/NA
Total Dissolved Solids	780		30	26	mg/L	1		SM 2540C	Total/NA
pH	7.2	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

# Detection Summary

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

## Client Sample ID: MW-305A (Continued)

## Lab Sample ID: 310-204549-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ground Water Elevation	651.16				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	158.3				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.88				mg/L	1		Field Sampling	Total/NA
pH, Field	7.05				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1224				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	12.4				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	1.02				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-306

## Lab Sample ID: 310-204549-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	35		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	370		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	49		2.0	0.30	ug/L	1		6020A	Total/NA
Boron	1000		100	58	ug/L	1		6020A	Total/NA
Cadmium	0.95		0.10	0.051	ug/L	1		6020A	Total/NA
Calcium	74		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	5.6		0.50	0.091	ug/L	1		6020A	Total/NA
Molybdenum	5.1		2.0	1.3	ug/L	1		6020A	Total/NA
Total Dissolved Solids	880		30	26	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	670.27				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	92.0				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.14				mg/L	1		Field Sampling	Total/NA
pH, Field	6.42				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1339				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	12.7				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	8.99				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-310

## Lab Sample ID: 310-204549-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	250		5.0	2.2	mg/L	5		9056A	Total/NA
Fluoride	1.3		0.50	0.28	mg/L	5		9056A	Total/NA
Sulfate	720		20	9.8	mg/L	20		9056A	Total/NA
Arsenic	0.97	J	2.0	0.75	ug/L	1		6020A	Total/NA
Barium	92		2.0	0.30	ug/L	1		6020A	Total/NA
Boron	360		100	58	ug/L	1		6020A	Total/NA
Cadmium	0.51		0.10	0.051	ug/L	1		6020A	Total/NA
Calcium	210		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.75		0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	58		10	2.5	ug/L	1		6020A	Total/NA
Molybdenum	83		2.0	1.3	ug/L	1		6020A	Total/NA
Selenium	2.4	J	5.0	0.96	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1600		30	26	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	642.70				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	161.0				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.46				mg/L	1		Field Sampling	Total/NA
pH, Field	7.07				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	2362				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	12.6				Degrees C	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 - 25221072

Job ID: 310-204549-1

## Client Sample ID: MW-310 (Continued)

## Lab Sample ID: 310-204549-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Turbidity, Field	2.38				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-310A

## Lab Sample ID: 310-204549-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	120		5.0	2.2	mg/L	5		9056A	Total/NA
Fluoride	1.9		0.50	0.28	mg/L	5		9056A	Total/NA
Sulfate	1100		20	9.8	mg/L	20		9056A	Total/NA
Barium	14		2.0	0.30	ug/L	1		6020A	Total/NA
Boron	1500		100	58	ug/L	1		6020A	Total/NA
Calcium	82		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.48	J	0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	270		10	2.5	ug/L	1		6020A	Total/NA
Molybdenum	5.0		2.0	1.3	ug/L	1		6020A	Total/NA
Total Dissolved Solids	2300		150	130	mg/L	1		SM 2540C	Total/NA
pH	7.7	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	644.88				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	160.2				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.98				mg/L	1		Field Sampling	Total/NA
pH, Field	7.47				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	3106				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	12.5				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	2.25				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-311

## Lab Sample ID: 310-204549-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	11		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	75		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	180		2.0	0.30	ug/L	1		6020A	Total/NA
Boron	64	J	100	58	ug/L	1		6020A	Total/NA
Calcium	160		0.50	0.19	mg/L	1		6020A	Total/NA
Lithium	5.9	J	10	2.5	ug/L	1		6020A	Total/NA
Selenium	2.1	J	5.0	0.96	ug/L	1		6020A	Total/NA
Total Dissolved Solids	590		30	26	mg/L	1		SM 2540C	Total/NA
pH	6.9	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	643.02				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	179.8				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	1.18				mg/L	1		Field Sampling	Total/NA
pH, Field	6.66				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	945				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	9.3				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	0.78				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-311A

## Lab Sample ID: 310-204549-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	130		5.0	2.2	mg/L	5		9056A	Total/NA
Fluoride	4.0		0.50	0.28	mg/L	5		9056A	Total/NA
Sulfate	1100		20	9.8	mg/L	20		9056A	Total/NA
Barium	12		2.0	0.30	ug/L	1		6020A	Total/NA
Boron	1500		100	58	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 - 25221072

Job ID: 310-204549-1

**Client Sample ID: MW-311A (Continued)**

**Lab Sample ID: 310-204549-10**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	42		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.13	J	0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	290		10	2.5	ug/L	1		6020A	Total/NA
Total Dissolved Solids	2200		150	130	mg/L	1		SM 2540C	Total/NA
pH	7.8	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	644.16				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	146.9				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.77				mg/L	1		Field Sampling	Total/NA
pH, Field	7.76				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	3332				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	12.3				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	0.02				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

**Client Sample ID: MW-302**

**Lab Sample ID: 310-204549-1**

Date Collected: 04/13/21 18:15

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	190		5.0	2.2	mg/L			04/23/21 14:57	5
Fluoride	0.33	J	0.50	0.28	mg/L			04/23/21 14:57	5
Sulfate	360		5.0	2.5	mg/L			04/24/21 04:04	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/20/21 09:00	04/26/21 22:15	1
Arsenic	<0.75		2.0	0.75	ug/L		04/20/21 09:00	04/26/21 22:15	1
Barium	22		2.0	0.30	ug/L		04/20/21 09:00	04/26/21 22:15	1
Beryllium	<0.27		1.0	0.27	ug/L		04/20/21 09:00	04/26/21 22:15	1
Boron	1300		100	58	ug/L		04/20/21 09:00	04/26/21 22:15	1
Cadmium	0.26		0.10	0.051	ug/L		04/20/21 09:00	04/26/21 22:15	1
Calcium	180		0.50	0.19	mg/L		04/20/21 09:00	04/26/21 22:15	1
Chromium	3.0	J	5.0	1.1	ug/L		04/20/21 09:00	04/26/21 22:15	1
Cobalt	5.5		0.50	0.091	ug/L		04/20/21 09:00	04/26/21 22:15	1
Lead	0.59		0.50	0.21	ug/L		04/20/21 09:00	04/26/21 22:15	1
Lithium	10		10	2.5	ug/L		04/20/21 09:00	04/26/21 22:15	1
Molybdenum	<1.3		2.0	1.3	ug/L		04/20/21 09:00	04/26/21 22:15	1
Selenium	<0.96		5.0	0.96	ug/L		04/20/21 09:00	04/26/21 22:15	1
Thallium	<0.26		1.0	0.26	ug/L		04/20/21 09:00	04/26/21 22:15	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		04/22/21 14:28	04/23/21 14:19	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1500		30	26	mg/L			04/19/21 09:05	1
pH	7.5	HF	0.1	0.1	SU			04/16/21 19:35	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	656.05				ft			04/13/21 18:15	1
Oxidation Reduction Potential	198.2				millivolts			04/13/21 18:15	1
Oxygen, Dissolved, Client Supplied	0.37				mg/L			04/13/21 18:15	1
pH, Field	6.44				SU			04/13/21 18:15	1
Specific Conductance, Field	2087				umhos/cm			04/13/21 18:15	1
Temperature, Field	11.9				Degrees C			04/13/21 18:15	1
Turbidity, Field	22.9				NTU			04/13/21 18:15	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

**Client Sample ID: MW-303**

**Lab Sample ID: 310-204549-2**

Date Collected: 04/13/21 16:50

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	29		5.0	2.2	mg/L			04/23/21 15:13	5
Fluoride	<0.28		0.50	0.28	mg/L			04/23/21 15:13	5
Sulfate	140		5.0	2.5	mg/L			04/23/21 15:13	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/20/21 09:00	04/26/21 22:18	1
Arsenic	<0.75		2.0	0.75	ug/L		04/20/21 09:00	04/26/21 22:18	1
Barium	63		2.0	0.30	ug/L		04/20/21 09:00	04/26/21 22:18	1
Beryllium	<0.27		1.0	0.27	ug/L		04/20/21 09:00	04/26/21 22:18	1
Boron	420		100	58	ug/L		04/20/21 09:00	04/26/21 22:18	1
Cadmium	0.12		0.10	0.051	ug/L		04/20/21 09:00	04/26/21 22:18	1
Calcium	160		0.50	0.19	mg/L		04/20/21 09:00	04/26/21 22:18	1
Chromium	<1.1		5.0	1.1	ug/L		04/20/21 09:00	04/26/21 22:18	1
Cobalt	0.43	J	0.50	0.091	ug/L		04/20/21 09:00	04/26/21 22:18	1
Lead	<0.21		0.50	0.21	ug/L		04/20/21 09:00	04/26/21 22:18	1
Lithium	4.1	J	10	2.5	ug/L		04/20/21 09:00	04/26/21 22:18	1
Molybdenum	2.9		2.0	1.3	ug/L		04/20/21 09:00	04/26/21 22:18	1
Selenium	5.1		5.0	0.96	ug/L		04/20/21 09:00	04/26/21 22:18	1
Thallium	<0.26		1.0	0.26	ug/L		04/20/21 09:00	04/26/21 22:18	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		04/22/21 14:28	04/23/21 14:21	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	720		30	26	mg/L			04/19/21 09:05	1
pH	7.0	HF	0.1	0.1	SU			04/16/21 19:24	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	653.82				ft			04/13/21 16:50	1
Oxidation Reduction Potential	184.7				millivolts			04/13/21 16:50	1
Oxygen, Dissolved, Client Supplied	2.83				mg/L			04/13/21 16:50	1
pH, Field	6.67				SU			04/13/21 16:50	1
Specific Conductance, Field	1118				umhos/cm			04/13/21 16:50	1
Temperature, Field	9.7				Degrees C			04/13/21 16:50	1
Turbidity, Field	4.31				NTU			04/13/21 16:50	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

**Client Sample ID: MW-304**

**Lab Sample ID: 310-204549-3**

Date Collected: 04/14/21 16:50

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	240		5.0	2.2	mg/L			04/23/21 15:28	5
Fluoride	1.1		0.50	0.28	mg/L			04/23/21 15:28	5
Sulfate	200		5.0	2.5	mg/L			04/23/21 15:28	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/20/21 09:00	04/26/21 22:20	1
Arsenic	<0.75		2.0	0.75	ug/L		04/20/21 09:00	04/26/21 22:20	1
Barium	80		2.0	0.30	ug/L		04/20/21 09:00	04/26/21 22:20	1
Beryllium	<0.27		1.0	0.27	ug/L		04/20/21 09:00	04/26/21 22:20	1
Boron	990		100	58	ug/L		04/20/21 09:00	04/26/21 22:20	1
Cadmium	<0.051		0.10	0.051	ug/L		04/20/21 09:00	04/26/21 22:20	1
Calcium	120		0.50	0.19	mg/L		04/20/21 09:00	04/26/21 22:20	1
Chromium	<1.1		5.0	1.1	ug/L		04/20/21 09:00	04/26/21 22:20	1
Cobalt	0.43	J	0.50	0.091	ug/L		04/20/21 09:00	04/26/21 22:20	1
Lead	<0.21		0.50	0.21	ug/L		04/20/21 09:00	04/26/21 22:20	1
Lithium	3.3	J	10	2.5	ug/L		04/20/21 09:00	04/26/21 22:20	1
Molybdenum	1.7	J	2.0	1.3	ug/L		04/20/21 09:00	04/26/21 22:20	1
Selenium	<0.96		5.0	0.96	ug/L		04/20/21 09:00	04/26/21 22:20	1
Thallium	<0.26		1.0	0.26	ug/L		04/20/21 09:00	04/26/21 22:20	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		04/22/21 14:28	04/23/21 14:23	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1000		60	52	mg/L			04/20/21 13:51	1
pH	7.1	HF	0.1	0.1	SU			04/16/21 19:57	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	654.34				ft			04/14/21 16:50	1
Oxidation Reduction Potential	-97.5				millivolts			04/14/21 16:50	1
Oxygen, Dissolved, Client Supplied	0.20				mg/L			04/14/21 16:50	1
pH, Field	6.94				SU			04/14/21 16:50	1
Specific Conductance, Field	1797				umhos/cm			04/14/21 16:50	1
Temperature, Field	13.1				Degrees C			04/14/21 16:50	1
Turbidity, Field	16.9				NTU			04/14/21 16:50	1

# Client Sample Results

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

**Client Sample ID: MW-305**

**Lab Sample ID: 310-204549-4**

Date Collected: 04/16/21 10:15

Matrix: Water

Date Received: 04/16/21 17:00

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	240		5.0	2.2	mg/L			04/23/21 15:44	5
Fluoride	0.37	J	0.50	0.28	mg/L			04/23/21 15:44	5
Sulfate	120		5.0	2.5	mg/L			04/23/21 15:44	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/20/21 09:00	04/21/21 16:51	1
Arsenic	<0.75		2.0	0.75	ug/L		04/20/21 09:00	04/21/21 16:51	1
Barium	130		2.0	0.30	ug/L		04/20/21 09:00	04/21/21 16:51	1
Beryllium	<0.27		1.0	0.27	ug/L		04/20/21 09:00	04/21/21 16:51	1
Boron	860		100	58	ug/L		04/20/21 09:00	04/21/21 16:51	1
Cadmium	0.12		0.10	0.051	ug/L		04/20/21 09:00	04/21/21 16:51	1
Calcium	110		0.50	0.19	mg/L		04/20/21 09:00	04/21/21 16:51	1
Chromium	<1.1		5.0	1.1	ug/L		04/20/21 09:00	04/21/21 16:51	1
Cobalt	18		0.50	0.091	ug/L		04/20/21 09:00	04/21/21 16:51	1
Lead	<0.21		0.50	0.21	ug/L		04/20/21 09:00	04/21/21 16:51	1
Lithium	2.6	J	10	2.5	ug/L		04/20/21 09:00	04/21/21 16:51	1
Molybdenum	8.2		2.0	1.3	ug/L		04/20/21 09:00	04/21/21 16:51	1
Selenium	<0.96		5.0	0.96	ug/L		04/20/21 09:00	04/21/21 16:51	1
Thallium	0.36	J	1.0	0.26	ug/L		04/20/21 09:00	04/21/21 16:51	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		04/22/21 14:28	04/23/21 14:25	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	900		150	130	mg/L			04/20/21 13:51	1
pH	7.1	HF	0.1	0.1	SU			04/16/21 17:01	1

## Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	661.15				ft			04/16/21 10:15	1
Oxidation Reduction Potential	43.6				millivolts			04/16/21 10:15	1
Oxygen, Dissolved, Client Supplied	0.16				mg/L			04/16/21 10:15	1
pH, Field	6.92				SU			04/16/21 10:15	1
Specific Conductance, Field	1799				umhos/cm			04/16/21 10:15	1
Temperature, Field	12.9				Degrees C			04/16/21 10:15	1
Turbidity, Field	8.17				NTU			04/16/21 10:15	1



# Client Sample Results

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

**Client Sample ID: MW-305A**

**Lab Sample ID: 310-204549-5**

Date Collected: 04/15/21 13:45

Matrix: Water

Date Received: 04/16/21 17:00

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	140		5.0	2.2	mg/L			04/23/21 15:59	5
Fluoride	0.56		0.50	0.28	mg/L			04/23/21 15:59	5
Sulfate	150		5.0	2.5	mg/L			04/23/21 15:59	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/20/21 09:00	04/21/21 16:53	1
Arsenic	<0.75		2.0	0.75	ug/L		04/20/21 09:00	04/21/21 16:53	1
Barium	80		2.0	0.30	ug/L		04/20/21 09:00	04/21/21 16:53	1
Beryllium	<0.27		1.0	0.27	ug/L		04/20/21 09:00	04/21/21 16:53	1
Boron	190		100	58	ug/L		04/20/21 09:00	04/21/21 16:53	1
Cadmium	<0.051		0.10	0.051	ug/L		04/20/21 09:00	04/21/21 16:53	1
Calcium	150		0.50	0.19	mg/L		04/20/21 09:00	04/21/21 16:53	1
Chromium	<1.1		5.0	1.1	ug/L		04/20/21 09:00	04/21/21 16:53	1
Cobalt	0.50		0.50	0.091	ug/L		04/20/21 09:00	04/21/21 16:53	1
Lead	<0.21		0.50	0.21	ug/L		04/20/21 09:00	04/21/21 16:53	1
Lithium	17		10	2.5	ug/L		04/20/21 09:00	04/21/21 16:53	1
Molybdenum	5.5		2.0	1.3	ug/L		04/20/21 09:00	04/21/21 16:53	1
Selenium	<0.96		5.0	0.96	ug/L		04/20/21 09:00	04/21/21 16:53	1
Thallium	<0.26		1.0	0.26	ug/L		04/20/21 09:00	04/21/21 16:53	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		04/22/21 14:28	04/23/21 14:28	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	780		30	26	mg/L			04/20/21 13:51	1
pH	7.2	HF	0.1	0.1	SU			04/16/21 19:56	1

## Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	651.16				ft			04/15/21 13:45	1
Oxidation Reduction Potential	158.3				millivolts			04/15/21 13:45	1
Oxygen, Dissolved, Client Supplied	0.88				mg/L			04/15/21 13:45	1
pH, Field	7.05				SU			04/15/21 13:45	1
Specific Conductance, Field	1224				umhos/cm			04/15/21 13:45	1
Temperature, Field	12.4				Degrees C			04/15/21 13:45	1
Turbidity, Field	1.02				NTU			04/15/21 13:45	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

**Client Sample ID: MW-306**

**Lab Sample ID: 310-204549-6**

Date Collected: 04/13/21 15:00

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>35</b>		5.0	2.2	mg/L			04/23/21 16:46	5
Fluoride	<0.28		0.50	0.28	mg/L			04/23/21 16:46	5
<b>Sulfate</b>	<b>370</b>		5.0	2.5	mg/L			04/23/21 16:46	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/20/21 09:00	04/21/21 16:56	1
Arsenic	<0.75		2.0	0.75	ug/L		04/20/21 09:00	04/21/21 16:56	1
<b>Barium</b>	<b>49</b>		2.0	0.30	ug/L		04/20/21 09:00	04/21/21 16:56	1
Beryllium	<0.27		1.0	0.27	ug/L		04/20/21 09:00	04/21/21 16:56	1
<b>Boron</b>	<b>1000</b>		100	58	ug/L		04/20/21 09:00	04/21/21 16:56	1
<b>Cadmium</b>	<b>0.95</b>		0.10	0.051	ug/L		04/20/21 09:00	04/21/21 16:56	1
<b>Calcium</b>	<b>74</b>		0.50	0.19	mg/L		04/20/21 09:00	04/21/21 16:56	1
Chromium	<1.1		5.0	1.1	ug/L		04/20/21 09:00	04/21/21 16:56	1
<b>Cobalt</b>	<b>5.6</b>		0.50	0.091	ug/L		04/20/21 09:00	04/21/21 16:56	1
Lead	<0.21		0.50	0.21	ug/L		04/20/21 09:00	04/21/21 16:56	1
Lithium	<2.5		10	2.5	ug/L		04/20/21 09:00	04/21/21 16:56	1
<b>Molybdenum</b>	<b>5.1</b>		2.0	1.3	ug/L		04/20/21 09:00	04/21/21 16:56	1
Selenium	<0.96		5.0	0.96	ug/L		04/20/21 09:00	04/21/21 16:56	1
Thallium	<0.26		1.0	0.26	ug/L		04/20/21 09:00	04/21/21 16:56	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		04/22/21 14:28	04/23/21 14:30	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>880</b>		30	26	mg/L			04/19/21 09:05	1
<b>pH</b>	<b>6.8</b>	HF	0.1	0.1	SU			04/16/21 16:59	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Ground Water Elevation</b>	<b>670.27</b>				ft			04/13/21 15:00	1
<b>Oxidation Reduction Potential</b>	<b>92.0</b>				millivolts			04/13/21 15:00	1
<b>Oxygen, Dissolved, Client Supplied</b>	<b>0.14</b>				mg/L			04/13/21 15:00	1
<b>pH, Field</b>	<b>6.42</b>				SU			04/13/21 15:00	1
<b>Specific Conductance, Field</b>	<b>1339</b>				umhos/cm			04/13/21 15:00	1
<b>Temperature, Field</b>	<b>12.7</b>				Degrees C			04/13/21 15:00	1
<b>Turbidity, Field</b>	<b>8.99</b>				NTU			04/13/21 15:00	1

# Client Sample Results

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

**Client Sample ID: MW-310**

**Lab Sample ID: 310-204549-7**

Date Collected: 04/13/21 13:25

Matrix: Water

Date Received: 04/16/21 17:00

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	250		5.0	2.2	mg/L			04/23/21 17:02	5
Fluoride	1.3		0.50	0.28	mg/L			04/23/21 17:02	5
Sulfate	720		20	9.8	mg/L			04/26/21 11:06	20

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/20/21 09:00	04/21/21 17:01	1
Arsenic	0.97	J	2.0	0.75	ug/L		04/20/21 09:00	04/21/21 17:01	1
Barium	92		2.0	0.30	ug/L		04/20/21 09:00	04/21/21 17:01	1
Beryllium	<0.27		1.0	0.27	ug/L		04/20/21 09:00	04/21/21 17:01	1
Boron	360		100	58	ug/L		04/20/21 09:00	04/21/21 17:01	1
Cadmium	0.51		0.10	0.051	ug/L		04/20/21 09:00	04/21/21 17:01	1
Calcium	210		0.50	0.19	mg/L		04/20/21 09:00	04/21/21 17:01	1
Chromium	<1.1		5.0	1.1	ug/L		04/20/21 09:00	04/21/21 17:01	1
Cobalt	0.75		0.50	0.091	ug/L		04/20/21 09:00	04/21/21 17:01	1
Lead	<0.21		0.50	0.21	ug/L		04/20/21 09:00	04/21/21 17:01	1
Lithium	58		10	2.5	ug/L		04/20/21 09:00	04/21/21 17:01	1
Molybdenum	83		2.0	1.3	ug/L		04/20/21 09:00	04/21/21 17:01	1
Selenium	2.4	J	5.0	0.96	ug/L		04/20/21 09:00	04/21/21 17:01	1
Thallium	<0.26		1.0	0.26	ug/L		04/20/21 09:00	04/21/21 17:01	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		04/22/21 14:28	04/23/21 14:32	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1600		30	26	mg/L			04/19/21 13:42	1
pH	7.4	HF	0.1	0.1	SU			04/16/21 19:38	1

## Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	642.70				ft			04/13/21 13:25	1
Oxidation Reduction Potential	161.0				millivolts			04/13/21 13:25	1
Oxygen, Dissolved, Client Supplied	0.46				mg/L			04/13/21 13:25	1
pH, Field	7.07				SU			04/13/21 13:25	1
Specific Conductance, Field	2362				umhos/cm			04/13/21 13:25	1
Temperature, Field	12.6				Degrees C			04/13/21 13:25	1
Turbidity, Field	2.38				NTU			04/13/21 13:25	1

# Client Sample Results

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

**Client Sample ID: MW-310A**

**Lab Sample ID: 310-204549-8**

Date Collected: 04/15/21 14:20

Matrix: Water

Date Received: 04/16/21 17:00

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	120		5.0	2.2	mg/L			04/23/21 17:17	5
Fluoride	1.9		0.50	0.28	mg/L			04/23/21 17:17	5
Sulfate	1100		20	9.8	mg/L			04/26/21 11:22	20

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/20/21 09:00	04/21/21 17:04	1
Arsenic	<0.75		2.0	0.75	ug/L		04/20/21 09:00	04/21/21 17:04	1
Barium	14		2.0	0.30	ug/L		04/20/21 09:00	04/21/21 17:04	1
Beryllium	<0.27		1.0	0.27	ug/L		04/20/21 09:00	04/21/21 17:04	1
Boron	1500		100	58	ug/L		04/20/21 09:00	04/21/21 17:04	1
Cadmium	<0.051		0.10	0.051	ug/L		04/20/21 09:00	04/21/21 17:04	1
Calcium	82		0.50	0.19	mg/L		04/20/21 09:00	04/21/21 17:04	1
Chromium	<1.1		5.0	1.1	ug/L		04/20/21 09:00	04/21/21 17:04	1
Cobalt	0.48	J	0.50	0.091	ug/L		04/20/21 09:00	04/21/21 17:04	1
Lead	<0.21		0.50	0.21	ug/L		04/20/21 09:00	04/21/21 17:04	1
Lithium	270		10	2.5	ug/L		04/20/21 09:00	04/21/21 17:04	1
Molybdenum	5.0		2.0	1.3	ug/L		04/20/21 09:00	04/21/21 17:04	1
Selenium	<0.96		5.0	0.96	ug/L		04/20/21 09:00	04/21/21 17:04	1
Thallium	<0.26		1.0	0.26	ug/L		04/20/21 09:00	04/21/21 17:04	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		04/22/21 14:28	04/23/21 14:34	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2300		150	130	mg/L			04/20/21 13:51	1
pH	7.7	HF	0.1	0.1	SU			04/16/21 19:45	1

## Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	644.88				ft			04/15/21 14:20	1
Oxidation Reduction Potential	160.2				millivolts			04/15/21 14:20	1
Oxygen, Dissolved, Client Supplied	0.98				mg/L			04/15/21 14:20	1
pH, Field	7.47				SU			04/15/21 14:20	1
Specific Conductance, Field	3106				umhos/cm			04/15/21 14:20	1
Temperature, Field	12.5				Degrees C			04/15/21 14:20	1
Turbidity, Field	2.25				NTU			04/15/21 14:20	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

**Client Sample ID: MW-311**

**Lab Sample ID: 310-204549-9**

Date Collected: 04/14/21 08:55

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>11</b>		5.0	2.2	mg/L			04/23/21 17:33	5
Fluoride	<0.28		0.50	0.28	mg/L			04/23/21 17:33	5
<b>Sulfate</b>	<b>75</b>		5.0	2.5	mg/L			04/23/21 17:33	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/20/21 09:00	04/21/21 17:07	1
Arsenic	<0.75		2.0	0.75	ug/L		04/20/21 09:00	04/21/21 17:07	1
<b>Barium</b>	<b>180</b>		2.0	0.30	ug/L		04/20/21 09:00	04/21/21 17:07	1
Beryllium	<0.27		1.0	0.27	ug/L		04/20/21 09:00	04/21/21 17:07	1
<b>Boron</b>	<b>64 J</b>		100	58	ug/L		04/20/21 09:00	04/21/21 17:07	1
Cadmium	<0.051		0.10	0.051	ug/L		04/20/21 09:00	04/21/21 17:07	1
<b>Calcium</b>	<b>160</b>		0.50	0.19	mg/L		04/20/21 09:00	04/21/21 17:07	1
Chromium	<1.1		5.0	1.1	ug/L		04/20/21 09:00	04/21/21 17:07	1
Cobalt	<0.091		0.50	0.091	ug/L		04/20/21 09:00	04/21/21 17:07	1
Lead	<0.21		0.50	0.21	ug/L		04/20/21 09:00	04/21/21 17:07	1
<b>Lithium</b>	<b>5.9 J</b>		10	2.5	ug/L		04/20/21 09:00	04/21/21 17:07	1
Molybdenum	<1.3		2.0	1.3	ug/L		04/20/21 09:00	04/21/21 17:07	1
<b>Selenium</b>	<b>2.1 J</b>		5.0	0.96	ug/L		04/20/21 09:00	04/21/21 17:07	1
Thallium	<0.26		1.0	0.26	ug/L		04/20/21 09:00	04/21/21 17:07	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		04/22/21 14:28	04/23/21 14:40	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>590</b>		30	26	mg/L			04/20/21 13:51	1
<b>pH</b>	<b>6.9</b>	HF	0.1	0.1	SU			04/16/21 19:58	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Ground Water Elevation</b>	<b>643.02</b>				ft			04/14/21 08:55	1
<b>Oxidation Reduction Potential</b>	<b>179.8</b>				millivolts			04/14/21 08:55	1
<b>Oxygen, Dissolved, Client Supplied</b>	<b>1.18</b>				mg/L			04/14/21 08:55	1
<b>pH, Field</b>	<b>6.66</b>				SU			04/14/21 08:55	1
<b>Specific Conductance, Field</b>	<b>945</b>				umhos/cm			04/14/21 08:55	1
<b>Temperature, Field</b>	<b>9.3</b>				Degrees C			04/14/21 08:55	1
<b>Turbidity, Field</b>	<b>0.78</b>				NTU			04/14/21 08:55	1

# Client Sample Results

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-204549-10**

Date Collected: 04/16/21 11:30

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	130		5.0	2.2	mg/L			04/23/21 17:49	5
Fluoride	4.0		0.50	0.28	mg/L			04/23/21 17:49	5
Sulfate	1100		20	9.8	mg/L			04/26/21 11:38	20

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/20/21 09:00	04/21/21 17:09	1
Arsenic	<0.75		2.0	0.75	ug/L		04/20/21 09:00	04/21/21 17:09	1
Barium	12		2.0	0.30	ug/L		04/20/21 09:00	04/21/21 17:09	1
Beryllium	<0.27		1.0	0.27	ug/L		04/20/21 09:00	04/21/21 17:09	1
Boron	1500		100	58	ug/L		04/20/21 09:00	04/21/21 17:09	1
Cadmium	<0.051		0.10	0.051	ug/L		04/20/21 09:00	04/21/21 17:09	1
Calcium	42		0.50	0.19	mg/L		04/20/21 09:00	04/21/21 17:09	1
Chromium	<1.1		5.0	1.1	ug/L		04/20/21 09:00	04/21/21 17:09	1
Cobalt	0.13	J	0.50	0.091	ug/L		04/20/21 09:00	04/21/21 17:09	1
Lead	<0.21		0.50	0.21	ug/L		04/20/21 09:00	04/21/21 17:09	1
Lithium	290		10	2.5	ug/L		04/20/21 09:00	04/21/21 17:09	1
Molybdenum	<1.3		2.0	1.3	ug/L		04/20/21 09:00	04/21/21 17:09	1
Selenium	<0.96		5.0	0.96	ug/L		04/20/21 09:00	04/21/21 17:09	1
Thallium	<0.26		1.0	0.26	ug/L		04/20/21 09:00	04/21/21 17:09	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		04/22/21 14:28	04/23/21 14:43	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2200		150	130	mg/L			04/20/21 13:51	1
pH	7.8	HF	0.1	0.1	SU			04/16/21 19:54	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	644.16				ft			04/16/21 11:30	1
Oxidation Reduction Potential	146.9				millivolts			04/16/21 11:30	1
Oxygen, Dissolved, Client Supplied	0.77				mg/L			04/16/21 11:30	1
pH, Field	7.76				SU			04/16/21 11:30	1
Specific Conductance, Field	3332				umhos/cm			04/16/21 11:30	1
Temperature, Field	12.3				Degrees C			04/16/21 11:30	1
Turbidity, Field	0.02				NTU			04/16/21 11:30	1

# Definitions/Glossary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

## Qualifiers

### HPLC/IC

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

### Metals

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

### General Chemistry

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

## 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 - 25221072

Job ID: 310-204549-1

## Method: 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 310-314219/3**  
**Matrix: Water**  
**Analysis Batch: 314219**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.43		1.0	0.43	mg/L			04/23/21 12:37	1
Fluoride	<0.055		0.10	0.055	mg/L			04/23/21 12:37	1
Sulfate	<0.49		1.0	0.49	mg/L			04/23/21 12:37	1

**Lab Sample ID: LCS 310-314219/4**  
**Matrix: Water**  
**Analysis Batch: 314219**

**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	9.26		mg/L		93	90 - 110
Fluoride	2.00	2.11		mg/L		106	90 - 110
Sulfate	10.0	10.1		mg/L		101	90 - 110

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

**Lab Sample ID: MB 310-313195/1-A**  
**Matrix: Water**  
**Analysis Batch: 314039**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 313195**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/20/21 09:00	04/26/21 20:36	1
Arsenic	<0.75		2.0	0.75	ug/L		04/20/21 09:00	04/26/21 20:36	1
Barium	<0.30		2.0	0.30	ug/L		04/20/21 09:00	04/26/21 20:36	1
Beryllium	<0.27		1.0	0.27	ug/L		04/20/21 09:00	04/26/21 20:36	1
Boron	<58		100	58	ug/L		04/20/21 09:00	04/26/21 20:36	1
Cadmium	<0.051		0.10	0.051	ug/L		04/20/21 09:00	04/26/21 20:36	1
Calcium	<0.19		0.50	0.19	mg/L		04/20/21 09:00	04/26/21 20:36	1
Chromium	<1.1		5.0	1.1	ug/L		04/20/21 09:00	04/26/21 20:36	1
Cobalt	<0.091		0.50	0.091	ug/L		04/20/21 09:00	04/26/21 20:36	1
Lead	<0.21		0.50	0.21	ug/L		04/20/21 09:00	04/26/21 20:36	1
Lithium	<2.5		10	2.5	ug/L		04/20/21 09:00	04/26/21 20:36	1
Molybdenum	<1.3		2.0	1.3	ug/L		04/20/21 09:00	04/26/21 20:36	1
Selenium	<0.96		5.0	0.96	ug/L		04/20/21 09:00	04/26/21 20:36	1
Thallium	<0.26		1.0	0.26	ug/L		04/20/21 09:00	04/26/21 20:36	1

**Lab Sample ID: LCS 310-313195/2-A**  
**Matrix: Water**  
**Analysis Batch: 314039**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 313195**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	200	219		ug/L		109	80 - 120
Arsenic	200	216		ug/L		108	80 - 120
Barium	100	112		ug/L		112	80 - 120
Beryllium	100	103		ug/L		103	80 - 120
Boron	200	231		ug/L		116	80 - 120
Cadmium	100	113		ug/L		113	80 - 120
Calcium	2.00	1.86		mg/L		93	80 - 120
Chromium	100	107		ug/L		107	80 - 120
Cobalt	100	111		ug/L		111	80 - 120

Eurofins TestAmerica, Cedar Falls



# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

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

**Lab Sample ID: LCS 310-313195/2-A**  
**Matrix: Water**  
**Analysis Batch: 314022**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 313195**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	200	227		ug/L		114	80 - 120
Lithium	200	217		ug/L		109	80 - 120
Molybdenum	200	221		ug/L		110	80 - 120
Selenium	400	422		ug/L		105	80 - 120
Thallium	200	231		ug/L		115	80 - 120

**Lab Sample ID: MB 310-313197/1-A**  
**Matrix: Water**  
**Analysis Batch: 313546**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 313197**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/20/21 09:00	04/21/21 15:55	1
Arsenic	<0.75		2.0	0.75	ug/L		04/20/21 09:00	04/21/21 15:55	1
Barium	<0.30		2.0	0.30	ug/L		04/20/21 09:00	04/21/21 15:55	1
Beryllium	<0.27		1.0	0.27	ug/L		04/20/21 09:00	04/21/21 15:55	1
Boron	<58		100	58	ug/L		04/20/21 09:00	04/21/21 15:55	1
Cadmium	<0.051		0.10	0.051	ug/L		04/20/21 09:00	04/21/21 15:55	1
Calcium	<0.19		0.50	0.19	mg/L		04/20/21 09:00	04/21/21 15:55	1
Chromium	<1.1		5.0	1.1	ug/L		04/20/21 09:00	04/21/21 15:55	1
Cobalt	<0.091		0.50	0.091	ug/L		04/20/21 09:00	04/21/21 15:55	1
Lead	<0.21		0.50	0.21	ug/L		04/20/21 09:00	04/21/21 15:55	1
Lithium	<2.5		10	2.5	ug/L		04/20/21 09:00	04/21/21 15:55	1
Molybdenum	<1.3		2.0	1.3	ug/L		04/20/21 09:00	04/21/21 15:55	1
Selenium	<0.96		5.0	0.96	ug/L		04/20/21 09:00	04/21/21 15:55	1
Thallium	<0.26		1.0	0.26	ug/L		04/20/21 09:00	04/21/21 15:55	1

**Lab Sample ID: LCS 310-313197/2-A**  
**Matrix: Water**  
**Analysis Batch: 313546**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 313197**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	200	193		ug/L		96	80 - 120
Arsenic	200	207		ug/L		103	80 - 120
Barium	100	102		ug/L		102	80 - 120
Beryllium	100	104		ug/L		104	80 - 120
Boron	200	195		ug/L		97	80 - 120
Cadmium	100	98.9		ug/L		99	80 - 120
Calcium	2.00	1.78		mg/L		89	80 - 120
Chromium	100	103		ug/L		103	80 - 120
Cobalt	100	98.8		ug/L		99	80 - 120
Lead	200	201		ug/L		100	80 - 120
Lithium	200	197		ug/L		98	80 - 120
Molybdenum	200	195		ug/L		98	80 - 120
Selenium	400	395		ug/L		99	80 - 120
Thallium	200	212		ug/L		106	80 - 120

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

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

**Lab Sample ID: 310-204549-6 DU**  
**Matrix: Water**  
**Analysis Batch: 313546**

**Client Sample ID: MW-306**  
**Prep Type: Total/NA**  
**Prep Batch: 313197**

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Antimony	<1.1		<1.1		ug/L		NC	20
Arsenic	<0.75		<0.75		ug/L		NC	20
Barium	49		48.7		ug/L		0.09	20
Beryllium	<0.27		<0.27		ug/L		NC	20
Boron	1000		1030		ug/L		0.7	20
Cadmium	0.95		0.954		ug/L		0.5	20
Calcium	74		74.5		mg/L		0.06	20
Chromium	<1.1		<1.1		ug/L		NC	20
Cobalt	5.6		5.75		ug/L		2	20
Lead	<0.21		<0.21		ug/L		NC	20
Lithium	<2.5		<2.5		ug/L		NC	20
Molybdenum	5.1		5.19		ug/L		2	20
Selenium	<0.96		<0.96		ug/L		NC	20
Thallium	<0.26		<0.26		ug/L		NC	20

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID: MB 310-313631/1-A**  
**Matrix: Water**  
**Analysis Batch: 313806**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 313631**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Mercury	<0.15		0.20	0.15	ug/L		04/22/21 14:28	04/23/21 13:49	1

**Lab Sample ID: LCS 310-313631/2-A**  
**Matrix: Water**  
**Analysis Batch: 313806**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 313631**

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

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

**Lab Sample ID: MB 310-313155/1**  
**Matrix: Water**  
**Analysis Batch: 313155**

**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			04/19/21 09:05	1

**Lab Sample ID: LCS 310-313155/2**  
**Matrix: Water**  
**Analysis Batch: 313155**

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

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

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

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

**Lab Sample ID: MB 310-313222/1**  
**Matrix: Water**  
**Analysis Batch: 313222**

**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			04/19/21 13:42	1

**Lab Sample ID: LCS 310-313222/2**  
**Matrix: Water**  
**Analysis Batch: 313222**

**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	940		mg/L		94	90 - 110

**Lab Sample ID: MB 310-313365/1**  
**Matrix: Water**  
**Analysis Batch: 313365**

**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			04/20/21 13:51	1

**Lab Sample ID: LCS 310-313365/2**  
**Matrix: Water**  
**Analysis Batch: 313365**

**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	962		mg/L		96	90 - 110

## Method: SM 4500 H+ B - pH

**Lab Sample ID: LCS 310-313064/59**  
**Matrix: Water**  
**Analysis Batch: 313064**

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

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

**Lab Sample ID: LCS 310-313078/1**  
**Matrix: Water**  
**Analysis Batch: 313078**

**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		101	98 - 102

**Lab Sample ID: 310-204549-2 DU**  
**Matrix: Water**  
**Analysis Batch: 313078**

**Client Sample ID: MW-303**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.0	HF	7.0		SU		0.1	20

# QC Sample Results

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

## Method: SM 4500 H+ B - pH (Continued)

Lab Sample ID: 310-204549-8 DU  
Matrix: Water  
Analysis Batch: 313078

Client Sample ID: MW-310A  
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.7	HF	7.6		SU		0.4	20

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# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

## HPLC/IC

### Analysis Batch: 314219

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-1	MW-302	Total/NA	Water	9056A	
310-204549-1	MW-302	Total/NA	Water	9056A	
310-204549-2	MW-303	Total/NA	Water	9056A	
310-204549-3	MW-304	Total/NA	Water	9056A	
310-204549-4	MW-305	Total/NA	Water	9056A	
310-204549-5	MW-305A	Total/NA	Water	9056A	
310-204549-6	MW-306	Total/NA	Water	9056A	
310-204549-7	MW-310	Total/NA	Water	9056A	
310-204549-7	MW-310	Total/NA	Water	9056A	
310-204549-8	MW-310A	Total/NA	Water	9056A	
310-204549-8	MW-310A	Total/NA	Water	9056A	
310-204549-9	MW-311	Total/NA	Water	9056A	
310-204549-10	MW-311A	Total/NA	Water	9056A	
310-204549-10	MW-311A	Total/NA	Water	9056A	
MB 310-314219/3	Method Blank	Total/NA	Water	9056A	
LCS 310-314219/4	Lab Control Sample	Total/NA	Water	9056A	

## Metals

### Prep Batch: 313195

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-1	MW-302	Total/NA	Water	3010A	
310-204549-2	MW-303	Total/NA	Water	3010A	
310-204549-3	MW-304	Total/NA	Water	3010A	
MB 310-313195/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-313195/2-A	Lab Control Sample	Total/NA	Water	3010A	

### Prep Batch: 313197

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-4	MW-305	Total/NA	Water	3010A	
310-204549-5	MW-305A	Total/NA	Water	3010A	
310-204549-6	MW-306	Total/NA	Water	3010A	
310-204549-7	MW-310	Total/NA	Water	3010A	
310-204549-8	MW-310A	Total/NA	Water	3010A	
310-204549-9	MW-311	Total/NA	Water	3010A	
310-204549-10	MW-311A	Total/NA	Water	3010A	
MB 310-313197/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-313197/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-204549-6 DU	MW-306	Total/NA	Water	3010A	

### Analysis Batch: 313546

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-4	MW-305	Total/NA	Water	6020A	313197
310-204549-5	MW-305A	Total/NA	Water	6020A	313197
310-204549-6	MW-306	Total/NA	Water	6020A	313197
310-204549-7	MW-310	Total/NA	Water	6020A	313197
310-204549-8	MW-310A	Total/NA	Water	6020A	313197
310-204549-9	MW-311	Total/NA	Water	6020A	313197
310-204549-10	MW-311A	Total/NA	Water	6020A	313197
MB 310-313197/1-A	Method Blank	Total/NA	Water	6020A	313197
LCS 310-313197/2-A	Lab Control Sample	Total/NA	Water	6020A	313197

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# QC Association Summary

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

## Metals (Continued)

### Analysis Batch: 313546 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-6 DU	MW-306	Total/NA	Water	6020A	313197

### Prep Batch: 313631

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-1	MW-302	Total/NA	Water	7470A	
310-204549-2	MW-303	Total/NA	Water	7470A	
310-204549-3	MW-304	Total/NA	Water	7470A	
310-204549-4	MW-305	Total/NA	Water	7470A	
310-204549-5	MW-305A	Total/NA	Water	7470A	
310-204549-6	MW-306	Total/NA	Water	7470A	
310-204549-7	MW-310	Total/NA	Water	7470A	
310-204549-8	MW-310A	Total/NA	Water	7470A	
310-204549-9	MW-311	Total/NA	Water	7470A	
310-204549-10	MW-311A	Total/NA	Water	7470A	
MB 310-313631/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-313631/2-A	Lab Control Sample	Total/NA	Water	7470A	

### Analysis Batch: 313806

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-1	MW-302	Total/NA	Water	7470A	313631
310-204549-2	MW-303	Total/NA	Water	7470A	313631
310-204549-3	MW-304	Total/NA	Water	7470A	313631
310-204549-4	MW-305	Total/NA	Water	7470A	313631
310-204549-5	MW-305A	Total/NA	Water	7470A	313631
310-204549-6	MW-306	Total/NA	Water	7470A	313631
310-204549-7	MW-310	Total/NA	Water	7470A	313631
310-204549-8	MW-310A	Total/NA	Water	7470A	313631
310-204549-9	MW-311	Total/NA	Water	7470A	313631
310-204549-10	MW-311A	Total/NA	Water	7470A	313631
MB 310-313631/1-A	Method Blank	Total/NA	Water	7470A	313631
LCS 310-313631/2-A	Lab Control Sample	Total/NA	Water	7470A	313631

### Analysis Batch: 314022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-1	MW-302	Total/NA	Water	6020A	313195
310-204549-2	MW-303	Total/NA	Water	6020A	313195
310-204549-3	MW-304	Total/NA	Water	6020A	313195
MB 310-313195/1-A	Method Blank	Total/NA	Water	6020A	313195
LCS 310-313195/2-A	Lab Control Sample	Total/NA	Water	6020A	313195

### Analysis Batch: 314039

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-1	MW-302	Total/NA	Water	6020A	313195
310-204549-2	MW-303	Total/NA	Water	6020A	313195
310-204549-3	MW-304	Total/NA	Water	6020A	313195
MB 310-313195/1-A	Method Blank	Total/NA	Water	6020A	313195
LCS 310-313195/2-A	Lab Control Sample	Total/NA	Water	6020A	313195

# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

## General Chemistry

### Analysis Batch: 313064

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-4	MW-305	Total/NA	Water	SM 4500 H+ B	
310-204549-6	MW-306	Total/NA	Water	SM 4500 H+ B	
LCS 310-313064/59	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

### Analysis Batch: 313078

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-1	MW-302	Total/NA	Water	SM 4500 H+ B	
310-204549-2	MW-303	Total/NA	Water	SM 4500 H+ B	
310-204549-3	MW-304	Total/NA	Water	SM 4500 H+ B	
310-204549-5	MW-305A	Total/NA	Water	SM 4500 H+ B	
310-204549-7	MW-310	Total/NA	Water	SM 4500 H+ B	
310-204549-8	MW-310A	Total/NA	Water	SM 4500 H+ B	
310-204549-9	MW-311	Total/NA	Water	SM 4500 H+ B	
310-204549-10	MW-311A	Total/NA	Water	SM 4500 H+ B	
LCS 310-313078/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-204549-2 DU	MW-303	Total/NA	Water	SM 4500 H+ B	
310-204549-8 DU	MW-310A	Total/NA	Water	SM 4500 H+ B	

### Analysis Batch: 313155

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-1	MW-302	Total/NA	Water	SM 2540C	
310-204549-2	MW-303	Total/NA	Water	SM 2540C	
310-204549-6	MW-306	Total/NA	Water	SM 2540C	
MB 310-313155/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-313155/2	Lab Control Sample	Total/NA	Water	SM 2540C	

### Analysis Batch: 313222

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-7	MW-310	Total/NA	Water	SM 2540C	
MB 310-313222/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-313222/2	Lab Control Sample	Total/NA	Water	SM 2540C	

### Analysis Batch: 313365

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-3	MW-304	Total/NA	Water	SM 2540C	
310-204549-4	MW-305	Total/NA	Water	SM 2540C	
310-204549-5	MW-305A	Total/NA	Water	SM 2540C	
310-204549-8	MW-310A	Total/NA	Water	SM 2540C	
310-204549-9	MW-311	Total/NA	Water	SM 2540C	
310-204549-10	MW-311A	Total/NA	Water	SM 2540C	
MB 310-313365/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-313365/2	Lab Control Sample	Total/NA	Water	SM 2540C	

## Field Service / Mobile Lab

### Analysis Batch: 313728

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-1	MW-302	Total/NA	Water	Field Sampling	
310-204549-2	MW-303	Total/NA	Water	Field Sampling	
310-204549-3	MW-304	Total/NA	Water	Field Sampling	
310-204549-4	MW-305	Total/NA	Water	Field Sampling	

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# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

## Field Service / Mobile Lab (Continued)

### Analysis Batch: 313728 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-5	MW-305A	Total/NA	Water	Field Sampling	
310-204549-6	MW-306	Total/NA	Water	Field Sampling	
310-204549-7	MW-310	Total/NA	Water	Field Sampling	
310-204549-8	MW-310A	Total/NA	Water	Field Sampling	
310-204549-9	MW-311	Total/NA	Water	Field Sampling	
310-204549-10	MW-311A	Total/NA	Water	Field Sampling	

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# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

**Client Sample ID: MW-302**

**Lab Sample ID: 310-204549-1**

**Date Collected: 04/13/21 18:15**

**Matrix: Water**

**Date Received: 04/16/21 17:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	314219	04/23/21 14:57	JNR	TAL CF
Total/NA	Analysis	9056A		5	314219	04/24/21 04:04	JNR	TAL CF
Total/NA	Prep	3010A			313195	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	314022	04/26/21 22:15	SAD	TAL CF
Total/NA	Prep	3010A			313195	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	314039	04/26/21 22:15	SAD	TAL CF
Total/NA	Prep	7470A			313631	04/22/21 14:28	HED	TAL CF
Total/NA	Analysis	7470A		1	313806	04/23/21 14:19	HED	TAL CF
Total/NA	Analysis	SM 2540C		1	313155	04/19/21 09:05	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	313078	04/16/21 19:35	GRS	TAL CF
Total/NA	Analysis	Field Sampling		1	313728	04/13/21 18:15	SLD	TAL CF

**Client Sample ID: MW-303**

**Lab Sample ID: 310-204549-2**

**Date Collected: 04/13/21 16:50**

**Matrix: Water**

**Date Received: 04/16/21 17:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	314219	04/23/21 15:13	JNR	TAL CF
Total/NA	Prep	3010A			313195	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	314022	04/26/21 22:18	SAD	TAL CF
Total/NA	Prep	3010A			313195	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	314039	04/26/21 22:18	SAD	TAL CF
Total/NA	Prep	7470A			313631	04/22/21 14:28	HED	TAL CF
Total/NA	Analysis	7470A		1	313806	04/23/21 14:21	HED	TAL CF
Total/NA	Analysis	SM 2540C		1	313155	04/19/21 09:05	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	313078	04/16/21 19:24	GRS	TAL CF
Total/NA	Analysis	Field Sampling		1	313728	04/13/21 16:50	SLD	TAL CF

**Client Sample ID: MW-304**

**Lab Sample ID: 310-204549-3**

**Date Collected: 04/14/21 16:50**

**Matrix: Water**

**Date Received: 04/16/21 17:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	314219	04/23/21 15:28	JNR	TAL CF
Total/NA	Prep	3010A			313195	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	314022	04/26/21 22:20	SAD	TAL CF
Total/NA	Prep	3010A			313195	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	314039	04/26/21 22:20	SAD	TAL CF
Total/NA	Prep	7470A			313631	04/22/21 14:28	HED	TAL CF
Total/NA	Analysis	7470A		1	313806	04/23/21 14:23	HED	TAL CF
Total/NA	Analysis	SM 2540C		1	313365	04/20/21 13:51	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	313078	04/16/21 19:57	GRS	TAL CF
Total/NA	Analysis	Field Sampling		1	313728	04/14/21 16:50	SLD	TAL CF

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# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

## Client Sample ID: MW-305

Lab Sample ID: 310-204549-4

Date Collected: 04/16/21 10:15

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	314219	04/23/21 15:44	JNR	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 16:51	SAD	TAL CF
Total/NA	Prep	7470A			313631	04/22/21 14:28	HED	TAL CF
Total/NA	Analysis	7470A		1	313806	04/23/21 14:25	HED	TAL CF
Total/NA	Analysis	SM 2540C		1	313365	04/20/21 13:51	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	313064	04/16/21 17:01	AJW	TAL CF
Total/NA	Analysis	Field Sampling		1	313728	04/16/21 10:15	SLD	TAL CF

## Client Sample ID: MW-305A

Lab Sample ID: 310-204549-5

Date Collected: 04/15/21 13:45

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	314219	04/23/21 15:59	JNR	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 16:53	SAD	TAL CF
Total/NA	Prep	7470A			313631	04/22/21 14:28	HED	TAL CF
Total/NA	Analysis	7470A		1	313806	04/23/21 14:28	HED	TAL CF
Total/NA	Analysis	SM 2540C		1	313365	04/20/21 13:51	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	313078	04/16/21 19:56	GRS	TAL CF
Total/NA	Analysis	Field Sampling		1	313728	04/15/21 13:45	SLD	TAL CF

## Client Sample ID: MW-306

Lab Sample ID: 310-204549-6

Date Collected: 04/13/21 15:00

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	314219	04/23/21 16:46	JNR	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 16:56	SAD	TAL CF
Total/NA	Prep	7470A			313631	04/22/21 14:28	HED	TAL CF
Total/NA	Analysis	7470A		1	313806	04/23/21 14:30	HED	TAL CF
Total/NA	Analysis	SM 2540C		1	313155	04/19/21 09:05	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	313064	04/16/21 16:59	AJW	TAL CF
Total/NA	Analysis	Field Sampling		1	313728	04/13/21 15:00	SLD	TAL CF

## Client Sample ID: MW-310

Lab Sample ID: 310-204549-7

Date Collected: 04/13/21 13:25

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	314219	04/23/21 17:02	JNR	TAL CF
Total/NA	Analysis	9056A		20	314219	04/26/21 11:06	JNR	TAL CF

Eurofins TestAmerica, Cedar Falls

# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

## Client Sample ID: MW-310

Date Collected: 04/13/21 13:25

Date Received: 04/16/21 17:00

## Lab Sample ID: 310-204549-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 17:01	SAD	TAL CF
Total/NA	Prep	7470A			313631	04/22/21 14:28	HED	TAL CF
Total/NA	Analysis	7470A		1	313806	04/23/21 14:32	HED	TAL CF
Total/NA	Analysis	SM 2540C		1	313222	04/19/21 13:42	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	313078	04/16/21 19:38	GRS	TAL CF
Total/NA	Analysis	Field Sampling		1	313728	04/13/21 13:25	SLD	TAL CF

## Client Sample ID: MW-310A

Date Collected: 04/15/21 14:20

Date Received: 04/16/21 17:00

## Lab Sample ID: 310-204549-8

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	314219	04/23/21 17:17	JNR	TAL CF
Total/NA	Analysis	9056A		20	314219	04/26/21 11:22	JNR	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 17:04	SAD	TAL CF
Total/NA	Prep	7470A			313631	04/22/21 14:28	HED	TAL CF
Total/NA	Analysis	7470A		1	313806	04/23/21 14:34	HED	TAL CF
Total/NA	Analysis	SM 2540C		1	313365	04/20/21 13:51	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	313078	04/16/21 19:45	GRS	TAL CF
Total/NA	Analysis	Field Sampling		1	313728	04/15/21 14:20	SLD	TAL CF

## Client Sample ID: MW-311

Date Collected: 04/14/21 08:55

Date Received: 04/16/21 17:00

## Lab Sample ID: 310-204549-9

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	314219	04/23/21 17:33	JNR	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 17:07	SAD	TAL CF
Total/NA	Prep	7470A			313631	04/22/21 14:28	HED	TAL CF
Total/NA	Analysis	7470A		1	313806	04/23/21 14:40	HED	TAL CF
Total/NA	Analysis	SM 2540C		1	313365	04/20/21 13:51	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	313078	04/16/21 19:58	GRS	TAL CF
Total/NA	Analysis	Field Sampling		1	313728	04/14/21 08:55	SLD	TAL CF

## Client Sample ID: MW-311A

Date Collected: 04/16/21 11:30

Date Received: 04/16/21 17:00

## Lab Sample ID: 310-204549-10

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	314219	04/23/21 17:49	JNR	TAL CF
Total/NA	Analysis	9056A		20	314219	04/26/21 11:38	JNR	TAL CF

Eurofins TestAmerica, Cedar Falls

# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-204549-10**

**Date Collected: 04/16/21 11:30**

**Matrix: Water**

**Date Received: 04/16/21 17:00**

<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	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 17:09	SAD	TAL CF
Total/NA	Prep	7470A			313631	04/22/21 14:28	HED	TAL CF
Total/NA	Analysis	7470A		1	313806	04/23/21 14:43	HED	TAL CF
Total/NA	Analysis	SM 2540C		1	313365	04/20/21 13:51	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	313078	04/16/21 19:54	GRS	TAL CF
Total/NA	Analysis	Field Sampling		1	313728	04/16/21 11:30	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 - 25221072

Job ID: 310-204549-1

## 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

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# Method Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-1

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



Environment Testing  
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310-204549 Chain of Custody

### Cooler/Sample Receipt and Temperature Log Form

<b>Client Information</b>			
Client: <u>SCS Engineers</u>			
City/State:	<u>Madison</u>	STATE <u>WI</u>	Project: <u>Ottumwa Gen. Station</u>
<b>Receipt Information</b>			
Date/Time Received:	DATE <u>4/16/21</u>	TIME <u>1700</u>	Received By:
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: _____			
<b>Condition of Cooler/Containers</b>			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>TA-DSM</u>	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>5</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? ↓	
<u>MW-306, MW 31A, MW-302, MW-304</u>			
<b>Temperature Record</b>			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>0</u>	Correction Factor (°C):	<u>0</u>
• Temp/Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>0.8</u>	Corrected Temp (°C):	<u>0.8</u>
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
<b>Exceptions Noted</b>			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
<b>Additional Comments</b>			

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



Place COC scanning label  
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**Cooler/Sample Receipt and Temperature Log Form**

Client Information		
Client: <u>SCS Engineers</u>		
City/State: <u>Madison</u> <small>CITY</small> <u>WI</u> <small>STATE</small>	Project: <u>Ottumwa Gen. Station</u>	
Receipt Information		
Date/Time Received: <u>4/16/21</u> <small>DATE</small> <u>7:00</u> <small>TIME</small>	Received By: _____	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AC-23</u>
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>4</u> of <u>5</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? ↓
<u>MW-302, MW-303, MW-310, MW-306</u>		
Temperature Record		
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE	
Thermometer ID: <u>0</u>	Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>1.9</u>	Corrected Temp (°C): <u>1.9</u>	
• Sample Container Temperature		
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):		
Corrected Temp (°C):		
Exceptions Noted		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
Additional Comments		





Cooler/Sample Receipt and Temperature Log Form

Client Information		
Client: <u>SCS Engineers</u>		
City/State: <u>Madison</u> <small>CITY</small> <u>WI</u> <small>STATE</small>	Project: <u>Ottumwa Gen. Station</u>	
Receipt Information		
Date/Time Received: <u>4/17/21</u> <small>DATE</small> <u>1700</u> <small>TIME</small>	Received By:	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AC-20</u>
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>5</u> of <u>5</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? ↓
<u>MW-311, MW-305A, MW-304</u>		
Temperature Record		
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE	
Thermometer ID: <u>0</u>	Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>1.2</u>	Corrected Temp (°C): <u>1.2</u>	
• Sample Container Temperature		
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):		
Corrected Temp (°C):		
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		





Place COC scanning label  
here

Cooler/Sample Receipt and Temperature Log Form

Client Information		
Client: <u>SCS Engineers</u>		
City/State: <u>Madison</u> <sup>CITY</sup> <u>WI</u> <sup>STATE</sup>	Project: <u>Ottumwa Gen. Station</u>	
Receipt Information		
Date/Time Received: <u>4/16/21</u> <sup>DATE</sup> <u>7:00</u> <sup>TIME</sup>	Received By:	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AB-92</u>
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>3</u> of <u>5</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? ↓
<u>MW 311A, Field Blank, MW 310A, MW 305</u>		
Temperature Record		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>0</u>	Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>1.6</u>	Corrected Temp (°C): <u>1.6</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		



Environment Testing  
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Place COC scanning label  
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**Cooler/Sample Receipt and Temperature Log Form**

Client Information			
Client: <u>SCS Engineers</u>			
City/State:	<u>Madison</u>	STATE	<u>WI</u>
Project:		<u>Ottumwa Gen. Station</u>	
Receipt Information			
Date/Time Received:	DATE	TIME	Received By:
	<u>4/14/21</u>	<u>7:00</u>	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee			
<input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>Clive P-7</u>	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>2</u> of <u>5</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? ↓	
<u>MW-310A, MW-310, MW-305</u>			
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>0</u>	Correction Factor (°C):	<u>0</u>
• Temp. Blank Temperature – If no temp. blank, or temp blank temperature above criteria, proceed to Sample Container Temperature:			
Uncorrected Temp (°C):		Corrected Temp (°C):	
• Sample Container Temperature			
Container(s) used:	CONTAINER 1	CONTAINER 2	
	<u>plastic 250ml</u>		
Uncorrected Temp (°C):	<u>3.1</u>		
Corrected Temp (°C):	<u>3.1</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			

<b>Client Information</b>		Sampler: <u>Tentzen Buszka</u>		Lab PM: <u>Fredrick, Sandie</u>		Carrier Tracking No(s): <u>310-59841-17487.1</u>	
Client Contact: <u>Meghan Bloodgett</u>		Phone: <u>269-443-0855</u>		E-Mail: <u>sandra.fredrick@eurofinset.com</u>		State of Origin: _____	
Company: <u>SCS Engineers</u>		PWSID: _____		Analysis Requested: _____		Page: <u>Page 1 of 1</u>	
Address: <u>2830 Dairy Drive</u>		Due Date Requested: _____		Field Filtered Sample (Yes or No): <u>X</u>		Job #: _____	
City: <u>Madison</u>		IAT Requested (days): _____		Perform MS/MSD (Yes or No): <u>X</u>		Preservation Codes: <u>M - Hexane</u>	
State, Zip: <u>WI, 53718</u>		Compliance Project: <u>Δ Yes Δ No</u>		Total Number of Containers: <u>X</u>		<u>N - None</u>	
Phone: <u>269-443-0855</u>		PO # <u>25221072</u>		5030 - Radium-226 (GFC)		<u>O - Na2O4S</u>	
Email: <u>mbloodgett@scsengineers.com</u>		WO # _____		5040 - Radium-228 (GFC)		<u>P - Na2SO3</u>	
Project Name: <u>Cittumwa Generating Station - 25221072</u>		Project #: <u>31011020</u>		5050A - ORGEM-28D - Chloride, Fluoride & Sulfate		<u>R - Na2SO3</u>	
Site: <u>065</u>		Sample Date		5040 - Radium-228 (GFC)		<u>S - H2SO4</u>	
Sample Identification		Sample Time		5040 - Radium-226 (GFC)		<u>T - TSP Decahydrate</u>	
MW-302		4-13-21 18:15		5040 - Radium-228 (GFC)		<u>U - Acetone</u>	
MW-303		4-13-21 16:50		2490C - Cadm. SM4500.H+		<u>V - MCAA</u>	
MW-304		4-14-21 16:50		6029A, 7470A		<u>W - pH 4.5</u>	
MW-305		4-16-21 10:15		2490C - Cadm. SM4500.H+		<u>Z - other (specify)</u>	
MW-305A		4-15-21 13:45		2490C - Cadm. SM4500.H+		Other: _____	
MW-306		4-13-21 15:00		2490C - Cadm. SM4500.H+		Special Instructions/Note: _____	
MW-310		4-13-21 13:25		2490C - Cadm. SM4500.H+		Special Instructions/Note: _____	
MW-310A		4-15-21 14:20		2490C - Cadm. SM4500.H+		Special Instructions/Note: _____	
MW-311		4-14-21 8:55		2490C - Cadm. SM4500.H+		Special Instructions/Note: _____	
MW-311A		4-16-21 11:30		2490C - Cadm. SM4500.H+		Special Instructions/Note: _____	
<b>Possible Hazard Identification</b>							
<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: _____ Date: _____							
Reinquired by: <u>John Pz</u> Date: <u>4-16-21 14:00</u>							
Reinquired by: _____ Date/Time: _____							
Reinquired by: _____ Date/Time: _____							
Custody Seals Intact: <u>Δ Yes Δ No</u>							
Custody Seal No.: _____							
Special Instructions/C.C. Requirements: _____							
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							
Method of Shipment: _____							
Received by: <u>John Pz</u> Company: <u>SCS</u>							
Received by: _____ Date/Time: _____							
Received by: _____ Date/Time: _____							
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	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 - REQUIRES SEPARATE COC	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								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	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: 310-204549-1

**Login Number: 204549**

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

**List Number: 1**

**Creator: Ramos, Eric F**

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

**Table 1. Groundwater Monitoring Results - Field Parameters**  
**Ottumwa Generating Station / SCS Engineers Project No. 25221072.00**  
**April 2021**

Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmhos/cm)	ORP (mV)	Turbidity
MW-301	4/14/2021 - 10:10	682.94	9.1	6.26	5.99	1,062	232.5	1.61
MW-302	4/13/2021 - 18:15	656.05	11.9	6.44	0.37	2,087	198.2	22.9
MW-303	4/13/2021 - 16:50	653.82	9.7	6.67	2.83	1,118	184.7	4.31
MW-304	4/14/2021 - 16:50	654.34	13.1	6.94	0.20	1,797	-97.5	16.9
MW-305	4/16/2021 - 10:15	661.15	12.9	6.92	0.16	1,799	43.6	8.17
MW-305A	4/15/2021 - 13:45	651.16	12.4	7.05	0.88	1,224	158.3	1.02
MW-306	4/13/2021 - 15:00	670.27	12.7	6.42	0.14	1,339	92.0	8.99
MW-307	4/14/2021 - 12:30	649.53	11.5	6.59	0.41	1,675	-39.9	21.2
MW-308	4/15/2021 - 13:55	647.66	11.5	6.70	0.44	1,598	-49.3	4.47
MW-309	4/14/2021 - 15:25	646.46	11.7	7.00	0.36	1,411	-40.6	9.32
MW-310	4/13/2021 - 13:25	642.70	12.6	7.07	0.46	2,362	161.0	2.38
MW-310A	4/15/2021 - 14:20	644.88	12.5	7.47	0.98	3,106	160.2	2.25
MW-311	4/14/2021 - 08:55	643.02	9.3	6.66	1.18	945	179.8	0.78
MW-311A	4/16/2021 - 11:30	644.16	12.3	7.76	0.77	3,332	146.9	0.02

Abbreviations:

mg/L = milligrams per liter

amsl = above mean sea level

NA = Not Analyzed

NM= Not Measured

Notes:

none

Created by: NDK  
 Last revision by: JR  
 Checked by: NDK

Date: 4/21/2021  
 Date: 4/22/2021  
 Date: 4/22/2021

C:\Users\FredrickS\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\4NCCUHIK\[2104\_April - OGS\_CCR\_Field.xlsx]GW Field Parameters

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-204549-2

Client Project/Site: Ottumwa Generating Station - 25221072

**For:**

SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:  
5/18/2021 11:55:17 AM*

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

### LINKS

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

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





# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Sample Summary . . . . .	4
Detection Summary . . . . .	5
Client Sample Results . . . . .	6
Definitions . . . . .	16
QC Sample Results . . . . .	17
QC Association . . . . .	19
Chronicle . . . . .	20
Certification Summary . . . . .	23
Method Summary . . . . .	24
Chain of Custody . . . . .	25
Receipt Checklists . . . . .	32
Tracer Carrier Summary . . . . .	34

# Case Narrative

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

## Job ID: 310-204549-2

### Laboratory: Eurofins TestAmerica, Cedar Falls

#### Narrative

#### Job Narrative 310-204549-2

#### Comments

No additional comments.

#### Receipt

The samples were received on 4/16/2021 5:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 5 coolers at receipt time were 0.8° C, 1.2° C, 1.6° C, 1.9° C and 3.1° C.

#### RAD

Methods 903.0, 9315: Radium-226 Batch 506413 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-302 (310-204549-1), MW-303 (310-204549-2), MW-304 (310-204549-3), MW-305 (310-204549-4), MW-305A (310-204549-5), MW-306 (310-204549-6), MW-310 (310-204549-7), MW-310A (310-204549-8), MW-311 (310-204549-9), MW-311A (310-204549-10), (LCS 160-506413/1-A) and (LCSD 160-506413/2-A)

Method 904.0: Radium-228 Batch 506418 The following sample did not meet the requested limit (RL) due to the reduced sample volume attributed to the presence of matrix interference. During preparation the analyst visually noted matrix effects. The data have been reported with this narrative. MW-302 (310-204549-1)

Methods 904.0, 9320: Radium-228 Batch 506418 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-302 (310-204549-1), MW-303 (310-204549-2), MW-304 (310-204549-3), MW-305 (310-204549-4), MW-305A (310-204549-5), MW-306 (310-204549-6), MW-310 (310-204549-7), MW-310A (310-204549-8), MW-311 (310-204549-9), MW-311A (310-204549-10), (LCS 160-506418/1-A), (LCSD 160-506418/2-A) and (MB 160-506418/23-A)

Method PrecSep\_0: Radium 228 Prep Batch 160-506418: The following samples were prepared at a reduced aliquot due to Matrix: MW-302 (310-204549-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precision.

Method PrecSep\_0: Radium 228 Prep Batch 160-506418: Insufficient sample volume was available to perform a sample duplicate (DUP) for the following samples: MW-303 (310-204549-2), MW-304 (310-204549-3), MW-305 (310-204549-4), MW-305A (310-204549-5), MW-306 (310-204549-6), MW-310 (310-204549-7), MW-310A (310-204549-8), MW-311 (310-204549-9) and MW-311A (310-204549-10). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep-21: Radium 226 Prep Batch 160-506413: Insufficient sample volume was available to perform a sample duplicate (DUP) for the following samples: MW-303 (310-204549-2), MW-304 (310-204549-3), MW-305 (310-204549-4), MW-305A (310-204549-5), MW-306 (310-204549-6), MW-310 (310-204549-7), MW-310A (310-204549-8), MW-311 (310-204549-9) and MW-311A (310-204549-10). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep-21: Radium 226 Prep Batch 160-506413: The following samples were prepared at a reduced aliquot due to Matrix: MW-302 (310-204549-1). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) 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 - 25221072

Job ID: 310-204549-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-204549-1	MW-302	Water	04/13/21 18:15	04/16/21 17:00	
310-204549-2	MW-303	Water	04/13/21 16:50	04/16/21 17:00	
310-204549-3	MW-304	Water	04/14/21 16:50	04/16/21 17:00	
310-204549-4	MW-305	Water	04/16/21 10:15	04/16/21 17:00	
310-204549-5	MW-305A	Water	04/15/21 13:45	04/16/21 17:00	
310-204549-6	MW-306	Water	04/13/21 15:00	04/16/21 17:00	
310-204549-7	MW-310	Water	04/13/21 13:25	04/16/21 17:00	
310-204549-8	MW-310A	Water	04/15/21 14:20	04/16/21 17:00	
310-204549-9	MW-311	Water	04/14/21 08:55	04/16/21 17:00	
310-204549-10	MW-311A	Water	04/16/21 11:30	04/16/21 17:00	

# Detection Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

<b>Client Sample ID: MW-302</b>	<b>Lab Sample ID: 310-204549-1</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-303</b>	<b>Lab Sample ID: 310-204549-2</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-304</b>	<b>Lab Sample ID: 310-204549-3</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-305</b>	<b>Lab Sample ID: 310-204549-4</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-305A</b>	<b>Lab Sample ID: 310-204549-5</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-306</b>	<b>Lab Sample ID: 310-204549-6</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-310</b>	<b>Lab Sample ID: 310-204549-7</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-310A</b>	<b>Lab Sample ID: 310-204549-8</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-311</b>	<b>Lab Sample ID: 310-204549-9</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-311A</b>	<b>Lab Sample ID: 310-204549-10</b>
<input type="checkbox"/> 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 - 25221072

Job ID: 310-204549-2

**Client Sample ID: MW-302**

**Lab Sample ID: 310-204549-1**

Date Collected: 04/13/21 18:15

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.486		0.223	0.227	1.00	0.248	pCi/L	04/21/21 10:34	05/15/21 10:54	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	69.7		40 - 110					04/21/21 10:34	05/15/21 10:54	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	0.415	U G	0.617	0.618	1.00	1.04	pCi/L	04/21/21 10:55	05/06/21 20:33	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	69.7		40 - 110					04/21/21 10:55	05/06/21 20:33	1
Y Carrier	85.6		40 - 110					04/21/21 10:55	05/06/21 20:33	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	0.901	U	0.656	0.658	5.00	1.04	pCi/L		05/17/21 21:22	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

**Client Sample ID: MW-303**

**Lab Sample ID: 310-204549-2**

Date Collected: 04/13/21 16:50

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.178		0.111	0.112	1.00	0.152	pCi/L	04/21/21 10:34	05/15/21 10:54	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	75.8		40 - 110					04/21/21 10:34	05/15/21 10:54	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	0.333	U	0.327	0.329	1.00	0.532	pCi/L	04/21/21 10:55	05/06/21 20:25	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	75.8		40 - 110					04/21/21 10:55	05/06/21 20:25	1
Y Carrier	83.4		40 - 110					04/21/21 10:55	05/06/21 20:25	1

**Method: Ra226\_Ra228 Pos - Combined Radium-226 and Radium-228**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226 and 228	0.510	U	0.345	0.348	5.00	0.532	pCi/L		05/17/21 21:22	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

**Client Sample ID: MW-304**

**Lab Sample ID: 310-204549-3**

Date Collected: 04/14/21 16:50

Matrix: Water

Date Received: 04/16/21 17:00

**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		0.232	0.258	1.00	0.147	pCi/L	04/21/21 10:34	05/15/21 10:55	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	70.3		40 - 110					04/21/21 10:34	05/15/21 10:55	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	1.25		0.406	0.422	1.00	0.541	pCi/L	04/21/21 10:55	05/06/21 20:26	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	70.3		40 - 110					04/21/21 10:55	05/06/21 20:26	1
Y Carrier	84.5		40 - 110					04/21/21 10:55	05/06/21 20:26	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	2.49		0.468	0.495	5.00	0.541	pCi/L		05/17/21 21:22	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

**Client Sample ID: MW-305**  
 Date Collected: 04/16/21 10:15  
 Date Received: 04/16/21 17:00

**Lab Sample ID: 310-204549-4**  
 Matrix: Water

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.279		0.118	0.121	1.00	0.125	pCi/L	04/21/21 10:34	05/15/21 10:55	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	68.5		40 - 110					04/21/21 10:34	05/15/21 10:55	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	0.0482	U	0.332	0.332	1.00	0.584	pCi/L	04/21/21 10:55	05/06/21 20:26	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	68.5		40 - 110					04/21/21 10:55	05/06/21 20:26	1
Y Carrier	84.1		40 - 110					04/21/21 10:55	05/06/21 20:26	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	0.327	U	0.352	0.353	5.00	0.584	pCi/L		05/17/21 21:22	1



# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

**Client Sample ID: MW-305A**

**Lab Sample ID: 310-204549-5**

Date Collected: 04/15/21 13:45

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	2.33		0.328	0.389	1.00	0.180	pCi/L	04/21/21 10:34	05/15/21 10:56	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	64.8		40 - 110					04/21/21 10:34	05/15/21 10:56	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	0.340	U	0.334	0.336	1.00	0.542	pCi/L	04/21/21 10:55	05/06/21 20:28	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	64.8		40 - 110					04/21/21 10:55	05/06/21 20:28	1
Y Carrier	87.9		40 - 110					04/21/21 10:55	05/06/21 20:28	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		0.468	0.514	5.00	0.542	pCi/L		05/17/21 21:22	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

**Client Sample ID: MW-306**

**Lab Sample ID: 310-204549-6**

Date Collected: 04/13/21 15:00

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0205	U	0.0930	0.0931	1.00	0.176	pCi/L	04/21/21 10:34	05/15/21 10:57	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	65.8		40 - 110					04/21/21 10:34	05/15/21 10:57	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	0.313	U	0.367	0.368	1.00	0.606	pCi/L	04/21/21 10:55	05/06/21 20:28	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	65.8		40 - 110					04/21/21 10:55	05/06/21 20:28	1
Y Carrier	78.1		40 - 110					04/21/21 10:55	05/06/21 20:28	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	0.334	U	0.379	0.380	5.00	0.606	pCi/L		05/17/21 21:22	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

**Client Sample ID: MW-310**

**Lab Sample ID: 310-204549-7**

Date Collected: 04/13/21 13:25

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0354	U	0.0825	0.0826	1.00	0.181	pCi/L	04/21/21 10:34	05/15/21 10:56	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	65.2		40 - 110					04/21/21 10:34	05/15/21 10:56	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	-0.0334	U	0.317	0.317	1.00	0.578	pCi/L	04/21/21 10:55	05/06/21 20:28	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	65.2		40 - 110					04/21/21 10:55	05/06/21 20:28	1
Y Carrier	81.1		40 - 110					04/21/21 10:55	05/06/21 20:28	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	0.000	U	0.328	0.328	5.00	0.578	pCi/L		05/17/21 21:22	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

**Client Sample ID: MW-310A**

**Lab Sample ID: 310-204549-8**

Date Collected: 04/15/21 14:20

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	4.14		0.422	0.563	1.00	0.176	pCi/L	04/21/21 10:34	05/15/21 10:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	58.2		40 - 110					04/21/21 10:34	05/15/21 10:59	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	0.293	U	0.388	0.389	1.00	0.646	pCi/L	04/21/21 10:55	05/06/21 20:28	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	58.2		40 - 110					04/21/21 10:55	05/06/21 20:28	1
Y Carrier	84.1		40 - 110					04/21/21 10:55	05/06/21 20:28	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	4.44		0.573	0.684	5.00	0.646	pCi/L		05/17/21 21:22	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

**Client Sample ID: MW-311**  
**Date Collected: 04/14/21 08:55**  
**Date Received: 04/16/21 17:00**

**Lab Sample ID: 310-204549-9**  
**Matrix: Water**

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0364	U	0.0672	0.0673	1.00	0.119	pCi/L	04/21/21 10:34	05/15/21 10:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.6		40 - 110					04/21/21 10:34	05/15/21 10:59	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	0.158	U	0.279	0.279	1.00	0.473	pCi/L	04/21/21 10:55	05/06/21 20:29	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	83.6		40 - 110					04/21/21 10:55	05/06/21 20:29	1
Y Carrier	81.1		40 - 110					04/21/21 10:55	05/06/21 20:29	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	0.194	U	0.287	0.287	5.00	0.473	pCi/L		05/17/21 21:22	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-204549-10**

Date Collected: 04/16/21 11:30

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	3.25		0.379	0.479	1.00	0.168	pCi/L	04/21/21 10:34	05/15/21 10:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	57.0		40 - 110					04/21/21 10:34	05/15/21 10:59	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	0.600	U	0.421	0.425	1.00	0.656	pCi/L	04/21/21 10:55	05/06/21 20:29	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	57.0		40 - 110					04/21/21 10:55	05/06/21 20:29	1
Y Carrier	84.5		40 - 110					04/21/21 10:55	05/06/21 20:29	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	3.85		0.566	0.640	5.00	0.656	pCi/L		05/17/21 21:22	1

# Definitions/Glossary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

## Qualifiers

### Rad

Qualifier	Qualifier Description
G	The Sample MDC is greater than the requested RL.
U	Result is less than the sample detection limit.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
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 - 25221072

Job ID: 310-204549-2

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

**Lab Sample ID: MB 160-506413/23-A**  
**Matrix: Water**  
**Analysis Batch: 509911**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 506413**

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.03455	U	0.0669	0.0670	1.00	0.120	pCi/L	04/21/21 10:34	05/15/21 11:00	1
Carrier	MB	MB	Limits			Prepared	Analyzed	Dil Fac		
Ba Carrier	%Yield	Qualifier		Prepared	Analyzed					
Ba Carrier	71.5		40 - 110	04/21/21 10:34	05/15/21 11:00	1				

**Lab Sample ID: LCS 160-506413/1-A**  
**Matrix: Water**  
**Analysis Batch: 509912**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 506413**

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	10.23		1.11	1.00	0.132	pCi/L	90	75 - 125
Carrier	LCS	LCS	Limits			Prepared	Analyzed	Dil Fac	
Ba Carrier	%Yield	Qualifier		Prepared	Analyzed				
Ba Carrier	69.7		40 - 110	04/21/21 10:34	05/15/21 11:00	1			

**Lab Sample ID: LCSD 160-506413/2-A**  
**Matrix: Water**  
**Analysis Batch: 509912**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 506413**

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
				Uncert. (2σ+/-)							
Radium-226	11.3	10.75		1.15	1.00	0.136	pCi/L	95	75 - 125	0.23	1
Carrier	LCSD	LCSD	Limits			Prepared	Analyzed	Dil Fac			
Ba Carrier	%Yield	Qualifier		Prepared	Analyzed						
Ba Carrier	71.2		40 - 110	04/21/21 10:34	05/15/21 11:00	1					

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

**Lab Sample ID: MB 160-506418/23-A**  
**Matrix: Water**  
**Analysis Batch: 508606**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 506418**

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.1770	U	0.333	0.333	1.00	0.566	pCi/L	04/21/21 10:55	05/06/21 20:29	1
Carrier	MB	MB	Limits			Prepared	Analyzed	Dil Fac		
Ba Carrier	%Yield	Qualifier		Prepared	Analyzed					
Ba Carrier	71.5		40 - 110	04/21/21 10:55	05/06/21 20:29	1				
Y Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac				
Y Carrier	81.1		40 - 110	04/21/21 10:55	05/06/21 20:29	1				



# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

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

**Lab Sample ID: LCS 160-506418/1-A**  
**Matrix: Water**  
**Analysis Batch: 508605**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 506418**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	
									75	125
Radium-228	7.23	8.276		1.07	1.00	0.474	pCi/L	114	75	125
<b>LCS LCS</b>										
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>							
Ba Carrier	69.7		40 - 110							
Y Carrier	84.5		40 - 110							

**Lab Sample ID: LCSD 160-506418/2-A**  
**Matrix: Water**  
**Analysis Batch: 508605**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 506418**

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		RER	Limit
									75	125	0.24	1
Radium-228	7.23	8.808		1.12	1.00	0.453	pCi/L	122	75	125	0.24	1
<b>LCSD LCSD</b>												
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>									
Ba Carrier	71.2		40 - 110									
Y Carrier	83.0		40 - 110									

# QC Association Summary

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

## Rad

### Prep Batch: 506413

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-1	MW-302	Total/NA	Water	PrecSep-21	
310-204549-2	MW-303	Total/NA	Water	PrecSep-21	
310-204549-3	MW-304	Total/NA	Water	PrecSep-21	
310-204549-4	MW-305	Total/NA	Water	PrecSep-21	
310-204549-5	MW-305A	Total/NA	Water	PrecSep-21	
310-204549-6	MW-306	Total/NA	Water	PrecSep-21	
310-204549-7	MW-310	Total/NA	Water	PrecSep-21	
310-204549-8	MW-310A	Total/NA	Water	PrecSep-21	
310-204549-9	MW-311	Total/NA	Water	PrecSep-21	
310-204549-10	MW-311A	Total/NA	Water	PrecSep-21	
MB 160-506413/23-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-506413/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-506413/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

### Prep Batch: 506418

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-1	MW-302	Total/NA	Water	PrecSep_0	
310-204549-2	MW-303	Total/NA	Water	PrecSep_0	
310-204549-3	MW-304	Total/NA	Water	PrecSep_0	
310-204549-4	MW-305	Total/NA	Water	PrecSep_0	
310-204549-5	MW-305A	Total/NA	Water	PrecSep_0	
310-204549-6	MW-306	Total/NA	Water	PrecSep_0	
310-204549-7	MW-310	Total/NA	Water	PrecSep_0	
310-204549-8	MW-310A	Total/NA	Water	PrecSep_0	
310-204549-9	MW-311	Total/NA	Water	PrecSep_0	
310-204549-10	MW-311A	Total/NA	Water	PrecSep_0	
MB 160-506418/23-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-506418/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-506418/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

## Client Sample ID: MW-302

Lab Sample ID: 310-204549-1

Date Collected: 04/13/21 18:15

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			506413	04/21/21 10:34	RBR	TAL SL
Total/NA	Analysis	903.0		1	509912	05/15/21 10:54	ANW	TAL SL
Total/NA	Prep	PrecSep_0			506418	04/21/21 10:55	RBR	TAL SL
Total/NA	Analysis	904.0		1	508605	05/06/21 20:33	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	510131	05/17/21 21:22	SCB	TAL SL

## Client Sample ID: MW-303

Lab Sample ID: 310-204549-2

Date Collected: 04/13/21 16:50

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			506413	04/21/21 10:34	RBR	TAL SL
Total/NA	Analysis	903.0		1	509912	05/15/21 10:54	ANW	TAL SL
Total/NA	Prep	PrecSep_0			506418	04/21/21 10:55	RBR	TAL SL
Total/NA	Analysis	904.0		1	508606	05/06/21 20:25	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	510131	05/17/21 21:22	SCB	TAL SL

## Client Sample ID: MW-304

Lab Sample ID: 310-204549-3

Date Collected: 04/14/21 16:50

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			506413	04/21/21 10:34	RBR	TAL SL
Total/NA	Analysis	903.0		1	509912	05/15/21 10:55	ANW	TAL SL
Total/NA	Prep	PrecSep_0			506418	04/21/21 10:55	RBR	TAL SL
Total/NA	Analysis	904.0		1	508606	05/06/21 20:26	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	510131	05/17/21 21:22	SCB	TAL SL

## Client Sample ID: MW-305

Lab Sample ID: 310-204549-4

Date Collected: 04/16/21 10:15

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			506413	04/21/21 10:34	RBR	TAL SL
Total/NA	Analysis	903.0		1	509912	05/15/21 10:55	ANW	TAL SL
Total/NA	Prep	PrecSep_0			506418	04/21/21 10:55	RBR	TAL SL
Total/NA	Analysis	904.0		1	508606	05/06/21 20:26	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	510131	05/17/21 21:22	SCB	TAL SL

# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

## Client Sample ID: MW-305A

Lab Sample ID: 310-204549-5

Date Collected: 04/15/21 13:45

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			506413	04/21/21 10:34	RBR	TAL SL
Total/NA	Analysis	903.0		1	509912	05/15/21 10:56	ANW	TAL SL
Total/NA	Prep	PrecSep_0			506418	04/21/21 10:55	RBR	TAL SL
Total/NA	Analysis	904.0		1	508606	05/06/21 20:28	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	510131	05/17/21 21:22	SCB	TAL SL

## Client Sample ID: MW-306

Lab Sample ID: 310-204549-6

Date Collected: 04/13/21 15:00

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			506413	04/21/21 10:34	RBR	TAL SL
Total/NA	Analysis	903.0		1	509912	05/15/21 10:57	ANW	TAL SL
Total/NA	Prep	PrecSep_0			506418	04/21/21 10:55	RBR	TAL SL
Total/NA	Analysis	904.0		1	508606	05/06/21 20:28	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	510131	05/17/21 21:22	SCB	TAL SL

## Client Sample ID: MW-310

Lab Sample ID: 310-204549-7

Date Collected: 04/13/21 13:25

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			506413	04/21/21 10:34	RBR	TAL SL
Total/NA	Analysis	903.0		1	509912	05/15/21 10:56	ANW	TAL SL
Total/NA	Prep	PrecSep_0			506418	04/21/21 10:55	RBR	TAL SL
Total/NA	Analysis	904.0		1	508606	05/06/21 20:28	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	510131	05/17/21 21:22	SCB	TAL SL

## Client Sample ID: MW-310A

Lab Sample ID: 310-204549-8

Date Collected: 04/15/21 14:20

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			506413	04/21/21 10:34	RBR	TAL SL
Total/NA	Analysis	903.0		1	509911	05/15/21 10:59	ANW	TAL SL
Total/NA	Prep	PrecSep_0			506418	04/21/21 10:55	RBR	TAL SL
Total/NA	Analysis	904.0		1	508606	05/06/21 20:28	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	510131	05/17/21 21:22	SCB	TAL SL

# Lab Chronicle

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

**Client Sample ID: MW-311**

**Lab Sample ID: 310-204549-9**

**Date Collected: 04/14/21 08:55**

**Matrix: Water**

**Date Received: 04/16/21 17:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			506413	04/21/21 10:34	RBR	TAL SL
Total/NA	Analysis	903.0		1	509911	05/15/21 10:59	ANW	TAL SL
Total/NA	Prep	PrecSep_0			506418	04/21/21 10:55	RBR	TAL SL
Total/NA	Analysis	904.0		1	508606	05/06/21 20:29	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	510131	05/17/21 21:22	SCB	TAL SL

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-204549-10**

**Date Collected: 04/16/21 11:30**

**Matrix: Water**

**Date Received: 04/16/21 17:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			506413	04/21/21 10:34	RBR	TAL SL
Total/NA	Analysis	903.0		1	509911	05/15/21 10:59	ANW	TAL SL
Total/NA	Prep	PrecSep_0			506418	04/21/21 10:55	RBR	TAL SL
Total/NA	Analysis	904.0		1	508606	05/06/21 20:29	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	510131	05/17/21 21:22	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 - 25221072

Job ID: 310-204549-2

## 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	12-08-21
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	11-30-21
Iowa	State	373	12-01-22
Kansas	NELAP	E-10236	10-31-21
Kentucky (DW)	State	KY90125	01-01-22
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-21
Louisiana	NELAP	04080	06-30-21
Louisiana (DW)	State	LA011	12-31-21
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	04-01-22
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	03-01-22
South Carolina	State	85002001	06-30-21
Texas	NELAP	T104704193	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

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

# Method Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-2

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

#### Protocol References:

EPA = US Environmental Protection Agency

None = None

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

#### Laboratory References:

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





Environment Testing  
TestAmerica



310-204549 Chain of Custody

### Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS Engineers</u>			
City/State:	<u>Madison</u>	STATE <u>WI</u>	Project: <u>Ottumwa Gen. Station</u>
Receipt Information			
Date/Time Received:	DATE <u>4/16/21</u>	TIME <u>1700</u>	Received By:
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>TA-DSM</u>	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>5</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? ↓	
<u>MW-306, MW 31A, MW-302, MW-304</u>			
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>0</u>	Correction Factor (°C):	<u>0</u>
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>0.8</u>	Corrected Temp (°C):	<u>0.8</u>
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			

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





Place COC scanning label  
here

Cooler/Sample Receipt and Temperature Log Form

Client Information		
Client: <u>SCS Engineers</u>		
City/State: <u>Madison</u> <small>CITY</small> <u>WI</u> <small>STATE</small>	Project: <u>Ottumwa Gen. Station</u>	
Receipt Information		
Date/Time Received: <u>4/16/21</u> <small>DATE</small> <u>7:00</u> <small>TIME</small>	Received By:	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AC-23</u>
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>4</u> of <u>5</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? ↓
<u>MW-302, MW-303, MW-310, MW-306</u>		
Temperature Record		
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE	
Thermometer ID: <u>0</u>	Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>1.9</u>	Corrected Temp (°C): <u>1.9</u>	
• Sample Container Temperature		
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):		
Corrected Temp (°C):		
Exceptions Noted		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
Additional Comments		



Cooler/Sample Receipt and Temperature Log Form

Client Information		
Client: <u>SCS Engineers</u>		
City/State: <u>Madison</u> <small>CITY</small> <u>WI</u> <small>STATE</small>	Project: <u>Ottumwa Gen. Station</u>	
Receipt Information		
Date/Time Received: <u>4/17/21</u> <small>DATE</small> <u>1700</u> <small>TIME</small>	Received By:	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AC-20</u>
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>5</u> of <u>5</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? ↓
<u>MW-311, MW-305A, MW-304</u>		
Temperature Record		
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE	
Thermometer ID:	<u>0</u>	Correction Factor (°C): <u>0</u>
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C):	<u>1.2</u>	Corrected Temp (°C): <u>1.2</u>
• Sample Container Temperature		
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):		
Corrected Temp (°C):		
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		





Place COC scanning label  
here

Cooler/Sample Receipt and Temperature Log Form

Client Information		
Client: <u>SCS Engineers</u>		
City/State: <u>Madison</u> <sup>CITY</sup> <u>WI</u> <sup>STATE</sup>	Project: <u>Ottumwa Gen. Station</u>	
Receipt Information		
Date/Time Received: <u>4/16/21</u> <sup>DATE</sup> <u>7:00</u> <sup>TIME</sup>	Received By:	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AB-92</u>
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>3</u> of <u>5</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? ↓
<u>MW 311A, Field Blank, MW 310A, MW 305</u>		
Temperature Record		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>0</u>	Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>1.6</u>	Corrected Temp (°C): <u>1.6</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		





Place COC scanning label  
here

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS Engineers</u>			
City/State:	<u>Madison</u> <small>CITY</small>	<u>WI</u> <small>STATE</small>	Project: <u>Ottumwa Gen. Station</u>
Receipt Information			
Date/Time Received:	<u>4/14/21</u> <small>DATE</small>	<u>7:00</u> <small>TIME</small>	Received By:
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>Clive P-7</u>	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>2</u> of <u>5</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? ↓	
<u>MW-310A, MW-310, MW-305</u>			
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>0</u>	Correction Factor (°C):	<u>0</u>
• Temp. Blank Temperature – If no temp. blank, or temp blank temperature above criteria, proceed to Sample Container Temperature:			
Uncorrected Temp (°C):		Corrected Temp (°C):	
• Sample Container Temperature			
Container(s) used:	<u>plastic 250ml</u> <small>CONTAINER 1</small>	<small>CONTAINER 2</small>	
Uncorrected Temp (°C):	<u>3.1</u>		
Corrected Temp (°C):	<u>3.1</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			

<b>Client Information</b>		Sampler: <u>Tentzen Buszka</u>		Lab PM: <u>Fredrick, Sandie</u>	Carrier Tracking No(s): <u>310-59841-17487.1</u>						
Client Contact: <u>Meghan Bloodgett</u>		Phone: <u>269-493-0855</u>		E-Mail: <u>sandra.fredrick@eurofinset.com</u>	State of Origin: _____						
Company: <u>SCS Engineers</u>		PWSID: _____		Page 1 of 1							
Address: <u>2830 Dairy Drive</u>		Due Date Requested: _____		Job #:							
City: <u>Madison</u>		IAT Requested (days): _____		Preservation Codes:							
State, Zip: <u>WI 53718</u>		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSC4 F - MeOH G - Anchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: _____							
Phone: <u>269-493-0855</u>		PO # <u>25221072</u>		M - Hexane N - None O - AshNaO2 P - Na2OAS Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Decahydrate U - Acetone V - MCAA W - pH 4.5 Z - other (specify)							
Email: <u>mbloodgett@scsengineers.com</u>		WO # _____		Total Number of Containers: _____							
Project Name: <u>Cittumwa Generating Station - 25221072</u>		Project # <u>31011020</u>		Special Instructions/Note: _____							
Site: <u>065</u>		SSOW# _____		Analysis Requested							
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix (W=Water, S=Soil, O=Other)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	503 - Radium-226 (GFC)	504 - Radium-228 (GFC)	505A - ORGEM-28D - Chloride, Fluoride & Sulfate	6029A, 7470A	2490C, Caled. SM4500.H+
MW-302	4-13-21	18:15	G	Water	W	W	X	X	X	X	X
MW-303	4-13-21	16:50	G	Water	W	W	X	X	X	X	X
MW-304	4-14-21	16:50	G	Water	W	W	X	X	X	X	X
MW-305	4-16-21	10:15	G	Water	W	W	X	X	X	X	X
MW-305A	4-15-21	13:45	G	Water	W	W	X	X	X	X	X
MW-306	4-13-21	15:00	G	Water	W	W	X	X	X	X	X
MW-310	4-13-21	13:25	G	Water	W	W	X	X	X	X	X
MW-310A	4-15-21	14:20	G	Water	W	W	X	X	X	X	X
MW-311	4-14-21	8:55	G	Water	W	W	X	X	X	X	X
MW-311A	4-16-21	11:30	G	Water	W	W	X	X	X	X	X
<b>Possible Hazard Identification</b> <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): _____											
<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b> <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months											
Special Instructions/C Requirements: _____											
Empty Kit Relinquished by: _____ Date: _____ Time: _____ Method of Shipment: _____											
Reinquished by: <u>John Pz</u> Date: <u>4-16-21</u> Time: <u>14:00</u> Company: <u>SCS</u>											
Reinquished by: _____ Date/Time: _____ Company: _____											
Reinquished by: _____ Date/Time: _____ Company: _____											
Custody Seals Intact: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 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	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 - REQUIRES SEPARATE COC	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							3
	Iron (filtered)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15
	Lithium (filtered)										x	x					3
Manganese (filtered)	x		x	x	x	x	x	x	x	x	x	x	x	x	x	14	
Field Parameters	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).

C:\Users\Fredricks\AppData\Local\Microsoft\Windows\NetCache\Content.Outlook\Z396DTG3\OGS\_CCR\_Rule\_Sampling\_2104.xls]Sheet1

# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-204549-2

**Login Number: 204549**

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

**List Number: 1**

**Creator: Ramos, Eric F**

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



# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-204549-2

**Login Number: 204549**

**List Number: 2**

**Creator: Mazariegos, Leonel A**

**List Source: Eurofins TestAmerica, St. Louis**

**List Creation: 04/20/21 03:27 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 - 25221072

Job ID: 310-204549-2

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

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	
310-204549-1	MW-302	69.7	
310-204549-2	MW-303	75.8	
310-204549-3	MW-304	70.3	
310-204549-4	MW-305	68.5	
310-204549-5	MW-305A	64.8	
310-204549-6	MW-306	65.8	
310-204549-7	MW-310	65.2	
310-204549-8	MW-310A	58.2	
310-204549-9	MW-311	83.6	
310-204549-10	MW-311A	57.0	
LCS 160-506413/1-A	Lab Control Sample	69.7	
LCSD 160-506413/2-A	Lab Control Sample Dup	71.2	
MB 160-506413/23-A	Method Blank	71.5	
<b>Tracer/Carrier Legend</b>			
Ba = Ba Carrier			

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

Matrix: Water

Prep Type: Total/NA

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)
310-204549-1	MW-302	69.7	85.6
310-204549-2	MW-303	75.8	83.4
310-204549-3	MW-304	70.3	84.5
310-204549-4	MW-305	68.5	84.1
310-204549-5	MW-305A	64.8	87.9
310-204549-6	MW-306	65.8	78.1
310-204549-7	MW-310	65.2	81.1
310-204549-8	MW-310A	58.2	84.1
310-204549-9	MW-311	83.6	81.1
310-204549-10	MW-311A	57.0	84.5
LCS 160-506418/1-A	Lab Control Sample	69.7	84.5
LCSD 160-506418/2-A	Lab Control Sample Dup	71.2	83.0
MB 160-506418/23-A	Method Blank	71.5	81.1
<b>Tracer/Carrier Legend</b>			
Ba = Ba Carrier			
Y = Y Carrier			

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-204549-3

Client Project/Site: Ottumwa Generating Station - 25221072

**For:**

SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:  
4/29/2021 3:04:24 PM*

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

### LINKS

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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 . . . . .	8
Definitions . . . . .	18
QC Sample Results . . . . .	19
QC Association . . . . .	22
Chronicle . . . . .	25
Certification Summary . . . . .	28
Method Summary . . . . .	29
Chain of Custody . . . . .	30
Receipt Checklists . . . . .	37

# Case Narrative

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

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## Job ID: 310-204549-3

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Laboratory: Eurofins TestAmerica, Cedar Falls

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### Narrative

Job Narrative  
310-204549-3

### Comments

No additional comments.

### Receipt

The samples were received on 4/16/2021 5:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 5 coolers at receipt time were 0.8° C, 1.2° C, 1.6° C, 1.9° C and 3.1° 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 - 25221072

Job ID: 310-204549-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-204549-1	MW-302	Water	04/13/21 18:15	04/16/21 17:00	
310-204549-2	MW-303	Water	04/13/21 16:50	04/16/21 17:00	
310-204549-3	MW-304	Water	04/14/21 16:50	04/16/21 17:00	
310-204549-4	MW-305	Water	04/16/21 10:15	04/16/21 17:00	
310-204549-5	MW-305A	Water	04/15/21 13:45	04/16/21 17:00	
310-204549-6	MW-306	Water	04/13/21 15:00	04/16/21 17:00	
310-204549-7	MW-310	Water	04/13/21 13:25	04/16/21 17:00	
310-204549-8	MW-310A	Water	04/15/21 14:20	04/16/21 17:00	
310-204549-9	MW-311	Water	04/14/21 08:55	04/16/21 17:00	
310-204549-10	MW-311A	Water	04/16/21 11:30	04/16/21 17:00	

# Detection Summary

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

## Client Sample ID: MW-302

## Lab Sample ID: 310-204549-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	240000		1000	610	ug/L	1		6020A	Total/NA
Potassium	1500		500	150	ug/L	1		6020A	Total/NA
Iron	350		100	36	ug/L	1		6020A	Total/NA
Magnesium	50000		500	100	ug/L	1		6020A	Total/NA
Manganese	200		10	4.4	ug/L	1		6020A	Total/NA
Manganese	110		10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	72		6.9	3.2	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	72		6.9	3.2	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-303

## Lab Sample ID: 310-204549-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	89000		1000	610	ug/L	1		6020A	Total/NA
Potassium	800		500	150	ug/L	1		6020A	Total/NA
Iron	44	J	100	36	ug/L	1		6020A	Total/NA
Magnesium	22000		500	100	ug/L	1		6020A	Total/NA
Manganese	330		10	4.4	ug/L	1		6020A	Total/NA
Manganese	340		10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	440		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	440		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-304

## Lab Sample ID: 310-204549-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	210000		1000	610	ug/L	1		6020A	Total/NA
Potassium	8200		500	150	ug/L	1		6020A	Total/NA
Iron	4500		100	36	ug/L	1		6020A	Total/NA
Magnesium	40000		500	100	ug/L	1		6020A	Total/NA
Manganese	3600		10	4.4	ug/L	1		6020A	Total/NA
Iron	4500		100	36	ug/L	1		6020A	Dissolved
Manganese	3800		10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	360		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	360		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-305

## Lab Sample ID: 310-204549-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	200000		1000	610	ug/L	1		6020A	Total/NA
Potassium	7900		500	150	ug/L	1		6020A	Total/NA
Iron	170		100	36	ug/L	1		6020A	Total/NA
Magnesium	47000		500	100	ug/L	1		6020A	Total/NA
Manganese	3500		10	4.4	ug/L	1		6020A	Total/NA
Cobalt	20		0.50	0.091	ug/L	1		6020A	Dissolved
Iron	85	J	100	36	ug/L	1		6020A	Dissolved
Manganese	3800		10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	470		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	470		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-305A

## Lab Sample ID: 310-204549-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	68000		1000	610	ug/L	1		6020A	Total/NA
Potassium	3600		500	150	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 - 25221072

Job ID: 310-204549-3

## Client Sample ID: MW-305A (Continued)

## Lab Sample ID: 310-204549-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	29000		500	100	ug/L	1		6020A	Total/NA
Manganese	78		10	4.4	ug/L	1		6020A	Total/NA
Manganese	87		10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	300		9.1	4.2	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	300		9.1	4.2	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-306

## Lab Sample ID: 310-204549-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	170000		1000	610	ug/L	1		6020A	Total/NA
Potassium	3500		500	150	ug/L	1		6020A	Total/NA
Iron	220		100	36	ug/L	1		6020A	Total/NA
Magnesium	25000		500	100	ug/L	1		6020A	Total/NA
Manganese	15000		100	44	ug/L	10		6020A	Total/NA
Cobalt	6.1		0.50	0.091	ug/L	1		6020A	Dissolved
Iron	110		100	36	ug/L	1		6020A	Dissolved
Manganese	15000		100	44	ug/L	10		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	270		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	270		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-310

## Lab Sample ID: 310-204549-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	150000		1000	610	ug/L	1		6020A	Total/NA
Potassium	17000		500	150	ug/L	1		6020A	Total/NA
Magnesium	100000		5000	1000	ug/L	10		6020A	Total/NA
Manganese	290		10	4.4	ug/L	1		6020A	Total/NA
Lithium	63		10	2.5	ug/L	1		6020A	Dissolved
Manganese	330		10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	130		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	130		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-310A

## Lab Sample ID: 310-204549-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	600000		10000	6100	ug/L	10		6020A	Total/NA
Potassium	9200		500	150	ug/L	1		6020A	Total/NA
Magnesium	37000		500	100	ug/L	1		6020A	Total/NA
Manganese	34		10	4.4	ug/L	1		6020A	Total/NA
Lithium	300		10	2.5	ug/L	1		6020A	Dissolved
Manganese	39		10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	340		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	340		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-311

## Lab Sample ID: 310-204549-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	5200		1000	610	ug/L	1		6020A	Total/NA
Potassium	650		500	150	ug/L	1		6020A	Total/NA
Magnesium	36000		500	100	ug/L	1		6020A	Total/NA
Bicarbonate Alkalinity as CaCO3	450		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	450		10	4.6	mg/L	1		SM 2320B	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 - 25221072

Job ID: 310-204549-3

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-204549-10**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	720000		10000	6100	ug/L	10		6020A	Total/NA
Potassium	8300		500	150	ug/L	1		6020A	Total/NA
Magnesium	21000		500	100	ug/L	1		6020A	Total/NA
Manganese	6.1	J	10	4.4	ug/L	1		6020A	Total/NA
Lithium	330		10	2.5	ug/L	1		6020A	Dissolved
Manganese	6.2	J	10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	370		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	370		10	4.6	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 - 25221072

Job ID: 310-204549-3

**Client Sample ID: MW-302**  
 Date Collected: 04/13/21 18:15  
 Date Received: 04/16/21 17:00

**Lab Sample ID: 310-204549-1**  
 Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	240000		1000	610	ug/L		04/20/21 09:00	04/26/21 22:15	1
Potassium	1500		500	150	ug/L		04/20/21 09:00	04/26/21 22:15	1
Iron	350		100	36	ug/L		04/20/21 09:00	04/26/21 22:15	1
Magnesium	50000		500	100	ug/L		04/20/21 09:00	04/26/21 22:15	1
Manganese	200		10	4.4	ug/L		04/20/21 09:00	04/26/21 22:15	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		04/19/21 08:16	04/26/21 19:45	1
Manganese	110		10	4.4	ug/L		04/19/21 08:16	04/26/21 19:45	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	72		6.9	3.2	mg/L			04/21/21 13:31	1
Carbonate Alkalinity as CaCO3	<3.2		6.9	3.2	mg/L			04/21/21 13:31	1
Total Alkalinity as CaCO3	72		6.9	3.2	mg/L			04/21/21 13:31	1

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# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

**Client Sample ID: MW-303**  
 Date Collected: 04/13/21 16:50  
 Date Received: 04/16/21 17:00

**Lab Sample ID: 310-204549-2**  
 Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	89000		1000	610	ug/L		04/20/21 09:00	04/26/21 22:18	1
Potassium	800		500	150	ug/L		04/20/21 09:00	04/26/21 22:18	1
Iron	44	J	100	36	ug/L		04/20/21 09:00	04/26/21 22:18	1
Magnesium	22000		500	100	ug/L		04/20/21 09:00	04/26/21 22:18	1
Manganese	330		10	4.4	ug/L		04/20/21 09:00	04/26/21 22:18	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		04/19/21 08:16	04/26/21 19:48	1
Manganese	340		10	4.4	ug/L		04/19/21 08:16	04/26/21 19:48	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	440		10	4.6	mg/L			04/21/21 13:31	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			04/21/21 13:31	1
Total Alkalinity as CaCO3	440		10	4.6	mg/L			04/21/21 13:31	1



# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

**Client Sample ID: MW-304**

**Lab Sample ID: 310-204549-3**

Date Collected: 04/14/21 16:50

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	210000		1000	610	ug/L		04/20/21 09:00	04/26/21 22:20	1
Potassium	8200		500	150	ug/L		04/20/21 09:00	04/26/21 22:20	1
Iron	4500		100	36	ug/L		04/20/21 09:00	04/26/21 22:20	1
Magnesium	40000		500	100	ug/L		04/20/21 09:00	04/26/21 22:20	1
Manganese	3600		10	4.4	ug/L		04/20/21 09:00	04/26/21 22:20	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	4500		100	36	ug/L		04/19/21 08:16	04/26/21 20:07	1
Manganese	3800		10	4.4	ug/L		04/19/21 08:16	04/26/21 20:07	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	360		10	4.6	mg/L			04/26/21 10:52	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			04/26/21 10:52	1
Total Alkalinity as CaCO3	360		10	4.6	mg/L			04/26/21 10:52	1

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# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

**Client Sample ID: MW-305**  
 Date Collected: 04/16/21 10:15  
 Date Received: 04/16/21 17:00

**Lab Sample ID: 310-204549-4**  
 Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	200000		1000	610	ug/L		04/20/21 09:00	04/21/21 16:51	1
Potassium	7900		500	150	ug/L		04/20/21 09:00	04/21/21 16:51	1
Iron	170		100	36	ug/L		04/20/21 09:00	04/21/21 16:51	1
Magnesium	47000		500	100	ug/L		04/20/21 09:00	04/21/21 16:51	1
Manganese	3500		10	4.4	ug/L		04/20/21 09:00	04/21/21 16:51	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	20		0.50	0.091	ug/L		04/19/21 08:16	04/26/21 20:09	1
Iron	85	J	100	36	ug/L		04/19/21 08:16	04/26/21 20:09	1
Manganese	3800		10	4.4	ug/L		04/19/21 08:16	04/26/21 20:09	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	470		10	4.6	mg/L			04/26/21 10:52	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			04/26/21 10:52	1
Total Alkalinity as CaCO3	470		10	4.6	mg/L			04/26/21 10:52	1

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# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

**Client Sample ID: MW-305A**

**Lab Sample ID: 310-204549-5**

Date Collected: 04/15/21 13:45

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	68000		1000	610	ug/L		04/20/21 09:00	04/21/21 16:53	1
Potassium	3600		500	150	ug/L		04/20/21 09:00	04/21/21 16:53	1
Iron	<36		100	36	ug/L		04/20/21 09:00	04/21/21 16:53	1
Magnesium	29000		500	100	ug/L		04/20/21 09:00	04/21/21 16:53	1
Manganese	78		10	4.4	ug/L		04/20/21 09:00	04/21/21 16:53	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		04/19/21 08:16	04/26/21 20:12	1
Manganese	87		10	4.4	ug/L		04/19/21 08:16	04/26/21 20:12	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	300		9.1	4.2	mg/L			04/26/21 10:52	1
Carbonate Alkalinity as CaCO3	<4.2		9.1	4.2	mg/L			04/26/21 10:52	1
Total Alkalinity as CaCO3	300		9.1	4.2	mg/L			04/26/21 10:52	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

**Client Sample ID: MW-306**

**Lab Sample ID: 310-204549-6**

Date Collected: 04/13/21 15:00

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	170000		1000	610	ug/L		04/20/21 09:00	04/21/21 16:56	1
Potassium	3500		500	150	ug/L		04/20/21 09:00	04/21/21 16:56	1
Iron	220		100	36	ug/L		04/20/21 09:00	04/21/21 16:56	1
Magnesium	25000		500	100	ug/L		04/20/21 09:00	04/21/21 16:56	1
Manganese	15000		100	44	ug/L		04/20/21 09:00	04/29/21 11:49	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	6.1		0.50	0.091	ug/L		04/19/21 08:16	04/26/21 20:15	1
Iron	110		100	36	ug/L		04/19/21 08:16	04/26/21 20:15	1
Manganese	15000		100	44	ug/L		04/19/21 08:16	04/27/21 11:36	10

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	270		10	4.6	mg/L			04/21/21 13:31	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			04/21/21 13:31	1
Total Alkalinity as CaCO3	270		10	4.6	mg/L			04/21/21 13:31	1

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# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

**Client Sample ID: MW-310**

**Lab Sample ID: 310-204549-7**

Date Collected: 04/13/21 13:25

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	150000		1000	610	ug/L		04/20/21 09:00	04/21/21 17:01	1
Potassium	17000		500	150	ug/L		04/20/21 09:00	04/21/21 17:01	1
Iron	<36		100	36	ug/L		04/20/21 09:00	04/21/21 17:01	1
Magnesium	100000		5000	1000	ug/L		04/20/21 09:00	04/22/21 13:42	10
Manganese	290		10	4.4	ug/L		04/20/21 09:00	04/21/21 17:01	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		04/19/21 08:16	04/26/21 20:17	1
Lithium	63		10	2.5	ug/L		04/19/21 08:16	04/26/21 20:17	1
Manganese	330		10	4.4	ug/L		04/19/21 08:16	04/26/21 20:17	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	130		10	4.6	mg/L			04/21/21 13:31	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			04/21/21 13:31	1
Total Alkalinity as CaCO3	130		10	4.6	mg/L			04/21/21 13:31	1

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# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

**Client Sample ID: MW-310A**

**Lab Sample ID: 310-204549-8**

Date Collected: 04/15/21 14:20

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	600000		10000	6100	ug/L		04/20/21 09:00	04/22/21 13:44	10
Potassium	9200		500	150	ug/L		04/20/21 09:00	04/21/21 17:04	1
Iron	<36		100	36	ug/L		04/20/21 09:00	04/21/21 17:04	1
Magnesium	37000		500	100	ug/L		04/20/21 09:00	04/21/21 17:04	1
Manganese	34		10	4.4	ug/L		04/20/21 09:00	04/21/21 17:04	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		04/19/21 08:16	04/26/21 20:20	1
Lithium	300		10	2.5	ug/L		04/19/21 08:16	04/26/21 20:20	1
Manganese	39		10	4.4	ug/L		04/19/21 08:16	04/26/21 20:20	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	340		10	4.6	mg/L			04/26/21 10:52	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			04/26/21 10:52	1
Total Alkalinity as CaCO3	340		10	4.6	mg/L			04/26/21 10:52	1



# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

**Client Sample ID: MW-311**  
 Date Collected: 04/14/21 08:55  
 Date Received: 04/16/21 17:00

**Lab Sample ID: 310-204549-9**  
 Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	5200		1000	610	ug/L		04/20/21 09:00	04/21/21 17:07	1
Potassium	650		500	150	ug/L		04/20/21 09:00	04/21/21 17:07	1
Iron	<36		100	36	ug/L		04/20/21 09:00	04/21/21 17:07	1
Magnesium	36000		500	100	ug/L		04/20/21 09:00	04/21/21 17:07	1
Manganese	<4.4		10	4.4	ug/L		04/20/21 09:00	04/21/21 17:07	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		04/19/21 08:16	04/26/21 20:23	1
Manganese	<4.4		10	4.4	ug/L		04/19/21 08:16	04/26/21 20:23	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	450		10	4.6	mg/L			04/26/21 10:52	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			04/26/21 10:52	1
Total Alkalinity as CaCO3	450		10	4.6	mg/L			04/26/21 10:52	1

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# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-204549-10**

Date Collected: 04/16/21 11:30

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	720000		10000	6100	ug/L		04/20/21 09:00	04/22/21 13:47	10
Potassium	8300		500	150	ug/L		04/20/21 09:00	04/21/21 17:09	1
Iron	<36		100	36	ug/L		04/20/21 09:00	04/21/21 17:09	1
Magnesium	21000		500	100	ug/L		04/20/21 09:00	04/21/21 17:09	1
Manganese	6.1	J	10	4.4	ug/L		04/20/21 09:00	04/21/21 17:09	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		04/19/21 08:16	04/26/21 20:26	1
Lithium	330		10	2.5	ug/L		04/19/21 08:16	04/26/21 20:26	1
Manganese	6.2	J	10	4.4	ug/L		04/19/21 08:16	04/26/21 20:26	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	370		10	4.6	mg/L			04/26/21 10:52	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			04/26/21 10:52	1
Total Alkalinity as CaCO3	370		10	4.6	mg/L			04/26/21 10:52	1

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# Definitions/Glossary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

## Qualifiers

### Metals

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

## Glossary

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

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

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

**Lab Sample ID: MB 310-313144/1-A**  
**Matrix: Water**  
**Analysis Batch: 314022**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 313144**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.091		0.50	0.091	ug/L		04/19/21 08:16	04/26/21 18:52	1
Lithium	<2.5		10	2.5	ug/L		04/19/21 08:16	04/26/21 18:52	1
Iron	<36		100	36	ug/L		04/19/21 08:16	04/26/21 18:52	1
Manganese	<4.4		10	4.4	ug/L		04/19/21 08:16	04/26/21 18:52	1

**Lab Sample ID: LCS 310-313144/2-A**  
**Matrix: Water**  
**Analysis Batch: 314022**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 313144**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Cobalt	100	113		ug/L		113	80 - 120
Lithium	200	214		ug/L		107	80 - 120
Iron	200	225		ug/L		112	80 - 120
Manganese	100	108		ug/L		108	80 - 120

**Lab Sample ID: MB 310-313195/1-A**  
**Matrix: Water**  
**Analysis Batch: 314022**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 313195**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	<610		1000	610	ug/L		04/20/21 09:00	04/26/21 20:36	1
Potassium	<150		500	150	ug/L		04/20/21 09:00	04/26/21 20:36	1
Iron	<36		100	36	ug/L		04/20/21 09:00	04/26/21 20:36	1
Magnesium	<100		500	100	ug/L		04/20/21 09:00	04/26/21 20:36	1
Manganese	<4.4		10	4.4	ug/L		04/20/21 09:00	04/26/21 20:36	1

**Lab Sample ID: LCS 310-313195/2-A**  
**Matrix: Water**  
**Analysis Batch: 314022**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 313195**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Sodium	2000	2120		ug/L		106	80 - 120
Potassium	2000	2220		ug/L		111	80 - 120
Iron	200	221		ug/L		110	80 - 120
Magnesium	2000	2070		ug/L		104	80 - 120
Manganese	100	105		ug/L		105	80 - 120

**Lab Sample ID: MB 310-313197/1-A**  
**Matrix: Water**  
**Analysis Batch: 313546**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 313197**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	<610		1000	610	ug/L		04/20/21 09:00	04/21/21 15:55	1
Potassium	<150		500	150	ug/L		04/20/21 09:00	04/21/21 15:55	1
Iron	<36		100	36	ug/L		04/20/21 09:00	04/21/21 15:55	1
Magnesium	<100		500	100	ug/L		04/20/21 09:00	04/21/21 15:55	1
Manganese	<4.4		10	4.4	ug/L		04/20/21 09:00	04/21/21 15:55	1

# QC Sample Results

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

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

**Lab Sample ID: LCS 310-313197/2-A**  
**Matrix: Water**  
**Analysis Batch: 313546**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 313197**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Sodium	2000	1900		ug/L		95	80 - 120
Potassium	2000	1970		ug/L		99	80 - 120
Iron	200	217		ug/L		108	80 - 120
Magnesium	2000	1880		ug/L		94	80 - 120
Manganese	100	101		ug/L		101	80 - 120

**Lab Sample ID: 310-204549-6 DU**  
**Matrix: Water**  
**Analysis Batch: 313546**

**Client Sample ID: MW-306**  
**Prep Type: Total/NA**  
**Prep Batch: 313197**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Sodium	170000		177000		ug/L		2	20
Potassium	3500		3530		ug/L		0.5	20
Iron	220		218		ug/L		0.2	20
Magnesium	25000		25400		ug/L		2	20

**Lab Sample ID: 310-204549-2 DU**  
**Matrix: Water**  
**Analysis Batch: 314022**

**Client Sample ID: MW-303**  
**Prep Type: Dissolved**  
**Prep Batch: 313144**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Cobalt	0.36	J	0.392	J	ug/L		8	20
Lithium	3.7	J	4.58	J	ug/L		20	20
Iron	<36		<36		ug/L		NC	20
Manganese	340		345		ug/L		2	20

## Method: SM 2320B - Alkalinity

**Lab Sample ID: MB 310-313478/1**  
**Matrix: Water**  
**Analysis Batch: 313478**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/21/21 13:31	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/21/21 13:31	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/21/21 13:31	1

**Lab Sample ID: LCS 310-313478/2**  
**Matrix: Water**  
**Analysis Batch: 313478**

**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	1010		mg/L		101	90 - 110

**Lab Sample ID: MB 310-313906/1**  
**Matrix: Water**  
**Analysis Batch: 313906**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/26/21 10:52	1

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

## Method: SM 2320B - Alkalinity (Continued)

**Lab Sample ID: MB 310-313906/1**  
**Matrix: Water**  
**Analysis Batch: 313906**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/26/21 10:52	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/26/21 10:52	1

**Lab Sample ID: LCS 310-313906/2**  
**Matrix: Water**  
**Analysis Batch: 313906**

**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



# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

## Metals

### Prep Batch: 313144

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-1	MW-302	Dissolved	Water	3010A	
310-204549-2	MW-303	Dissolved	Water	3010A	
310-204549-3	MW-304	Dissolved	Water	3010A	
310-204549-4	MW-305	Dissolved	Water	3010A	
310-204549-5	MW-305A	Dissolved	Water	3010A	
310-204549-6	MW-306	Dissolved	Water	3010A	
310-204549-7	MW-310	Dissolved	Water	3010A	
310-204549-8	MW-310A	Dissolved	Water	3010A	
310-204549-9	MW-311	Dissolved	Water	3010A	
310-204549-10	MW-311A	Dissolved	Water	3010A	
MB 310-313144/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-313144/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-204549-2 DU	MW-303	Dissolved	Water	3010A	

### Prep Batch: 313195

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-1	MW-302	Total/NA	Water	3010A	
310-204549-2	MW-303	Total/NA	Water	3010A	
310-204549-3	MW-304	Total/NA	Water	3010A	
MB 310-313195/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-313195/2-A	Lab Control Sample	Total/NA	Water	3010A	

### Prep Batch: 313197

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-4	MW-305	Total/NA	Water	3010A	
310-204549-5	MW-305A	Total/NA	Water	3010A	
310-204549-6	MW-306	Total/NA	Water	3010A	
310-204549-7	MW-310	Total/NA	Water	3010A	
310-204549-8	MW-310A	Total/NA	Water	3010A	
310-204549-9	MW-311	Total/NA	Water	3010A	
310-204549-10	MW-311A	Total/NA	Water	3010A	
MB 310-313197/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-313197/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-204549-6 DU	MW-306	Total/NA	Water	3010A	

### Analysis Batch: 313546

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-4	MW-305	Total/NA	Water	6020A	313197
310-204549-5	MW-305A	Total/NA	Water	6020A	313197
310-204549-6	MW-306	Total/NA	Water	6020A	313197
310-204549-7	MW-310	Total/NA	Water	6020A	313197
310-204549-8	MW-310A	Total/NA	Water	6020A	313197
310-204549-9	MW-311	Total/NA	Water	6020A	313197
310-204549-10	MW-311A	Total/NA	Water	6020A	313197
MB 310-313197/1-A	Method Blank	Total/NA	Water	6020A	313197
LCS 310-313197/2-A	Lab Control Sample	Total/NA	Water	6020A	313197
310-204549-6 DU	MW-306	Total/NA	Water	6020A	313197

### Analysis Batch: 313720

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-7	MW-310	Total/NA	Water	6020A	313197

Eurofins TestAmerica, Cedar Falls

# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

## Metals (Continued)

### Analysis Batch: 313720 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-8	MW-310A	Total/NA	Water	6020A	313197
310-204549-10	MW-311A	Total/NA	Water	6020A	313197

### Analysis Batch: 314022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-1	MW-302	Dissolved	Water	6020A	313144
310-204549-1	MW-302	Total/NA	Water	6020A	313195
310-204549-2	MW-303	Dissolved	Water	6020A	313144
310-204549-2	MW-303	Total/NA	Water	6020A	313195
310-204549-3	MW-304	Dissolved	Water	6020A	313144
310-204549-3	MW-304	Total/NA	Water	6020A	313195
310-204549-4	MW-305	Dissolved	Water	6020A	313144
310-204549-5	MW-305A	Dissolved	Water	6020A	313144
310-204549-6	MW-306	Dissolved	Water	6020A	313144
310-204549-7	MW-310	Dissolved	Water	6020A	313144
310-204549-8	MW-310A	Dissolved	Water	6020A	313144
310-204549-9	MW-311	Dissolved	Water	6020A	313144
310-204549-10	MW-311A	Dissolved	Water	6020A	313144
MB 310-313144/1-A	Method Blank	Total/NA	Water	6020A	313144
MB 310-313195/1-A	Method Blank	Total/NA	Water	6020A	313195
LCS 310-313144/2-A	Lab Control Sample	Total/NA	Water	6020A	313144
LCS 310-313195/2-A	Lab Control Sample	Total/NA	Water	6020A	313195
310-204549-2 DU	MW-303	Dissolved	Water	6020A	313144

### Analysis Batch: 314182

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-6	MW-306	Dissolved	Water	6020A	313144

### Analysis Batch: 314383

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-6	MW-306	Total/NA	Water	6020A	313197

## General Chemistry

### Analysis Batch: 313478

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-1	MW-302	Total/NA	Water	SM 2320B	
310-204549-2	MW-303	Total/NA	Water	SM 2320B	
310-204549-6	MW-306	Total/NA	Water	SM 2320B	
310-204549-7	MW-310	Total/NA	Water	SM 2320B	
MB 310-313478/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-313478/2	Lab Control Sample	Total/NA	Water	SM 2320B	

### Analysis Batch: 313906

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204549-3	MW-304	Total/NA	Water	SM 2320B	
310-204549-4	MW-305	Total/NA	Water	SM 2320B	
310-204549-5	MW-305A	Total/NA	Water	SM 2320B	
310-204549-8	MW-310A	Total/NA	Water	SM 2320B	
310-204549-9	MW-311	Total/NA	Water	SM 2320B	
310-204549-10	MW-311A	Total/NA	Water	SM 2320B	



# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

## General Chemistry (Continued)

### Analysis Batch: 313906 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-313906/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-313906/2	Lab Control Sample	Total/NA	Water	SM 2320B	

- 1
- 2
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# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

## Client Sample ID: MW-302

Lab Sample ID: 310-204549-1

Date Collected: 04/13/21 18:15

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			313144	04/19/21 08:16	JNR	TAL CF
Dissolved	Analysis	6020A		1	314022	04/26/21 19:45	SAD	TAL CF
Total/NA	Prep	3010A			313195	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	314022	04/26/21 22:15	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	313478	04/21/21 13:31	DFS	TAL CF

## Client Sample ID: MW-303

Lab Sample ID: 310-204549-2

Date Collected: 04/13/21 16:50

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			313144	04/19/21 08:16	JNR	TAL CF
Dissolved	Analysis	6020A		1	314022	04/26/21 19:48	SAD	TAL CF
Total/NA	Prep	3010A			313195	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	314022	04/26/21 22:18	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	313478	04/21/21 13:31	DFS	TAL CF

## Client Sample ID: MW-304

Lab Sample ID: 310-204549-3

Date Collected: 04/14/21 16:50

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			313144	04/19/21 08:16	JNR	TAL CF
Dissolved	Analysis	6020A		1	314022	04/26/21 20:07	SAD	TAL CF
Total/NA	Prep	3010A			313195	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	314022	04/26/21 22:20	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	313906	04/26/21 10:52	DFS	TAL CF

## Client Sample ID: MW-305

Lab Sample ID: 310-204549-4

Date Collected: 04/16/21 10:15

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			313144	04/19/21 08:16	JNR	TAL CF
Dissolved	Analysis	6020A		1	314022	04/26/21 20:09	SAD	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 16:51	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	313906	04/26/21 10:52	DFS	TAL CF

# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

## Client Sample ID: MW-305A

Lab Sample ID: 310-204549-5

Date Collected: 04/15/21 13:45

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			313144	04/19/21 08:16	JNR	TAL CF
Dissolved	Analysis	6020A		1	314022	04/26/21 20:12	SAD	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 16:53	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	313906	04/26/21 10:52	DFS	TAL CF

## Client Sample ID: MW-306

Lab Sample ID: 310-204549-6

Date Collected: 04/13/21 15:00

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			313144	04/19/21 08:16	JNR	TAL CF
Dissolved	Analysis	6020A		1	314022	04/26/21 20:15	SAD	TAL CF
Dissolved	Prep	3010A			313144	04/19/21 08:16	JNR	TAL CF
Dissolved	Analysis	6020A		10	314182	04/27/21 11:36	SAD	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 16:56	SAD	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		10	314383	04/29/21 11:49	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	313478	04/21/21 13:31	DFS	TAL CF

## Client Sample ID: MW-310

Lab Sample ID: 310-204549-7

Date Collected: 04/13/21 13:25

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			313144	04/19/21 08:16	JNR	TAL CF
Dissolved	Analysis	6020A		1	314022	04/26/21 20:17	SAD	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 17:01	SAD	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		10	313720	04/22/21 13:42	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	313478	04/21/21 13:31	DFS	TAL CF

## Client Sample ID: MW-310A

Lab Sample ID: 310-204549-8

Date Collected: 04/15/21 14:20

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			313144	04/19/21 08:16	JNR	TAL CF
Dissolved	Analysis	6020A		1	314022	04/26/21 20:20	SAD	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 17:04	SAD	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		10	313720	04/22/21 13:44	SAD	TAL CF

Eurofins TestAmerica, Cedar Falls

# Lab Chronicle

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

**Client Sample ID: MW-310A**

**Lab Sample ID: 310-204549-8**

Date Collected: 04/15/21 14:20

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2320B		1	313906	04/26/21 10:52	DFS	TAL CF

**Client Sample ID: MW-311**

**Lab Sample ID: 310-204549-9**

Date Collected: 04/14/21 08:55

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			313144	04/19/21 08:16	JNR	TAL CF
Dissolved	Analysis	6020A		1	314022	04/26/21 20:23	SAD	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 17:07	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	313906	04/26/21 10:52	DFS	TAL CF

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-204549-10**

Date Collected: 04/16/21 11:30

Matrix: Water

Date Received: 04/16/21 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			313144	04/19/21 08:16	JNR	TAL CF
Dissolved	Analysis	6020A		1	314022	04/26/21 20:26	SAD	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 17:09	SAD	TAL CF
Total/NA	Prep	3010A			313197	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		10	313720	04/22/21 13:47	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	313906	04/26/21 10:52	DFS	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 - 25221072

Job ID: 310-204549-3

## 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

- 1
- 2
- 3
- 4
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# Method Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204549-3

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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Environment Testing  
TestAmerica



310-204549 Chain of Custody

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

Client Information			
Client: <u>SCS Engineers</u>			
City/State:	CITY <u>Madison</u>	STATE <u>WI</u>	Project: <u>Ottumwa Gen. Station</u>
Receipt Information			
Date/Time Received:	DATE <u>4/14/21</u>	TIME <u>1700</u>	Received By:
Delivery Type:	<input type="checkbox"/> UPS	<input type="checkbox"/> FedEx	<input type="checkbox"/> FedEx Ground
	<input checked="" type="checkbox"/> Lab Courier	<input type="checkbox"/> Lab Field Services	<input type="checkbox"/> Client Drop-off
	<input type="checkbox"/> US Mail	<input type="checkbox"/> Spee-Dee	<input type="checkbox"/> Other: _____
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	If yes: Cooler ID: <u>TA-DSM</u>
Multiple Coolers?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>5</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? ↓
<u>MW-306, MW 31A, MW-302, MW-304</u>			
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice	<input type="checkbox"/> Blue ice	<input type="checkbox"/> Dry ice
	<input type="checkbox"/> Other: _____	<input type="checkbox"/> NONE	
Thermometer ID:	<u>0</u>	Correction Factor (°C):	<u>0</u>
• Temp. Blank Temperature - If no temp. blank, or temp. blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	<u>0.8</u>	Corrected Temp (°C):	<u>0.8</u>
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
Exceptions Noted			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
Additional Comments			



Place COC scanning label  
here

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

Client Information		
Client: <u>SCS Engineers</u>		
City/State: <small>CITY</small> <u>Madison</u> <small>STATE</small> <u>WI</u>	Project: <u>Ottumwa Gen. Station</u>	
Receipt Information		
Date/Time Received: <small>DATE</small> <u>4/16/21</u> <small>TIME</small> <u>1100</u>	Received By: _____	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AC-23</u>
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>4</u> of <u>5</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? ↓
<u>MW-302, MW-303, MW-310, MW-306</u>		
Temperature Record		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>0</u>	Correction Factor (°C): <u>0</u>	
• <b>Temp Blank Temperature</b> – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>1.9</u>	Corrected Temp (°C): <u>1.9</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		





Place COC scanning label  
here

### Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS Engineers</u>			
City/State: <u>Madison</u> <small>CITY</small> <u>WI</u> <small>STATE</small>	Project: <u>Ottumwa Gen. Station</u>		
Receipt Information			
Date/Time Received: <u>4/17/20</u> <small>DATE</small> <u>1700</u> <small>TIME</small>	Received By:		
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AC-20</u>	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>5</u> of <u>5</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? ↓	
<u>MW-311, MW-305A, MW-304</u>			
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>0</u>	Correction Factor (°C): <u>0</u>		
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>1.2</u>	Corrected Temp (°C): <u>1.2</u>		
• Sample Container Temperature			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
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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Environment Testing  
TestAmerica

Place COC scanning label  
here

### Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS Engineers</u>			
City/State:	<u>Madison</u> <small>CITY</small> <u>WI</u> <small>STATE</small>	Project: <u>Ottumwa Gen. Station</u>	
Receipt Information			
Date/Time Received:	<u>4/16/21</u> <small>DATE</small> <u>7:00</u> <small>TIME</small>	Received By:	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AB-92</u>	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>3</u> of <u>5</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? ↓	
<u>MW 311A, Field Blank, MW 310A, MW 305</u>			
Temperature Record			
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE			
Thermometer ID: <u>0</u>		Correction Factor (°C): <u>0</u>	
• <b>Temp Blank Temperature</b> – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>1.6</u>		Corrected Temp (°C): <u>1.6</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			





Environment Testing  
TestAmerica

Place COC scanning label  
here

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

Client Information			
Client: <u>SLS Engineers</u>			
City/State:	CITY <u>Madison</u>	STATE <u>WI</u>	Project: <u>Ottumwa Gen. Station</u>
Receipt Information:			
Date/Time Received:	DATE <u>4/14/21</u>	TIME <u>1100</u>	Received By:
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>Clive P-7</u>	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>2</u> of <u>5</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? ↓	
<u>MW-310A, MW-310, MW-305</u>			
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID:	<u>0</u>	Correction Factor (°C):	<u>0</u>
• Temp. Blank Temperature – If no temp. blank, or temp. blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):		Corrected Temp (°C):	
Sample Container Temperature			
Container(s) used:	CONTAINER 1 <u>plastic 250ml</u>	CONTAINER 2	
Uncorrected Temp (°C):	<u>3.1</u>		
Corrected Temp (°C):	<u>3.1</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			

**Chain of Custody Record**

**Client Information**  
 Client Contact: Meghan Blodgett  
 Company: SCS Engineers  
 Address: 2830 Dairy Drive  
 City: Madison  
 State, Zip: WI, 53718  
 Phone: 264-943-0855  
 Email: mblodgett@scsengineers.com  
 Project Name: Oltumwa Generating Station - 25221072  
 Site: OAS

**Sampler:** Tanten Buszka  
**Lab PM:** Fredrick, Sandie  
**Phone:** 264-443-0855  
**E-Mail:** sandra.fredrick@eurofinset.com

**Carrier Tr. No(s):** 310-59842-17488.1  
**State of Origin:**  
**Page:** Page 1 of 1  
**Job #:**

**Due Date Requested:**  
**TAT Requested (days):**  
**Compliance Project:** Yes No  
**PO #:** 25221072  
**WC #:**  
**Project #:** 31011020  
**SSOW#:**

**Analysis Requested**

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=wastefl, B=filter, A=air)	Preservation Code:	Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)		220B - Alkalinity/Carb/Bicarb		5020A - Metals (5)		5020A - D Metals (4)		Special Instructions/Note:
						N	D	N	D	N	D	N	D	N	D	
MW-302	4-13-21	18:15	G	Water		N	D	N	D	X	X	X	X	X	X	
MW-303	4-13-21	16:50	G	Water		N	D	N	D	X	X	X	X	X	X	
MW-304	4-14-21	16:50	G	Water		N	D	N	D	X	X	X	X	X	X	
MW-305	4-16-21	10:15	G	Water		N	D	N	D	X	X	X	X	X	X	
MW-305A	4-15-21	13:45	G	Water		N	D	N	D	X	X	X	X	X	X	
MW-306	4-13-21	15:00	G	Water		N	D	N	D	X	X	X	X	X	X	
MW-310	4-13-21	13:25	G	Water		N	D	N	D	X	X	X	X	X	X	
MW-310A	4-15-21	14:20	G	Water		N	D	N	D	X	X	X	X	X	X	
MW-311	4-14-21	8:55	G	Water		N	D	N	D	X	X	X	X	X	X	
MW-311A	4-16-21	11:30	G	Water		N	D	N	D	X	X	X	X	X	X	

**Preservation Codes:**  
 A - HCl, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2CO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)  
 Other:

**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:**

**Possible Hazard Identification**  
 Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Radiological  
 Deliverable Requested: I, II, III, IV, Other (specify)

**Empty Kit Relinquished by:** Tanten Buszka  
**Date:** 4-16-21 14:00  
**Company:** SCS

**Relinquished by:** Tanten Buszka  
**Date/Time:** 4-16-21 14:00  
**Company:** SCS

**Relinquished by:**  
**Date/Time:**  
**Company:**

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

**Received by:** Tanten Buszka  
**Date/Time:** 4/16/2020  
**Company:** SCS

**Received by:**  
**Date/Time:**  
**Company:**

**Received by:**  
**Date/Time:**  
**Company:**

**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	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 - REQUIRES SEPARATE COC	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							3
	Iron (filtered)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15
	Lithium (filtered)										x	x					3
Manganese (filtered)	x		x	x	x	x	x	x	x	x	x	x	x	x	x	14	
Field Parameters	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).

C:\Users\Fredricks\AppData\Local\Microsoft\Windows\NetCache\Content.Outlook\Z396DTG3\OGS\_CCR\_Rule\_Sampling\_2104.xls]Sheet1

# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-204549-3

**Login Number: 204549**

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

**List Number: 1**

**Creator: Ramos, Eric F**

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



## ANALYTICAL REPORT

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

Laboratory Job ID: 310-204548-1

Client Project/Site: Ottumwa Generating Station - 25221072

**For:**

SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:  
4/28/2021 3:10:47 PM*

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 . . . . .	13
Certification Summary . . . . .	14
Method Summary . . . . .	15
Chain of Custody . . . . .	16
Receipt Checklists . . . . .	19
Field Data Sheets . . . . .	20



# Case Narrative

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-1

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## Job ID: 310-204548-1

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### Laboratory: Eurofins TestAmerica, Cedar Falls

#### Narrative

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#### Job Narrative 310-204548-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 4/16/2021 5:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.6° C.

#### HPLC/IC

Methods 300.0, 9056A: The following sample was diluted due to the nature of the sample matrix: MW-301 (310-204548-1). 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 - 25221072

Job ID: 310-204548-1

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-204548-1	MW-301	Water	04/14/21 10:10	04/16/21 17:00	
310-204548-2	Field Blank	Water	04/14/21 09:40	04/16/21 17:00	

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# Detection Summary

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-1

## Client Sample ID: MW-301

## Lab Sample ID: 310-204548-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	150		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	140		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	52		2.0	0.30	ug/L	1		6020A	Total/NA
Boron	690		100	58	ug/L	1		6020A	Total/NA
Calcium	96		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.29	J	0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	23		10	2.5	ug/L	1		6020A	Total/NA
Selenium	6.5		5.0	0.96	ug/L	1		6020A	Total/NA
Total Dissolved Solids	620		30	26	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	682.94				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	232.5				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	5.99				mg/L	1		Field Sampling	Total/NA
pH, Field	6.26				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1062				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	9.1				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	1.61				NTU	1		Field Sampling	Total/NA

## Client Sample ID: Field Blank

## Lab Sample ID: 310-204548-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	0.45	J	1.0	0.43	mg/L	1		9056A	Total/NA
pH	5.9	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-1

**Client Sample ID: MW-301**

**Lab Sample ID: 310-204548-1**

Date Collected: 04/14/21 10:10

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	150		5.0	2.2	mg/L			04/25/21 21:04	5
Fluoride	<0.28		0.50	0.28	mg/L			04/25/21 21:04	5
Sulfate	140		5.0	2.5	mg/L			04/25/21 21:04	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/20/21 09:00	04/26/21 21:56	1
Arsenic	<0.75		2.0	0.75	ug/L		04/20/21 09:00	04/26/21 21:56	1
Barium	52		2.0	0.30	ug/L		04/20/21 09:00	04/26/21 21:56	1
Beryllium	<0.27		1.0	0.27	ug/L		04/20/21 09:00	04/26/21 21:56	1
Boron	690		100	58	ug/L		04/20/21 09:00	04/26/21 21:56	1
Cadmium	<0.051		0.10	0.051	ug/L		04/20/21 09:00	04/26/21 21:56	1
Calcium	96		0.50	0.19	mg/L		04/20/21 09:00	04/26/21 21:56	1
Chromium	<1.1		5.0	1.1	ug/L		04/20/21 09:00	04/26/21 21:56	1
Cobalt	0.29	J	0.50	0.091	ug/L		04/20/21 09:00	04/26/21 21:56	1
Lead	<0.21		0.50	0.21	ug/L		04/20/21 09:00	04/26/21 21:56	1
Lithium	23		10	2.5	ug/L		04/20/21 09:00	04/26/21 21:56	1
Molybdenum	<1.3		2.0	1.3	ug/L		04/20/21 09:00	04/26/21 21:56	1
Selenium	6.5		5.0	0.96	ug/L		04/20/21 09:00	04/26/21 21:56	1
Thallium	<0.26		1.0	0.26	ug/L		04/20/21 09:00	04/26/21 21:56	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		04/22/21 14:28	04/23/21 14:15	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	620		30	26	mg/L			04/19/21 13:42	1
pH	6.8	HF	0.1	0.1	SU			04/16/21 19:33	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	682.94				ft			04/14/21 10:10	1
Oxidation Reduction Potential	232.5				millivolts			04/14/21 10:10	1
Oxygen, Dissolved, Client Supplied	5.99				mg/L			04/14/21 10:10	1
pH, Field	6.26				SU			04/14/21 10:10	1
Specific Conductance, Field	1062				umhos/cm			04/14/21 10:10	1
Temperature, Field	9.1				Degrees C			04/14/21 10:10	1
Turbidity, Field	1.61				NTU			04/14/21 10:10	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-1

**Client Sample ID: Field Blank**

**Lab Sample ID: 310-204548-2**

Date Collected: 04/14/21 09:40

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	0.45	J	1.0	0.43	mg/L			04/25/21 21:35	1
Fluoride	<0.055		0.10	0.055	mg/L			04/25/21 21:35	1
Sulfate	<0.49		1.0	0.49	mg/L			04/25/21 21:35	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/20/21 09:00	04/26/21 22:12	1
Arsenic	<0.75		2.0	0.75	ug/L		04/20/21 09:00	04/26/21 22:12	1
Barium	<0.30		2.0	0.30	ug/L		04/20/21 09:00	04/26/21 22:12	1
Beryllium	<0.27		1.0	0.27	ug/L		04/20/21 09:00	04/26/21 22:12	1
Boron	<58		100	58	ug/L		04/20/21 09:00	04/26/21 22:12	1
Cadmium	<0.051		0.10	0.051	ug/L		04/20/21 09:00	04/26/21 22:12	1
Calcium	<0.19		0.50	0.19	mg/L		04/20/21 09:00	04/26/21 22:12	1
Chromium	<1.1		5.0	1.1	ug/L		04/20/21 09:00	04/26/21 22:12	1
Cobalt	<0.091		0.50	0.091	ug/L		04/20/21 09:00	04/26/21 22:12	1
Lead	<0.21		0.50	0.21	ug/L		04/20/21 09:00	04/26/21 22:12	1
Lithium	<2.5		10	2.5	ug/L		04/20/21 09:00	04/26/21 22:12	1
Molybdenum	<1.3		2.0	1.3	ug/L		04/20/21 09:00	04/26/21 22:12	1
Selenium	<0.96		5.0	0.96	ug/L		04/20/21 09:00	04/26/21 22:12	1
Thallium	<0.26		1.0	0.26	ug/L		04/20/21 09:00	04/26/21 22:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		04/22/21 14:28	04/23/21 14:17	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<26		30	26	mg/L			04/19/21 13:42	1
pH	5.9	HF	0.1	0.1	SU			04/16/21 19:26	1

# Definitions/Glossary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-1

## Qualifiers

### HPLC/IC

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

### Metals

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

### General Chemistry

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

## 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 - 25221072

Job ID: 310-204548-1

## Method: 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 310-314202/3**  
**Matrix: Water**  
**Analysis Batch: 314202**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.43		1.0	0.43	mg/L			04/25/21 11:26	1
Fluoride	<0.055		0.10	0.055	mg/L			04/25/21 11:26	1
Sulfate	<0.49		1.0	0.49	mg/L			04/25/21 11:26	1

**Lab Sample ID: LCS 310-314202/64**  
**Matrix: Water**  
**Analysis Batch: 314202**

**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	9.02		mg/L		90	90 - 110
Fluoride	2.00	2.08		mg/L		104	90 - 110
Sulfate	10.0	9.84		mg/L		98	90 - 110

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

**Lab Sample ID: MB 310-313195/1-A**  
**Matrix: Water**  
**Analysis Batch: 314039**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 313195**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/20/21 09:00	04/26/21 20:36	1
Arsenic	<0.75		2.0	0.75	ug/L		04/20/21 09:00	04/26/21 20:36	1
Barium	<0.30		2.0	0.30	ug/L		04/20/21 09:00	04/26/21 20:36	1
Beryllium	<0.27		1.0	0.27	ug/L		04/20/21 09:00	04/26/21 20:36	1
Boron	<58		100	58	ug/L		04/20/21 09:00	04/26/21 20:36	1
Cadmium	<0.051		0.10	0.051	ug/L		04/20/21 09:00	04/26/21 20:36	1
Calcium	<0.19		0.50	0.19	mg/L		04/20/21 09:00	04/26/21 20:36	1
Chromium	<1.1		5.0	1.1	ug/L		04/20/21 09:00	04/26/21 20:36	1
Cobalt	<0.091		0.50	0.091	ug/L		04/20/21 09:00	04/26/21 20:36	1
Lead	<0.21		0.50	0.21	ug/L		04/20/21 09:00	04/26/21 20:36	1
Lithium	<2.5		10	2.5	ug/L		04/20/21 09:00	04/26/21 20:36	1
Molybdenum	<1.3		2.0	1.3	ug/L		04/20/21 09:00	04/26/21 20:36	1
Selenium	<0.96		5.0	0.96	ug/L		04/20/21 09:00	04/26/21 20:36	1
Thallium	<0.26		1.0	0.26	ug/L		04/20/21 09:00	04/26/21 20:36	1

**Lab Sample ID: LCS 310-313195/2-A**  
**Matrix: Water**  
**Analysis Batch: 314039**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 313195**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	200	219		ug/L		109	80 - 120
Arsenic	200	216		ug/L		108	80 - 120
Barium	100	112		ug/L		112	80 - 120
Beryllium	100	103		ug/L		103	80 - 120
Boron	200	231		ug/L		116	80 - 120
Cadmium	100	113		ug/L		113	80 - 120
Calcium	2.00	1.86		mg/L		93	80 - 120
Chromium	100	107		ug/L		107	80 - 120
Cobalt	100	111		ug/L		111	80 - 120

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-1

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

Lab Sample ID: LCS 310-313195/2-A  
 Matrix: Water  
 Analysis Batch: 314022

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 313195

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	200	227		ug/L		114	80 - 120
Lithium	200	217		ug/L		109	80 - 120
Molybdenum	200	221		ug/L		110	80 - 120
Selenium	400	422		ug/L		105	80 - 120
Thallium	200	231		ug/L		115	80 - 120

## Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-313631/1-A  
 Matrix: Water  
 Analysis Batch: 313806

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 313631

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		04/22/21 14:28	04/23/21 13:49	1

Lab Sample ID: LCS 310-313631/2-A  
 Matrix: Water  
 Analysis Batch: 313806

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 313631

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	1.67	1.53		ug/L		92	80 - 120

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

Lab Sample ID: MB 310-313222/1  
 Matrix: Water  
 Analysis Batch: 313222

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			04/19/21 13:42	1

Lab Sample ID: LCS 310-313222/2  
 Matrix: Water  
 Analysis Batch: 313222

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	940		mg/L		94	90 - 110

## Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-313078/1  
 Matrix: Water  
 Analysis Batch: 313078

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		101	98 - 102



# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-1

## HPLC/IC

### Analysis Batch: 314202

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-1	MW-301	Total/NA	Water	9056A	
310-204548-2	Field Blank	Total/NA	Water	9056A	
MB 310-314202/3	Method Blank	Total/NA	Water	9056A	
LCS 310-314202/64	Lab Control Sample	Total/NA	Water	9056A	

## Metals

### Prep Batch: 313195

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-1	MW-301	Total/NA	Water	3010A	
310-204548-2	Field Blank	Total/NA	Water	3010A	
MB 310-313195/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-313195/2-A	Lab Control Sample	Total/NA	Water	3010A	

### Prep Batch: 313631

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-1	MW-301	Total/NA	Water	7470A	
310-204548-2	Field Blank	Total/NA	Water	7470A	
MB 310-313631/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-313631/2-A	Lab Control Sample	Total/NA	Water	7470A	

### Analysis Batch: 313806

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-1	MW-301	Total/NA	Water	7470A	313631
310-204548-2	Field Blank	Total/NA	Water	7470A	313631
MB 310-313631/1-A	Method Blank	Total/NA	Water	7470A	313631
LCS 310-313631/2-A	Lab Control Sample	Total/NA	Water	7470A	313631

### Analysis Batch: 314022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-1	MW-301	Total/NA	Water	6020A	313195
310-204548-2	Field Blank	Total/NA	Water	6020A	313195
MB 310-313195/1-A	Method Blank	Total/NA	Water	6020A	313195
LCS 310-313195/2-A	Lab Control Sample	Total/NA	Water	6020A	313195

### Analysis Batch: 314039

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-1	MW-301	Total/NA	Water	6020A	313195
310-204548-2	Field Blank	Total/NA	Water	6020A	313195
MB 310-313195/1-A	Method Blank	Total/NA	Water	6020A	313195
LCS 310-313195/2-A	Lab Control Sample	Total/NA	Water	6020A	313195

## General Chemistry

### Analysis Batch: 313078

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-1	MW-301	Total/NA	Water	SM 4500 H+ B	
310-204548-2	Field Blank	Total/NA	Water	SM 4500 H+ B	
LCS 310-313078/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-1

## General Chemistry

### Analysis Batch: 313222

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-1	MW-301	Total/NA	Water	SM 2540C	
310-204548-2	Field Blank	Total/NA	Water	SM 2540C	
MB 310-313222/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-313222/2	Lab Control Sample	Total/NA	Water	SM 2540C	

## Field Service / Mobile Lab

### Analysis Batch: 313728

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-1	MW-301	Total/NA	Water	Field Sampling	

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- 12
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- 14
- 15

# Lab Chronicle

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-1

**Client Sample ID: MW-301**

**Lab Sample ID: 310-204548-1**

**Date Collected: 04/14/21 10:10**

**Matrix: Water**

**Date Received: 04/16/21 17:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	314202	04/25/21 21:04	JNR	TAL CF
Total/NA	Prep	3010A			313195	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	314022	04/26/21 21:56	SAD	TAL CF
Total/NA	Prep	3010A			313195	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	314039	04/26/21 21:56	SAD	TAL CF
Total/NA	Prep	7470A			313631	04/22/21 14:28	HED	TAL CF
Total/NA	Analysis	7470A		1	313806	04/23/21 14:15	HED	TAL CF
Total/NA	Analysis	SM 2540C		1	313222	04/19/21 13:42	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	313078	04/16/21 19:33	GRS	TAL CF
Total/NA	Analysis	Field Sampling		1	313728	04/14/21 10:10	SLD	TAL CF

**Client Sample ID: Field Blank**

**Lab Sample ID: 310-204548-2**

**Date Collected: 04/14/21 09:40**

**Matrix: Water**

**Date Received: 04/16/21 17:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1	314202	04/25/21 21:35	JNR	TAL CF
Total/NA	Prep	3010A			313195	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	314022	04/26/21 22:12	SAD	TAL CF
Total/NA	Prep	3010A			313195	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	314039	04/26/21 22:12	SAD	TAL CF
Total/NA	Prep	7470A			313631	04/22/21 14:28	HED	TAL CF
Total/NA	Analysis	7470A		1	313806	04/23/21 14:17	HED	TAL CF
Total/NA	Analysis	SM 2540C		1	313222	04/19/21 13:42	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	313078	04/16/21 19:26	GRS	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 - 25221072

Job ID: 310-204548-1

## 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 - 25221072

Job ID: 310-204548-1

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



Environment Testing  
TestAmerica



310-204548 Chain of Custody

**Cooler/Sample Receipt and Temperature I**

<b>Client Information</b>		
Client: <u>SCS Engineers</u>		
City/State: <u>Madison WI</u>	Project: <u>Ottumwa Gen. Station</u>	
<b>Receipt Information</b>		
Date/Time Received: <u>04/10/17 1700</u>	Received By:	
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: _____		
<b>Condition of Cooler/Containers</b>		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AC-21</u>
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>1</u>
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
<u>MW-301 Field Blank → 250 #NO<sub>3</sub> / 250 HNO<sub>3</sub> (FF) / 500 NT Plastic</u>		
<b>Temperature Record</b>		
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE	
Thermometer ID: <u>0</u>	Correction Factor (°C): <u>0</u>	
• <b>Temp Blank Temperature</b> – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>1.6</u>	Corrected Temp (°C): <u>1.6</u>	
• <b>Sample Container Temperature</b>		
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):		
Corrected Temp (°C):		
<b>Exceptions Noted</b>		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
<b>Additional Comments</b>		

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**

<b>Client Information</b>		<b>Sampler</b> Lab PM: Fredrick, Sandie		<b>Carrier Tracking No(s):</b> 310-59839-17485-1	
Client Contact: Meghan Blodgett		Phone: 269-443-0855		Page: Page 1 of 1	
Company: SCS Engineers		Address: 2850 Dairy Drive		State of Origin:	
City: Madison		State, Zip: WI, 53718		Job #:	
Phone: 269-443-0855		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Preservation Codes: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - H2SO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
Email: mblodgett@scsengineers.com		TAT Requested (days):		Other:	
Project Name: Ottumwa Generating Station - 25221072		Due Date Requested:		Total Number of Containers: <input checked="" type="checkbox"/>	
Site: OCS		PO #: 25221072		Special Instructions/Note:	
Sample Identification		WC #: 25221072		Analysis Requested	
Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, D=dew/ice, B=biological)	Perform MS/MSD (Yes or No)	Field Filtered Sample (Yes or No)
4-14-21	10:10	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4-14-21	9:40	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MW-301				503 - Radium-226 (GFP)	<input checked="" type="checkbox"/>
Field Blank				504 - Radium-228 (GFP)	<input checked="" type="checkbox"/>
				505A - ORGM_280 - Chloride, Fluoride & Sulfate	<input checked="" type="checkbox"/>
				505B - ORGM_280 - Chloride, Fluoride & Sulfate	<input checked="" type="checkbox"/>
				6020A, 7470A	<input checked="" type="checkbox"/>
				2540C - Catcd, SM4500_H+	<input checked="" type="checkbox"/>
<p><b>Possible Hazard Identification</b></p> <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): _____					
<p><b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b></p> <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months					
<p><b>Empty Kit Relinquished by:</b> _____                  Relinquished by: <u>Jurten Buszka</u> Date: 4-16-21 14:00                  Relinquished by: _____ Date: _____                  Relinquished by: _____ Date: _____</p>					
<p><b>Special Instructions/QC Requirements:</b> _____</p>					
<p><b>Method of Shipment:</b> _____                  Received by: _____ Date/Time: 4/16 1700                  Received by: _____ Date/Time: _____                  Received by: _____ Date/Time: _____</p>					
<p><b>Custody Seals Intact:</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No                  Cooler Temperature(s) °C and Other Remarks: _____</p>					



**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	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 - REQUIRES SEPARATE COC	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							3
	Iron (filtered)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15
	Lithium (filtered)										x	x					3
Manganese (filtered)	x		x	x	x	x	x	x	x	x	x	x	x	x	x	14	
Field Parameters	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).

C:\Users\Fredricks\AppData\Local\Microsoft\Windows\NetCache\Content.Outlook\Z396DTG3\OGS\_CCR\_Rule\_Sampling\_2104.xls]Sheet1



# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-204548-1

**Login Number: 204548**

**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	



**Table 1. Groundwater Monitoring Results - Field Parameters**  
**Ottumwa Generating Station / SCS Engineers Project No. 25221072.00**  
**April 2021**

Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmhos/cm)	ORP (mV)	Turbidity
MW-301	4/14/2021 - 10:10	682.94	9.1	6.26	5.99	1,062	232.5	1.61
MW-302	4/13/2021 - 18:15	656.05	11.9	6.44	0.37	2,087	198.2	22.9
MW-303	4/13/2021 - 16:50	653.82	9.7	6.67	2.83	1,118	184.7	4.31
MW-304	4/14/2021 - 16:50	654.34	13.1	6.94	0.20	1,797	-97.5	16.9
MW-305	4/16/2021 - 10:15	661.15	12.9	6.92	0.16	1,799	43.6	8.17
MW-305A	4/15/2021 - 13:45	651.16	12.4	7.05	0.88	1,224	158.3	1.02
MW-306	4/13/2021 - 15:00	670.27	12.7	6.42	0.14	1,339	92.0	8.99
MW-307	4/14/2021 - 12:30	649.53	11.5	6.59	0.41	1,675	-39.9	21.2
MW-308	4/15/2021 - 13:55	647.66	11.5	6.70	0.44	1,598	-49.3	4.47
MW-309	4/14/2021 - 15:25	646.46	11.7	7.00	0.36	1,411	-40.6	9.32
MW-310	4/13/2021 - 13:25	642.70	12.6	7.07	0.46	2,362	161.0	2.38
MW-310A	4/15/2021 - 14:20	644.88	12.5	7.47	0.98	3,106	160.2	2.25
MW-311	4/14/2021 - 08:55	643.02	9.3	6.66	1.18	945	179.8	0.78
MW-311A	4/16/2021 - 11:30	644.16	12.3	7.76	0.77	3,332	146.9	0.02

Abbreviations:

mg/L = milligrams per liter

amsl = above mean sea level

NA = Not Analyzed

NM= Not Measured

Notes:

none

Created by: NDK  
 Last revision by: JR  
 Checked by: NDK

Date: 4/21/2021  
 Date: 4/22/2021  
 Date: 4/22/2021

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## ANALYTICAL REPORT

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

Laboratory Job ID: 310-204548-2

Client Project/Site: Ottumwa Generating Station - 25221072

**For:**

SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:  
5/18/2021 7:40:15 AM*

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

### LINKS

Review your project  
results through  
**Total Access**

Have a Question?



Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

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

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

# 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



# Case Narrative

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-2

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## Job ID: 310-204548-2

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### Laboratory: Eurofins TestAmerica, Cedar Falls

#### Narrative

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#### Job Narrative 310-204548-2

#### Comments

No additional comments.

#### Receipt

The samples were received on 4/16/2021 5:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.6° C.

#### RAD

Methods 903.0, 9315: Radium-226 Batch 506413 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 (310-204548-1), Field Blank (310-204548-2), (LCS 160-506413/1-A), (LCSD 160-506413/2-A) and (MB 160-506413/23-A)

Methods 904.0, 9320: Radium-228 Batch 506418 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 (310-204548-1), Field Blank (310-204548-2), (LCS 160-506418/1-A), (LCSD 160-506418/2-A) and (MB 160-506418/23-A)

Method PrecSep\_0: Radium 228 Prep Batch 160-506418: Insufficient sample volume was available to perform a sample duplicate (DUP) for the following samples: MW-301 (310-204548-1) and Field Blank (310-204548-2). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep-21: Radium 226 Prep Batch 160-506413: Insufficient sample volume was available to perform a sample duplicate (DUP) for the following samples: MW-301 (310-204548-1) and Field Blank (310-204548-2). 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 - 25221072

Job ID: 310-204548-2

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-204548-1	MW-301	Water	04/14/21 10:10	04/16/21 17:00	
310-204548-2	Field Blank	Water	04/14/21 09:40	04/16/21 17:00	

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# Detection Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-2

**Client Sample ID: MW-301**

**Lab Sample ID: 310-204548-1**

No Detections.

**Client Sample ID: Field Blank**

**Lab Sample ID: 310-204548-2**

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 - 25221072

Job ID: 310-204548-2

**Client Sample ID: MW-301**

**Lab Sample ID: 310-204548-1**

Date Collected: 04/14/21 10:10

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.133		0.0918	0.0926	1.00	0.124	pCi/L	04/21/21 10:34	05/15/21 10:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	69.1		40 - 110					04/21/21 10:34	05/15/21 10:53	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	0.465	U	0.374	0.377	1.00	0.594	pCi/L	04/21/21 10:55	05/06/21 20:32	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	69.1		40 - 110					04/21/21 10:55	05/06/21 20:32	1
Y Carrier	80.4		40 - 110					04/21/21 10:55	05/06/21 20:32	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	0.598		0.385	0.388	5.00	0.594	pCi/L		05/17/21 21:22	1



# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-2

## Client Sample ID: Field Blank

## Lab Sample ID: 310-204548-2

Date Collected: 04/14/21 09:40

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.00748	U	0.0586	0.0586	1.00	0.120	pCi/L	04/21/21 10:34	05/15/21 10:54	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	70.0		40 - 110					04/21/21 10:34	05/15/21 10:54	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	0.0664	U	0.291	0.291	1.00	0.512	pCi/L	04/21/21 10:55	05/06/21 20:33	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	70.0		40 - 110					04/21/21 10:55	05/06/21 20:33	1
Y Carrier	86.0		40 - 110					04/21/21 10:55	05/06/21 20:33	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	0.0739	U	0.297	0.297	5.00	0.512	pCi/L		05/17/21 21:22	1

# Definitions/Glossary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-2

## Qualifiers

### Rad

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

## Glossary

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

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-2

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

**Lab Sample ID: MB 160-506413/23-A**  
**Matrix: Water**  
**Analysis Batch: 509911**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 506413**

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.03455	U	0.0669	0.0670	1.00	0.120	pCi/L	04/21/21 10:34	05/15/21 11:00	1
Carrier	MB	MB	Limits			Prepared	Analyzed	Dil Fac		
Ba Carrier	%Yield	Qualifier		Prepared	Analyzed					
Ba Carrier	71.5		40 - 110	04/21/21 10:34	05/15/21 11:00	1				

**Lab Sample ID: LCS 160-506413/1-A**  
**Matrix: Water**  
**Analysis Batch: 509912**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 506413**

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Radium-226	11.3	10.23		1.11	1.00	0.132	pCi/L	90	75 - 125
Carrier	LCS	LCS	Limits			Prepared	Analyzed	Dil Fac	
Ba Carrier	%Yield	Qualifier		Prepared	Analyzed				
Ba Carrier	69.7		40 - 110	04/21/21 10:34	05/15/21 11:00	1			

**Lab Sample ID: LCSD 160-506413/2-A**  
**Matrix: Water**  
**Analysis Batch: 509912**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 506413**

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
				Uncert. (2σ+/-)							
Radium-226	11.3	10.75		1.15	1.00	0.136	pCi/L	95	75 - 125	0.23	1
Carrier	LCSD	LCSD	Limits			Prepared	Analyzed	Dil Fac			
Ba Carrier	%Yield	Qualifier		Prepared	Analyzed						
Ba Carrier	71.2		40 - 110	04/21/21 10:34	05/15/21 11:00	1					

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

**Lab Sample ID: MB 160-506418/23-A**  
**Matrix: Water**  
**Analysis Batch: 508606**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 506418**

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.1770	U	0.333	0.333	1.00	0.566	pCi/L	04/21/21 10:55	05/06/21 20:29	1
Carrier	MB	MB	Limits			Prepared	Analyzed	Dil Fac		
Ba Carrier	%Yield	Qualifier		Prepared	Analyzed					
Ba Carrier	71.5		40 - 110	04/21/21 10:55	05/06/21 20:29	1				
Y Carrier	%Yield	Qualifier	Limits			Prepared	Analyzed	Dil Fac		
Y Carrier	81.1		40 - 110	04/21/21 10:55	05/06/21 20:29				1	

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-2

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

**Lab Sample ID: LCS 160-506418/1-A**  
**Matrix: Water**  
**Analysis Batch: 508605**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 506418**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits												
Radium-228	7.23	8.276		1.07	1.00	0.474	pCi/L	114	75 - 125												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Carrier</th> <th>LCS %Yield</th> <th>LCS Qualifier</th> <th>Limits</th> </tr> </thead> <tbody> <tr> <td>Ba Carrier</td> <td>69.7</td> <td></td> <td>40 - 110</td> </tr> <tr> <td>Y Carrier</td> <td>84.5</td> <td></td> <td>40 - 110</td> </tr> </tbody> </table>										Carrier	LCS %Yield	LCS Qualifier	Limits	Ba Carrier	69.7		40 - 110	Y Carrier	84.5		40 - 110
Carrier	LCS %Yield	LCS Qualifier	Limits																		
Ba Carrier	69.7		40 - 110																		
Y Carrier	84.5		40 - 110																		

**Lab Sample ID: LCSD 160-506418/2-A**  
**Matrix: Water**  
**Analysis Batch: 508605**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 506418**

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit												
Radium-228	7.23	8.808		1.12	1.00	0.453	pCi/L	122	75 - 125	0.24	1												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Carrier</th> <th>LCSD %Yield</th> <th>LCSD Qualifier</th> <th>Limits</th> </tr> </thead> <tbody> <tr> <td>Ba Carrier</td> <td>71.2</td> <td></td> <td>40 - 110</td> </tr> <tr> <td>Y Carrier</td> <td>83.0</td> <td></td> <td>40 - 110</td> </tr> </tbody> </table>												Carrier	LCSD %Yield	LCSD Qualifier	Limits	Ba Carrier	71.2		40 - 110	Y Carrier	83.0		40 - 110
Carrier	LCSD %Yield	LCSD Qualifier	Limits																				
Ba Carrier	71.2		40 - 110																				
Y Carrier	83.0		40 - 110																				

# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-2

## Rad

### Prep Batch: 506413

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-1	MW-301	Total/NA	Water	PrecSep-21	
310-204548-2	Field Blank	Total/NA	Water	PrecSep-21	
MB 160-506413/23-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-506413/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-506413/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

### Prep Batch: 506418

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-1	MW-301	Total/NA	Water	PrecSep_0	
310-204548-2	Field Blank	Total/NA	Water	PrecSep_0	
MB 160-506418/23-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-506418/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-506418/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-2

## Client Sample ID: MW-301

Date Collected: 04/14/21 10:10

Date Received: 04/16/21 17:00

## Lab Sample ID: 310-204548-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			506413	04/21/21 10:34	RBR	TAL SL
Total/NA	Analysis	903.0		1	509912	05/15/21 10:53	ANW	TAL SL
Total/NA	Prep	PrecSep_0			506418	04/21/21 10:55	RBR	TAL SL
Total/NA	Analysis	904.0		1	508605	05/06/21 20:32	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	510131	05/17/21 21:22	SCB	TAL SL

## Client Sample ID: Field Blank

Date Collected: 04/14/21 09:40

Date Received: 04/16/21 17:00

## Lab Sample ID: 310-204548-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			506413	04/21/21 10:34	RBR	TAL SL
Total/NA	Analysis	903.0		1	509912	05/15/21 10:54	ANW	TAL SL
Total/NA	Prep	PrecSep_0			506418	04/21/21 10:55	RBR	TAL SL
Total/NA	Analysis	904.0		1	508605	05/06/21 20:33	ANW	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	510131	05/17/21 21:22	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 - 25221072

Job ID: 310-204548-2

## 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	12-08-21
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	11-30-21
Iowa	State	373	12-01-22
Kansas	NELAP	E-10236	10-31-21
Kentucky (DW)	State	KY90125	01-01-22
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-21
Louisiana	NELAP	04080	06-30-21
Louisiana (DW)	State	LA011	12-31-21
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	04-01-22
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	03-01-22
South Carolina	State	85002001	06-30-21
Texas	NELAP	T104704193	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

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

# Method Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-2

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

#### Protocol References:

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

#### Laboratory References:

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







Environment Testing  
TestAmerica



310-204548 Chain of Custody

**Cooler/Sample Receipt and Temperature I**

Client Information	
Client: <u>SCS Engineers</u>	
City/State: <u>Madison WI</u>	Project: <u>Ottumwa Gen. Station</u>
Receipt Information	
Date/Time Received: <u>04/10/17 1700</u>	Received By:
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____	
Condition of Cooler/Containers	
Sample(s) received in Cooler? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AC-21</u>
Multiple Coolers? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>1</u>
Cooler Custody Seals Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
<u>MW-301 Field Blank → 250 #NO<sub>3</sub> / 250 HNO<sub>3</sub> (FF) / 500 NT Plastic</u>	
Temperature Record	
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE	
Thermometer ID: <u>0</u>	Correction Factor (°C): <u>0</u>
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature	
Uncorrected Temp (°C): <u>1.6</u>	Corrected Temp (°C): <u>1.6</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



**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	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 - REQUIRES SEPARATE COC	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							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	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).

C:\Users\Fredricks\AppData\Local\Microsoft\Windows\NetCache\Content.Outlook\Z396DTG3\OGS\_CCR\_Rule\_Sampling\_2104.xls]Sheet1

# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-204548-2

**Login Number: 204548**

**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: 310-204548-2

**Login Number: 204548**

**List Number: 2**

**Creator: Mazariegos, Leonel A**

**List Source: Eurofins TestAmerica, St. Louis**

**List Creation: 04/20/21 02:54 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> 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 - 25221072

Job ID: 310-204548-2

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

Matrix: Water

Prep Type: Total/NA

### Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (40-110)							
310-204548-1	MW-301	69.1							
310-204548-2	Field Blank	70.0							
LCS 160-506413/1-A	Lab Control Sample	69.7							
LCS D 160-506413/2-A	Lab Control Sample Dup	71.2							
MB 160-506413/23-A	Method Blank	71.5							

#### Tracer/Carrier Legend

Ba = Ba Carrier

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

Matrix: Water

Prep Type: Total/NA

### Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)						
310-204548-1	MW-301	69.1	80.4						
310-204548-2	Field Blank	70.0	86.0						
LCS 160-506418/1-A	Lab Control Sample	69.7	84.5						
LCS D 160-506418/2-A	Lab Control Sample Dup	71.2	83.0						
MB 160-506418/23-A	Method Blank	71.5	81.1						

#### Tracer/Carrier Legend

Ba = Ba Carrier

Y = Y Carrier

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-204548-3

Client Project/Site: Ottumwa Generating Station - 25221072

**For:**

SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:  
4/27/2021 10:45:50 AM*

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

### LINKS

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

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

# 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





# Case Narrative

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-3

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**Job ID: 310-204548-3**

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**Laboratory: Eurofins TestAmerica, Cedar Falls**

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**Narrative**

**Job Narrative**  
**310-204548-3**

**Comments**

No additional comments.

**Receipt**

The samples were received on 4/16/2021 5:00 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.6° 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.

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

# Sample Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-204548-1	MW-301	Water	04/14/21 10:10	04/16/21 17:00	
310-204548-2	Field Blank	Water	04/14/21 09:40	04/16/21 17:00	

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- 2
- 3
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- 11
- 12
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- 14

# Detection Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-3

## Client Sample ID: MW-301

## Lab Sample ID: 310-204548-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	78000		1000	610	ug/L	1		6020A	Total/NA
Potassium	1200		500	150	ug/L	1		6020A	Total/NA
Iron	49	J	100	36	ug/L	1		6020A	Total/NA
Magnesium	34000		500	100	ug/L	1		6020A	Total/NA
Manganese	14		10	4.4	ug/L	1		6020A	Total/NA
Manganese	10		10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	170		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	170		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: Field Blank

## Lab Sample ID: 310-204548-2

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 - 25221072

Job ID: 310-204548-3

**Client Sample ID: MW-301**

**Lab Sample ID: 310-204548-1**

Date Collected: 04/14/21 10:10

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	78000		1000	610	ug/L		04/20/21 09:00	04/26/21 21:56	1
Potassium	1200		500	150	ug/L		04/20/21 09:00	04/26/21 21:56	1
Iron	49	J	100	36	ug/L		04/20/21 09:00	04/26/21 21:56	1
Magnesium	34000		500	100	ug/L		04/20/21 09:00	04/26/21 21:56	1
Manganese	14		10	4.4	ug/L		04/20/21 09:00	04/26/21 21:56	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		04/19/21 08:16	04/26/21 19:40	1
Manganese	10		10	4.4	ug/L		04/19/21 08:16	04/26/21 19:40	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	170		10	4.6	mg/L			04/26/21 10:52	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			04/26/21 10:52	1
Total Alkalinity as CaCO3	170		10	4.6	mg/L			04/26/21 10:52	1

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- 2
- 3
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- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-3

**Client Sample ID: Field Blank**

**Lab Sample ID: 310-204548-2**

Date Collected: 04/14/21 09:40

Matrix: Water

Date Received: 04/16/21 17:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	<610		1000	610	ug/L		04/20/21 09:00	04/26/21 22:12	1
Potassium	<150		500	150	ug/L		04/20/21 09:00	04/26/21 22:12	1
Iron	<36		100	36	ug/L		04/20/21 09:00	04/26/21 22:12	1
Magnesium	<100		500	100	ug/L		04/20/21 09:00	04/26/21 22:12	1
Manganese	<4.4		10	4.4	ug/L		04/20/21 09:00	04/26/21 22:12	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		04/19/21 08:16	04/26/21 19:43	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/19/21 15:26	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/19/21 15:26	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/19/21 15:26	1

# Definitions/Glossary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-3

## Qualifiers

### Metals

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

## Glossary

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

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-3

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

**Lab Sample ID: MB 310-313144/1-A**  
**Matrix: Water**  
**Analysis Batch: 314022**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 313144**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		04/19/21 08:16	04/26/21 18:52	1
Manganese	<4.4		10	4.4	ug/L		04/19/21 08:16	04/26/21 18:52	1

**Lab Sample ID: LCS 310-313144/2-A**  
**Matrix: Water**  
**Analysis Batch: 314022**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 313144**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	200	225		ug/L		112	80 - 120
Manganese	100	108		ug/L		108	80 - 120

**Lab Sample ID: MB 310-313195/1-A**  
**Matrix: Water**  
**Analysis Batch: 314022**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 313195**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	<610		1000	610	ug/L		04/20/21 09:00	04/26/21 20:36	1
Potassium	<150		500	150	ug/L		04/20/21 09:00	04/26/21 20:36	1
Iron	<36		100	36	ug/L		04/20/21 09:00	04/26/21 20:36	1
Magnesium	<100		500	100	ug/L		04/20/21 09:00	04/26/21 20:36	1
Manganese	<4.4		10	4.4	ug/L		04/20/21 09:00	04/26/21 20:36	1

**Lab Sample ID: LCS 310-313195/2-A**  
**Matrix: Water**  
**Analysis Batch: 314022**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 313195**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sodium	2000	2120		ug/L		106	80 - 120
Potassium	2000	2220		ug/L		111	80 - 120
Iron	200	221		ug/L		110	80 - 120
Magnesium	2000	2070		ug/L		104	80 - 120
Manganese	100	105		ug/L		105	80 - 120

## Method: 2320B - Alkalinity (Low Level)

**Lab Sample ID: MB 310-313244/1**  
**Matrix: Water**  
**Analysis Batch: 313244**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/19/21 15:26	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/19/21 15:26	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/19/21 15:26	1

**Lab Sample ID: LCS 310-313244/2**  
**Matrix: Water**  
**Analysis Batch: 313244**

**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	992		mg/L		99	90 - 110

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-3

## Method: SM 2320B - Alkalinity

**Lab Sample ID: MB 310-313906/1**  
**Matrix: Water**  
**Analysis Batch: 313906**

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

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/26/21 10:52	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/26/21 10:52	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			04/26/21 10:52	1

**Lab Sample ID: LCS 310-313906/2**  
**Matrix: Water**  
**Analysis Batch: 313906**

**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

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- 3
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- 14



# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-3

## Metals

### Prep Batch: 313144

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-1	MW-301	Dissolved	Water	3010A	
310-204548-2	Field Blank	Dissolved	Water	3010A	
MB 310-313144/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-313144/2-A	Lab Control Sample	Total/NA	Water	3010A	

### Prep Batch: 313195

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-1	MW-301	Total/NA	Water	3010A	
310-204548-2	Field Blank	Total/NA	Water	3010A	
MB 310-313195/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-313195/2-A	Lab Control Sample	Total/NA	Water	3010A	

### Analysis Batch: 314022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-1	MW-301	Dissolved	Water	6020A	313144
310-204548-1	MW-301	Total/NA	Water	6020A	313195
310-204548-2	Field Blank	Dissolved	Water	6020A	313144
310-204548-2	Field Blank	Total/NA	Water	6020A	313195
MB 310-313144/1-A	Method Blank	Total/NA	Water	6020A	313144
MB 310-313195/1-A	Method Blank	Total/NA	Water	6020A	313195
LCS 310-313144/2-A	Lab Control Sample	Total/NA	Water	6020A	313144
LCS 310-313195/2-A	Lab Control Sample	Total/NA	Water	6020A	313195

## General Chemistry

### Analysis Batch: 313244

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-2	Field Blank	Total/NA	Water	2320B	
MB 310-313244/1	Method Blank	Total/NA	Water	2320B	
LCS 310-313244/2	Lab Control Sample	Total/NA	Water	2320B	

### Analysis Batch: 313906

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204548-1	MW-301	Total/NA	Water	SM 2320B	
MB 310-313906/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-313906/2	Lab Control Sample	Total/NA	Water	SM 2320B	

# Lab Chronicle

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-3

**Client Sample ID: MW-301**

**Lab Sample ID: 310-204548-1**

**Date Collected: 04/14/21 10:10**

**Matrix: Water**

**Date Received: 04/16/21 17:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			313144	04/19/21 08:16	JNR	TAL CF
Dissolved	Analysis	6020A		1	314022	04/26/21 19:40	SAD	TAL CF
Total/NA	Prep	3010A			313195	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	314022	04/26/21 21:56	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	313906	04/26/21 10:52	DFS	TAL CF

**Client Sample ID: Field Blank**

**Lab Sample ID: 310-204548-2**

**Date Collected: 04/14/21 09:40**

**Matrix: Water**

**Date Received: 04/16/21 17:00**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			313144	04/19/21 08:16	JNR	TAL CF
Dissolved	Analysis	6020A		1	314022	04/26/21 19:43	SAD	TAL CF
Total/NA	Prep	3010A			313195	04/20/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	314022	04/26/21 22:12	SAD	TAL CF
Total/NA	Analysis	2320B		1	313244	04/19/21 15:26	DFS	TAL CF

**Laboratory References:**

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

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- 2
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- 6
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- 9
- 10
- 11
- 12
- 13
- 14

# Accreditation/Certification Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-3

## 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

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# Method Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-204548-3

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.

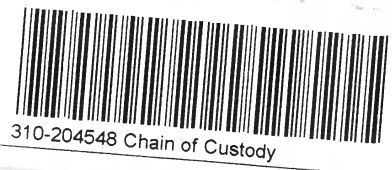
#### Laboratory References:

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





Environment Testing  
TestAmerica



**Cooler/Sample Receipt and Temperature I**

<b>Client Information</b>		
Client: <u>SCS Engineers</u>		
City/State: <u>Madison WI</u>	Project: <u>Ottumwa Gen. Station</u>	
<b>Receipt Information</b>		
Date/Time Received: <u>04/16/19 1700</u>	Received By:	
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: _____		
<b>Condition of Cooler/Containers</b>		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AC-21</u>
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>1</u>
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
<u>MW-301 Field Blank → 250 #NO<sub>3</sub> / 250 HNO<sub>3</sub> (FF) / 500 NT Plastic</u>		
<b>Temperature Record</b>		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>0</u>	Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>1.6</u>	Corrected Temp (°C): <u>1.6</u>	
<b>Sample Container Temperature</b>		
Container(s) used:	CONTAINER 1	CONTAINER 2
Uncorrected Temp (°C):		
Corrected Temp (°C):		
<b>Exceptions Noted</b>		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
<b>Additional Comments</b>		

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

Eurofins TestAmerica, Cedar Falls

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

**Client Information**  
 Client Contact: **Meghan Bloodgett**  
 Company: **S.C.S Engineers**  
 Address: **2830 Dairy Drive**  
 City: **Madison**  
 State, Zip: **WI, 53718**  
 Phone: **261-943-0855**  
 Email: **mbloodgett@scsengineers.com**  
 Project Name: **Ottumwa Generating Station - 25221072**  
 Site: **065**

**Sampler**: **Tamara Buszka**  
 Lab PIV: **Fredrick, Sandie**  
 Phone: **261-943-0855**  
 E-Mail: **sandra.fredrick@eurofinset.com**

**Due Date Requested:**   
**TAT Requested (days):**   
**Compliance Project:**  Yes  No   
**PC #:** **25221072**  
**WO #:**   
**Project #:** **31011020**  
**Site:** **SSOW4**

**Carrier Tracking Note(s):**   
**State of Origin:**   
**Job #:**   
**COC No:** **310-59840-17486-1**  
**Page:** **Page 1 of 1**  
**Job #:**   
**Preservation Codes:**  
 A - HCL  
 M - Hexane  
 B - NaOH  
 N - None  
 C - Zn Acetate  
 O - AsNaO2  
 D - Nitric Acid  
 P - Na2OAS  
 E - NaHSO4  
 Q - Na2SO3  
 F - MeOH  
 R - Na2SO3  
 G - Amchlor  
 S - H2SO4  
 H - Ascorbic Acid  
 T - TSP Dodecahydrate  
 I - Ice  
 U - Acetone  
 J - DI Water  
 V - MCAVA  
 K - EDTA  
 W - pH 4-5  
 L - EDA  
 Z - other (specify)  
 Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=soil, D=waste/dirt, BT=tissue/BVAU)	Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)		3320B - Alkalinity/Carb/Bicarb		6020A - Metals (5)		6020A - D. Metals (4)		Total Number of Containers	Special Instructions/Note:
					Field Filtered	MS/MSD	Alkalinity	Carb/Bicarb	Metals	D. Metals						
MW-3C1	4-14-21	10:10	G	Water	X	X	X	X	X	X	X	X	X			
Field Blank	4-14-21	9:40	G	Water	X	X	X	X	X	X	X	X	X			

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

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

**Empty Kit Relinquished by:** **Tamara Buszka** Date/Time: **4.16.21 14:00** Company: **SCS**

**Relinquished by:** **Tamara Buszka** Date/Time: **4/16 1700** Company: **Company**

**Relinquished by:** **Tamara Buszka** Date/Time: **4/16 1700** Company: **Company**

**Relinquished by:** **Tamara Buszka** Date/Time: **4/16 1700** Company: **Company**

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

**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:**



**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	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 - REQUIRES SEPARATE COC	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							3
	Iron (filtered)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15
	Lithium (filtered)										x	x					3
Manganese (filtered)	x		x	x	x	x	x	x	x	x	x	x	x	x	x	14	
Field Parameters	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).

C:\Users\Fredricks\AppData\Local\Microsoft\Windows\NetCache\Content.Outlook\Z396DTG3\OGS\_CCR\_Rule\_Sampling\_2104.xls]Sheet1

# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-204548-3

**Login Number: 204548**

**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	



## C3 Assessment Monitoring, July 2021

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-210533-1

Client Project/Site: Ottumwa Generating Station - 25221072  
Revision: 1

For:  
SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:  
7/21/2021 11:01:39 AM

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

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

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

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



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Sample Summary . . . . .	4
Detection Summary . . . . .	5
Client Sample Results . . . . .	6
Definitions . . . . .	10
QC Sample Results . . . . .	11
QC Association . . . . .	12
Chronicle . . . . .	13
Certification Summary . . . . .	14
Method Summary . . . . .	15
Chain of Custody . . . . .	16
Receipt Checklists . . . . .	19
Field Data Sheets . . . . .	20

# Case Narrative

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-210533-1

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## Job ID: 310-210533-1

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Laboratory: Eurofins TestAmerica, Cedar Falls

### Narrative

Job Narrative  
310-210533-1

### Comments

No additional comments.

### Receipt

The samples were received on 7/9/2021 9:25 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.6° C.

### Receipt Exceptions

Client requested report split. Field data added.

### 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.

# Sample Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-210533-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-210533-1	MW-306	Water	07/06/21 19:15	07/09/21 09:25	
310-210533-3	MW-310	Water	07/06/21 18:05	07/09/21 09:25	
310-210533-4	MW-311A	Water	07/07/21 12:25	07/09/21 09:25	
310-210533-5	Field Blank	Water	07/06/21 19:15	07/09/21 09:25	

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# Detection Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-210533-1

## Client Sample ID: MW-306

## Lab Sample ID: 310-210533-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cobalt	5.8		0.50	0.091	ug/L	1		6020A	Total/NA
Ground Water Elevation	661.87				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	119.2				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.33				mg/L	1		Field Sampling	Total/NA
pH, Field	7.44				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1357				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	14.3				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	1.37				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-310

## Lab Sample ID: 310-210533-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	52		10	2.5	ug/L	1		6020A	Total/NA
Ground Water Elevation	639.32				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	88.6				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.21				mg/L	1		Field Sampling	Total/NA
pH, Field	8.23				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1852				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.0				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	0.00				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-311A

## Lab Sample ID: 310-210533-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	3.8		0.50	0.28	mg/L	5		9056A	Total/NA
Ground Water Elevation	642.38				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	80.8				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.42				mg/L	1		Field Sampling	Total/NA
pH, Field	8.19				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	3381				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	14.2				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	0.00				NTU	1		Field Sampling	Total/NA

## Client Sample ID: Field Blank

## Lab Sample ID: 310-210533-5

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 - 25221072

Job ID: 310-210533-1

**Client Sample ID: MW-306**

**Lab Sample ID: 310-210533-1**

Date Collected: 07/06/21 19:15

Matrix: Water

Date Received: 07/09/21 09:25

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	5.8		0.50	0.091	ug/L		07/13/21 09:00	07/14/21 23:07	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	661.87				ft			07/06/21 19:15	1
Oxidation Reduction Potential	119.2				millivolts			07/06/21 19:15	1
Oxygen, Dissolved, Client Supplied	0.33				mg/L			07/06/21 19:15	1
pH, Field	7.44				SU			07/06/21 19:15	1
Specific Conductance, Field	1357				umhos/cm			07/06/21 19:15	1
Temperature, Field	14.3				Degrees C			07/06/21 19:15	1
Turbidity, Field	1.37				NTU			07/06/21 19:15	1

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- 12
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- 14
- 15

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-210533-1

**Client Sample ID: MW-310**  
 Date Collected: 07/06/21 18:05  
 Date Received: 07/09/21 09:25

**Lab Sample ID: 310-210533-3**  
 Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	52		10	2.5	ug/L		07/13/21 09:00	07/14/21 23:14	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	639.32				ft			07/06/21 18:05	1
Oxidation Reduction Potential	88.6				millivolts			07/06/21 18:05	1
Oxygen, Dissolved, Client Supplied	0.21				mg/L			07/06/21 18:05	1
pH, Field	8.23				SU			07/06/21 18:05	1
Specific Conductance, Field	1852				umhos/cm			07/06/21 18:05	1
Temperature, Field	13.0				Degrees C			07/06/21 18:05	1
Turbidity, Field	0.00				NTU			07/06/21 18:05	1

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



# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-210533-1

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-210533-4**

Date Collected: 07/07/21 12:25

Matrix: Water

Date Received: 07/09/21 09:25

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	3.8		0.50	0.28	mg/L			07/19/21 12:47	5

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	642.38				ft			07/07/21 12:25	1
Oxidation Reduction Potential	80.8				millivolts			07/07/21 12:25	1
Oxygen, Dissolved, Client Supplied	0.42				mg/L			07/07/21 12:25	1
pH, Field	8.19				SU			07/07/21 12:25	1
Specific Conductance, Field	3381				umhos/cm			07/07/21 12:25	1
Temperature, Field	14.2				Degrees C			07/07/21 12:25	1
Turbidity, Field	0.00				NTU			07/07/21 12:25	1

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- 15

# Client Sample Results

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-210533-1

**Client Sample ID: Field Blank**

**Lab Sample ID: 310-210533-5**

Date Collected: 07/06/21 19:15

Matrix: Water

Date Received: 07/09/21 09:25

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	<0.055		0.10	0.055	mg/L			07/19/21 13:02	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.091		0.50	0.091	ug/L		07/13/21 09:00	07/14/21 23:31	1
Lithium	<2.5		10	2.5	ug/L		07/13/21 09:00	07/14/21 23:31	1

# Definitions/Glossary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-210533-1

## Qualifiers

### Metals

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

## Glossary

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

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-210533-1

## Method: 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 310-322778/39**  
**Matrix: Water**  
**Analysis Batch: 322778**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	<0.055		0.10	0.055	mg/L			07/19/21 11:29	1

**Lab Sample ID: LCS 310-322778/15**  
**Matrix: Water**  
**Analysis Batch: 322778**

**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	1.95		mg/L		97	90 - 110

**Lab Sample ID: LCS 310-322778/40**  
**Matrix: Water**  
**Analysis Batch: 322778**

**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	1.95		mg/L		98	90 - 110

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

**Lab Sample ID: MB 310-322135/1-A**  
**Matrix: Water**  
**Analysis Batch: 322457**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 322135**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.091		0.50	0.091	ug/L		07/13/21 09:00	07/14/21 22:11	1
Lithium	<2.5		10	2.5	ug/L		07/13/21 09:00	07/14/21 22:11	1

**Lab Sample ID: LCS 310-322135/2-A**  
**Matrix: Water**  
**Analysis Batch: 322457**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 322135**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cobalt	100	104		ug/L		104	80 - 120
Lithium	200	209		ug/L		105	80 - 120

**Lab Sample ID: 310-210533-5 DU**  
**Matrix: Water**  
**Analysis Batch: 322457**

**Client Sample ID: Field Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 322135**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Cobalt	<0.091		0.105	J	ug/L		NC	20
Lithium	<2.5		<2.5		ug/L		NC	20

# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-210533-1

## HPLC/IC

### Analysis Batch: 322778

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-210533-4	MW-311A	Total/NA	Water	9056A	
310-210533-5	Field Blank	Total/NA	Water	9056A	
MB 310-322778/39	Method Blank	Total/NA	Water	9056A	
LCS 310-322778/15	Lab Control Sample	Total/NA	Water	9056A	
LCS 310-322778/40	Lab Control Sample	Total/NA	Water	9056A	

## Metals

### Prep Batch: 322135

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-210533-1	MW-306	Total/NA	Water	3010A	
310-210533-3	MW-310	Total/NA	Water	3010A	
310-210533-5	Field Blank	Total/NA	Water	3010A	
MB 310-322135/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-322135/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-210533-5 DU	Field Blank	Total/NA	Water	3010A	

### Analysis Batch: 322457

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-210533-1	MW-306	Total/NA	Water	6020A	322135
310-210533-3	MW-310	Total/NA	Water	6020A	322135
310-210533-5	Field Blank	Total/NA	Water	6020A	322135
MB 310-322135/1-A	Method Blank	Total/NA	Water	6020A	322135
LCS 310-322135/2-A	Lab Control Sample	Total/NA	Water	6020A	322135
310-210533-5 DU	Field Blank	Total/NA	Water	6020A	322135

## Field Service / Mobile Lab

### Analysis Batch: 323036

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-210533-1	MW-306	Total/NA	Water	Field Sampling	
310-210533-3	MW-310	Total/NA	Water	Field Sampling	
310-210533-4	MW-311A	Total/NA	Water	Field Sampling	

# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-210533-1

## Client Sample ID: MW-306

Date Collected: 07/06/21 19:15

Date Received: 07/09/21 09:25

## Lab Sample ID: 310-210533-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			322135	07/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	322457	07/14/21 23:07	SAP	TAL CF
Total/NA	Analysis	Field Sampling		1	323036	07/06/21 19:15	SJF	TAL CF

## Client Sample ID: MW-310

Date Collected: 07/06/21 18:05

Date Received: 07/09/21 09:25

## Lab Sample ID: 310-210533-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			322135	07/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	322457	07/14/21 23:14	SAP	TAL CF
Total/NA	Analysis	Field Sampling		1	323036	07/06/21 18:05	SJF	TAL CF

## Client Sample ID: MW-311A

Date Collected: 07/07/21 12:25

Date Received: 07/09/21 09:25

## Lab Sample ID: 310-210533-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	322778	07/19/21 12:47	JNR	TAL CF
Total/NA	Analysis	Field Sampling		1	323036	07/07/21 12:25	SJF	TAL CF

## Client Sample ID: Field Blank

Date Collected: 07/06/21 19:15

Date Received: 07/09/21 09:25

## Lab Sample ID: 310-210533-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1	322778	07/19/21 13:02	JNR	TAL CF
Total/NA	Prep	3010A			322135	07/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	322457	07/14/21 23:31	SAP	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 - 25221072

Job ID: 310-210533-1

## 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 - 25221072

Job ID: 310-210533-1

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

**Protocol References:**

EPA = US Environmental Protection Agency

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

**Laboratory References:**

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







Environment Testing  
TestAmerica



310-210533 Chain of Custody

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

<b>Client Information</b>		
Client: <u>SCS Engineers</u>		
City/State: <u>Madison</u> <small>CITY</small>	STATE: <u>WI</u>	Project: <u>Ottumwa Generating Station</u>
<b>Receipt Information</b>		
Date/Time Received: <u>7/09/2021</u> <small>DATE</small> <u>0925</u> <small>TIME</small>	Received By: <u>AW</u>	
Delivery Type: <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
<b>Condition of Cooler/Containers</b>		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: _____
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____
Cooler Custody Seals Present?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No <sup>AW</sup> <sub>7/4</sub>	If yes: Cooler custody seals intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
<b>Temperature Record</b>		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>P</u>	Correction Factor (°C): <u>0</u>	
*Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C): <u>0.0</u>	Corrected Temp (°C): <u>0.0</u>	
<b>Sample Container Temperature</b>		
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):		
Corrected Temp (°C):		
<b>Exceptions/Notes</b>		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
<b>Additional Comments</b>		

<b>Client Information</b> Client Contact: Meghan Blodgett Company: SCS Engineers Address: 2830 Dairy Drive City: Madison State: IA Zip: 52718 Phone: 608-224-2834 Email: mblodgett@scsengineers.com Project Name: Ottumwa Generating Station - 25221072 Site:		Lab Pk#: Fredrick, Sandie E-Mail: sandra.fredrick@eurofinset.com PWSID:		Carrier Tracking No(s): State of Origin: Iowa		COC No: 310-61984-18087.1 Page: Page 1 of 1 Job #:	
Due Date Requested: TAT Requested (days): Contingency Project: <input type="checkbox"/> Yes <input type="checkbox"/> No PO #: 25221072 VAC #:		Analysis Requested 8020A - Metals (5) 9056A_ORGFM_28D - Chloride, Fluoride & Sulfate 9056A_ORGFM_28D - Fluoride 8020A - Metals (Co. Li)		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaOH/SC4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:		Preservation Codes: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2S2O3 R - Na2S2O3 S - H2SC4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
Sample Identification MW-306 MW-307 MW-310 MW-311A Field Blank		Sample Date 7/6/21 7/6/21 7/6/21 7/7/21 7/6/21		Sample Time 1915 2045 1805 1225 1915		Sample Type (C=Comp, G=grab) Matrix (W=water, S=solid, O=waste/oil, BT=tissue, A=air)	
Field Filtered Sample (Yes or No)		Total Number of Containers		Special Instructions/Note: Cobalt only for 306 Cobalt only for 307 Lithium only for 310 Fluoride only for 311A Cobalt, Lithium, Fluoride See sample table included		Special Instructions/Note: Cobalt only for 306 Cobalt only for 307 Lithium only for 310 Fluoride only for 311A Cobalt, Lithium, Fluoride See sample table included	
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant Deliverable Requested: I, II, III, IV, Other (specify)		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For Months		Special Instructions/OC Requirements		Method of Shipment:	
Empty Kit Requisitioned by: Adam Watson Requisitioned by: Adam Watson Requisitioned by:		Date: 6/8/2021 1500 Date/Time:		Date/Time: 7/01/21 925 Date/Time:		Date/Time:	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		Company: SCS Eng. Company:		Company:	



# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-210533-1

**Login Number: 210533**

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

**List Number: 1**

**Creator: Watkins, Allison R**

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

**Table 1. Groundwater Monitoring Results - Field Parameters**  
**Ottumwa Generating Station / SCS Engineers Project No. 25221072.00**  
**July 2021**

<b>Sample</b>	<b>Date/Sample Time</b>	<b>Groundwater Elevation (amsl)</b>	<b>Temperature (Deg. C)</b>	<b>pH (Std. Units)</b>	<b>Dissolved Oxygen (mg/L)</b>	<b>Specific Conductivity (µmhos/cm)</b>	<b>ORP (mV)</b>	<b>Turbidity</b>
MW-306	7/6/2021 - 19:15	661.87	14.3	7.44	0.33	1,357	119.2	1.37
MW-307	7/6/2021 - 20:45	647.03	13.2	7.05	0.21	1,705	14.7	17.91
MW-310	7/6/2021 - 18:05	639.32	13.0	8.23	0.21	1,852	88.6	0.00
MW-311A	7/7/2021 - 12:25	642.38	14.2	8.19	0.42	3,381	80.8	0.00

Abbreviations:

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

Notes:  
 none

Created by: <u>NDK</u>	Date: <u>7/20/2021</u>
Last revision by: <u>NDK</u>	Date: <u>7/20/2021</u>
Checked by: <u>JR</u>	Date: <u>7/20/2021</u>

C:\Users\fredricks\AppData\Local\Microsoft\Windows\NetCache\Content.Outlook\PAJXB4G4\2107\_July - OGS\_CCR\_Field.xlsx\GW Field Parameters

## C4 Assessment Monitoring, October 2021

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-217098-1

Client Project/Site: Ottuwa Generating Station - 25221072

**For:**

SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:  
10/25/2021 5:32:49 PM*

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

### LINKS

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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 . . . . .	9
Definitions . . . . .	18
QC Sample Results . . . . .	19
QC Association . . . . .	23
Chronicle . . . . .	26
Certification Summary . . . . .	29
Method Summary . . . . .	30
Chain of Custody . . . . .	31
Receipt Checklists . . . . .	35
Field Data Sheets . . . . .	36



# Case Narrative

Client: SCS Engineers  
Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

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## Job ID: 310-217098-1

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### Laboratory: Eurofins TestAmerica, Cedar Falls

#### Narrative

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#### Job Narrative 310-217098-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 10/11/2021 5:42 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 1.7° C and 3.9° C.

#### HPLC/IC

Methods 300.0, 9056A: The following samples were diluted due to the nature of the sample matrix: MW-302 (310-217098-1), MW-303 (310-217098-2), MW-304 (310-217098-3), MW-305 (310-217098-4), MW-305A (310-217098-5), MW-306 (310-217098-6) and MW-310 (310-217098-7). 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: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-217098-1	MW-302	Water	10/07/21 10:35	10/11/21 17:42
310-217098-2	MW-303	Water	10/07/21 11:59	10/11/21 17:42
310-217098-3	MW-304	Water	10/08/21 07:57	10/11/21 17:42
310-217098-4	MW-305	Water	10/06/21 13:25	10/11/21 17:42
310-217098-5	MW-305A	Water	10/08/21 09:30	10/11/21 17:42
310-217098-6	MW-306	Water	10/08/21 09:00	10/11/21 17:42
310-217098-7	MW-310	Water	10/06/21 15:20	10/11/21 17:42
310-217098-8	MW-310A	Water	10/08/21 10:35	10/11/21 17:42
310-217098-9	MW-311A	Water	10/08/21 11:55	10/11/21 17:42

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# Detection Summary

Client: SCS Engineers  
 Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

## Client Sample ID: MW-302

## Lab Sample ID: 310-217098-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	200		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	850		20	9.8	mg/L	20		9056A	Total/NA
Barium	18		2.0	0.37	ug/L	1		6020A	Total/NA
Boron	1200		100	58	ug/L	1		6020A	Total/NA
Cadmium	0.23		0.10	0.051	ug/L	1		6020A	Total/NA
Calcium	170		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	2.2		0.50	0.19	ug/L	1		6020A	Total/NA
Lead	0.22	J	0.50	0.21	ug/L	1		6020A	Total/NA
Lithium	11		10	2.5	ug/L	1		6020A	Total/NA
Molybdenum	1.7	J	2.0	1.3	ug/L	1		6020A	Total/NA
Selenium	1.2	J	5.0	0.96	ug/L	1		6020A	Total/NA
Thallium	0.56	J	1.0	0.26	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1300		250	130	mg/L	1		SM 2540C	Total/NA
pH	6.6	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	654.86				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	211.5				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.30				mg/L	1		Field Sampling	Total/NA
pH, Field	6.49				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1920				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	14.9				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	15.6				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-303

## Lab Sample ID: 310-217098-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	140		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	170		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	80		2.0	0.37	ug/L	1		6020A	Total/NA
Boron	860		100	58	ug/L	1		6020A	Total/NA
Cadmium	0.28		0.10	0.051	ug/L	1		6020A	Total/NA
Calcium	190		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	4.0		0.50	0.19	ug/L	1		6020A	Total/NA
Lithium	5.8	J	10	2.5	ug/L	1		6020A	Total/NA
Molybdenum	1.4	J	2.0	1.3	ug/L	1		6020A	Total/NA
Total Dissolved Solids	720		250	130	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	649.80				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	66.5				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.32				mg/L	1		Field Sampling	Total/NA
pH, Field	6.70				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1343				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	17.6				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	11.1				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-304

## Lab Sample ID: 310-217098-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	260		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	230		5.0	2.5	mg/L	5		9056A	Total/NA
Arsenic	0.88	J	2.0	0.75	ug/L	1		6020A	Total/NA
Barium	79		2.0	0.37	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: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

## Client Sample ID: MW-304 (Continued)

## Lab Sample ID: 310-217098-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	990		100	58	ug/L	1		6020A	Total/NA
Calcium	120		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.42	J	0.50	0.19	ug/L	1		6020A	Total/NA
Lithium	4.0	J	10	2.5	ug/L	1		6020A	Total/NA
Molybdenum	2.0		2.0	1.3	ug/L	1		6020A	Total/NA
Total Dissolved Solids	760		250	130	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	649.53				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-78.7				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.32				mg/L	1		Field Sampling	Total/NA
pH, Field	6.97				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1617				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.8				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	7.3				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-305

## Lab Sample ID: 310-217098-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	230		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	150		5.0	2.5	mg/L	5		9056A	Total/NA
Arsenic	0.75	J	2.0	0.75	ug/L	1		6020A	Total/NA
Barium	120		2.0	0.37	ug/L	1		6020A	Total/NA
Boron	880		100	58	ug/L	1		6020A	Total/NA
Calcium	110		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	18		0.50	0.19	ug/L	1		6020A	Total/NA
Lead	0.29	J	0.50	0.21	ug/L	1		6020A	Total/NA
Lithium	3.1	J	10	2.5	ug/L	1		6020A	Total/NA
Molybdenum	8.1		2.0	1.3	ug/L	1		6020A	Total/NA
Thallium	0.37	J	1.0	0.26	ug/L	1		6020A	Total/NA
Total Dissolved Solids	680		250	130	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	654.83				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	46.9				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.44				mg/L	1		Field Sampling	Total/NA
pH, Field	6.94				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1629				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.7				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	3.8				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-305A

## Lab Sample ID: 310-217098-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	130		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	140		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	84		2.0	0.37	ug/L	1		6020A	Total/NA
Boron	200		100	58	ug/L	1		6020A	Total/NA
Calcium	150		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.94		0.50	0.19	ug/L	1		6020A	Total/NA
Lithium	17		10	2.5	ug/L	1		6020A	Total/NA
Molybdenum	4.2		2.0	1.3	ug/L	1		6020A	Total/NA
Total Dissolved Solids	730		50	26	mg/L	1		SM 2540C	Total/NA
pH	7.0	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Detection Summary

Client: SCS Engineers  
 Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

## Client Sample ID: MW-305A (Continued)

## Lab Sample ID: 310-217098-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ground Water Elevation	645.57				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	147.8				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	2.02				mg/L	1		Field Sampling	Total/NA
pH, Field	6.90				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1145				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	14.7				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	14.3				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-306

## Lab Sample ID: 310-217098-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	180		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	460		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	71		2.0	0.37	ug/L	1		6020A	Total/NA
Boron	730		100	58	ug/L	1		6020A	Total/NA
Cadmium	1.7		0.10	0.051	ug/L	1		6020A	Total/NA
Calcium	130		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	11		0.50	0.19	ug/L	1		6020A	Total/NA
Molybdenum	6.1		2.0	1.3	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1100		50	26	mg/L	1		SM 2540C	Total/NA
pH	6.7	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	662.27				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	86.0				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.40				mg/L	1		Field Sampling	Total/NA
pH, Field	6.66				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1506				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	14.7				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	6.7				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-310

## Lab Sample ID: 310-217098-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	120		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	470		5.0	2.5	mg/L	5		9056A	Total/NA
Arsenic	1.1	J	2.0	0.75	ug/L	1		6020A	Total/NA
Barium	53		2.0	0.37	ug/L	1		6020A	Total/NA
Boron	520		100	58	ug/L	1		6020A	Total/NA
Cadmium	0.21		0.10	0.051	ug/L	1		6020A	Total/NA
Calcium	130		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.72		0.50	0.19	ug/L	1		6020A	Total/NA
Lithium	52		10	2.5	ug/L	1		6020A	Total/NA
Molybdenum	70		2.0	1.3	ug/L	1		6020A	Total/NA
Selenium	2.3	J	5.0	0.96	ug/L	1		6020A	Total/NA
Total Dissolved Solids	930		250	130	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	638.19				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	96.8				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.48				mg/L	1		Field Sampling	Total/NA
pH, Field	7.20				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1425				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	15.4				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	1.0				NTU	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: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

## Client Sample ID: MW-310A

## Lab Sample ID: 310-217098-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	130		5.0	2.2	mg/L	5		9056A	Total/NA
Fluoride	0.28	J	0.50	0.28	mg/L	5		9056A	Total/NA
Sulfate	1200		20	9.8	mg/L	20		9056A	Total/NA
Barium	12		2.0	0.37	ug/L	1		6020A	Total/NA
Boron	1500		100	58	ug/L	1		6020A	Total/NA
Calcium	80		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.45	J	0.50	0.19	ug/L	1		6020A	Total/NA
Lithium	280		10	2.5	ug/L	1		6020A	Total/NA
Molybdenum	1.9	J	2.0	1.3	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1800		250	130	mg/L	1		SM 2540C	Total/NA
pH	7.7	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	639.57				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	143.1				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	6.21				mg/L	1		Field Sampling	Total/NA
pH, Field	7.65				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	2808				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	15.6				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	15.0				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-311A

## Lab Sample ID: 310-217098-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	140		5.0	2.2	mg/L	5		9056A	Total/NA
Fluoride	2.0		0.50	0.28	mg/L	5		9056A	Total/NA
Sulfate	1100		20	9.8	mg/L	20		9056A	Total/NA
Barium	8.7		2.0	0.37	ug/L	1		6020A	Total/NA
Boron	1400		100	58	ug/L	1		6020A	Total/NA
Calcium	40		0.50	0.19	mg/L	1		6020A	Total/NA
Lithium	290		10	2.5	ug/L	1		6020A	Total/NA
Total Dissolved Solids	2000		250	130	mg/L	1		SM 2540C	Total/NA
pH	7.9	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	640.58				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	140.7				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	1.68				mg/L	1		Field Sampling	Total/NA
pH, Field	8.12				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	2930				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	15.1				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	9.6				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: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

**Client Sample ID: MW-302**

**Lab Sample ID: 310-217098-1**

Date Collected: 10/07/21 10:35

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	200		5.0	2.2	mg/L			10/14/21 18:58	5
Fluoride	<0.28		0.50	0.28	mg/L			10/14/21 18:58	5
Sulfate	850		20	9.8	mg/L			10/15/21 16:01	20

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		10/13/21 09:00	10/25/21 14:43	1
Arsenic	<0.75		2.0	0.75	ug/L		10/13/21 09:00	10/25/21 14:43	1
Barium	18		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 14:43	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 14:43	1
Boron	1200		100	58	ug/L		10/13/21 09:00	10/25/21 14:43	1
Cadmium	0.23		0.10	0.051	ug/L		10/13/21 09:00	10/25/21 14:43	1
Calcium	170		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 14:43	1
Chromium	1.3	J	5.0	1.1	ug/L		10/13/21 09:00	10/25/21 14:43	1
Cobalt	2.2		0.50	0.19	ug/L		10/13/21 09:00	10/25/21 14:43	1
Lead	0.22	J	0.50	0.21	ug/L		10/13/21 09:00	10/25/21 14:43	1
Lithium	11		10	2.5	ug/L		10/13/21 09:00	10/25/21 14:43	1
Molybdenum	1.7	J	2.0	1.3	ug/L		10/13/21 09:00	10/25/21 14:43	1
Selenium	1.2	J	5.0	0.96	ug/L		10/13/21 09:00	10/25/21 14:43	1
Thallium	0.56	J	1.0	0.26	ug/L		10/13/21 09:00	10/25/21 14:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		10/20/21 13:56	10/21/21 09:15	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1300		250	130	mg/L			10/13/21 12:25	1
pH	6.6	HF	0.1	0.1	SU			10/12/21 16:36	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	654.86				ft			10/07/21 10:35	1
Oxidation Reduction Potential	211.5				millivolts			10/07/21 10:35	1
Oxygen, Dissolved, Client Supplied	0.30				mg/L			10/07/21 10:35	1
pH, Field	6.49				SU			10/07/21 10:35	1
Specific Conductance, Field	1920				umhos/cm			10/07/21 10:35	1
Temperature, Field	14.9				Degrees C			10/07/21 10:35	1
Turbidity, Field	15.6				NTU			10/07/21 10:35	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

**Client Sample ID: MW-303**

**Lab Sample ID: 310-217098-2**

Date Collected: 10/07/21 11:59

Matrix: Water

Date Received: 10/11/21 17:42

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	140		5.0	2.2	mg/L			10/14/21 19:14	5
Fluoride	<0.28		0.50	0.28	mg/L			10/14/21 19:14	5
Sulfate	170		5.0	2.5	mg/L			10/14/21 19:14	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		10/13/21 09:00	10/25/21 14:47	1
Arsenic	<0.75		2.0	0.75	ug/L		10/13/21 09:00	10/25/21 14:47	1
Barium	80		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 14:47	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 14:47	1
Boron	860		100	58	ug/L		10/13/21 09:00	10/25/21 14:47	1
Cadmium	0.28		0.10	0.051	ug/L		10/13/21 09:00	10/25/21 14:47	1
Calcium	190		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 14:47	1
Chromium	<1.1		5.0	1.1	ug/L		10/13/21 09:00	10/25/21 14:47	1
Cobalt	4.0		0.50	0.19	ug/L		10/13/21 09:00	10/25/21 14:47	1
Lead	<0.21		0.50	0.21	ug/L		10/13/21 09:00	10/25/21 14:47	1
Lithium	5.8 J		10	2.5	ug/L		10/13/21 09:00	10/25/21 14:47	1
Molybdenum	1.4 J		2.0	1.3	ug/L		10/13/21 09:00	10/25/21 14:47	1
Selenium	<0.96		5.0	0.96	ug/L		10/13/21 09:00	10/25/21 14:47	1
Thallium	<0.26		1.0	0.26	ug/L		10/13/21 09:00	10/25/21 14:47	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		10/20/21 13:56	10/21/21 09:18	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	720		250	130	mg/L			10/13/21 12:25	1
pH	6.8	HF	0.1	0.1	SU			10/12/21 16:55	1

## Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	649.80				ft			10/07/21 11:59	1
Oxidation Reduction Potential	66.5				millivolts			10/07/21 11:59	1
Oxygen, Dissolved, Client Supplied	0.32				mg/L			10/07/21 11:59	1
pH, Field	6.70				SU			10/07/21 11:59	1
Specific Conductance, Field	1343				umhos/cm			10/07/21 11:59	1
Temperature, Field	17.6				Degrees C			10/07/21 11:59	1
Turbidity, Field	11.1				NTU			10/07/21 11:59	1



# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

**Client Sample ID: MW-304**

**Lab Sample ID: 310-217098-3**

Date Collected: 10/08/21 07:57

Matrix: Water

Date Received: 10/11/21 17:42

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>260</b>		5.0	2.2	mg/L			10/14/21 19:29	5
Fluoride	<0.28		0.50	0.28	mg/L			10/14/21 19:29	5
<b>Sulfate</b>	<b>230</b>		5.0	2.5	mg/L			10/14/21 19:29	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:10	1
<b>Arsenic</b>	<b>0.88</b>	<b>J</b>	2.0	0.75	ug/L		10/13/21 09:00	10/25/21 15:10	1
<b>Barium</b>	<b>79</b>		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 15:10	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 15:10	1
<b>Boron</b>	<b>990</b>		100	58	ug/L		10/13/21 09:00	10/25/21 15:10	1
Cadmium	<0.051		0.10	0.051	ug/L		10/13/21 09:00	10/25/21 15:10	1
<b>Calcium</b>	<b>120</b>		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 15:10	1
Chromium	<1.1		5.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:10	1
<b>Cobalt</b>	<b>0.42</b>	<b>J</b>	0.50	0.19	ug/L		10/13/21 09:00	10/25/21 15:10	1
Lead	<0.21		0.50	0.21	ug/L		10/13/21 09:00	10/25/21 15:10	1
<b>Lithium</b>	<b>4.0</b>	<b>J</b>	10	2.5	ug/L		10/13/21 09:00	10/25/21 15:10	1
<b>Molybdenum</b>	<b>2.0</b>		2.0	1.3	ug/L		10/13/21 09:00	10/25/21 15:10	1
Selenium	<0.96		5.0	0.96	ug/L		10/13/21 09:00	10/25/21 15:10	1
Thallium	<0.26		1.0	0.26	ug/L		10/13/21 09:00	10/25/21 15:10	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		10/20/21 13:56	10/21/21 09:20	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>760</b>		250	130	mg/L			10/13/21 12:25	1
<b>pH</b>	<b>7.1</b>	<b>HF</b>	0.1	0.1	SU			10/12/21 16:54	1

## Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Ground Water Elevation</b>	<b>649.53</b>				ft			10/08/21 07:57	1
<b>Oxidation Reduction Potential</b>	<b>-78.7</b>				millivolts			10/08/21 07:57	1
<b>Oxygen, Dissolved, Client Supplied</b>	<b>0.32</b>				mg/L			10/08/21 07:57	1
<b>pH, Field</b>	<b>6.97</b>				SU			10/08/21 07:57	1
<b>Specific Conductance, Field</b>	<b>1617</b>				umhos/cm			10/08/21 07:57	1
<b>Temperature, Field</b>	<b>13.8</b>				Degrees C			10/08/21 07:57	1
<b>Turbidity, Field</b>	<b>7.3</b>				NTU			10/08/21 07:57	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

**Client Sample ID: MW-305**

**Lab Sample ID: 310-217098-4**

Date Collected: 10/06/21 13:25

Matrix: Water

Date Received: 10/11/21 17:42

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>230</b>		5.0	2.2	mg/L			10/14/21 19:45	5
Fluoride	<0.28		0.50	0.28	mg/L			10/14/21 19:45	5
<b>Sulfate</b>	<b>150</b>		5.0	2.5	mg/L			10/14/21 19:45	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:14	1
<b>Arsenic</b>	<b>0.75</b>	<b>J</b>	2.0	0.75	ug/L		10/13/21 09:00	10/25/21 15:14	1
<b>Barium</b>	<b>120</b>		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 15:14	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 15:14	1
<b>Boron</b>	<b>880</b>		100	58	ug/L		10/13/21 09:00	10/25/21 15:14	1
Cadmium	<0.051		0.10	0.051	ug/L		10/13/21 09:00	10/25/21 15:14	1
<b>Calcium</b>	<b>110</b>		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 15:14	1
Chromium	<1.1		5.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:14	1
<b>Cobalt</b>	<b>18</b>		0.50	0.19	ug/L		10/13/21 09:00	10/25/21 15:14	1
<b>Lead</b>	<b>0.29</b>	<b>J</b>	0.50	0.21	ug/L		10/13/21 09:00	10/25/21 15:14	1
<b>Lithium</b>	<b>3.1</b>	<b>J</b>	10	2.5	ug/L		10/13/21 09:00	10/25/21 15:14	1
<b>Molybdenum</b>	<b>8.1</b>		2.0	1.3	ug/L		10/13/21 09:00	10/25/21 15:14	1
Selenium	<0.96		5.0	0.96	ug/L		10/13/21 09:00	10/25/21 15:14	1
<b>Thallium</b>	<b>0.37</b>	<b>J</b>	1.0	0.26	ug/L		10/13/21 09:00	10/25/21 15:14	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		10/20/21 13:56	10/21/21 09:22	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>680</b>		250	130	mg/L			10/13/21 12:25	1
<b>pH</b>	<b>7.1</b>	<b>HF</b>	0.1	0.1	SU			10/12/21 16:53	1

## Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Ground Water Elevation</b>	<b>654.83</b>				ft			10/06/21 13:25	1
<b>Oxidation Reduction Potential</b>	<b>46.9</b>				millivolts			10/06/21 13:25	1
<b>Oxygen, Dissolved, Client Supplied</b>	<b>0.44</b>				mg/L			10/06/21 13:25	1
<b>pH, Field</b>	<b>6.94</b>				SU			10/06/21 13:25	1
<b>Specific Conductance, Field</b>	<b>1629</b>				umhos/cm			10/06/21 13:25	1
<b>Temperature, Field</b>	<b>13.7</b>				Degrees C			10/06/21 13:25	1
<b>Turbidity, Field</b>	<b>3.8</b>				NTU			10/06/21 13:25	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

**Client Sample ID: MW-305A**

**Lab Sample ID: 310-217098-5**

Date Collected: 10/08/21 09:30

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	130		5.0	2.2	mg/L			10/14/21 20:00	5
Fluoride	<0.28		0.50	0.28	mg/L			10/14/21 20:00	5
Sulfate	140		5.0	2.5	mg/L			10/14/21 20:00	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:17	1
Arsenic	<0.75		2.0	0.75	ug/L		10/13/21 09:00	10/25/21 15:17	1
Barium	84		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 15:17	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 15:17	1
Boron	200		100	58	ug/L		10/13/21 09:00	10/25/21 15:17	1
Cadmium	<0.051		0.10	0.051	ug/L		10/13/21 09:00	10/25/21 15:17	1
Calcium	150		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 15:17	1
Chromium	<1.1		5.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:17	1
Cobalt	0.94		0.50	0.19	ug/L		10/13/21 09:00	10/25/21 15:17	1
Lead	<0.21		0.50	0.21	ug/L		10/13/21 09:00	10/25/21 15:17	1
Lithium	17		10	2.5	ug/L		10/13/21 09:00	10/25/21 15:17	1
Molybdenum	4.2		2.0	1.3	ug/L		10/13/21 09:00	10/25/21 15:17	1
Selenium	<0.96		5.0	0.96	ug/L		10/13/21 09:00	10/25/21 15:17	1
Thallium	<0.26		1.0	0.26	ug/L		10/13/21 09:00	10/25/21 15:17	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		10/20/21 13:56	10/21/21 09:24	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	730		50	26	mg/L			10/13/21 12:25	1
pH	7.0	HF	0.1	0.1	SU			10/12/21 17:00	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	645.57				ft			10/08/21 09:30	1
Oxidation Reduction Potential	147.8				millivolts			10/08/21 09:30	1
Oxygen, Dissolved, Client Supplied	2.02				mg/L			10/08/21 09:30	1
pH, Field	6.90				SU			10/08/21 09:30	1
Specific Conductance, Field	1145				umhos/cm			10/08/21 09:30	1
Temperature, Field	14.7				Degrees C			10/08/21 09:30	1
Turbidity, Field	14.3				NTU			10/08/21 09:30	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

**Client Sample ID: MW-306**

**Lab Sample ID: 310-217098-6**

Date Collected: 10/08/21 09:00

Matrix: Water

Date Received: 10/11/21 17:42

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>180</b>		5.0	2.2	mg/L			10/14/21 20:16	5
Fluoride	<0.28		0.50	0.28	mg/L			10/14/21 20:16	5
<b>Sulfate</b>	<b>460</b>		5.0	2.5	mg/L			10/14/21 20:16	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:20	1
Arsenic	<0.75		2.0	0.75	ug/L		10/13/21 09:00	10/25/21 15:20	1
<b>Barium</b>	<b>71</b>		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 15:20	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 15:20	1
<b>Boron</b>	<b>730</b>		100	58	ug/L		10/13/21 09:00	10/25/21 15:20	1
<b>Cadmium</b>	<b>1.7</b>		0.10	0.051	ug/L		10/13/21 09:00	10/25/21 15:20	1
<b>Calcium</b>	<b>130</b>		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 15:20	1
Chromium	<1.1		5.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:20	1
<b>Cobalt</b>	<b>11</b>		0.50	0.19	ug/L		10/13/21 09:00	10/25/21 15:20	1
Lead	<0.21		0.50	0.21	ug/L		10/13/21 09:00	10/25/21 15:20	1
Lithium	<2.5		10	2.5	ug/L		10/13/21 09:00	10/25/21 15:20	1
<b>Molybdenum</b>	<b>6.1</b>		2.0	1.3	ug/L		10/13/21 09:00	10/25/21 15:20	1
Selenium	<0.96		5.0	0.96	ug/L		10/13/21 09:00	10/25/21 15:20	1
Thallium	<0.26		1.0	0.26	ug/L		10/13/21 09:00	10/25/21 15:20	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		10/20/21 13:56	10/21/21 09:26	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>1100</b>		50	26	mg/L			10/13/21 12:25	1
<b>pH</b>	<b>6.7</b>	HF	0.1	0.1	SU			10/12/21 16:39	1

## Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Ground Water Elevation</b>	<b>662.27</b>				ft			10/08/21 09:00	1
<b>Oxidation Reduction Potential</b>	<b>86.0</b>				millivolts			10/08/21 09:00	1
<b>Oxygen, Dissolved, Client Supplied</b>	<b>0.40</b>				mg/L			10/08/21 09:00	1
<b>pH, Field</b>	<b>6.66</b>				SU			10/08/21 09:00	1
<b>Specific Conductance, Field</b>	<b>1506</b>				umhos/cm			10/08/21 09:00	1
<b>Temperature, Field</b>	<b>14.7</b>				Degrees C			10/08/21 09:00	1
<b>Turbidity, Field</b>	<b>6.7</b>				NTU			10/08/21 09:00	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

**Client Sample ID: MW-310**

**Lab Sample ID: 310-217098-7**

Date Collected: 10/06/21 15:20

Matrix: Water

Date Received: 10/11/21 17:42

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Chloride</b>	<b>120</b>		5.0	2.2	mg/L			10/14/21 20:32	5
Fluoride	<0.28		0.50	0.28	mg/L			10/14/21 20:32	5
<b>Sulfate</b>	<b>470</b>		5.0	2.5	mg/L			10/14/21 20:32	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:24	1
<b>Arsenic</b>	<b>1.1</b>	<b>J</b>	2.0	0.75	ug/L		10/13/21 09:00	10/25/21 15:24	1
<b>Barium</b>	<b>53</b>		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 15:24	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 15:24	1
<b>Boron</b>	<b>520</b>		100	58	ug/L		10/13/21 09:00	10/25/21 15:24	1
<b>Cadmium</b>	<b>0.21</b>		0.10	0.051	ug/L		10/13/21 09:00	10/25/21 15:24	1
<b>Calcium</b>	<b>130</b>		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 15:24	1
Chromium	<1.1		5.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:24	1
<b>Cobalt</b>	<b>0.72</b>		0.50	0.19	ug/L		10/13/21 09:00	10/25/21 15:24	1
Lead	<0.21		0.50	0.21	ug/L		10/13/21 09:00	10/25/21 15:24	1
<b>Lithium</b>	<b>52</b>		10	2.5	ug/L		10/13/21 09:00	10/25/21 15:24	1
<b>Molybdenum</b>	<b>70</b>		2.0	1.3	ug/L		10/13/21 09:00	10/25/21 15:24	1
<b>Selenium</b>	<b>2.3</b>	<b>J</b>	5.0	0.96	ug/L		10/13/21 09:00	10/25/21 15:24	1
Thallium	<0.26		1.0	0.26	ug/L		10/13/21 09:00	10/25/21 15:24	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		10/20/21 13:56	10/21/21 09:28	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>930</b>		250	130	mg/L			10/13/21 12:25	1
<b>pH</b>	<b>7.1</b>	<b>HF</b>	0.1	0.1	SU			10/12/21 16:40	1

## Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Ground Water Elevation</b>	<b>638.19</b>				ft			10/06/21 15:20	1
<b>Oxidation Reduction Potential</b>	<b>96.8</b>				millivolts			10/06/21 15:20	1
<b>Oxygen, Dissolved, Client Supplied</b>	<b>0.48</b>				mg/L			10/06/21 15:20	1
<b>pH, Field</b>	<b>7.20</b>				SU			10/06/21 15:20	1
<b>Specific Conductance, Field</b>	<b>1425</b>				umhos/cm			10/06/21 15:20	1
<b>Temperature, Field</b>	<b>15.4</b>				Degrees C			10/06/21 15:20	1
<b>Turbidity, Field</b>	<b>1.0</b>				NTU			10/06/21 15:20	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

**Client Sample ID: MW-310A**

**Lab Sample ID: 310-217098-8**

Date Collected: 10/08/21 10:35

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	130		5.0	2.2	mg/L			10/14/21 21:34	5
Fluoride	0.28	J	0.50	0.28	mg/L			10/14/21 21:34	5
Sulfate	1200		20	9.8	mg/L			10/14/21 21:50	20

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:27	1
Arsenic	<0.75		2.0	0.75	ug/L		10/13/21 09:00	10/25/21 15:27	1
Barium	12		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 15:27	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 15:27	1
Boron	1500		100	58	ug/L		10/13/21 09:00	10/25/21 15:27	1
Cadmium	<0.051		0.10	0.051	ug/L		10/13/21 09:00	10/25/21 15:27	1
Calcium	80		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 15:27	1
Chromium	<1.1		5.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:27	1
Cobalt	0.45	J	0.50	0.19	ug/L		10/13/21 09:00	10/25/21 15:27	1
Lead	<0.21		0.50	0.21	ug/L		10/13/21 09:00	10/25/21 15:27	1
Lithium	280		10	2.5	ug/L		10/13/21 09:00	10/25/21 15:27	1
Molybdenum	1.9	J	2.0	1.3	ug/L		10/13/21 09:00	10/25/21 15:27	1
Selenium	<0.96		5.0	0.96	ug/L		10/13/21 09:00	10/25/21 15:27	1
Thallium	<0.26		1.0	0.26	ug/L		10/13/21 09:00	10/25/21 15:27	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		10/21/21 10:13	10/22/21 09:39	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1800		250	130	mg/L			10/13/21 12:25	1
pH	7.7	HF	0.1	0.1	SU			10/12/21 16:41	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	639.57				ft			10/08/21 10:35	1
Oxidation Reduction Potential	143.1				millivolts			10/08/21 10:35	1
Oxygen, Dissolved, Client Supplied	6.21				mg/L			10/08/21 10:35	1
pH, Field	7.65				SU			10/08/21 10:35	1
Specific Conductance, Field	2808				umhos/cm			10/08/21 10:35	1
Temperature, Field	15.6				Degrees C			10/08/21 10:35	1
Turbidity, Field	15.0				NTU			10/08/21 10:35	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-217098-9**

Date Collected: 10/08/21 11:55

Matrix: Water

Date Received: 10/11/21 17:42

## Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	140		5.0	2.2	mg/L			10/14/21 22:05	5
Fluoride	2.0		0.50	0.28	mg/L			10/14/21 22:05	5
Sulfate	1100		20	9.8	mg/L			10/14/21 22:21	20

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:31	1
Arsenic	<0.75		2.0	0.75	ug/L		10/13/21 09:00	10/25/21 15:31	1
Barium	8.7		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 15:31	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 15:31	1
Boron	1400		100	58	ug/L		10/13/21 09:00	10/25/21 15:31	1
Cadmium	<0.051		0.10	0.051	ug/L		10/13/21 09:00	10/25/21 15:31	1
Calcium	40		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 15:31	1
Chromium	<1.1		5.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:31	1
Cobalt	<0.19		0.50	0.19	ug/L		10/13/21 09:00	10/25/21 15:31	1
Lead	<0.21		0.50	0.21	ug/L		10/13/21 09:00	10/25/21 15:31	1
Lithium	290		10	2.5	ug/L		10/13/21 09:00	10/25/21 15:31	1
Molybdenum	<1.3		2.0	1.3	ug/L		10/13/21 09:00	10/25/21 15:31	1
Selenium	<0.96		5.0	0.96	ug/L		10/13/21 09:00	10/25/21 15:31	1
Thallium	<0.26		1.0	0.26	ug/L		10/13/21 09:00	10/25/21 15:31	1

## Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		10/21/21 10:13	10/22/21 09:41	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	2000		250	130	mg/L			10/13/21 12:25	1
pH	7.9	HF	0.1	0.1	SU			10/12/21 17:01	1

## Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	640.58				ft			10/08/21 11:55	1
Oxidation Reduction Potential	140.7				millivolts			10/08/21 11:55	1
Oxygen, Dissolved, Client Supplied	1.68				mg/L			10/08/21 11:55	1
pH, Field	8.12				SU			10/08/21 11:55	1
Specific Conductance, Field	2930				umhos/cm			10/08/21 11:55	1
Temperature, Field	15.1				Degrees C			10/08/21 11:55	1
Turbidity, Field	9.6				NTU			10/08/21 11:55	1

# Definitions/Glossary

Client: SCS Engineers  
Project/Site: Ottawa Generating Station - 25221072

Job ID: 310-217098-1

## 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
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### General Chemistry

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

## Glossary

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



# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

## Method: 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 310-332306/3**  
**Matrix: Water**  
**Analysis Batch: 332306**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.43		1.0	0.43	mg/L			10/14/21 15:17	1
Fluoride	<0.055		0.10	0.055	mg/L			10/14/21 15:17	1
Sulfate	<0.49		1.0	0.49	mg/L			10/14/21 15:17	1

**Lab Sample ID: LCS 310-332306/4**  
**Matrix: Water**  
**Analysis Batch: 332306**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	10.0	10.1		mg/L		101	90 - 110
Fluoride	2.00	2.06		mg/L		103	90 - 110
Sulfate	10.0	10.4		mg/L		104	90 - 110

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

**Lab Sample ID: MB 310-331427/1-A**  
**Matrix: Water**  
**Analysis Batch: 332861**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 331427**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		10/13/21 09:00	10/25/21 14:36	1
Arsenic	<0.75		2.0	0.75	ug/L		10/13/21 09:00	10/25/21 14:36	1
Barium	<0.37		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 14:36	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 14:36	1
Boron	<58		100	58	ug/L		10/13/21 09:00	10/25/21 14:36	1
Cadmium	<0.051		0.10	0.051	ug/L		10/13/21 09:00	10/25/21 14:36	1
Calcium	<0.19		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 14:36	1
Chromium	<1.1		5.0	1.1	ug/L		10/13/21 09:00	10/25/21 14:36	1
Cobalt	<0.19		0.50	0.19	ug/L		10/13/21 09:00	10/25/21 14:36	1
Lead	<0.21		0.50	0.21	ug/L		10/13/21 09:00	10/25/21 14:36	1
Lithium	<2.5		10	2.5	ug/L		10/13/21 09:00	10/25/21 14:36	1
Molybdenum	<1.3		2.0	1.3	ug/L		10/13/21 09:00	10/25/21 14:36	1
Selenium	<0.96		5.0	0.96	ug/L		10/13/21 09:00	10/25/21 14:36	1
Thallium	<0.26		1.0	0.26	ug/L		10/13/21 09:00	10/25/21 14:36	1

**Lab Sample ID: LCS 310-331427/2-A**  
**Matrix: Water**  
**Analysis Batch: 332861**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 331427**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	200	189		ug/L		95	80 - 120
Arsenic	200	201		ug/L		100	80 - 120
Barium	100	105		ug/L		105	80 - 120
Beryllium	100	101		ug/L		101	80 - 120
Boron	200	189		ug/L		94	80 - 120
Cadmium	100	99.5		ug/L		99	80 - 120
Calcium	2.00	1.85		mg/L		93	80 - 120
Chromium	100	101		ug/L		101	80 - 120
Cobalt	100	106		ug/L		106	80 - 120

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# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

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

**Lab Sample ID: LCS 310-331427/2-A**  
**Matrix: Water**  
**Analysis Batch: 332861**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 331427**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	200	211		ug/L		105	80 - 120
Lithium	200	199		ug/L		100	80 - 120
Molybdenum	200	194		ug/L		97	80 - 120
Selenium	400	377		ug/L		94	80 - 120
Thallium	200	211		ug/L		106	80 - 120

**Lab Sample ID: 310-217098-2 MS**  
**Matrix: Water**  
**Analysis Batch: 332861**

**Client Sample ID: MW-303**  
**Prep Type: Total/NA**  
**Prep Batch: 331427**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	<1.1		200	197		ug/L		98	75 - 125
Arsenic	<0.75		200	211		ug/L		105	75 - 125
Barium	80		100	197		ug/L		117	75 - 125
Beryllium	<0.27		100	105		ug/L		105	75 - 125
Boron	860		200	1120	4	ug/L		131	75 - 125
Cadmium	0.28		100	99.4		ug/L		99	75 - 125
Calcium	190		2.00	204	4	mg/L		556	75 - 125
Chromium	<1.1		100	104		ug/L		104	75 - 125
Cobalt	4.0		100	111		ug/L		107	75 - 125
Lead	<0.21		200	205		ug/L		102	75 - 125
Lithium	5.8	J	200	214		ug/L		104	75 - 125
Molybdenum	1.4	J	200	215		ug/L		107	75 - 125
Selenium	<0.96		400	399		ug/L		100	75 - 125
Thallium	<0.26		200	200		ug/L		100	75 - 125

**Lab Sample ID: 310-217098-2 MSD**  
**Matrix: Water**  
**Analysis Batch: 332861**

**Client Sample ID: MW-303**  
**Prep Type: Total/NA**  
**Prep Batch: 331427**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	<1.1		200	203		ug/L		102	75 - 125	3	20
Arsenic	<0.75		200	217		ug/L		109	75 - 125	3	20
Barium	80		100	198		ug/L		118	75 - 125	1	20
Beryllium	<0.27		100	107		ug/L		107	75 - 125	1	20
Boron	860		200	1130	4	ug/L		134	75 - 125	1	20
Cadmium	0.28		100	103		ug/L		102	75 - 125	3	20
Calcium	190		2.00	207	4	mg/L		683	75 - 125	1	20
Chromium	<1.1		100	106		ug/L		106	75 - 125	1	20
Cobalt	4.0		100	112		ug/L		107	75 - 125	1	20
Lead	<0.21		200	212		ug/L		106	75 - 125	3	20
Lithium	5.8	J	200	217		ug/L		106	75 - 125	2	20
Molybdenum	1.4	J	200	215		ug/L		107	75 - 125	0	20
Selenium	<0.96		400	414		ug/L		104	75 - 125	4	20
Thallium	<0.26		200	208		ug/L		104	75 - 125	4	20

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

## Method: 7470A - Mercury (CVAA)

**Lab Sample ID: MB 310-332319/1-A**  
**Matrix: Water**  
**Analysis Batch: 332502**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 332319**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		10/20/21 13:56	10/21/21 08:26	1

**Lab Sample ID: LCS 310-332319/2-A**  
**Matrix: Water**  
**Analysis Batch: 332502**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 332319**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	1.67	1.70		ug/L		102	80 - 120

**Lab Sample ID: MB 310-332451/1-A**  
**Matrix: Water**  
**Analysis Batch: 332662**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 332451**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		10/21/21 10:13	10/22/21 09:09	1

**Lab Sample ID: LCS 310-332451/2-A**  
**Matrix: Water**  
**Analysis Batch: 332662**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 332451**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	1.67	1.71		ug/L		103	80 - 120

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

**Lab Sample ID: MB 310-331505/1**  
**Matrix: Water**  
**Analysis Batch: 331505**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<26		50	26	mg/L			10/13/21 12:25	1

**Lab Sample ID: LCS 310-331505/2**  
**Matrix: Water**  
**Analysis Batch: 331505**

**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	912		mg/L		91	90 - 110

**Lab Sample ID: 310-217098-4 DU**  
**Matrix: Water**  
**Analysis Batch: 331505**

**Client Sample ID: MW-305**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	680		720		mg/L		6	20

# QC Sample Results

Client: SCS Engineers  
Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

## Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-331376/1  
Matrix: Water  
Analysis Batch: 331376

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

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

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

# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

## HPLC/IC

### Analysis Batch: 332306

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217098-1	MW-302	Total/NA	Water	9056A	
310-217098-1	MW-302	Total/NA	Water	9056A	
310-217098-2	MW-303	Total/NA	Water	9056A	
310-217098-3	MW-304	Total/NA	Water	9056A	
310-217098-4	MW-305	Total/NA	Water	9056A	
310-217098-5	MW-305A	Total/NA	Water	9056A	
310-217098-6	MW-306	Total/NA	Water	9056A	
310-217098-7	MW-310	Total/NA	Water	9056A	
310-217098-8	MW-310A	Total/NA	Water	9056A	
310-217098-8	MW-310A	Total/NA	Water	9056A	
310-217098-9	MW-311A	Total/NA	Water	9056A	
310-217098-9	MW-311A	Total/NA	Water	9056A	
MB 310-332306/3	Method Blank	Total/NA	Water	9056A	
LCS 310-332306/4	Lab Control Sample	Total/NA	Water	9056A	

## Metals

### Prep Batch: 331427

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217098-1	MW-302	Total/NA	Water	3010A	
310-217098-2	MW-303	Total/NA	Water	3010A	
310-217098-3	MW-304	Total/NA	Water	3010A	
310-217098-4	MW-305	Total/NA	Water	3010A	
310-217098-5	MW-305A	Total/NA	Water	3010A	
310-217098-6	MW-306	Total/NA	Water	3010A	
310-217098-7	MW-310	Total/NA	Water	3010A	
310-217098-8	MW-310A	Total/NA	Water	3010A	
310-217098-9	MW-311A	Total/NA	Water	3010A	
MB 310-331427/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-331427/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-217098-2 MS	MW-303	Total/NA	Water	3010A	
310-217098-2 MSD	MW-303	Total/NA	Water	3010A	

### Prep Batch: 332319

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217098-1	MW-302	Total/NA	Water	7470A	
310-217098-2	MW-303	Total/NA	Water	7470A	
310-217098-3	MW-304	Total/NA	Water	7470A	
310-217098-4	MW-305	Total/NA	Water	7470A	
310-217098-5	MW-305A	Total/NA	Water	7470A	
310-217098-6	MW-306	Total/NA	Water	7470A	
310-217098-7	MW-310	Total/NA	Water	7470A	
MB 310-332319/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-332319/2-A	Lab Control Sample	Total/NA	Water	7470A	

### Prep Batch: 332451

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217098-8	MW-310A	Total/NA	Water	7470A	
310-217098-9	MW-311A	Total/NA	Water	7470A	
MB 310-332451/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-332451/2-A	Lab Control Sample	Total/NA	Water	7470A	

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# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

## Metals

### Analysis Batch: 332502

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217098-1	MW-302	Total/NA	Water	7470A	332319
310-217098-2	MW-303	Total/NA	Water	7470A	332319
310-217098-3	MW-304	Total/NA	Water	7470A	332319
310-217098-4	MW-305	Total/NA	Water	7470A	332319
310-217098-5	MW-305A	Total/NA	Water	7470A	332319
310-217098-6	MW-306	Total/NA	Water	7470A	332319
310-217098-7	MW-310	Total/NA	Water	7470A	332319
MB 310-332319/1-A	Method Blank	Total/NA	Water	7470A	332319
LCS 310-332319/2-A	Lab Control Sample	Total/NA	Water	7470A	332319

### Analysis Batch: 332662

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217098-8	MW-310A	Total/NA	Water	7470A	332451
310-217098-9	MW-311A	Total/NA	Water	7470A	332451
MB 310-332451/1-A	Method Blank	Total/NA	Water	7470A	332451
LCS 310-332451/2-A	Lab Control Sample	Total/NA	Water	7470A	332451

### Analysis Batch: 332861

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217098-1	MW-302	Total/NA	Water	6020A	331427
310-217098-2	MW-303	Total/NA	Water	6020A	331427
310-217098-3	MW-304	Total/NA	Water	6020A	331427
310-217098-4	MW-305	Total/NA	Water	6020A	331427
310-217098-5	MW-305A	Total/NA	Water	6020A	331427
310-217098-6	MW-306	Total/NA	Water	6020A	331427
310-217098-7	MW-310	Total/NA	Water	6020A	331427
310-217098-8	MW-310A	Total/NA	Water	6020A	331427
310-217098-9	MW-311A	Total/NA	Water	6020A	331427
MB 310-331427/1-A	Method Blank	Total/NA	Water	6020A	331427
LCS 310-331427/2-A	Lab Control Sample	Total/NA	Water	6020A	331427
310-217098-2 MS	MW-303	Total/NA	Water	6020A	331427
310-217098-2 MSD	MW-303	Total/NA	Water	6020A	331427

## General Chemistry

### Analysis Batch: 331376

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217098-1	MW-302	Total/NA	Water	SM 4500 H+ B	
310-217098-2	MW-303	Total/NA	Water	SM 4500 H+ B	
310-217098-3	MW-304	Total/NA	Water	SM 4500 H+ B	
310-217098-4	MW-305	Total/NA	Water	SM 4500 H+ B	
310-217098-5	MW-305A	Total/NA	Water	SM 4500 H+ B	
310-217098-6	MW-306	Total/NA	Water	SM 4500 H+ B	
310-217098-7	MW-310	Total/NA	Water	SM 4500 H+ B	
310-217098-8	MW-310A	Total/NA	Water	SM 4500 H+ B	
310-217098-9	MW-311A	Total/NA	Water	SM 4500 H+ B	
LCS 310-331376/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

### Analysis Batch: 331505

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217098-1	MW-302	Total/NA	Water	SM 2540C	

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# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

## General Chemistry (Continued)

### Analysis Batch: 331505 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217098-2	MW-303	Total/NA	Water	SM 2540C	
310-217098-3	MW-304	Total/NA	Water	SM 2540C	
310-217098-4	MW-305	Total/NA	Water	SM 2540C	
310-217098-5	MW-305A	Total/NA	Water	SM 2540C	
310-217098-6	MW-306	Total/NA	Water	SM 2540C	
310-217098-7	MW-310	Total/NA	Water	SM 2540C	
310-217098-8	MW-310A	Total/NA	Water	SM 2540C	
310-217098-9	MW-311A	Total/NA	Water	SM 2540C	
MB 310-331505/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-331505/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-217098-4 DU	MW-305	Total/NA	Water	SM 2540C	

## Field Service / Mobile Lab

### Analysis Batch: 331984

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217098-1	MW-302	Total/NA	Water	Field Sampling	
310-217098-2	MW-303	Total/NA	Water	Field Sampling	
310-217098-3	MW-304	Total/NA	Water	Field Sampling	
310-217098-4	MW-305	Total/NA	Water	Field Sampling	
310-217098-5	MW-305A	Total/NA	Water	Field Sampling	
310-217098-6	MW-306	Total/NA	Water	Field Sampling	
310-217098-7	MW-310	Total/NA	Water	Field Sampling	
310-217098-8	MW-310A	Total/NA	Water	Field Sampling	
310-217098-9	MW-311A	Total/NA	Water	Field Sampling	

# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

**Client Sample ID: MW-302**

**Date Collected: 10/07/21 10:35**

**Date Received: 10/11/21 17:42**

**Lab Sample ID: 310-217098-1**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	332306	10/14/21 18:58	JNR	TAL CF
Total/NA	Analysis	9056A		20	332306	10/15/21 16:01	JNR	TAL CF
Total/NA	Prep	3010A			331427	10/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332861	10/25/21 14:43	SAP	TAL CF
Total/NA	Prep	7470A			332319	10/20/21 13:56	EAM	TAL CF
Total/NA	Analysis	7470A		1	332502	10/21/21 09:15	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	331505	10/13/21 12:25	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	331376	10/12/21 16:36	ARG	TAL CF
Total/NA	Analysis	Field Sampling		1	331984	10/07/21 10:35	SLD	TAL CF

**Client Sample ID: MW-303**

**Date Collected: 10/07/21 11:59**

**Date Received: 10/11/21 17:42**

**Lab Sample ID: 310-217098-2**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	332306	10/14/21 19:14	JNR	TAL CF
Total/NA	Prep	3010A			331427	10/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332861	10/25/21 14:47	SAP	TAL CF
Total/NA	Prep	7470A			332319	10/20/21 13:56	EAM	TAL CF
Total/NA	Analysis	7470A		1	332502	10/21/21 09:18	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	331505	10/13/21 12:25	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	331376	10/12/21 16:55	ARG	TAL CF
Total/NA	Analysis	Field Sampling		1	331984	10/07/21 11:59	SLD	TAL CF

**Client Sample ID: MW-304**

**Date Collected: 10/08/21 07:57**

**Date Received: 10/11/21 17:42**

**Lab Sample ID: 310-217098-3**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	332306	10/14/21 19:29	JNR	TAL CF
Total/NA	Prep	3010A			331427	10/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332861	10/25/21 15:10	SAP	TAL CF
Total/NA	Prep	7470A			332319	10/20/21 13:56	EAM	TAL CF
Total/NA	Analysis	7470A		1	332502	10/21/21 09:20	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	331505	10/13/21 12:25	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	331376	10/12/21 16:54	ARG	TAL CF
Total/NA	Analysis	Field Sampling		1	331984	10/08/21 07:57	SLD	TAL CF

**Client Sample ID: MW-305**

**Date Collected: 10/06/21 13:25**

**Date Received: 10/11/21 17:42**

**Lab Sample ID: 310-217098-4**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	332306	10/14/21 19:45	JNR	TAL CF

Eurofins TestAmerica, Cedar Falls



# Lab Chronicle

Client: SCS Engineers  
 Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

**Client Sample ID: MW-305**  
**Date Collected: 10/06/21 13:25**  
**Date Received: 10/11/21 17:42**

**Lab Sample ID: 310-217098-4**  
**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			331427	10/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332861	10/25/21 15:14	SAP	TAL CF
Total/NA	Prep	7470A			332319	10/20/21 13:56	EAM	TAL CF
Total/NA	Analysis	7470A		1	332502	10/21/21 09:22	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	331505	10/13/21 12:25	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	331376	10/12/21 16:53	ARG	TAL CF
Total/NA	Analysis	Field Sampling		1	331984	10/06/21 13:25	SLD	TAL CF

**Client Sample ID: MW-305A**  
**Date Collected: 10/08/21 09:30**  
**Date Received: 10/11/21 17:42**

**Lab Sample ID: 310-217098-5**  
**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	332306	10/14/21 20:00	JNR	TAL CF
Total/NA	Prep	3010A			331427	10/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332861	10/25/21 15:17	SAP	TAL CF
Total/NA	Prep	7470A			332319	10/20/21 13:56	EAM	TAL CF
Total/NA	Analysis	7470A		1	332502	10/21/21 09:24	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	331505	10/13/21 12:25	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	331376	10/12/21 17:00	ARG	TAL CF
Total/NA	Analysis	Field Sampling		1	331984	10/08/21 09:30	SLD	TAL CF

**Client Sample ID: MW-306**  
**Date Collected: 10/08/21 09:00**  
**Date Received: 10/11/21 17:42**

**Lab Sample ID: 310-217098-6**  
**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	332306	10/14/21 20:16	JNR	TAL CF
Total/NA	Prep	3010A			331427	10/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332861	10/25/21 15:20	SAP	TAL CF
Total/NA	Prep	7470A			332319	10/20/21 13:56	EAM	TAL CF
Total/NA	Analysis	7470A		1	332502	10/21/21 09:26	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	331505	10/13/21 12:25	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	331376	10/12/21 16:39	ARG	TAL CF
Total/NA	Analysis	Field Sampling		1	331984	10/08/21 09:00	SLD	TAL CF

**Client Sample ID: MW-310**  
**Date Collected: 10/06/21 15:20**  
**Date Received: 10/11/21 17:42**

**Lab Sample ID: 310-217098-7**  
**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	332306	10/14/21 20:32	JNR	TAL CF
Total/NA	Prep	3010A			331427	10/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332861	10/25/21 15:24	SAP	TAL CF

# Lab Chronicle

Client: SCS Engineers  
 Project/Site: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

## Client Sample ID: MW-310

Lab Sample ID: 310-217098-7

Date Collected: 10/06/21 15:20

Matrix: Water

Date Received: 10/11/21 17:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	7470A			332319	10/20/21 13:56	EAM	TAL CF
Total/NA	Analysis	7470A		1	332502	10/21/21 09:28	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	331505	10/13/21 12:25	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	331376	10/12/21 16:40	ARG	TAL CF
Total/NA	Analysis	Field Sampling		1	331984	10/06/21 15:20	SLD	TAL CF

## Client Sample ID: MW-310A

Lab Sample ID: 310-217098-8

Date Collected: 10/08/21 10:35

Matrix: Water

Date Received: 10/11/21 17:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	332306	10/14/21 21:34	JNR	TAL CF
Total/NA	Analysis	9056A		20	332306	10/14/21 21:50	JNR	TAL CF
Total/NA	Prep	3010A			331427	10/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332861	10/25/21 15:27	SAP	TAL CF
Total/NA	Prep	7470A			332451	10/21/21 10:13	EAM	TAL CF
Total/NA	Analysis	7470A		1	332662	10/22/21 09:39	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	331505	10/13/21 12:25	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	331376	10/12/21 16:41	ARG	TAL CF
Total/NA	Analysis	Field Sampling		1	331984	10/08/21 10:35	SLD	TAL CF

## Client Sample ID: MW-311A

Lab Sample ID: 310-217098-9

Date Collected: 10/08/21 11:55

Matrix: Water

Date Received: 10/11/21 17:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	332306	10/14/21 22:05	JNR	TAL CF
Total/NA	Analysis	9056A		20	332306	10/14/21 22:21	JNR	TAL CF
Total/NA	Prep	3010A			331427	10/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332861	10/25/21 15:31	SAP	TAL CF
Total/NA	Prep	7470A			332451	10/21/21 10:13	EAM	TAL CF
Total/NA	Analysis	7470A		1	332662	10/22/21 09:41	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	331505	10/13/21 12:25	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	331376	10/12/21 17:01	ARG	TAL CF
Total/NA	Analysis	Field Sampling		1	331984	10/08/21 11:55	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: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

## 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: Ottuwa Generating Station - 25221072

Job ID: 310-217098-1

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"

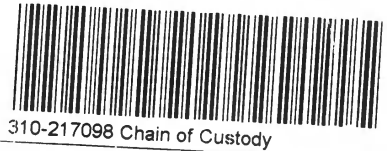
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

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



Environment Testing  
TestAmerica



310-217098 Chain of Custody

### Cooler/Sample Receipt and Temperature Log Form

<b>Client Information</b>			
Client: SCS Engineers			
City/State:	CITY Madison	STATE WI	Project: Ottumwa Generating Station App III/IV
<b>Receipt Information</b>			
Date/Time Received:	DATE 10-11-21	TIME 1742	Received By: HED
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: _____		
<b>Condition of Cooler/Containers</b>			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: AC38	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>2</u>	
Cooler Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
<b>Temperature Record</b>			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: N	Correction Factor (°C): 0		
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): 3.9	Corrected Temp (°C): 3.9		
<b>Sample Container Temperature</b>			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
<b>Exceptions Noted</b>			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
<b>Additional Comments</b>			
Contained MW-302, MW-303, MW-304, MW-305, MW-305A			



Environment Testing  
TestAmerica

Place COC scanning label here

### Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS Engineers</u>			
City/State:	CITY <u>Madison</u>	STATE <u>WI</u>	Project:
Receipt Information			
Date/Time Received:	DATE <u>10-11-21</u>	TIME <u>1742</u>	Received By: <u>HED</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AC39</u>	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>2</u> of <u>2</u>	
Cooler Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>N</u>	Correction Factor (°C): <u>0</u>		
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>1.7</u>	Corrected Temp (°C): <u>1.7</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			

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	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 - REQUIRES SEPARATE COC	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)																3	
	Iron (filtered)																	3
	Lithium (filtered)																	3
	Manganese (filtered)																	14
Field Parameters	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:\25221072-00\Data and Calculations\Field Work Requests\OGS CCR Rule\_Sampling\_2104.xls\Sheet1

<b>Client Information</b>		Sampler: <i>Rosa Cruz</i>	Lab PMI: Fredrick, Sandie	Carrier Tracking No(s):	COC No: 310-64465-17487.1
Client Contact: Meghan Blodgett		Phone: <i>608-509-8245</i>	E-Mail: <i>sandra.fredrick@eurofinset.com</i>	State of Origin:	Page: Page 1 of 1
Company: SCS Engineers		PWSID:	Job #:		
Address: 2830 Dairy Drive		Due Date Requested:	Analysis Requested		
City: Madison		TAT Requested (days):	Perform MS/MSD (Yes or No)		
State, Zip: WI, 53718		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Field Filtered Sample (Yes or No)		
Phone:		PO #: 25221072	903 0 - Radium-226 (GFC)		
Email: <i>mblodgett@scsengineers.com</i>		WC #:	904 0 - Radium-228 (GFC)		
Project Name: <i>Ottumwa Generating Station - 25221072 App III/IV (2)</i>		Project #: 31011020	9056A - ORGM_28D - Chloride, Fluoride & Sulfate		
Site: <i>App III/IV (2)</i>		SSOW#:	5020A, 7470A		
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=soil, B=fluid, A=air)
MW-302		10-7-21	10:35	G	Water
MW-303		10-7-21	11:59	G	Water
MW-304		10-8-21	7:57	G	Water
MW-305		10-6-21	13:25	G	Water
MW-305A		10-08-21	9:30	G	Water
MW-306		10-8-21	9:00	G	Water
MW-310		10-06-21	15:26	G	Water
MW-310A		10-08-21	10:35	G	Water
MW-311					Water
MW-311A		10-08-21	11:55	G	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):					
Empty Kit Relinquished by: <i>Rosa Cruz</i> Date: 10-11-21 6:00 Relinquished by: <i>Rosa Cruz</i> Date/Time: 10-11-21 6:00 Relinquished by: Date/Time: Relinquished by: Date/Time:					
Custody Seals Intact: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Custody Seal No.:					
Received by: <i>MM QA</i> Date/Time: 10-11-21 1742 Received by: Date/Time: Received by: Date/Time:			Method of Shipment: Date/Time: Date/Time: Date/Time:		
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months					
Special Instructions/QC Requirements:					
Total Number of containers:					
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:					





## Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-217098-1

SDG Number:

**Login Number: 217098**

**List Number: 1**

**Creator: Homolar, Dana J**

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

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



**Table 1. Groundwater Monitoring Results - Field Parameters**  
**Ottumwa Generating Station / SCS Engineers Project No. 25221072.00**  
**October 2021**

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	10/7/2021 8:29	681.95	17.9	6.26	4.17	1,062	207.3	8.9
MW-302	10/7/2021 10:35	654.86	14.9	6.49	0.30	1,920	211.5	15.6
MW-303	10/7/2021 11:59	649.80	17.6	6.70	0.32	1,343	66.5	11.1
MW-304	10/8/2021 7:57	649.53	13.8	6.97	0.32	1,617	-78.7	7.3
MW-305	10/6/2021 13:25	654.83	13.7	6.94	0.44	1,629	46.9	3.8
MW-305A	10/8/2021 9:30	645.57	14.7	6.90	2.02	1,145	147.8	14.3
MW-306	10/8/2021 9:00	662.27	14.7	6.66	0.40	1,506	86.0	6.7
MW-307	10/7/2021 15:47	644.49	14.4	6.71	0.19	1,552	-23.8	10.0
MW-308	10/7/2021 15:05	641.81	13.0	6.83	0.17	1,453	-26.1	12.8
MW-309	10/7/2021 18:02	640.71	13.1	7.18	0.21	1,297	-8.1	19.6
MW-310	10/6/2021 15:20	638.19	15.4	7.20	0.48	1,425	96.8	1.0
MW-310A	10/8/2021 10:35	639.57	15.6	7.65	6.21	2,808	143.1	15.0
MW-311	10/6/2021 17:10	Dry	NM	NM	NM	NM	NM	NM
MW-311A	10/8/2021 11:55	640.58	15.1	8.12	1.68	2,930	140.7	9.6

Abbreviations:

mg/L = milligrams per liter

amsl = above mean sea level

NA = Not Analyzed

NM= Not Measured

Notes:

none

Created by: NDK  
 Last revision by: JSN  
 Checked by: NDK

Date: 10/15/2021  
 Date: 10/15/2021  
 Date: 10/15/2021

C:\Users\FredrickS\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\MM4BE9B8\2110\_Oct - OGS\_CCR\_Field.xlsx]GW Field Parameters

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-217098-2

Client Project/Site: Ottumwa Generating Station - 25221072

**For:**

SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:  
11/14/2021 6:44:28 PM*

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

### LINKS

Review your project  
results through  
**Total Access**

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[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

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

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



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Sample Summary . . . . .	4
Detection Summary . . . . .	5
Client Sample Results . . . . .	6
Definitions . . . . .	15
QC Sample Results . . . . .	16
QC Association . . . . .	18
Chronicle . . . . .	19
Certification Summary . . . . .	22
Method Summary . . . . .	23
Chain of Custody . . . . .	24
Receipt Checklists . . . . .	28
Tracer Carrier Summary . . . . .	30

# Case Narrative

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

## Job ID: 310-217098-2

### Laboratory: Eurofins TestAmerica, Cedar Falls

#### Narrative

#### Job Narrative 310-217098-2

#### Comments

No additional comments.

#### Receipt

The samples were received on 10/11/2021 5:42 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 1.7° C and 3.9° C.

#### RAD

Methods 903.0, 9315: Radium 226 batch 531985 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-302 (310-217098-1), MW-303 (310-217098-2), MW-304 (310-217098-3), MW-305 (310-217098-4), MW-305A (310-217098-5), MW-306 (310-217098-6), MW-310 (310-217098-7), MW-310A (310-217098-8), MW-311A (310-217098-9), (LCS 160-531985/1-A), (LCSD 160-531985/2-A) and (MB 160-531985/23-A)

Methods 904.0, 9320: Radium 228 batch 531994 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-302 (310-217098-1), MW-303 (310-217098-2), MW-304 (310-217098-3), MW-305 (310-217098-4), MW-305A (310-217098-5), MW-306 (310-217098-6), MW-310 (310-217098-7), MW-310A (310-217098-8), MW-311A (310-217098-9), (LCS 160-531994/1-A), (LCSD 160-531994/2-A) and (MB 160-531994/23-A)

Method PrecSep\_0: Radium-228 Prep Batch 160-531994 The following samples were prepared at a reduced aliquot due to Matrix: MW-302 (310-217098-1), MW-303 (310-217098-2), MW-304 (310-217098-3), MW-305 (310-217098-4), MW-310 (310-217098-7), MW-310A (310-217098-8) and MW-311A (310-217098-9). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precision.

Method PrecSep\_0: Radium-228 Prep Batch 160-531994 Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-305A (310-217098-5) and MW-306 (310-217098-6). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep-21: Radium-226 Prep Batch 160-531985 The following samples were prepared at a reduced aliquot due to Matrix: MW-302 (310-217098-1), MW-303 (310-217098-2), MW-304 (310-217098-3), MW-305 (310-217098-4), MW-310 (310-217098-7), MW-310A (310-217098-8) and MW-311A (310-217098-9). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead of a sample duplicate (DUP) to demonstrate batch precision.

Method PrecSep-21: Radium-226 Prep Batch 160-531985 Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-305A (310-217098-5) and MW-306 (310-217098-6). 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 - 25221072

Job ID: 310-217098-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-217098-1	MW-302	Water	10/07/21 10:35	10/11/21 17:42
310-217098-2	MW-303	Water	10/07/21 11:59	10/11/21 17:42
310-217098-3	MW-304	Water	10/08/21 07:57	10/11/21 17:42
310-217098-4	MW-305	Water	10/06/21 13:25	10/11/21 17:42
310-217098-5	MW-305A	Water	10/08/21 09:30	10/11/21 17:42
310-217098-6	MW-306	Water	10/08/21 09:00	10/11/21 17:42
310-217098-7	MW-310	Water	10/06/21 15:20	10/11/21 17:42
310-217098-8	MW-310A	Water	10/08/21 10:35	10/11/21 17:42
310-217098-9	MW-311A	Water	10/08/21 11:55	10/11/21 17:42

- 1
- 2
- 3
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- 8
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- 11
- 12
- 13
- 14
- 15

# Detection Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

<b>Client Sample ID: MW-302</b>	<b>Lab Sample ID: 310-217098-1</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-303</b>	<b>Lab Sample ID: 310-217098-2</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-304</b>	<b>Lab Sample ID: 310-217098-3</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-305</b>	<b>Lab Sample ID: 310-217098-4</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-305A</b>	<b>Lab Sample ID: 310-217098-5</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-306</b>	<b>Lab Sample ID: 310-217098-6</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-310</b>	<b>Lab Sample ID: 310-217098-7</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-310A</b>	<b>Lab Sample ID: 310-217098-8</b>
<input type="checkbox"/> No Detections.	
<b>Client Sample ID: MW-311A</b>	<b>Lab Sample ID: 310-217098-9</b>
<input type="checkbox"/> 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 - 25221072

Job ID: 310-217098-2

**Client Sample ID: MW-302**

**Lab Sample ID: 310-217098-1**

Date Collected: 10/07/21 10:35

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	1.32		0.572	0.584	1.00	0.675	pCi/L	10/15/21 10:26	11/08/21 17:38	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	64.8		40 - 110					10/15/21 10:26	11/08/21 17:38	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	0.132	U	0.427	0.427	1.00	0.744	pCi/L	10/15/21 11:06	11/08/21 12:52	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	64.8		40 - 110					10/15/21 11:06	11/08/21 12:52	1
Y Carrier	82.2		40 - 110					10/15/21 11:06	11/08/21 12:52	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	1.45		0.714	0.723	5.00	0.744	pCi/L		11/12/21 20:04	1



# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

**Client Sample ID: MW-303**

**Lab Sample ID: 310-217098-2**

Date Collected: 10/07/21 11:59

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	0.639		0.362	0.366	1.00	0.476	pCi/L	10/15/21 10:26	11/08/21 17:38	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	93.8		40 - 110					10/15/21 10:26	11/08/21 17:38	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	0.277	U	0.313	0.314	1.00	0.514	pCi/L	10/15/21 11:06	11/08/21 12:52	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	93.8		40 - 110					10/15/21 11:06	11/08/21 12:52	1
Y Carrier	84.1		40 - 110					10/15/21 11:06	11/08/21 12:52	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	0.916		0.479	0.482	5.00	0.514	pCi/L		11/12/21 20:04	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

**Client Sample ID: MW-304**

**Lab Sample ID: 310-217098-3**

Date Collected: 10/08/21 07:57

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	1.84		0.558	0.582	1.00	0.546	pCi/L	10/15/21 10:26	11/08/21 17:38	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	83.9		40 - 110					10/15/21 10:26	11/08/21 17:38	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	1.65		0.472	0.495	1.00	0.600	pCi/L	10/15/21 11:06	11/08/21 12:58	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	83.9		40 - 110					10/15/21 11:06	11/08/21 12:58	1
Y Carrier	81.5		40 - 110					10/15/21 11:06	11/08/21 12:58	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	3.49		0.731	0.764	5.00	0.600	pCi/L		11/12/21 20:04	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

**Client Sample ID: MW-305**

**Lab Sample ID: 310-217098-4**

Date Collected: 10/06/21 13:25

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	0.835		0.462	0.468	1.00	0.630	pCi/L	10/15/21 10:26	11/08/21 17:39	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	92.5		40 - 110					10/15/21 10:26	11/08/21 17:39	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	0.823		0.359	0.367	1.00	0.508	pCi/L	10/15/21 11:06	11/08/21 12:58	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	92.5		40 - 110					10/15/21 11:06	11/08/21 12:58	1
Y Carrier	81.5		40 - 110					10/15/21 11:06	11/08/21 12:58	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	1.66		0.585	0.595	5.00	0.630	pCi/L		11/12/21 20:04	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

**Client Sample ID: MW-305A**

**Lab Sample ID: 310-217098-5**

Date Collected: 10/08/21 09:30

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	2.45		0.501	0.547	1.00	0.391	pCi/L	10/15/21 10:26	11/08/21 17:39	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	104		40 - 110					10/15/21 10:26	11/08/21 17:39	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	0.514		0.229	0.233	1.00	0.325	pCi/L	10/15/21 11:06	11/08/21 12:58	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	104		40 - 110					10/15/21 11:06	11/08/21 12:58	1
Y Carrier	84.9		40 - 110					10/15/21 11:06	11/08/21 12:58	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	2.96		0.551	0.595	5.00	0.391	pCi/L		11/12/21 20:04	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

**Client Sample ID: MW-306**

**Lab Sample ID: 310-217098-6**

Date Collected: 10/08/21 09:00

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	0.137	U	0.252	0.252	1.00	0.439	pCi/L	10/15/21 10:26	11/08/21 17:39	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	103		40 - 110					10/15/21 10:26	11/08/21 17:39	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Radium 228</b>	<b>0.657</b>		0.245	0.253	1.00	0.334	pCi/L	10/15/21 11:06	11/08/21 12:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	103		40 - 110					10/15/21 11:06	11/08/21 12:59	1
Y Carrier	85.6		40 - 110					10/15/21 11:06	11/08/21 12:59	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
<b>Radium 226 and 228</b>	<b>0.794</b>		0.351	0.357	5.00	0.439	pCi/L		11/12/21 20:04	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

**Client Sample ID: MW-310**

**Lab Sample ID: 310-217098-7**

Date Collected: 10/06/21 15:20

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	0.275	U	0.313	0.314	1.00	0.511	pCi/L	10/15/21 10:26	11/08/21 17:41	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	108		40 - 110					10/15/21 10:26	11/08/21 17:41	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	0.263	U	0.282	0.283	1.00	0.462	pCi/L	10/15/21 11:06	11/08/21 12:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	108		40 - 110					10/15/21 11:06	11/08/21 12:59	1
Y Carrier	84.5		40 - 110					10/15/21 11:06	11/08/21 12:59	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
<b>Radium 226 and 228</b>	<b>0.539</b>		0.421	0.423	5.00	0.511	pCi/L		11/12/21 20:04	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

**Client Sample ID: MW-310A**

**Lab Sample ID: 310-217098-8**

Date Collected: 10/08/21 10:35

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	4.35		0.735	0.833	1.00	0.512	pCi/L	10/15/21 10:26	11/08/21 17:41	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	101		40 - 110					10/15/21 10:26	11/08/21 17:41	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	1.07		0.343	0.357	1.00	0.450	pCi/L	10/15/21 11:06	11/08/21 13:01	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	101		40 - 110					10/15/21 11:06	11/08/21 13:01	1
Y Carrier	86.0		40 - 110					10/15/21 11:06	11/08/21 13:01	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	5.41		0.811	0.906	5.00	0.512	pCi/L		11/12/21 20:04	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-217098-9**

Date Collected: 10/08/21 11:55

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	3.67		0.677	0.754	1.00	0.495	pCi/L	10/15/21 10:26	11/08/21 17:41	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	103		40 - 110					10/15/21 10:26	11/08/21 17:41	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	0.774		0.369	0.375	1.00	0.542	pCi/L	10/15/21 11:06	11/08/21 12:58	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	103		40 - 110					10/15/21 11:06	11/08/21 12:58	1
Y Carrier	79.3		40 - 110					10/15/21 11:06	11/08/21 12:58	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	4.44		0.771	0.842	5.00	0.542	pCi/L		11/12/21 20:04	1



# Definitions/Glossary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

## Qualifiers

### Rad

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

## Glossary

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

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

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

**Lab Sample ID: MB 160-531985/23-A**  
**Matrix: Water**  
**Analysis Batch: 535397**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 531985**

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 226	0.3311	U	0.262	0.264	1.00	0.379	pCi/L	10/15/21 10:26	11/08/21 19:17	1
Carrier	MB	MB	Limits			Prepared	Analyzed	Dil Fac		
	%Yield	Qualifier								
Ba	97.2		40 - 110			10/15/21 10:26	11/08/21 19:17	1		

**Lab Sample ID: LCS 160-531985/1-A**  
**Matrix: Water**  
**Analysis Batch: 535393**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 531985**

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Radium 226	15.1	13.66		1.75	1.00	0.505	pCi/L	90	75 - 125
Carrier	LCS	LCS	Limits			Prepared	Analyzed	Dil Fac	
	%Yield	Qualifier							
Ba	106		40 - 110						

**Lab Sample ID: LCSD 160-531985/2-A**  
**Matrix: Water**  
**Analysis Batch: 535393**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 531985**

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
				Uncert. (2σ+/-)							
Radium 226	15.1	13.05		1.69	1.00	0.508	pCi/L	86	75 - 125	0.18	1
Carrier	LCSD	LCSD	Limits			Prepared	Analyzed	Dil Fac			
	%Yield	Qualifier									
Ba	106		40 - 110								

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

**Lab Sample ID: MB 160-531994/23-A**  
**Matrix: Water**  
**Analysis Batch: 535393**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 531994**

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 228	0.2280	U	0.367	0.367	1.00	0.616	pCi/L	10/15/21 11:06	11/08/21 13:04	1
Carrier	MB	MB	Limits			Prepared	Analyzed	Dil Fac		
	%Yield	Qualifier								
Ba	97.2		40 - 110			10/15/21 11:06	11/08/21 13:04	1		
Y Carrier	87.5		40 - 110			10/15/21 11:06	11/08/21 13:04	1		

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

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

**Lab Sample ID: LCS 160-531994/1-A**  
**Matrix: Water**  
**Analysis Batch: 535427**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 531994**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	
									75	125
Radium 228	12.2	11.49		1.34	1.00	0.499	pCi/L	94	75	125
<b>LCS LCS</b>										
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>							
Ba	106		40 - 110							
Y Carrier	82.6		40 - 110							

**Lab Sample ID: LCSD 160-531994/2-A**  
**Matrix: Water**  
**Analysis Batch: 535427**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 531994**

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		RER	Limit
									75	125	0.85	1
Radium 228	12.2	13.96		1.56	1.00	0.444	pCi/L	114	75	125	0.85	1
<b>LCSD LCSD</b>												
<b>Carrier</b>	<b>%Yield</b>	<b>Qualifier</b>	<b>Limits</b>									
Ba	106		40 - 110									
Y Carrier	83.4		40 - 110									

# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

## Rad

### Prep Batch: 531985

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217098-1	MW-302	Total/NA	Water	PrecSep-21	
310-217098-2	MW-303	Total/NA	Water	PrecSep-21	
310-217098-3	MW-304	Total/NA	Water	PrecSep-21	
310-217098-4	MW-305	Total/NA	Water	PrecSep-21	
310-217098-5	MW-305A	Total/NA	Water	PrecSep-21	
310-217098-6	MW-306	Total/NA	Water	PrecSep-21	
310-217098-7	MW-310	Total/NA	Water	PrecSep-21	
310-217098-8	MW-310A	Total/NA	Water	PrecSep-21	
310-217098-9	MW-311A	Total/NA	Water	PrecSep-21	
MB 160-531985/23-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-531985/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-531985/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

### Prep Batch: 531994

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217098-1	MW-302	Total/NA	Water	PrecSep_0	
310-217098-2	MW-303	Total/NA	Water	PrecSep_0	
310-217098-3	MW-304	Total/NA	Water	PrecSep_0	
310-217098-4	MW-305	Total/NA	Water	PrecSep_0	
310-217098-5	MW-305A	Total/NA	Water	PrecSep_0	
310-217098-6	MW-306	Total/NA	Water	PrecSep_0	
310-217098-7	MW-310	Total/NA	Water	PrecSep_0	
310-217098-8	MW-310A	Total/NA	Water	PrecSep_0	
310-217098-9	MW-311A	Total/NA	Water	PrecSep_0	
MB 160-531994/23-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-531994/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-531994/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

## Client Sample ID: MW-302

Date Collected: 10/07/21 10:35

Date Received: 10/11/21 17:42

## Lab Sample ID: 310-217098-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			531985	10/15/21 10:26	BMP	TAL SL
Total/NA	Analysis	903.0		1	535393	11/08/21 17:38	FLC	TAL SL
Total/NA	Prep	PrecSep_0			531994	10/15/21 11:06	BMP	TAL SL
Total/NA	Analysis	904.0		1	535427	11/08/21 12:52	EMH	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	536441	11/12/21 20:04	MLK	TAL SL

## Client Sample ID: MW-303

Date Collected: 10/07/21 11:59

Date Received: 10/11/21 17:42

## Lab Sample ID: 310-217098-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			531985	10/15/21 10:26	BMP	TAL SL
Total/NA	Analysis	903.0		1	535393	11/08/21 17:38	FLC	TAL SL
Total/NA	Prep	PrecSep_0			531994	10/15/21 11:06	BMP	TAL SL
Total/NA	Analysis	904.0		1	535427	11/08/21 12:52	EMH	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	536441	11/12/21 20:04	MLK	TAL SL

## Client Sample ID: MW-304

Date Collected: 10/08/21 07:57

Date Received: 10/11/21 17:42

## Lab Sample ID: 310-217098-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			531985	10/15/21 10:26	BMP	TAL SL
Total/NA	Analysis	903.0		1	535393	11/08/21 17:38	FLC	TAL SL
Total/NA	Prep	PrecSep_0			531994	10/15/21 11:06	BMP	TAL SL
Total/NA	Analysis	904.0		1	535397	11/08/21 12:58	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	536441	11/12/21 20:04	MLK	TAL SL

## Client Sample ID: MW-305

Date Collected: 10/06/21 13:25

Date Received: 10/11/21 17:42

## Lab Sample ID: 310-217098-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			531985	10/15/21 10:26	BMP	TAL SL
Total/NA	Analysis	903.0		1	535393	11/08/21 17:39	FLC	TAL SL
Total/NA	Prep	PrecSep_0			531994	10/15/21 11:06	BMP	TAL SL
Total/NA	Analysis	904.0		1	535397	11/08/21 12:58	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	536441	11/12/21 20:04	MLK	TAL SL

# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

## Client Sample ID: MW-305A

Lab Sample ID: 310-217098-5

Date Collected: 10/08/21 09:30

Matrix: Water

Date Received: 10/11/21 17:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			531985	10/15/21 10:26	BMP	TAL SL
Total/NA	Analysis	903.0		1	535393	11/08/21 17:39	FLC	TAL SL
Total/NA	Prep	PrecSep_0			531994	10/15/21 11:06	BMP	TAL SL
Total/NA	Analysis	904.0		1	535397	11/08/21 12:58	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	536441	11/12/21 20:04	MLK	TAL SL

## Client Sample ID: MW-306

Lab Sample ID: 310-217098-6

Date Collected: 10/08/21 09:00

Matrix: Water

Date Received: 10/11/21 17:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			531985	10/15/21 10:26	BMP	TAL SL
Total/NA	Analysis	903.0		1	535393	11/08/21 17:39	FLC	TAL SL
Total/NA	Prep	PrecSep_0			531994	10/15/21 11:06	BMP	TAL SL
Total/NA	Analysis	904.0		1	535397	11/08/21 12:59	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	536441	11/12/21 20:04	MLK	TAL SL

## Client Sample ID: MW-310

Lab Sample ID: 310-217098-7

Date Collected: 10/06/21 15:20

Matrix: Water

Date Received: 10/11/21 17:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			531985	10/15/21 10:26	BMP	TAL SL
Total/NA	Analysis	903.0		1	535390	11/08/21 17:41	JLP	TAL SL
Total/NA	Prep	PrecSep_0			531994	10/15/21 11:06	BMP	TAL SL
Total/NA	Analysis	904.0		1	535397	11/08/21 12:59	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	536441	11/12/21 20:04	MLK	TAL SL

## Client Sample ID: MW-310A

Lab Sample ID: 310-217098-8

Date Collected: 10/08/21 10:35

Matrix: Water

Date Received: 10/11/21 17:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			531985	10/15/21 10:26	BMP	TAL SL
Total/NA	Analysis	903.0		1	535390	11/08/21 17:41	JLP	TAL SL
Total/NA	Prep	PrecSep_0			531994	10/15/21 11:06	BMP	TAL SL
Total/NA	Analysis	904.0		1	535397	11/08/21 13:01	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	536441	11/12/21 20:04	MLK	TAL SL

# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-217098-9**

**Date Collected: 10/08/21 11:55**

**Matrix: Water**

**Date Received: 10/11/21 17:42**

<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	Prep	PrecSep-21			531985	10/15/21 10:26	BMP	TAL SL
Total/NA	Analysis	903.0		1	535390	11/08/21 17:41	JLP	TAL SL
Total/NA	Prep	PrecSep_0			531994	10/15/21 11:06	BMP	TAL SL
Total/NA	Analysis	904.0		1	535397	11/08/21 12:58	FLC	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	536441	11/12/21 20:04	MLK	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 - 25221072

Job ID: 310-217098-2

## 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	12-08-21
California	Los Angeles County Sanitation Districts	10259	06-30-22
California	State	2886	06-30-21 *
Connecticut	State	PH-0241	03-31-23
Florida	NELAP	E87689	06-30-22
HI - RadChem Recognition	State	n/a	06-30-22
Illinois	NELAP	200023	11-30-22
Iowa	State	373	12-01-22
Kansas	NELAP	E-10236	10-31-21 *
Kentucky (DW)	State	KY90125	01-01-22
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-21
Louisiana	NELAP	04080	06-30-22
Louisiana (DW)	State	LA011	12-31-21
Maryland	State	310	09-30-22
MI - RadChem Recognition	State	9005	06-30-22
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-22
New Jersey	NELAP	MO002	06-30-22
New York	NELAP	11616	04-01-22
North Dakota	State	R-207	06-30-22
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-22
Oregon	NELAP	4157	09-01-22
Pennsylvania	NELAP	68-00540	03-01-22
South Carolina	State	85002001	06-30-22
Texas	NELAP	T104704193	07-31-22
US Fish & Wildlife	US Federal Programs	058448	07-31-22
USDA	US Federal Programs	P330-17-00028	03-11-23
Utah	NELAP	MO000542021-14	08-01-22
Virginia	NELAP	10310	06-14-22
Washington	State	C592	08-30-22
West Virginia DEP	State	381	10-31-22

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



# Method Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217098-2

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

#### Protocol References:

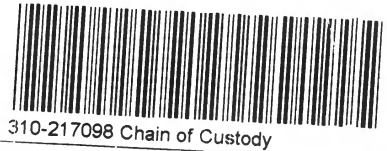
- EPA = US Environmental Protection Agency
- None = None
- TAL-STL = TestAmerica Laboratories, St. Louis, Facility Standard Operating Procedure.

#### Laboratory References:

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



Environment Testing  
TestAmerica



310-217098 Chain of Custody

### Cooler/Sample Receipt and Temperature Log Form

<b>Client Information</b>			
Client: SCS Engineers			
City/State:	CITY Madison	STATE WI	Project: Ottumwa Generating Station App III/IV
<b>Receipt Information</b>			
Date/Time Received:	DATE 10-11-21	TIME 1742	Received By: HED
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: _____		
<b>Condition of Cooler/Containers</b>			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: AC38	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>1</u> of <u>2</u>	
Cooler Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
<b>Temperature Record</b>			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: N	Correction Factor (°C): 0		
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): 3.9	Corrected Temp (°C): 3.9		
<b>• Sample Container Temperature</b>			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
<b>Exceptions Noted</b>			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
<b>Additional Comments</b>			
Contained MW-302, MW-303, MW-304, MW-305, MW-305A			



Environment Testing  
TestAmerica

Place COC scanning label here

### Cooler/Sample Receipt and Temperature Log Form

<b>Client Information</b>			
Client: <u>SCS Engineers</u>			
City/State:	CITY <u>Madison</u>	STATE <u>WI</u>	Project:
<b>Receipt Information</b>			
Date/Time Received:	DATE <u>10-11-21</u>	TIME <u>1742</u>	Received By: <u>HED</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____			
<b>Condition of Cooler/Containers</b>			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AC39</u>	
Multiple Coolers?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler # <u>2</u> of <u>2</u>	
Cooler Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
<b>Temperature Record</b>			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>N</u>	Correction Factor (°C): <u>0</u>		
• <b>Temp Blank Temperature</b> – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): <u>1.7</u>		Corrected Temp (°C): <u>1.7</u>	
• <b>Sample Container Temperature</b>			
Container(s) used:	<u>CONTAINER 1</u>	<u>CONTAINER 2</u>	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
<b>Exceptions Noted</b>			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
<b>Additional Comments</b>			

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	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	
Appendix IV Parameters	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	
	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 - REQUIRES SEPARATE COC	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)																3	
	Iron (filtered)																3	
	Lithium (filtered)																3	
	Manganese (filtered)																14	
	Field Parameters	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:\25221072-00\Data and Calculations\Field Work Requests\OGS CCR Rule Sampling\_2104.xls\Sheet1

<b>Client Information</b>		Sampler: <i>Rosa Cruz</i>	Lab PMI: Fredrick, Sandie	Carrier Tracking No(s):	COC No: 310-64465-17487.1
Client Contact: Meghan Blodgett		Phone: <i>608-509-8245</i>	E-Mail: sandra.fredrick@eurofinset.com	State of Origin:	Page: Page 1 of 1
Company: SCS Engineers		PWSID:	Job #:		
Address: 2830 Dairy Drive		Due Date Requested:	Analysis Requested		
City: Madison		TAT Requested (days):	Perform MS/MSD (Yes or No)		
State, Zip: WI, 53718		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Field Filtered Sample (Yes or No)		
Phone:		PO #: 25221072	903 0 - Radium-226 (GFC)		
Email: mblodgett@scsengineers.com		WC #:	904 0 - Radium-228 (GFC)		
Project Name: Ottumwa Generating Station - 25221072 <i>App III/IV (2)</i>		Project #: 31011020	9056A - ORGM_28D - Chloride, Fluoride & Sulfate		
Site:		SSOW#:	5020A, 7470A		
Sample Identification		Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=soil, B=fluid, A=air)
MW-302		10-7-21	10:35	G	Water
MW-303		10-7-21	11:59	G	Water
MW-304		10-8-21	7:57	G	Water
MW-305		10-6-21	13:25	G	Water
MW-305A		10-08-21	9:30	G	Water
MW-306		10-8-21	9:00	G	Water
MW-310		10-06-21	15:26	G	Water
MW-310A		10-08-21	10:35	G	Water
MW-311					Water
MW-311A		10-08-21	11:55	G	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):					
Empty Kit Relinquished by: <i>Rosa Cruz</i> Date: 10-11-21 6:00 Relinquished by: <i>Rosa Cruz</i> Date/Time: 10-11-21 6:00 Relinquished by: Date/Time: Relinquished by: Date/Time:					
Custody Seals Intact: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Custody Seal No.:					
Received by: <i>MM QA</i> Date/Time: 10-11-21 1742 Received by: Date/Time: Received by: Date/Time:					
Cooler Temperature(s) °C and Other Remarks:					
Special Instructions/QC Requirements:					
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					
Method of Shipment:					
Total Number of containers:					
Special Instructions/Note:					
Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:					
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)					

## Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-217098-2

SDG Number:

**Login Number: 217098**

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

**List Number: 1**

**Creator: Homolar, Dana J**

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



# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-217098-2

SDG Number:

**Login Number: 217098**

**List Number: 2**

**Creator: Johnson, Autumn R**

**List Source: Eurofins TestAmerica, St. Louis**

**List Creation: 10/13/21 04:01 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 - 25221072

Job ID: 310-217098-2

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

Matrix: Water

Prep Type: Total/NA

			Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba (40-110)		
310-217098-1	MW-302	64.8		
310-217098-2	MW-303	93.8		
310-217098-3	MW-304	83.9		
310-217098-4	MW-305	92.5		
310-217098-5	MW-305A	104		
310-217098-6	MW-306	103		
310-217098-7	MW-310	108		
310-217098-8	MW-310A	101		
310-217098-9	MW-311A	103		
LCS 160-531985/1-A	Lab Control Sample	106		
LCSD 160-531985/2-A	Lab Control Sample Dup	106		
MB 160-531985/23-A	Method Blank	97.2		
<b>Tracer/Carrier Legend</b>				
Ba = Ba				

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

Matrix: Water

Prep Type: Total/NA

			Percent Yield (Acceptance Limits)		
Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)		
310-217098-1	MW-302	64.8	82.2		
310-217098-2	MW-303	93.8	84.1		
310-217098-3	MW-304	83.9	81.5		
310-217098-4	MW-305	92.5	81.5		
310-217098-5	MW-305A	104	84.9		
310-217098-6	MW-306	103	85.6		
310-217098-7	MW-310	108	84.5		
310-217098-8	MW-310A	101	86.0		
310-217098-9	MW-311A	103	79.3		
LCS 160-531994/1-A	Lab Control Sample	106	82.6		
LCSD 160-531994/2-A	Lab Control Sample Dup	106	83.4		
MB 160-531994/23-A	Method Blank	97.2	87.5		
<b>Tracer/Carrier Legend</b>					
Ba = Ba					
Y = Y Carrier					



## ANALYTICAL REPORT

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

Laboratory Job ID: 310-217087-1

Client Project/Site: Ottumwa Generating Station - 25221072  
Additional

For:  
SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:  
10/25/2021 11:50:33 AM

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

### LINKS

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results through  
**TotalAccess**

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[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

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

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



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Sample Summary . . . . .	4
Detection Summary . . . . .	5
Client Sample Results . . . . .	8
Definitions . . . . .	17
QC Sample Results . . . . .	18
QC Association . . . . .	21
Chronicle . . . . .	23
Certification Summary . . . . .	26
Method Summary . . . . .	27
Chain of Custody . . . . .	28
Receipt Checklists . . . . .	31

# Case Narrative

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072 Additional

Job ID: 310-217087-1

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## Job ID: 310-217087-1

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### Laboratory: Eurofins TestAmerica, Cedar Falls

#### Narrative

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#### Job Narrative 310-217087-1

#### Comments

No additional comments.

#### Receipt

The samples were received on 10/11/2021 5:42 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.7° C.

#### Metals

Methods 200.8, 6020A: Due to sample matrix effect on the internal standard (ISTD), a dilution was required for the following sample: MW-306 (310-217087-6).

Method 6020A: The continuing calibration blank (CCB) for analytical batch 310-332689 contained Manganese above the reporting limit (RL). All reported samples associated with this CCB were either ND for this analyte or contained this analyte at a concentration greater than 10X the value found in the CCB; therefore, re-analysis of samples was not performed. MW-303 (310-217087-2), MW-304 (310-217087-3), MW-305 (310-217087-4) and MW-310 (310-217087-7)

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

#### General Chemistry

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



# Sample Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072  
Additional

Job ID: 310-217087-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-217087-1	MW-302	Water	10/07/21 10:35	10/11/21 17:42
310-217087-2	MW-303	Water	10/07/21 11:59	10/11/21 17:42
310-217087-3	MW-304	Water	10/08/21 07:57	10/11/21 17:42
310-217087-4	MW-305	Water	10/06/21 13:25	10/11/21 17:42
310-217087-5	MW-305A	Water	10/08/21 09:30	10/11/21 17:42
310-217087-6	MW-306	Water	10/08/21 09:00	10/11/21 17:42
310-217087-7	MW-310	Water	10/06/21 15:20	10/11/21 17:42
310-217087-8	MW-310A	Water	10/08/21 10:35	10/11/21 17:42
310-217087-9	MW-311A	Water	10/08/21 11:55	10/11/21 17:42

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# Detection Summary

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

## Client Sample ID: MW-302

## Lab Sample ID: 310-217087-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	65	J	100	36	ug/L	1		6020A	Total/NA
Magnesium	46000		500	100	ug/L	1		6020A	Total/NA
Manganese	120		10	4.4	ug/L	1		6020A	Total/NA
Potassium	1400		500	150	ug/L	1		6020A	Total/NA
Sodium	220000		1000	610	ug/L	1		6020A	Total/NA
Manganese	110		10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	120		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	120		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-303

## Lab Sample ID: 310-217087-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	120		100	36	ug/L	1		6020A	Total/NA
Magnesium	26000		500	100	ug/L	1		6020A	Total/NA
Manganese	1900		10	4.4	ug/L	1		6020A	Total/NA
Potassium	800		500	150	ug/L	1		6020A	Total/NA
Sodium	94000		1000	610	ug/L	1		6020A	Total/NA
Iron	100		100	36	ug/L	1		6020A	Dissolved
Manganese	1800	^2	10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	490		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	490		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-304

## Lab Sample ID: 310-217087-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	3700		100	36	ug/L	1		6020A	Total/NA
Magnesium	36000		500	100	ug/L	1		6020A	Total/NA
Manganese	3000		10	4.4	ug/L	1		6020A	Total/NA
Potassium	6800		500	150	ug/L	1		6020A	Total/NA
Sodium	190000		1000	610	ug/L	1		6020A	Total/NA
Iron	3900		100	36	ug/L	1		6020A	Dissolved
Manganese	3400	^2	10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	470		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	470		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-305

## Lab Sample ID: 310-217087-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	75	J	100	36	ug/L	1		6020A	Total/NA
Magnesium	44000		500	100	ug/L	1		6020A	Total/NA
Manganese	3200		10	4.4	ug/L	1		6020A	Total/NA
Potassium	7000		500	150	ug/L	1		6020A	Total/NA
Sodium	180000		1000	610	ug/L	1		6020A	Total/NA
Cobalt	17		0.50	0.19	ug/L	1		6020A	Dissolved
Iron	150		100	36	ug/L	1		6020A	Dissolved
Manganese	3300	^2	10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	500		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	500		10	4.6	mg/L	1		SM 2320B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Detection Summary

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

## Client Sample ID: MW-305A

## Lab Sample ID: 310-217087-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	26000		500	100	ug/L	1		6020A	Total/NA
Manganese	100		10	4.4	ug/L	1		6020A	Total/NA
Potassium	3400		500	150	ug/L	1		6020A	Total/NA
Sodium	52000		1000	610	ug/L	1		6020A	Total/NA
Manganese	120		10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	300		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	300		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-306

## Lab Sample ID: 310-217087-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	43000		5000	1000	ug/L	10		6020A	Total/NA
Manganese	30000		100	44	ug/L	10		6020A	Total/NA
Potassium	3700	J	5000	1500	ug/L	10		6020A	Total/NA
Sodium	170000		10000	6100	ug/L	10		6020A	Total/NA
Cobalt	9.9		0.50	0.19	ug/L	1		6020A	Dissolved
Iron	100		100	36	ug/L	1		6020A	Dissolved
Manganese	31000		100	44	ug/L	10		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	270		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	270		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-310

## Lab Sample ID: 310-217087-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	55000		500	100	ug/L	1		6020A	Total/NA
Manganese	350		10	4.4	ug/L	1		6020A	Total/NA
Potassium	9900		500	150	ug/L	1		6020A	Total/NA
Sodium	110000		1000	610	ug/L	1		6020A	Total/NA
Lithium	45		10	2.5	ug/L	1		6020A	Dissolved
Manganese	830	^2	10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	250		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	250		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-310A

## Lab Sample ID: 310-217087-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	36000		2000	400	ug/L	4		6020A	Total/NA
Manganese	26	J	40	18	ug/L	4		6020A	Total/NA
Potassium	8900		2000	600	ug/L	4		6020A	Total/NA
Sodium	570000		4000	2400	ug/L	4		6020A	Total/NA
Iron	38	J	100	36	ug/L	1		6020A	Dissolved
Lithium	240		10	2.5	ug/L	1		6020A	Dissolved
Manganese	30		10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	370		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	370		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-311A

## Lab Sample ID: 310-217087-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	20000		2000	400	ug/L	4		6020A	Total/NA
Potassium	7700		2000	600	ug/L	4		6020A	Total/NA
Sodium	670000		4000	2400	ug/L	4		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Detection Summary

Client: SCS Engineers

Job ID: 310-217087-1

Project/Site: Ottumwa Generating Station - 25221072

Additional

**Client Sample ID: MW-311A (Continued)**

**Lab Sample ID: 310-217087-9**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lithium	250		10	2.5	ug/L	1		6020A	Dissolved
Manganese	5.5	J	10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	380		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	380		10	4.6	mg/L	1		SM 2320B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

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# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

**Client Sample ID: MW-302**

**Lab Sample ID: 310-217087-1**

Date Collected: 10/07/21 10:35

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	65	J	100	36	ug/L		10/14/21 09:00	10/21/21 19:22	1
Magnesium	46000		500	100	ug/L		10/14/21 09:00	10/21/21 19:22	1
Manganese	120		10	4.4	ug/L		10/14/21 09:00	10/21/21 19:22	1
Potassium	1400		500	150	ug/L		10/14/21 09:00	10/21/21 19:22	1
Sodium	220000		1000	610	ug/L		10/14/21 09:00	10/21/21 19:22	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/13/21 09:00	10/18/21 19:55	1
Manganese	110		10	4.4	ug/L		10/13/21 09:00	10/18/21 19:55	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	120		10	4.6	mg/L			10/18/21 08:37	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			10/18/21 08:37	1
Total Alkalinity as CaCO3	120		10	4.6	mg/L			10/18/21 08:37	1



# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

**Client Sample ID: MW-303**

**Lab Sample ID: 310-217087-2**

Date Collected: 10/07/21 11:59

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	120		100	36	ug/L		10/14/21 09:00	10/21/21 19:25	1
Magnesium	26000		500	100	ug/L		10/14/21 09:00	10/21/21 19:25	1
Manganese	1900		10	4.4	ug/L		10/14/21 09:00	10/21/21 19:25	1
Potassium	800		500	150	ug/L		10/14/21 09:00	10/21/21 19:25	1
Sodium	94000		1000	610	ug/L		10/14/21 09:00	10/21/21 19:25	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	100		100	36	ug/L		10/13/21 09:00	10/22/21 22:12	1
Manganese	1800	^2	10	4.4	ug/L		10/13/21 09:00	10/22/21 22:12	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	490		10	4.6	mg/L			10/18/21 08:37	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			10/18/21 08:37	1
Total Alkalinity as CaCO3	490		10	4.6	mg/L			10/18/21 08:37	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

**Client Sample ID: MW-304**

**Lab Sample ID: 310-217087-3**

Date Collected: 10/08/21 07:57

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	3700		100	36	ug/L		10/14/21 09:00	10/21/21 19:42	1
Magnesium	36000		500	100	ug/L		10/14/21 09:00	10/21/21 19:42	1
Manganese	3000		10	4.4	ug/L		10/14/21 09:00	10/21/21 19:42	1
Potassium	6800		500	150	ug/L		10/14/21 09:00	10/21/21 19:42	1
Sodium	190000		1000	610	ug/L		10/14/21 09:00	10/21/21 19:42	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	3900		100	36	ug/L		10/13/21 09:00	10/22/21 22:15	1
Manganese	3400	^2	10	4.4	ug/L		10/13/21 09:00	10/22/21 22:15	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	470		10	4.6	mg/L			10/18/21 08:37	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			10/18/21 08:37	1
Total Alkalinity as CaCO3	470		10	4.6	mg/L			10/18/21 08:37	1

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# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

**Client Sample ID: MW-305**

**Lab Sample ID: 310-217087-4**

Date Collected: 10/06/21 13:25

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	75	J	100	36	ug/L		10/14/21 09:00	10/21/21 19:48	1
Magnesium	44000		500	100	ug/L		10/14/21 09:00	10/21/21 19:48	1
Manganese	3200		10	4.4	ug/L		10/14/21 09:00	10/21/21 19:48	1
Potassium	7000		500	150	ug/L		10/14/21 09:00	10/21/21 19:48	1
Sodium	180000		1000	610	ug/L		10/14/21 09:00	10/21/21 19:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	17		0.50	0.19	ug/L		10/13/21 09:00	10/22/21 22:28	1
Iron	150		100	36	ug/L		10/13/21 09:00	10/22/21 22:28	1
Manganese	3300	^2	10	4.4	ug/L		10/13/21 09:00	10/22/21 22:28	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	500		10	4.6	mg/L			10/15/21 08:54	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			10/15/21 08:54	1
Total Alkalinity as CaCO3	500		10	4.6	mg/L			10/15/21 08:54	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

**Client Sample ID: MW-305A**

**Lab Sample ID: 310-217087-5**

Date Collected: 10/08/21 09:30

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/14/21 09:00	10/21/21 19:52	1
<b>Magnesium</b>	<b>26000</b>		500	100	ug/L		10/14/21 09:00	10/21/21 19:52	1
<b>Manganese</b>	<b>100</b>		10	4.4	ug/L		10/14/21 09:00	10/21/21 19:52	1
<b>Potassium</b>	<b>3400</b>		500	150	ug/L		10/14/21 09:00	10/21/21 19:52	1
<b>Sodium</b>	<b>52000</b>		1000	610	ug/L		10/14/21 09:00	10/21/21 19:52	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/13/21 09:00	10/22/21 22:30	1
<b>Manganese</b>	<b>120</b>		10	4.4	ug/L		10/13/21 09:00	10/23/21 12:39	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Bicarbonate Alkalinity as CaCO3</b>	<b>300</b>		10	4.6	mg/L			10/18/21 08:37	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			10/18/21 08:37	1
<b>Total Alkalinity as CaCO3</b>	<b>300</b>		10	4.6	mg/L			10/18/21 08:37	1



# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

**Client Sample ID: MW-306**

**Lab Sample ID: 310-217087-6**

**Date Collected: 10/08/21 09:00**

**Matrix: Water**

**Date Received: 10/11/21 17:42**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<360		1000	360	ug/L		10/14/21 09:00	10/21/21 19:55	10
<b>Magnesium</b>	<b>43000</b>		5000	1000	ug/L		10/14/21 09:00	10/21/21 19:55	10
<b>Manganese</b>	<b>30000</b>		100	44	ug/L		10/14/21 09:00	10/21/21 19:55	10
<b>Potassium</b>	<b>3700 J</b>		5000	1500	ug/L		10/14/21 09:00	10/21/21 19:55	10
<b>Sodium</b>	<b>170000</b>		10000	6100	ug/L		10/14/21 09:00	10/21/21 19:55	10

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Cobalt</b>	<b>9.9</b>		0.50	0.19	ug/L		10/13/21 09:00	10/22/21 22:33	1
<b>Iron</b>	<b>100</b>		100	36	ug/L		10/13/21 09:00	10/22/21 22:33	1
<b>Manganese</b>	<b>31000</b>		100	44	ug/L		10/13/21 09:00	10/23/21 12:42	10

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Bicarbonate Alkalinity as CaCO3</b>	<b>270</b>		10	4.6	mg/L			10/18/21 08:37	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			10/18/21 08:37	1
<b>Total Alkalinity as CaCO3</b>	<b>270</b>		10	4.6	mg/L			10/18/21 08:37	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

**Client Sample ID: MW-310**

**Lab Sample ID: 310-217087-7**

**Date Collected: 10/06/21 15:20**

**Matrix: Water**

**Date Received: 10/11/21 17:42**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/14/21 09:00	10/21/21 19:59	1
<b>Magnesium</b>	<b>55000</b>		500	100	ug/L		10/14/21 09:00	10/21/21 19:59	1
<b>Manganese</b>	<b>350</b>		10	4.4	ug/L		10/14/21 09:00	10/21/21 19:59	1
<b>Potassium</b>	<b>9900</b>		500	150	ug/L		10/14/21 09:00	10/21/21 19:59	1
<b>Sodium</b>	<b>110000</b>		1000	610	ug/L		10/14/21 09:00	10/21/21 19:59	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/13/21 09:00	10/22/21 22:36	1
<b>Lithium</b>	<b>45</b>		10	2.5	ug/L		10/13/21 09:00	10/22/21 22:36	1
<b>Manganese</b>	<b>830</b>	<b>^2</b>	10	4.4	ug/L		10/13/21 09:00	10/22/21 22:36	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Bicarbonate Alkalinity as CaCO3</b>	<b>250</b>		10	4.6	mg/L			10/15/21 08:54	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			10/15/21 08:54	1
<b>Total Alkalinity as CaCO3</b>	<b>250</b>		10	4.6	mg/L			10/15/21 08:54	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

**Client Sample ID: MW-310A**

**Lab Sample ID: 310-217087-8**

Date Collected: 10/08/21 10:35

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<140		400	140	ug/L		10/14/21 09:00	10/21/21 20:02	4
<b>Magnesium</b>	<b>36000</b>		2000	400	ug/L		10/14/21 09:00	10/21/21 20:02	4
<b>Manganese</b>	<b>26</b>	<b>J</b>	40	18	ug/L		10/14/21 09:00	10/21/21 20:02	4
<b>Potassium</b>	<b>8900</b>		2000	600	ug/L		10/14/21 09:00	10/21/21 20:02	4
<b>Sodium</b>	<b>570000</b>		4000	2400	ug/L		10/14/21 09:00	10/21/21 20:02	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<b>38</b>	<b>J</b>	100	36	ug/L		10/13/21 09:00	10/22/21 22:38	1
Lithium	<b>240</b>		10	2.5	ug/L		10/13/21 09:00	10/22/21 22:38	1
Manganese	<b>30</b>		10	4.4	ug/L		10/13/21 09:00	10/23/21 12:47	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Bicarbonate Alkalinity as CaCO3</b>	<b>370</b>		10	4.6	mg/L			10/18/21 08:37	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			10/18/21 08:37	1
<b>Total Alkalinity as CaCO3</b>	<b>370</b>		10	4.6	mg/L			10/18/21 08:37	1

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

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-217087-9**

**Date Collected: 10/08/21 11:55**

**Matrix: Water**

**Date Received: 10/11/21 17:42**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<140		400	140	ug/L		10/14/21 09:00	10/21/21 20:05	4
<b>Magnesium</b>	<b>20000</b>		2000	400	ug/L		10/14/21 09:00	10/21/21 20:05	4
Manganese	<18		40	18	ug/L		10/14/21 09:00	10/21/21 20:05	4
<b>Potassium</b>	<b>7700</b>		2000	600	ug/L		10/14/21 09:00	10/21/21 20:05	4
<b>Sodium</b>	<b>670000</b>		4000	2400	ug/L		10/14/21 09:00	10/21/21 20:05	4

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/13/21 09:00	10/22/21 22:44	1
<b>Lithium</b>	<b>250</b>		10	2.5	ug/L		10/13/21 09:00	10/22/21 22:44	1
<b>Manganese</b>	<b>5.5 J</b>		10	4.4	ug/L		10/13/21 09:00	10/23/21 12:50	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Bicarbonate Alkalinity as CaCO3</b>	<b>380</b>		10	4.6	mg/L			10/18/21 08:37	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			10/18/21 08:37	1
<b>Total Alkalinity as CaCO3</b>	<b>380</b>		10	4.6	mg/L			10/18/21 08:37	1



# Definitions/Glossary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072  
Additional

Job ID: 310-217087-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
^2	Calibration Blank (ICB and/or CCB) is outside acceptance limits.
F1	MS and/or MSD recovery exceeds control limits.
F3	Duplicate RPD exceeds the control limit
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

## Glossary

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

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

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

**Lab Sample ID: MB 310-331373/1-A**  
**Matrix: Water**  
**Analysis Batch: 332110**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 331373**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.19		0.50	0.19	ug/L		10/13/21 09:00	10/18/21 19:38	1
Iron	<36		100	36	ug/L		10/13/21 09:00	10/18/21 19:38	1
Lithium	<2.5		10	2.5	ug/L		10/13/21 09:00	10/18/21 19:38	1
Manganese	<4.4		10	4.4	ug/L		10/13/21 09:00	10/18/21 19:38	1

**Lab Sample ID: MB 310-331373/1-A**  
**Matrix: Water**  
**Analysis Batch: 332664**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 331373**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	<0.19		0.50	0.19	ug/L		10/13/21 09:00	10/22/21 14:46	1
Iron	<36		100	36	ug/L		10/13/21 09:00	10/22/21 14:46	1
Lithium	<2.5		10	2.5	ug/L		10/13/21 09:00	10/22/21 14:46	1
Manganese	<4.4		10	4.4	ug/L		10/13/21 09:00	10/22/21 14:46	1

**Lab Sample ID: LCS 310-331373/2-A**  
**Matrix: Water**  
**Analysis Batch: 332110**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 331373**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cobalt	100	86.0		ug/L		86	80 - 120
Iron	200	168		ug/L		84	80 - 120
Lithium	200	187		ug/L		94	80 - 120
Manganese	100	88.0		ug/L		88	80 - 120

**Lab Sample ID: LCS 310-331373/2-A**  
**Matrix: Water**  
**Analysis Batch: 332664**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 331373**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cobalt	100	108		ug/L		108	80 - 120
Iron	200	223		ug/L		111	80 - 120
Lithium	200	206		ug/L		103	80 - 120
Manganese	100	100		ug/L		100	80 - 120

**Lab Sample ID: MB 310-331516/1-A**  
**Matrix: Water**  
**Analysis Batch: 332520**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 331516**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/14/21 09:00	10/21/21 15:34	1
Magnesium	<100		500	100	ug/L		10/14/21 09:00	10/21/21 15:34	1
Manganese	<4.4		10	4.4	ug/L		10/14/21 09:00	10/21/21 15:34	1
Potassium	<150		500	150	ug/L		10/14/21 09:00	10/21/21 15:34	1
Sodium	<610		1000	610	ug/L		10/14/21 09:00	10/21/21 15:34	1

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

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

**Lab Sample ID: LCS 310-331516/2-A**  
**Matrix: Water**  
**Analysis Batch: 332520**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 331516**  
**%Rec.**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Iron	200	198		ug/L		99	80 - 120
Magnesium	2000	1930		ug/L		96	80 - 120
Manganese	100	88.9		ug/L		89	80 - 120
Potassium	2000	1840		ug/L		92	80 - 120
Sodium	2000	1900		ug/L		95	80 - 120

**Lab Sample ID: 310-217087-3 DU**  
**Matrix: Water**  
**Analysis Batch: 332606**

**Client Sample ID: MW-304**  
**Prep Type: Total/NA**  
**Prep Batch: 331516**  
**%Rec.**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Iron	3700		3700		ug/L		0.8	20
Magnesium	36000		35900		ug/L		0.1	20
Manganese	3000		3090		ug/L		2	20
Potassium	6800		6810		ug/L		0.9	20
Sodium	190000		190000		ug/L		0.6	20

**Lab Sample ID: 310-217087-1 MS**  
**Matrix: Water**  
**Analysis Batch: 332110**

**Client Sample ID: MW-302**  
**Prep Type: Dissolved**  
**Prep Batch: 331373**  
**%Rec.**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Cobalt	0.97		100	106		ug/L		105	75 - 125
Iron	<36		200	228		ug/L		114	75 - 125
Lithium	13	F1	200	265	F1	ug/L		126	75 - 125
Manganese	110		100	223		ug/L		113	75 - 125

**Lab Sample ID: 310-217087-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 332110**

**Client Sample ID: MW-302**  
**Prep Type: Dissolved**  
**Prep Batch: 331373**  
**%Rec.**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Cobalt	0.97		100	95.6		ug/L		95	75 - 125	10	20
Iron	<36		200	203		ug/L		102	75 - 125	11	20
Lithium	13	F1	200	238		ug/L		113	75 - 125	11	20
Manganese	110		100	205		ug/L		95	75 - 125	9	20

**Lab Sample ID: 310-217087-8 DU**  
**Matrix: Water**  
**Analysis Batch: 332689**

**Client Sample ID: MW-310A**  
**Prep Type: Dissolved**  
**Prep Batch: 331373**  
**%Rec.**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Cobalt	0.49	J	0.476	J	ug/L		3	20
Iron	38	J	<36		ug/L		NC	20
Lithium	240		248		ug/L		3	20
Manganese	46	^2	30.4	F3	ug/L		40	20

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

## Method: SM 2320B - Alkalinity

**Lab Sample ID: MB 310-331761/1**  
**Matrix: Water**  
**Analysis Batch: 331761**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/15/21 08:54	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/15/21 08:54	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/15/21 08:54	1

**Lab Sample ID: LCS 310-331761/2**  
**Matrix: Water**  
**Analysis Batch: 331761**

**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	962		mg/L		96	90 - 110

**Lab Sample ID: MB 310-331940/1**  
**Matrix: Water**  
**Analysis Batch: 331940**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/18/21 08:37	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/18/21 08:37	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/18/21 08:37	1

**Lab Sample ID: LCS 310-331940/2**  
**Matrix: Water**  
**Analysis Batch: 331940**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Alkalinity as CaCO3	1000	1060		mg/L		106	90 - 110

# QC Association Summary

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

## Metals

### Prep Batch: 331373

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217087-1	MW-302	Dissolved	Water	3010A	
310-217087-2	MW-303	Dissolved	Water	3010A	
310-217087-3	MW-304	Dissolved	Water	3010A	
310-217087-4	MW-305	Dissolved	Water	3010A	
310-217087-5	MW-305A	Dissolved	Water	3010A	
310-217087-6	MW-306	Dissolved	Water	3010A	
310-217087-7	MW-310	Dissolved	Water	3010A	
310-217087-8	MW-310A	Dissolved	Water	3010A	
310-217087-9	MW-311A	Dissolved	Water	3010A	
MB 310-331373/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-331373/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-217087-1 MS	MW-302	Dissolved	Water	3010A	
310-217087-1 MSD	MW-302	Dissolved	Water	3010A	
310-217087-8 DU	MW-310A	Dissolved	Water	3010A	

### Prep Batch: 331516

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217087-1	MW-302	Total/NA	Water	3010A	
310-217087-2	MW-303	Total/NA	Water	3010A	
310-217087-3	MW-304	Total/NA	Water	3010A	
310-217087-4	MW-305	Total/NA	Water	3010A	
310-217087-5	MW-305A	Total/NA	Water	3010A	
310-217087-6	MW-306	Total/NA	Water	3010A	
310-217087-7	MW-310	Total/NA	Water	3010A	
310-217087-8	MW-310A	Total/NA	Water	3010A	
310-217087-9	MW-311A	Total/NA	Water	3010A	
MB 310-331516/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-331516/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-217087-3 DU	MW-304	Total/NA	Water	3010A	

### Analysis Batch: 332110

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217087-1	MW-302	Dissolved	Water	6020A	331373
MB 310-331373/1-A	Method Blank	Total/NA	Water	6020A	331373
LCS 310-331373/2-A	Lab Control Sample	Total/NA	Water	6020A	331373
310-217087-1 MS	MW-302	Dissolved	Water	6020A	331373
310-217087-1 MSD	MW-302	Dissolved	Water	6020A	331373

### Analysis Batch: 332520

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-331516/1-A	Method Blank	Total/NA	Water	6020A	331516
LCS 310-331516/2-A	Lab Control Sample	Total/NA	Water	6020A	331516

### Analysis Batch: 332606

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217087-1	MW-302	Total/NA	Water	6020A	331516
310-217087-2	MW-303	Total/NA	Water	6020A	331516
310-217087-3	MW-304	Total/NA	Water	6020A	331516
310-217087-4	MW-305	Total/NA	Water	6020A	331516
310-217087-5	MW-305A	Total/NA	Water	6020A	331516

Eurofins TestAmerica, Cedar Falls

# QC Association Summary

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

## Metals (Continued)

### Analysis Batch: 332606 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217087-6	MW-306	Total/NA	Water	6020A	331516
310-217087-7	MW-310	Total/NA	Water	6020A	331516
310-217087-8	MW-310A	Total/NA	Water	6020A	331516
310-217087-9	MW-311A	Total/NA	Water	6020A	331516
310-217087-3 DU	MW-304	Total/NA	Water	6020A	331516

### Analysis Batch: 332664

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-331373/1-A	Method Blank	Total/NA	Water	6020A	331373
LCS 310-331373/2-A	Lab Control Sample	Total/NA	Water	6020A	331373

### Analysis Batch: 332689

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217087-2	MW-303	Dissolved	Water	6020A	331373
310-217087-3	MW-304	Dissolved	Water	6020A	331373
310-217087-4	MW-305	Dissolved	Water	6020A	331373
310-217087-5	MW-305A	Dissolved	Water	6020A	331373
310-217087-6	MW-306	Dissolved	Water	6020A	331373
310-217087-7	MW-310	Dissolved	Water	6020A	331373
310-217087-8	MW-310A	Dissolved	Water	6020A	331373
310-217087-9	MW-311A	Dissolved	Water	6020A	331373
310-217087-8 DU	MW-310A	Dissolved	Water	6020A	331373

### Analysis Batch: 332758

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217087-5	MW-305A	Dissolved	Water	6020A	331373
310-217087-6	MW-306	Dissolved	Water	6020A	331373
310-217087-8	MW-310A	Dissolved	Water	6020A	331373
310-217087-9	MW-311A	Dissolved	Water	6020A	331373

## General Chemistry

### Analysis Batch: 331761

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217087-4	MW-305	Total/NA	Water	SM 2320B	
310-217087-7	MW-310	Total/NA	Water	SM 2320B	
MB 310-331761/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-331761/2	Lab Control Sample	Total/NA	Water	SM 2320B	

### Analysis Batch: 331940

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217087-1	MW-302	Total/NA	Water	SM 2320B	
310-217087-2	MW-303	Total/NA	Water	SM 2320B	
310-217087-3	MW-304	Total/NA	Water	SM 2320B	
310-217087-5	MW-305A	Total/NA	Water	SM 2320B	
310-217087-6	MW-306	Total/NA	Water	SM 2320B	
310-217087-8	MW-310A	Total/NA	Water	SM 2320B	
310-217087-9	MW-311A	Total/NA	Water	SM 2320B	
MB 310-331940/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-331940/2	Lab Control Sample	Total/NA	Water	SM 2320B	

# Lab Chronicle

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

**Client Sample ID: MW-302**

**Lab Sample ID: 310-217087-1**

Date Collected: 10/07/21 10:35

Matrix: Water

Date Received: 10/11/21 17:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332110	10/18/21 19:55	SAP	TAL CF
Total/NA	Prep	3010A			331516	10/14/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332606	10/21/21 19:22	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	331940	10/18/21 08:37	WJF	TAL CF

**Client Sample ID: MW-303**

**Lab Sample ID: 310-217087-2**

Date Collected: 10/07/21 11:59

Matrix: Water

Date Received: 10/11/21 17:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332689	10/22/21 22:12	SAP	TAL CF
Total/NA	Prep	3010A			331516	10/14/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332606	10/21/21 19:25	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	331940	10/18/21 08:37	WJF	TAL CF

**Client Sample ID: MW-304**

**Lab Sample ID: 310-217087-3**

Date Collected: 10/08/21 07:57

Matrix: Water

Date Received: 10/11/21 17:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332689	10/22/21 22:15	SAP	TAL CF
Total/NA	Prep	3010A			331516	10/14/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332606	10/21/21 19:42	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	331940	10/18/21 08:37	WJF	TAL CF

**Client Sample ID: MW-305**

**Lab Sample ID: 310-217087-4**

Date Collected: 10/06/21 13:25

Matrix: Water

Date Received: 10/11/21 17:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332689	10/22/21 22:28	SAP	TAL CF
Total/NA	Prep	3010A			331516	10/14/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332606	10/21/21 19:48	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	331761	10/15/21 08:54	WJF	TAL CF

# Lab Chronicle

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072  
 Additional

Job ID: 310-217087-1

## Client Sample ID: MW-305A

Lab Sample ID: 310-217087-5

Date Collected: 10/08/21 09:30

Matrix: Water

Date Received: 10/11/21 17:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332689	10/22/21 22:30	SAP	TAL CF
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332758	10/23/21 12:39	SAP	TAL CF
Total/NA	Prep	3010A			331516	10/14/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332606	10/21/21 19:52	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	331940	10/18/21 08:37	WJF	TAL CF

## Client Sample ID: MW-306

Lab Sample ID: 310-217087-6

Date Collected: 10/08/21 09:00

Matrix: Water

Date Received: 10/11/21 17:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332689	10/22/21 22:33	SAP	TAL CF
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		10	332758	10/23/21 12:42	SAP	TAL CF
Total/NA	Prep	3010A			331516	10/14/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		10	332606	10/21/21 19:55	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	331940	10/18/21 08:37	WJF	TAL CF

## Client Sample ID: MW-310

Lab Sample ID: 310-217087-7

Date Collected: 10/06/21 15:20

Matrix: Water

Date Received: 10/11/21 17:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332689	10/22/21 22:36	SAP	TAL CF
Total/NA	Prep	3010A			331516	10/14/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332606	10/21/21 19:59	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	331761	10/15/21 08:54	WJF	TAL CF

## Client Sample ID: MW-310A

Lab Sample ID: 310-217087-8

Date Collected: 10/08/21 10:35

Matrix: Water

Date Received: 10/11/21 17:42

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332689	10/22/21 22:38	SAP	TAL CF
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332758	10/23/21 12:47	SAP	TAL CF
Total/NA	Prep	3010A			331516	10/14/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		4	332606	10/21/21 20:02	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	331940	10/18/21 08:37	WJF	TAL CF



# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072  
Additional

Job ID: 310-217087-1

**Client Sample ID: MW-311A**

**Lab Sample ID: 310-217087-9**

**Date Collected: 10/08/21 11:55**

**Matrix: Water**

**Date Received: 10/11/21 17:42**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332689	10/22/21 22:44	SAP	TAL CF
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332758	10/23/21 12:50	SAP	TAL CF
Total/NA	Prep	3010A			331516	10/14/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		4	332606	10/21/21 20:05	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	331940	10/18/21 08:37	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 - 25221072  
Additional

Job ID: 310-217087-1

## 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

# Method Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072  
Additional

Job ID: 310-217087-1

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





Environment Testing  
TestAmerica



310-217087 Chain of Custody

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

<b>Client Information</b>			
Client: SCS Engineers			
City/State:	CITY Madison	STATE WI	Project: Ottumwa Generating Station
<b>Receipt Information</b>			
Date/Time Received:	DATE 10-11-21	TIME 1742	Received By: HED
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: _____			
<b>Condition of Cooler/Containers</b>			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: AC-40	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # ____ of ____	
Cooler Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
<b>Temperature Record</b>			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____	<input type="checkbox"/> NONE	
Thermometer ID: N	Correction Factor (°C): 0		
• Temp. Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C): 0.7	Corrected Temp (°C): 0.7		
<b>Sample Container Temperature</b>			
Container(s) used:	CONTAINER 1	CONTAINER 2	
Uncorrected Temp (°C):			
Corrected Temp (°C):			
<b>Exceptions Noted</b>			
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No			
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No			
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No			
NOTE: If yes, contact PM before proceeding. If no, proceed with login			
<b>Additional Comments</b>			



<b>Client Information</b>		Sampler: <u>Rosa CWZ</u>	Lab PMI: <u>Frederick, Sandie</u>	Carrier Tracking No(s):	COC No: 310-64466-17498.1								
Client Contact: Meghan Blodgett		Phone: <u>608-509-8245</u>	E-Mail: <u>sandra.frederick@eurofinset.com</u>	State of Origin:	Page: Page 1 of 1								
Company: SCS Engineers		PWSID:		Job #:									
Address: 2830 Dairy Drive		Due Date Requested:		Analysis Requested									
City: Madison		TAT Requested (days):		Total Number of containers									
State, Zip WI, 53718		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		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:									
Phone:		PO #: <u>25221072</u>		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)									
Email: mblodgett@scsengineers.com		WC #: <u>31011020</u>		Other:									
Project Name: Citruswa Generating Station - 25221072 <u>Additional (Z)</u>		Project #: 31011020		Special Instructions/Note:									
Site: <u>350W#</u>		Site:											
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=soil, B=sludge, A=air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	2320B - Alkalinity/Carb/leach	5020A - Metals (5)	5020A - D. Metals (2-4)	N	D	D	Special Instructions/Note:
MW-302	10-7-21	10:35	G	Water			X	X	X				
MW-303	10-7-21	11:59	G	Water			X	X	X				
MW-304	10-8-21	7:57	G	Water			X	X	X				
MW-305	10-6-21	13:25	G	Water			X	X	X				
MW-305A	10-8-21	9:30	G	Water			X	X	X				
MW-306	10-8-21	9:00	G	Water			X	X	X				
MW-310	10-6-21	15:20	G	Water			X	X	X				
MW-310A	10-8-21	10:35	G	Water			X	X	X				
MW-311	10-8-21	11:55	G	Water			X	X	X				
MW-311A	10-8-21	11:55	G	Water			X	X	X				
<b>Possible Hazard Identification</b> <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:													
<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b> <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months													
Special Instructions/QC Requirements:													
Method of Shipment:													
Relinquished by: <u>Rosa CWZ</u> Date/Time: <u>10-11-21 6:00</u> Company:													
Relinquished by: Company:													
Relinquished by: Company:													
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 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	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
	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
Appendix IV Parameters	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	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 - REQUIRES SEPARATE COC	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	3	
	Lithium (filtered)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	14	
Field Parameters	Manganese (filtered)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	14	
	Ferrous Iron (CHEMeIs)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15	
	Sulfide (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:\25221072-00\Data and Calculations\Field Work Requests\OGS CCR Rule Sampling 2104.xls|Sheet1



# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-217087-1

**Login Number: 217087**

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

**List Number: 1**

**Creator: Homolar, Dana J**

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

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-217096-1

Client Project/Site: Ottumwa Generating Station - 25221072

**For:**

SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:  
10/25/2021 5:29:39 PM*

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

### LINKS

Review your project  
results through  
**Total Access**

Have a Question?



Visit us at:

[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

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

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





# 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 . . . . .	19
Field Data Sheets . . . . .	20

# Case Narrative

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217096-1

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## Job ID: 310-217096-1

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Laboratory: Eurofins TestAmerica, Cedar Falls

### Narrative

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#### Job Narrative 310-217096-1

### Comments

No additional comments.

### Receipt

The samples were received on 10/11/2021 5:42 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.6° C.

### HPLC/IC

Methods 300.0, 9056A: The following sample was diluted due to the nature of the sample matrix: MW-301 (310-217096-1). 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 - 25221072

Job ID: 310-217096-1

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-217096-1	MW-301	Water	10/07/21 08:29	10/11/21 17:42
310-217096-2	Field Blank	Water	10/07/21 09:00	10/11/21 17:42

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# Detection Summary

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217096-1

## Client Sample ID: MW-301

## Lab Sample ID: 310-217096-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	180		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	180		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	61		2.0	0.37	ug/L	1		6020A	Total/NA
Boron	800		100	58	ug/L	1		6020A	Total/NA
Cadmium	0.057	J	0.10	0.051	ug/L	1		6020A	Total/NA
Calcium	100		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.48	J	0.50	0.19	ug/L	1		6020A	Total/NA
Lithium	26		10	2.5	ug/L	1		6020A	Total/NA
Selenium	7.5		5.0	0.96	ug/L	1		6020A	Total/NA
Total Dissolved Solids	670		50	26	mg/L	1		SM 2540C	Total/NA
pH	6.5	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	681.95				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	207.3				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	4.17				mg/L	1		Field Sampling	Total/NA
pH, Field	6.26				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1062				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	17.9				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	8.9				NTU	1		Field Sampling	Total/NA

## Client Sample ID: Field Blank

## Lab Sample ID: 310-217096-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	0.75	J	1.0	0.49	mg/L	1		9056A	Total/NA
pH	6.8	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 - 25221072

Job ID: 310-217096-1

**Client Sample ID: MW-301**

**Lab Sample ID: 310-217096-1**

Date Collected: 10/07/21 08:29

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	180		5.0	2.2	mg/L			10/14/21 18:27	5
Fluoride	<0.28		0.50	0.28	mg/L			10/14/21 18:27	5
Sulfate	180		5.0	2.5	mg/L			10/14/21 18:27	5

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		10/13/21 09:00	10/25/21 16:08	1
Arsenic	<0.75		2.0	0.75	ug/L		10/13/21 09:00	10/25/21 16:08	1
Barium	61		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 16:08	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 16:08	1
Boron	800		100	58	ug/L		10/13/21 09:00	10/25/21 16:08	1
Cadmium	0.057	J	0.10	0.051	ug/L		10/13/21 09:00	10/25/21 16:08	1
Calcium	100		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 16:08	1
Chromium	<1.1		5.0	1.1	ug/L		10/13/21 09:00	10/25/21 16:08	1
Cobalt	0.48	J	0.50	0.19	ug/L		10/13/21 09:00	10/25/21 16:08	1
Lead	<0.21		0.50	0.21	ug/L		10/13/21 09:00	10/25/21 16:08	1
Lithium	26		10	2.5	ug/L		10/13/21 09:00	10/25/21 16:08	1
Molybdenum	<1.3		2.0	1.3	ug/L		10/13/21 09:00	10/25/21 16:08	1
Selenium	7.5		5.0	0.96	ug/L		10/13/21 09:00	10/25/21 16:08	1
Thallium	<0.26		1.0	0.26	ug/L		10/13/21 09:00	10/25/21 16:08	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		10/20/21 13:56	10/21/21 09:11	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	670		50	26	mg/L			10/12/21 11:54	1
pH	6.5	HF	0.1	0.1	SU			10/12/21 17:04	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	681.95				ft			10/07/21 08:29	1
Oxidation Reduction Potential	207.3				millivolts			10/07/21 08:29	1
Oxygen, Dissolved, Client Supplied	4.17				mg/L			10/07/21 08:29	1
pH, Field	6.26				SU			10/07/21 08:29	1
Specific Conductance, Field	1062				umhos/cm			10/07/21 08:29	1
Temperature, Field	17.9				Degrees C			10/07/21 08:29	1
Turbidity, Field	8.9				NTU			10/07/21 08:29	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217096-1

**Client Sample ID: Field Blank**

**Lab Sample ID: 310-217096-2**

Date Collected: 10/07/21 09:00

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.43		1.0	0.43	mg/L			10/14/21 18:42	1
Fluoride	<0.055		0.10	0.055	mg/L			10/14/21 18:42	1
<b>Sulfate</b>	<b>0.75</b>	<b>J</b>	1.0	0.49	mg/L			10/14/21 18:42	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		10/13/21 09:00	10/25/21 16:11	1
Arsenic	<0.75		2.0	0.75	ug/L		10/13/21 09:00	10/25/21 16:11	1
Barium	<0.37		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 16:11	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 16:11	1
Boron	<58		100	58	ug/L		10/13/21 09:00	10/25/21 16:11	1
Cadmium	<0.051		0.10	0.051	ug/L		10/13/21 09:00	10/25/21 16:11	1
Calcium	<0.19		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 16:11	1
Chromium	<1.1		5.0	1.1	ug/L		10/13/21 09:00	10/25/21 16:11	1
Cobalt	<0.19		0.50	0.19	ug/L		10/13/21 09:00	10/25/21 16:11	1
Lead	<0.21		0.50	0.21	ug/L		10/13/21 09:00	10/25/21 16:11	1
Lithium	<2.5		10	2.5	ug/L		10/13/21 09:00	10/25/21 16:11	1
Molybdenum	<1.3		2.0	1.3	ug/L		10/13/21 09:00	10/25/21 16:11	1
Selenium	<0.96		5.0	0.96	ug/L		10/13/21 09:00	10/25/21 16:11	1
Thallium	<0.26		1.0	0.26	ug/L		10/13/21 09:00	10/25/21 16:11	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		10/20/21 13:56	10/21/21 09:13	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<26		50	26	mg/L			10/13/21 12:25	1
<b>pH</b>	<b>6.8</b>	<b>HF</b>	0.1	0.1	SU			10/12/21 16:59	1

# Definitions/Glossary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217096-1

## Qualifiers

### HPLC/IC

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

### Metals

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

### General Chemistry

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

## 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 - 25221072

Job ID: 310-217096-1

## Method: 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 310-332306/3**  
**Matrix: Water**  
**Analysis Batch: 332306**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.43		1.0	0.43	mg/L			10/14/21 15:17	1
Fluoride	<0.055		0.10	0.055	mg/L			10/14/21 15:17	1
Sulfate	<0.49		1.0	0.49	mg/L			10/14/21 15:17	1

**Lab Sample ID: LCS 310-332306/4**  
**Matrix: Water**  
**Analysis Batch: 332306**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	10.0	10.1		mg/L		101	90 - 110
Fluoride	2.00	2.06		mg/L		103	90 - 110
Sulfate	10.0	10.4		mg/L		104	90 - 110

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

**Lab Sample ID: MB 310-331427/1-A**  
**Matrix: Water**  
**Analysis Batch: 332861**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 331427**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		10/13/21 09:00	10/25/21 14:36	1
Arsenic	<0.75		2.0	0.75	ug/L		10/13/21 09:00	10/25/21 14:36	1
Barium	<0.37		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 14:36	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 14:36	1
Boron	<58		100	58	ug/L		10/13/21 09:00	10/25/21 14:36	1
Cadmium	<0.051		0.10	0.051	ug/L		10/13/21 09:00	10/25/21 14:36	1
Calcium	<0.19		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 14:36	1
Chromium	<1.1		5.0	1.1	ug/L		10/13/21 09:00	10/25/21 14:36	1
Cobalt	<0.19		0.50	0.19	ug/L		10/13/21 09:00	10/25/21 14:36	1
Lead	<0.21		0.50	0.21	ug/L		10/13/21 09:00	10/25/21 14:36	1
Lithium	<2.5		10	2.5	ug/L		10/13/21 09:00	10/25/21 14:36	1
Molybdenum	<1.3		2.0	1.3	ug/L		10/13/21 09:00	10/25/21 14:36	1
Selenium	<0.96		5.0	0.96	ug/L		10/13/21 09:00	10/25/21 14:36	1
Thallium	<0.26		1.0	0.26	ug/L		10/13/21 09:00	10/25/21 14:36	1

**Lab Sample ID: LCS 310-331427/2-A**  
**Matrix: Water**  
**Analysis Batch: 332861**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 331427**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	200	189		ug/L		95	80 - 120
Arsenic	200	201		ug/L		100	80 - 120
Barium	100	105		ug/L		105	80 - 120
Beryllium	100	101		ug/L		101	80 - 120
Boron	200	189		ug/L		94	80 - 120
Cadmium	100	99.5		ug/L		99	80 - 120
Calcium	2.00	1.85		mg/L		93	80 - 120
Chromium	100	101		ug/L		101	80 - 120
Cobalt	100	106		ug/L		106	80 - 120

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# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217096-1

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

Lab Sample ID: LCS 310-331427/2-A  
 Matrix: Water  
 Analysis Batch: 332861

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 331427

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	200	211		ug/L		105	80 - 120
Lithium	200	199		ug/L		100	80 - 120
Molybdenum	200	194		ug/L		97	80 - 120
Selenium	400	377		ug/L		94	80 - 120
Thallium	200	211		ug/L		106	80 - 120

## Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-332319/1-A  
 Matrix: Water  
 Analysis Batch: 332502

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 332319

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.15		0.20	0.15	ug/L		10/20/21 13:56	10/21/21 08:26	1

Lab Sample ID: LCS 310-332319/2-A  
 Matrix: Water  
 Analysis Batch: 332502

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 332319

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	1.67	1.70		ug/L		102	80 - 120

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

Lab Sample ID: MB 310-331341/1  
 Matrix: Water  
 Analysis Batch: 331341

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<26		50	26	mg/L			10/12/21 11:54	1

Lab Sample ID: LCS 310-331341/2  
 Matrix: Water  
 Analysis Batch: 331341

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	948		mg/L		95	90 - 110

Lab Sample ID: MB 310-331505/1  
 Matrix: Water  
 Analysis Batch: 331505

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	<26		50	26	mg/L			10/13/21 12:25	1

Lab Sample ID: LCS 310-331505/2  
 Matrix: Water  
 Analysis Batch: 331505

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	912		mg/L		91	90 - 110

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# QC Sample Results

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217096-1

## Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-331376/1  
Matrix: Water  
Analysis Batch: 331376

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

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

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# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217096-1

## HPLC/IC

### Analysis Batch: 332306

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217096-1	MW-301	Total/NA	Water	9056A	
310-217096-2	Field Blank	Total/NA	Water	9056A	
MB 310-332306/3	Method Blank	Total/NA	Water	9056A	
LCS 310-332306/4	Lab Control Sample	Total/NA	Water	9056A	

## Metals

### Prep Batch: 331427

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217096-1	MW-301	Total/NA	Water	3010A	
310-217096-2	Field Blank	Total/NA	Water	3010A	
MB 310-331427/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-331427/2-A	Lab Control Sample	Total/NA	Water	3010A	

### Prep Batch: 332319

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217096-1	MW-301	Total/NA	Water	7470A	
310-217096-2	Field Blank	Total/NA	Water	7470A	
MB 310-332319/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-332319/2-A	Lab Control Sample	Total/NA	Water	7470A	

### Analysis Batch: 332502

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217096-1	MW-301	Total/NA	Water	7470A	332319
310-217096-2	Field Blank	Total/NA	Water	7470A	332319
MB 310-332319/1-A	Method Blank	Total/NA	Water	7470A	332319
LCS 310-332319/2-A	Lab Control Sample	Total/NA	Water	7470A	332319

### Analysis Batch: 332861

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217096-1	MW-301	Total/NA	Water	6020A	331427
310-217096-2	Field Blank	Total/NA	Water	6020A	331427
MB 310-331427/1-A	Method Blank	Total/NA	Water	6020A	331427
LCS 310-331427/2-A	Lab Control Sample	Total/NA	Water	6020A	331427

## General Chemistry

### Analysis Batch: 331341

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217096-1	MW-301	Total/NA	Water	SM 2540C	
MB 310-331341/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-331341/2	Lab Control Sample	Total/NA	Water	SM 2540C	

### Analysis Batch: 331376

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217096-1	MW-301	Total/NA	Water	SM 4500 H+ B	
310-217096-2	Field Blank	Total/NA	Water	SM 4500 H+ B	
LCS 310-331376/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

### Analysis Batch: 331505

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217096-2	Field Blank	Total/NA	Water	SM 2540C	

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# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217096-1

## General Chemistry (Continued)

### Analysis Batch: 331505 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-331505/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-331505/2	Lab Control Sample	Total/NA	Water	SM 2540C	

## Field Service / Mobile Lab

### Analysis Batch: 331984

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217096-1	MW-301	Total/NA	Water	Field Sampling	

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# Lab Chronicle

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072

Job ID: 310-217096-1

**Client Sample ID: MW-301**

**Lab Sample ID: 310-217096-1**

**Date Collected: 10/07/21 08:29**

**Matrix: Water**

**Date Received: 10/11/21 17:42**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	332306	10/14/21 18:27	JNR	TAL CF
Total/NA	Prep	3010A			331427	10/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332861	10/25/21 16:08	SAP	TAL CF
Total/NA	Prep	7470A			332319	10/20/21 13:56	EAM	TAL CF
Total/NA	Analysis	7470A		1	332502	10/21/21 09:11	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	331341	10/12/21 11:54	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	331376	10/12/21 17:04	ARG	TAL CF
Total/NA	Analysis	Field Sampling		1	331984	10/07/21 08:29	SLD	TAL CF

**Client Sample ID: Field Blank**

**Lab Sample ID: 310-217096-2**

**Date Collected: 10/07/21 09:00**

**Matrix: Water**

**Date Received: 10/11/21 17:42**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1	332306	10/14/21 18:42	JNR	TAL CF
Total/NA	Prep	3010A			331427	10/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332861	10/25/21 16:11	SAP	TAL CF
Total/NA	Prep	7470A			332319	10/20/21 13:56	EAM	TAL CF
Total/NA	Analysis	7470A		1	332502	10/21/21 09:13	EAM	TAL CF
Total/NA	Analysis	SM 2540C		1	331505	10/13/21 12:25	ARG	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	331376	10/12/21 16:59	ARG	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 - 25221072

Job ID: 310-217096-1

## 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 - 25221072

Job ID: 310-217096-1

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



Environment Testing  
TestAmerica



310-217096 Chain of Custody

### Cooler/Sample Receipt and Temperature Log Form

<b>Client Information</b>		
Client: <u>SCS Engineers</u>		
City/State: <u>Madison</u> <small>CITY</small>	<u>WI</u> <small>STATE</small>	Project: <u>Ottumwa Generating Station - Additional</u>
<b>Receipt Information</b>		
Date/Time Received: <u>10-11-21</u> <small>DATE</small>	<u>1742</u> <small>TIME</small>	Received By: <u>HED</u>
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
<b>Condition of Cooler/Containers</b>		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AC23</u>
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____
Cooler Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
<b>Temperature Record</b>		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>N</u>	Correction Factor (°C): <u>0</u>	
• <b>Temp Blank Temperature</b> – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C):	Corrected Temp (°C):	
• <b>Sample Container Temperature</b>		
Container(s) used:	<u>CONTAINER 1</u> <u>250ml No Treat MW-301</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):	<u>1.6</u>	
Corrected Temp (°C):	<u>1.6</u>	
<b>Exceptions Noted</b>		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
<b>Additional Comments</b>		



### Chain of Custody Record

<b>Client Information</b> Client Contact: <b>Meghan Blodgett</b> Company: <b>SCS Engineers</b> Address: <b>2830 Dairy Drive</b> City: <b>Madison</b> State, Zip: <b>WI, 53718</b> Phone: <b>25221072</b> Email: <b>mblodgett@scsengineers.com</b> Project Name: <b>Oitumwa Generating Station - 25221072</b> Site: <b>SCOW#</b>		Sampler: <b>Rosa Cruz</b> Lab PM: <b>Fredrick Sandie</b> Phone: <b>609-509-8295</b> E-Mail: <b>sandra.fredrick@eurofinset.com</b>		Carrier Tracking No(s): <b>310-G4463-17485.1</b> State of Origin: <b>Page 1 of 1</b> Job #:	
Due Date Requested: TAT Requested (days): Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No PO #: <b>25221072</b> WO #: <b>31011020</b> Project #: SSGW#:		<b>Analysis Requested</b> Total Number of Containers: <b>2</b>			
<b>Sample Identification</b> MW-301 Field Blank		Sample Date <b>10-07-21</b> <b>10-07-21</b>	Sample Time <b>8:24</b> <b>9:00</b>	Sample Type (C=Comp, G=grab) <b>6</b> <b>6</b>	Matrix (W=Water, S=Sediment, O=Other/Soil) Preservation Code: <b>Water</b> <b>Water</b>
Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/> Perform MS/MSD (Yes or No) <input checked="" type="checkbox"/> 903 - Radium-226 (GFC) <input checked="" type="checkbox"/> 904 - Radium-228 (GFC) <input checked="" type="checkbox"/> 905A - ORGM_28D - Chloride Fluoride & Sulfate <input checked="" type="checkbox"/> 9020A_7470A <input checked="" type="checkbox"/> 2540C_Calcid_SM4500_H+ <input checked="" type="checkbox"/>		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: Special Instructions Note:		Special Instructions/OC Requirements: <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)			
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: <b>Rosa Cruz</b> Relinquished by Date/Time: <b>10-11-21 6:00</b> Relinquished by Company: <b>Company</b>			
Custody Seal Intact: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Custody Seal No.:		Received by: <b>MA GA</b> Received by Date/Time: <b>10-11-21 1742</b> Received by Company: <b>Company</b>			
Cooler Temperature(s) °C and Other Remarks:		Method of Shipment:			



# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-217096-1

SDG Number:

**Login Number: 217096**

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

**List Number: 1**

**Creator: Homolar, Dana J**

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



**Table 1. Groundwater Monitoring Results - Field Parameters**  
**Ottumwa Generating Station / SCS Engineers Project No. 25221072.00**  
**October 2021**

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	10/7/2021 8:29	681.95	17.9	6.26	4.17	1,062	207.3	8.9
MW-302	10/7/2021 10:35	654.86	14.9	6.49	0.30	1,920	211.5	15.6
MW-303	10/7/2021 11:59	649.80	17.6	6.70	0.32	1,343	66.5	11.1
MW-304	10/8/2021 7:57	649.53	13.8	6.97	0.32	1,617	-78.7	7.3
MW-305	10/6/2021 13:25	654.83	13.7	6.94	0.44	1,629	46.9	3.8
MW-305A	10/8/2021 9:30	645.57	14.7	6.90	2.02	1,145	147.8	14.3
MW-306	10/8/2021 9:00	662.27	14.7	6.66	0.40	1,506	86.0	6.7
MW-307	10/7/2021 15:47	644.49	14.4	6.71	0.19	1,552	-23.8	10.0
MW-308	10/7/2021 15:05	641.81	13.0	6.83	0.17	1,453	-26.1	12.8
MW-309	10/7/2021 18:02	640.71	13.1	7.18	0.21	1,297	-8.1	19.6
MW-310	10/6/2021 15:20	638.19	15.4	7.20	0.48	1,425	96.8	1.0
MW-310A	10/8/2021 10:35	639.57	15.6	7.65	6.21	2,808	143.1	15.0
MW-311	10/6/2021 17:10	Dry	NM	NM	NM	NM	NM	NM
MW-311A	10/8/2021 11:55	640.58	15.1	8.12	1.68	2,930	140.7	9.6

Abbreviations:

mg/L = milligrams per liter

amsl = above mean sea level

NA = Not Analyzed

NM= Not Measured

Notes:

none

Created by: NDK  
 Last revision by: JSN  
 Checked by: NDK

Date: 10/15/2021  
 Date: 10/15/2021  
 Date: 10/15/2021

C:\Users\FredrickS\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\MM4BE9B8\2110\_Oct - OGS\_CCR\_Field.xlsx]GW Field Parameters

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-217096-2

Client Project/Site: Ottumwa Generating Station - 25221072  
App III/IV

For:  
SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:  
11/14/2021 6:42:55 PM

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

### LINKS

Review your project  
results through  
**TotalAccess**

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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 . . . . .	17
Tracer Carrier Summary . . . . .	19



# Case Narrative

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072 App III/IV

Job ID: 310-217096-2

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## Job ID: 310-217096-2

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### Laboratory: Eurofins TestAmerica, Cedar Falls

#### Narrative

#### Job Narrative 310-217096-2

#### Comments

No additional comments.

#### Receipt

The samples were received on 10/11/2021 5:42 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.6° C.

#### RAD

Methods 903.0, 9315: Radium 226 batch 531985 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 (310-217096-1), Field Blank (310-217096-2), (LCS 160-531985/1-A), (LCSD 160-531985/2-A) and (MB 160-531985/23-A)

Methods 904.0, 9320: Radium 228 batch 531994 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 (310-217096-1), Field Blank (310-217096-2), (LCS 160-531994/1-A), (LCSD 160-531994/2-A) and (MB 160-531994/23-A)

Method PrecSep\_0: Radium-228 Prep Batch 160-531994 Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-301 (310-217096-1) and Field Blank (310-217096-2). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep-21: Radium-226 Prep Batch 160-531985 Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-301 (310-217096-1) and Field Blank (310-217096-2). 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 - 25221072 App  
III/IV

Job ID: 310-217096-2

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-217096-1	MW-301	Water	10/07/21 08:29	10/11/21 17:42
310-217096-2	Field Blank	Water	10/07/21 09:00	10/11/21 17:42

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# Detection Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072 App III/IV

Job ID: 310-217096-2

**Client Sample ID: MW-301**

**Lab Sample ID: 310-217096-1**

No Detections.

**Client Sample ID: Field Blank**

**Lab Sample ID: 310-217096-2**

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 - 25221072 App III/IV

Job ID: 310-217096-2

**Client Sample ID: MW-301**  
**Date Collected: 10/07/21 08:29**  
**Date Received: 10/11/21 17:42**

**Lab Sample ID: 310-217096-1**  
**Matrix: Water**

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	0.299	U	0.231	0.232	1.00	0.339	pCi/L	10/15/21 10:26	11/08/21 17:38	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	102		40 - 110					10/15/21 10:26	11/08/21 17:38	1

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
<b>Radium 228</b>	<b>0.744</b>		0.318	0.325	1.00	0.452	pCi/L	10/15/21 11:06	11/08/21 12:51	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	102		40 - 110					10/15/21 11:06	11/08/21 12:51	1
Y Carrier	67.7		40 - 110					10/15/21 11:06	11/08/21 12:51	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
<b>Radium 226 and 228</b>	<b>1.04</b>		0.393	0.399	5.00	0.452	pCi/L		11/12/21 20:04	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072 App III/IV

Job ID: 310-217096-2

**Client Sample ID: Field Blank**

**Lab Sample ID: 310-217096-2**

Date Collected: 10/07/21 09:00

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium 226	0.180	U	0.207	0.207	1.00	0.337	pCi/L	10/15/21 10:26	11/08/21 17:38	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	106		40 - 110					10/15/21 10:26	11/08/21 17:38	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	0.186	U	0.215	0.215	1.00	0.354	pCi/L	10/15/21 11:06	11/08/21 12:51	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	106		40 - 110					10/15/21 11:06	11/08/21 12:51	1
Y Carrier	85.2		40 - 110					10/15/21 11:06	11/08/21 12:51	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
<b>Radium 226 and 228</b>	<b>0.366</b>		0.298	0.298	5.00	0.354	pCi/L		11/12/21 20:04	1

# Definitions/Glossary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072 App III/I

Job ID: 310-217096-2

## Qualifiers

### Rad

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

## Glossary

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

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072 App III/I

Job ID: 310-217096-2

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

**Lab Sample ID: MB 160-531985/23-A**  
**Matrix: Water**  
**Analysis Batch: 535397**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 531985**

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 226	0.3311	U	0.262	0.264	1.00	0.379	pCi/L	10/15/21 10:26	11/08/21 19:17	1
Carrier	MB	MB	Limits			Prepared	Analyzed	Dil Fac		
	%Yield	Qualifier								
Ba	97.2		40 - 110			10/15/21 10:26	11/08/21 19:17	1		

**Lab Sample ID: LCS 160-531985/1-A**  
**Matrix: Water**  
**Analysis Batch: 535393**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 531985**

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Radium 226	15.1	13.66		1.75	1.00	0.505	pCi/L	90	75 - 125
Carrier	LCS	LCS	Limits			Prepared	Analyzed	Dil Fac	
	%Yield	Qualifier							
Ba	106		40 - 110						

**Lab Sample ID: LCSD 160-531985/2-A**  
**Matrix: Water**  
**Analysis Batch: 535393**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 531985**

Analyte	Spike Added	LCSD Result	LCSD Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
				Uncert. (2σ+/-)							
Radium 226	15.1	13.05		1.69	1.00	0.508	pCi/L	86	75 - 125	0.18	1
Carrier	LCSD	LCSD	Limits			Prepared	Analyzed	Dil Fac			
	%Yield	Qualifier									
Ba	106		40 - 110								

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

**Lab Sample ID: MB 160-531994/23-A**  
**Matrix: Water**  
**Analysis Batch: 535393**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 531994**

Analyte	MB	MB	Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium 228	0.2280	U	0.367	0.367	1.00	0.616	pCi/L	10/15/21 11:06	11/08/21 13:04	1
Carrier	MB	MB	Limits			Prepared	Analyzed	Dil Fac		
	%Yield	Qualifier								
Ba	97.2		40 - 110			10/15/21 11:06	11/08/21 13:04	1		
Y Carrier	87.5		40 - 110			10/15/21 11:06	11/08/21 13:04	1		

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072 App III/I

Job ID: 310-217096-2

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

**Lab Sample ID: LCS 160-531994/1-A**  
**Matrix: Water**  
**Analysis Batch: 535427**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 531994**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits												
Radium 228	12.2	11.49		1.34	1.00	0.499	pCi/L	94	75 - 125												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Carrier</th> <th>LCS %Yield</th> <th>LCS Qualifier</th> <th>Limits</th> </tr> </thead> <tbody> <tr> <td>Ba</td> <td>106</td> <td></td> <td>40 - 110</td> </tr> <tr> <td>Y Carrier</td> <td>82.6</td> <td></td> <td>40 - 110</td> </tr> </tbody> </table>										Carrier	LCS %Yield	LCS Qualifier	Limits	Ba	106		40 - 110	Y Carrier	82.6		40 - 110
Carrier	LCS %Yield	LCS Qualifier	Limits																		
Ba	106		40 - 110																		
Y Carrier	82.6		40 - 110																		

**Lab Sample ID: LCSD 160-531994/2-A**  
**Matrix: Water**  
**Analysis Batch: 535427**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 531994**

Analyte	Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit												
Radium 228	12.2	13.96		1.56	1.00	0.444	pCi/L	114	75 - 125	0.85	1												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Carrier</th> <th>LCSD %Yield</th> <th>LCSD Qualifier</th> <th>Limits</th> </tr> </thead> <tbody> <tr> <td>Ba</td> <td>106</td> <td></td> <td>40 - 110</td> </tr> <tr> <td>Y Carrier</td> <td>83.4</td> <td></td> <td>40 - 110</td> </tr> </tbody> </table>												Carrier	LCSD %Yield	LCSD Qualifier	Limits	Ba	106		40 - 110	Y Carrier	83.4		40 - 110
Carrier	LCSD %Yield	LCSD Qualifier	Limits																				
Ba	106		40 - 110																				
Y Carrier	83.4		40 - 110																				

# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072 App III/I\

Job ID: 310-217096-2

## Rad

### Prep Batch: 531985

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217096-1	MW-301	Total/NA	Water	PrecSep-21	
310-217096-2	Field Blank	Total/NA	Water	PrecSep-21	
MB 160-531985/23-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-531985/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-531985/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

### Prep Batch: 531994

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217096-1	MW-301	Total/NA	Water	PrecSep_0	
310-217096-2	Field Blank	Total/NA	Water	PrecSep_0	
MB 160-531994/23-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-531994/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-531994/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

# Lab Chronicle

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072 App III/I

Job ID: 310-217096-2

## Client Sample ID: MW-301

Date Collected: 10/07/21 08:29

Date Received: 10/11/21 17:42

## Lab Sample ID: 310-217096-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			531985	10/15/21 10:26	BMP	TAL SL
Total/NA	Analysis	903.0		1	535393	11/08/21 17:38	FLC	TAL SL
Total/NA	Prep	PrecSep_0			531994	10/15/21 11:06	BMP	TAL SL
Total/NA	Analysis	904.0		1	535427	11/08/21 12:51	EMH	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	536441	11/12/21 20:04	MLK	TAL SL

## Client Sample ID: Field Blank

Date Collected: 10/07/21 09:00

Date Received: 10/11/21 17:42

## Lab Sample ID: 310-217096-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			531985	10/15/21 10:26	BMP	TAL SL
Total/NA	Analysis	903.0		1	535393	11/08/21 17:38	FLC	TAL SL
Total/NA	Prep	PrecSep_0			531994	10/15/21 11:06	BMP	TAL SL
Total/NA	Analysis	904.0		1	535427	11/08/21 12:51	EMH	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	536441	11/12/21 20:04	MLK	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 - 25221072 App III/IV

Job ID: 310-217096-2

## 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	12-08-21
California	Los Angeles County Sanitation Districts	10259	06-30-22
California	State	2886	06-30-21 *
Connecticut	State	PH-0241	03-31-23
Florida	NELAP	E87689	06-30-22
HI - RadChem Recognition	State	n/a	06-30-22
Illinois	NELAP	200023	11-30-22
Iowa	State	373	12-01-22
Kansas	NELAP	E-10236	10-31-21 *
Kentucky (DW)	State	KY90125	01-01-22
Kentucky (WW)	State	KY90125 (Permit KY0004049)	12-31-21
Louisiana	NELAP	04080	06-30-22
Louisiana (DW)	State	LA011	12-31-21
Maryland	State	310	09-30-22
MI - RadChem Recognition	State	9005	06-30-22
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-22
New Jersey	NELAP	MO002	06-30-22
New York	NELAP	11616	04-01-22
North Dakota	State	R-207	06-30-22
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-22
Oregon	NELAP	4157	09-01-22
Pennsylvania	NELAP	68-00540	03-01-22
South Carolina	State	85002001	06-30-22
Texas	NELAP	T104704193	07-31-22
US Fish & Wildlife	US Federal Programs	058448	07-31-22
USDA	US Federal Programs	P330-17-00028	03-11-23
Utah	NELAP	MO000542021-14	08-01-22
Virginia	NELAP	10310	06-14-22
Washington	State	C592	08-30-22
West Virginia DEP	State	381	10-31-22

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



# Method Summary

Client: SCS Engineers

Job ID: 310-217096-2

Project/Site: Ottumwa Generating Station - 25221072 App III/IV

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



310-217096 Chain of Custody

### Cooler/Sample Receipt and Temperature Log Form

Client Information		
Client: <u>SCS Engineers</u>		
City/State: <small>CITY</small> <u>Madison</u> <small>STATE</small> <u>WI</u>	Project: <u>Ottumwa Generating Station - Additional</u>	
Receipt Information		
Date/Time Received: <small>DATE</small> <u>10-11-21</u> <small>TIME</small> <u>1742</u>	Received By: <u>HED</u>	
Delivery Type: <input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AC23</u>
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____
Cooler Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓
Temperature Record		
Coolant: <input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>N</u>	Correction Factor (°C): <u>0</u>	
• Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature		
Uncorrected Temp (°C):	Corrected Temp (°C):	
• Sample Container Temperature		
Container(s) used:	<u>CONTAINER 1</u> <u>250ml No Treat MW-301</u>	<u>CONTAINER 2</u>
Uncorrected Temp (°C):	<u>1.6</u>	
Corrected Temp (°C):	<u>1.6</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		



**Chain of Custody Record**

Client Information		Sampler: ROSA CWZ		Lab PM: Fredrick, Sandie		Carrier Tracking No(s):		COC No: 310-64463-17485.1		
Client Contact		Phone: 609-509-8295		E-Mail: sandra.fredrick@eurofinset.com		State of Origin:		Page Page 1 of 1		
Company: SCS Engineers		PWSID:						Job #:		
<p>Due Date Requested:</p> <p>TAT Requested (days):</p> <p>Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>PO #: 25221072</p> <p>WO #: 31011020</p> <p>Project Name: Oltumwa Generating Station - 25221072</p> <p>Site: <i>MW-301</i></p>										
Sample Identification			Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (M=water, S=solid, O=overseal)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Analysis Requested	
MW-301			10-07-21	8:24	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Total Number of containers	
Field Blank			10-07-21	9:00	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
									Special Instructions Note:	

<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)			
Empty Kit Relinquished by		Date:	
Relinquished by ROSA CRUZ		Date/Time: 10-11-21 06:00	
Relinquished by		Date/Time	
Relinquished by		Date/Time	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:	

Received by	Date/Time	Company	Method of Shipment
Received by	Date/Time	Company	
Received by <i>MW QA</i>	Date/Time: 10-11-21 1742	Company	

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 - Na2SO4  
 R - Na2S2O3  
 S - H2SO4  
 T - TSP Dehydrate  
 U - Acetone  
 V - MCAA  
 W - pH 4-5  
 Z - other (specify)



## Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-217096-2

SDG Number:

**Login Number: 217096**

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

**List Number: 1**

**Creator: Homolar, Dana J**

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



## Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-217096-2

SDG Number:

**Login Number: 217096**

**List Number: 2**

**Creator: Johnson, Autumn R**

**List Source: Eurofins TestAmerica, St. Louis**

**List Creation: 10/13/21 04:01 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 - 25221072 App III/IV

Job ID: 310-217096-2

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

Matrix: Water

Prep Type: Total/NA

### Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (40-110)							
310-217096-1	MW-301	102							
310-217096-2	Field Blank	106							
LCS 160-531985/1-A	Lab Control Sample	106							
LCS D 160-531985/2-A	Lab Control Sample Dup	106							
MB 160-531985/23-A	Method Blank	97.2							

### Tracer/Carrier Legend

Ba = Ba

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

Matrix: Water

Prep Type: Total/NA

### Percent Yield (Acceptance Limits)

Lab Sample ID	Client Sample ID	Ba (40-110)	Y (40-110)						
310-217096-1	MW-301	102	67.7						
310-217096-2	Field Blank	106	85.2						
LCS 160-531994/1-A	Lab Control Sample	106	82.6						
LCS D 160-531994/2-A	Lab Control Sample Dup	106	83.4						
MB 160-531994/23-A	Method Blank	97.2	87.5						

### Tracer/Carrier Legend

Ba = Ba

Y = Y Carrier

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-217097-1

Client Project/Site: Ottumwa Generating Station - 25221072 -  
Additional

**For:**

SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:  
10/26/2021 8:15:09 AM*

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

### LINKS

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results through  
**TotalAccess**

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[www.eurofinsus.com/Env](http://www.eurofinsus.com/Env)

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

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



# 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 . . . . .	13
Certification Summary . . . . .	14
Method Summary . . . . .	15
Chain of Custody . . . . .	16
Receipt Checklists . . . . .	18



# Case Narrative

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072 - Additional

Job ID: 310-217097-1

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**Job ID: 310-217097-1**

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**Laboratory: Eurofins TestAmerica, Cedar Falls**

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**Narrative**

**Job Narrative**  
**310-217097-1**

**Comments**

No additional comments.

**Receipt**

The samples were received on 10/11/2021 5:42 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.6° 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.

- 1
- 2
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# Sample Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072 -  
Additional

Job ID: 310-217097-1

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-217097-1	MW-301	Water	10/07/21 08:29	10/11/21 17:42
310-217097-2	Field Blank	Water	10/07/21 09:00	10/11/21 17:42

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

# Detection Summary

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072 -  
 Additional

Job ID: 310-217097-1

## Client Sample ID: MW-301

## Lab Sample ID: 310-217097-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	36000		500	100	ug/L	1		6020A	Total/NA
Manganese	18		10	4.4	ug/L	1		6020A	Total/NA
Potassium	1300		500	150	ug/L	1		6020A	Total/NA
Sodium	88000		1000	610	ug/L	1		6020A	Total/NA
Manganese	15		10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	210		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	210		10	4.6	mg/L	1		SM 2320B	Total/NA
Ground Water Elevation	681.95				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	207.3				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	4.17				mg/L	1		Field Sampling	Total/NA
pH, Field	6.26				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1062				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	17.9				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	8.9				NTU	1		Field Sampling	Total/NA

## Client Sample ID: Field Blank

## Lab Sample ID: 310-217097-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	97	J	100	36	ug/L	1		6020A	Dissolved

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072 -  
 Additional

Job ID: 310-217097-1

**Client Sample ID: MW-301**

**Lab Sample ID: 310-217097-1**

Date Collected: 10/07/21 08:29

Matrix: Water

Date Received: 10/11/21 17:42

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/13/21 09:00	10/25/21 16:15	1
<b>Magnesium</b>	<b>36000</b>		500	100	ug/L		10/13/21 09:00	10/25/21 16:15	1
<b>Manganese</b>	<b>18</b>		10	4.4	ug/L		10/13/21 09:00	10/25/21 16:15	1
<b>Potassium</b>	<b>1300</b>		500	150	ug/L		10/13/21 09:00	10/25/21 16:15	1
<b>Sodium</b>	<b>88000</b>		1000	610	ug/L		10/13/21 09:00	10/25/21 16:15	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/13/21 09:00	10/22/21 22:52	1
<b>Manganese</b>	<b>15</b>		10	4.4	ug/L		10/13/21 09:00	10/23/21 13:08	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Bicarbonate Alkalinity as CaCO3</b>	<b>210</b>		10	4.6	mg/L			10/18/21 08:37	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			10/18/21 08:37	1
<b>Total Alkalinity as CaCO3</b>	<b>210</b>		10	4.6	mg/L			10/18/21 08:37	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Ground Water Elevation</b>	<b>681.95</b>				ft			10/07/21 08:29	1
<b>Oxidation Reduction Potential</b>	<b>207.3</b>				millivolts			10/07/21 08:29	1
<b>Oxygen, Dissolved, Client Supplied</b>	<b>4.17</b>				mg/L			10/07/21 08:29	1
<b>pH, Field</b>	<b>6.26</b>				SU			10/07/21 08:29	1
<b>Specific Conductance, Field</b>	<b>1062</b>				umhos/cm			10/07/21 08:29	1
<b>Temperature, Field</b>	<b>17.9</b>				Degrees C			10/07/21 08:29	1
<b>Turbidity, Field</b>	<b>8.9</b>				NTU			10/07/21 08:29	1

# Client Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072 -  
 Additional

Job ID: 310-217097-1

**Client Sample ID: Field Blank**

**Lab Sample ID: 310-217097-2**

**Date Collected: 10/07/21 09:00**

**Matrix: Water**

**Date Received: 10/11/21 17:42**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/13/21 09:00	10/25/21 16:18	1
Magnesium	<100		500	100	ug/L		10/13/21 09:00	10/25/21 16:18	1
Manganese	<4.4		10	4.4	ug/L		10/13/21 09:00	10/25/21 16:18	1
Potassium	<150		500	150	ug/L		10/13/21 09:00	10/25/21 16:18	1
Sodium	<610		1000	610	ug/L		10/13/21 09:00	10/25/21 16:18	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	97	J	100	36	ug/L		10/13/21 09:00	10/22/21 23:05	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/15/21 11:51	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/15/21 11:51	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/15/21 11:51	1

- 1
- 2
- 3
- 4
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- 7
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- 9
- 10
- 11
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- 13
- 14

# Definitions/Glossary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072 -  
Additional

Job ID: 310-217097-1

## Qualifiers

### Metals

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

## Glossary

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

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072 -  
 Additional

Job ID: 310-217097-1

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

**Lab Sample ID: MB 310-331373/1-A**  
**Matrix: Water**  
**Analysis Batch: 332110**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 331373**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/13/21 09:00	10/18/21 19:38	1
Manganese	<4.4		10	4.4	ug/L		10/13/21 09:00	10/18/21 19:38	1

**Lab Sample ID: MB 310-331373/1-A**  
**Matrix: Water**  
**Analysis Batch: 332664**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 331373**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/13/21 09:00	10/22/21 14:46	1
Manganese	<4.4		10	4.4	ug/L		10/13/21 09:00	10/22/21 14:46	1

**Lab Sample ID: LCS 310-331373/2-A**  
**Matrix: Water**  
**Analysis Batch: 332110**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 331373**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	200	168		ug/L		84	80 - 120
Manganese	100	88.0		ug/L		88	80 - 120

**Lab Sample ID: LCS 310-331373/2-A**  
**Matrix: Water**  
**Analysis Batch: 332664**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 331373**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	200	223		ug/L		111	80 - 120
Manganese	100	100		ug/L		100	80 - 120

**Lab Sample ID: MB 310-331427/1-A**  
**Matrix: Water**  
**Analysis Batch: 332861**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 331427**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<36		100	36	ug/L		10/13/21 09:00	10/25/21 14:36	1
Magnesium	<100		500	100	ug/L		10/13/21 09:00	10/25/21 14:36	1
Manganese	<4.4		10	4.4	ug/L		10/13/21 09:00	10/25/21 14:36	1
Potassium	<150		500	150	ug/L		10/13/21 09:00	10/25/21 14:36	1
Sodium	<610		1000	610	ug/L		10/13/21 09:00	10/25/21 14:36	1

**Lab Sample ID: LCS 310-331427/2-A**  
**Matrix: Water**  
**Analysis Batch: 332861**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 331427**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	200	199		ug/L		99	80 - 120
Magnesium	2000	2050		ug/L		102	80 - 120
Manganese	100	103		ug/L		103	80 - 120
Potassium	2000	2070		ug/L		103	80 - 120
Sodium	2000	1980		ug/L		99	80 - 120

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072 -  
 Additional

Job ID: 310-217097-1

## Method: 2320B - Alkalinity (Low Level)

**Lab Sample ID: MB 310-331791/1**  
**Matrix: Water**  
**Analysis Batch: 331791**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/15/21 11:51	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/15/21 11:51	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/15/21 11:51	1

**Lab Sample ID: LCS 310-331791/2**  
**Matrix: Water**  
**Analysis Batch: 331791**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Alkalinity as CaCO3	1000	1020		mg/L		102	90 - 110

## Method: SM 2320B - Alkalinity

**Lab Sample ID: MB 310-331940/1**  
**Matrix: Water**  
**Analysis Batch: 331940**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/18/21 08:37	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/18/21 08:37	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/18/21 08:37	1

**Lab Sample ID: LCS 310-331940/2**  
**Matrix: Water**  
**Analysis Batch: 331940**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Alkalinity as CaCO3	1000	1060		mg/L		106	90 - 110



# QC Association Summary

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072 -  
 Additional

Job ID: 310-217097-1

## Metals

### Prep Batch: 331373

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217097-1	MW-301	Dissolved	Water	3010A	
310-217097-2	Field Blank	Dissolved	Water	3010A	
MB 310-331373/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-331373/2-A	Lab Control Sample	Total/NA	Water	3010A	

### Prep Batch: 331427

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217097-1	MW-301	Total/NA	Water	3010A	
310-217097-2	Field Blank	Total/NA	Water	3010A	
MB 310-331427/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-331427/2-A	Lab Control Sample	Total/NA	Water	3010A	

### Analysis Batch: 332110

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-331373/1-A	Method Blank	Total/NA	Water	6020A	331373
LCS 310-331373/2-A	Lab Control Sample	Total/NA	Water	6020A	331373

### Analysis Batch: 332664

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-331373/1-A	Method Blank	Total/NA	Water	6020A	331373
LCS 310-331373/2-A	Lab Control Sample	Total/NA	Water	6020A	331373

### Analysis Batch: 332689

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217097-1	MW-301	Dissolved	Water	6020A	331373
310-217097-2	Field Blank	Dissolved	Water	6020A	331373

### Analysis Batch: 332758

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217097-1	MW-301	Dissolved	Water	6020A	331373

### Analysis Batch: 332861

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217097-1	MW-301	Total/NA	Water	6020A	331427
310-217097-2	Field Blank	Total/NA	Water	6020A	331427
MB 310-331427/1-A	Method Blank	Total/NA	Water	6020A	331427
LCS 310-331427/2-A	Lab Control Sample	Total/NA	Water	6020A	331427

## General Chemistry

### Analysis Batch: 331791

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217097-2	Field Blank	Total/NA	Water	2320B	
MB 310-331791/1	Method Blank	Total/NA	Water	2320B	
LCS 310-331791/2	Lab Control Sample	Total/NA	Water	2320B	

### Analysis Batch: 331940

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217097-1	MW-301	Total/NA	Water	SM 2320B	
MB 310-331940/1	Method Blank	Total/NA	Water	SM 2320B	

Eurofins TestAmerica, Cedar Falls

# QC Association Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072 -  
Additional

Job ID: 310-217097-1

## General Chemistry (Continued)

### Analysis Batch: 331940 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 310-331940/2	Lab Control Sample	Total/NA	Water	SM 2320B	

## Field Service / Mobile Lab

### Analysis Batch: 331984

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217097-1	MW-301	Total/NA	Water	Field Sampling	

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# Lab Chronicle

Client: SCS Engineers  
 Project/Site: Ottumwa Generating Station - 25221072 -  
 Additional

Job ID: 310-217097-1

**Client Sample ID: MW-301**

**Lab Sample ID: 310-217097-1**

**Date Collected: 10/07/21 08:29**

**Matrix: Water**

**Date Received: 10/11/21 17:42**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332689	10/22/21 22:52	SAP	TAL CF
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332758	10/23/21 13:08	SAP	TAL CF
Total/NA	Prep	3010A			331427	10/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332861	10/25/21 16:15	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	331940	10/18/21 08:37	WJF	TAL CF
Total/NA	Analysis	Field Sampling		1	331984	10/07/21 08:29	SLD	TAL CF

**Client Sample ID: Field Blank**

**Lab Sample ID: 310-217097-2**

**Date Collected: 10/07/21 09:00**

**Matrix: Water**

**Date Received: 10/11/21 17:42**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332689	10/22/21 23:05	SAP	TAL CF
Total/NA	Prep	3010A			331427	10/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	332861	10/25/21 16:18	SAP	TAL CF
Total/NA	Analysis	2320B		1	331791	10/15/21 11:51	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 - 25221072 -  
Additional

Job ID: 310-217097-1

## 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
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- 13
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# Method Summary

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 25221072 -  
Additional

Job ID: 310-217097-1

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
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



Environment Testing  
TestAmerica



310-217097 Chain of Custody

### Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: <u>SCS Engineers</u>			
City/State:	CITY <u>Madison</u>	STATE <u>WI</u>	Project: <u>Ottumwa Generating Station - Additional</u>
Receipt Information			
Date/Time Received:	DATE <u>10-11-21</u>	TIME <u>1742</u>	Received By: <u>HED</u>
Delivery Type:	<input type="checkbox"/> UPS <input type="checkbox"/> FedEx <input type="checkbox"/> FedEx Ground <input type="checkbox"/> US Mail <input type="checkbox"/> Spee-Dee <input checked="" type="checkbox"/> Lab Courier <input type="checkbox"/> Lab Field Services <input type="checkbox"/> Client Drop-off <input type="checkbox"/> Other: _____		
Condition of Cooler/Containers			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AC23</u>	
Multiple Coolers?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler # _____ of _____	
Cooler Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Cooler custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sample Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Sample custody seals intact? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes: Which VOA samples are in cooler? ↓	
Temperature Record			
Coolant:	<input checked="" type="checkbox"/> Wet ice <input type="checkbox"/> Blue ice <input type="checkbox"/> Dry ice <input type="checkbox"/> Other: _____ <input type="checkbox"/> NONE		
Thermometer ID: <u>N</u>	Correction Factor (°C): <u>0</u>		
• Temp Blank Temperature - If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature			
Uncorrected Temp (°C):	Corrected Temp (°C):		
• Sample Container Temperature			
Container(s) used:	CONTAINER 1 <u>250ml No Treat MW-301</u>	CONTAINER 2	
Uncorrected Temp (°C):	<u>1.6</u>		
Corrected Temp (°C):	<u>1.6</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			



# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-217097-1

SDG Number:

**Login Number: 217097**


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

**List Number: 1**

**Creator: Homolar, Dana J**

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





Appendix D  
Historical Monitoring Results

Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-301																							
Number of Sampling Dates: 22																							
Parameter Name	Units	4/26/2016	6/23/2016	8/10/2016	10/26/2016	1/18/2017	4/19/2017	6/20/2017	8/23/2017	11/8/2017	4/18/2018	8/14/2018	8/29/2018	10/16/2018	1/8/2019	4/8/2019	10/24/2019	2/5/2020	3/12/2020	4/14/2020	10/8/2020	4/14/2021	10/7/2021
Boron	ug/L	574	612	597	620	599	565	657	779	488	480	735	--	410	--	380	680	540	--	700	650	690	800
Calcium	mg/L	66.9	62.5	65.6	71.9	74.1	61.5	59.3	66.8	65.2	63	72.5	--	47.2	--	43	78	68	--	84	94	96	100
Chloride	mg/L	63.4	66.9	73.3	76.3	71.6	54.8	69.8	73.5	59.8	63.4	--	63.1	33.9	--	50	110	120	--	140	170	150	180
Fluoride	mg/L	0.22	0.2	0.44	0.27	0.17	0.24	0.26	0.34	0.27	0.22	--	0.27	0.3	--	0.44	<0.23	--	--	<0.23	<0.23	<0.28	<0.28
Field pH	Std. Units	6.54	6.06	6.08	6.26	6.47	6.64	6.31	6.16	6.41	6.41	6.26	6.31	6.27	5.68	6.61	6.33	6.39	6.48	6.58	6.22	6.26	6.26
Sulfate	mg/L	150	157	159	169	171	190	166	162	178	186	--	181	164	--	81	130	130	--	140	140	140	180
Total Dissolved Solids	mg/L	500	531	576	545	545	499	490	557	448	514	--	532	392	--	340	510	570	--	550	660	620	670
Antimony	ug/L	<0.058	0.13	0.12	<0.058	0.11	<0.026	0.054	0.063	--	<0.026	0.2	--	<0.078	--	<0.53	<0.53	--	--	<0.58	<0.51	<1.1	<1.1
Arsenic	ug/L	0.38	0.38	0.26	0.14	0.23	0.22	0.15	0.14	--	0.074	0.29	--	0.16	--	<0.75	<0.75	<0.88	--	<0.88	<0.88	<0.75	<0.75
Barium	ug/L	51.6	55.8	52.3	53.3	42.4	35.5	39.9	44	--	31.6	44.5	--	28.1	--	25	56	43	--	54	58	52	61
Beryllium	ug/L	<0.08	<0.08	<0.08	<0.08	<0.08	<0.012	<0.012	<0.012	--	<0.012	0.14	--	<0.089	--	<0.27	<0.27	--	--	<0.27	--	<0.27	<0.27
Cadmium	ug/L	<0.029	<0.029	0.12	0.038	<0.029	0.035	0.044	0.037	--	0.023	0.16	--	<0.033	--	<0.077	0.04	<0.039	--	<0.039	0.075	<0.051	0.057
Chromium	ug/L	0.59	0.74	0.64	<0.34	0.59	0.49	0.25	0.39	--	<0.054	0.25	--	0.11	--	<0.98	<0.98	<1.1	--	<1.1	<1.1	<1.1	<1.1
Cobalt	ug/L	4.1	3.1	1.8	1.8	1.3	0.97	1	0.96	--	0.46	1.4	--	0.36	--	0.44	0.6	1.1	0.43	0.52	0.41	0.29	0.48
Lead	ug/L	<0.19	<0.19	<0.19	<0.19	<0.19	0.06	0.1	0.049	--	0.041	0.18	--	<0.13	--	<0.27	<0.27	<0.27	--	<0.27	<0.11	<0.21	<0.21
Lithium	ug/L	22.8	28.7	27.6	25.5	20.1	21.8	24.9	27.9	--	19.1	26.5	--	19.4	--	15	24	17	21	24	23	23	26
Mercury	ug/L	<0.039	<0.039	<0.039	<0.039	<0.039	<0.046	<0.046	<0.046	--	<0.09	<0.083	--	--	<0.09	<0.1	<0.1	--	--	<0.1	--	<0.15	<0.15
Molybdenum	ug/L	1.2	1.2	0.89	1	0.76	0.54	0.79	1.3	--	0.67	1.3	--	0.72	--	<1.1	1.1	--	--	1.2	<1.1	<1.3	<1.3
Selenium	ug/L	4.7	5.4	6.1	6.5	5.9	4.2	5.5	7.2	--	4.3	6.3	--	3.4	--	3.1	6.2	--	--	6.8	7.7	6.5	7.5
Thallium	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	0.14	<0.036	0.067	--	<0.036	0.16	--	<0.099	--	<0.27	<0.27	--	--	<0.26	<0.26	<0.26	<0.26
Total Radium	pCi/L	0.51	0.614	1.56	1.24	0.143	0.631	1.06	0.725	--	0.513	1.19	--	1.16	--	0.0956	0.956	0.228	--	0.315	0.407	0.598	1.04
Radium-226	pCi/L	0.084	0	0.831	-0.13	0.143	0.139	0.501	0.123	--	0.145	0.417	--	0.529	--	0.0726	0.15	0.049	--	0.0921	0.324	0.133	<0.339
Radium-228	pCi/L	0.426	0.614	0.732	1.24	-0.403	0.492	0.562	0.602	--	0.368	0.773	--	0.627	--	0.023	0.753	0.179	--	0.223	0.0831	0.465	0.744
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	962	939	1035	1062	1062
Field Temperature	deg C	10.5	17.1	19.9	16.3	6.8	10.8	17.3	19.7	13.9	7.2	20.4	20.6	16.6	7.88	7.27	13.71	5.38	6.9	8.7	15.4	9.1	17.9
Groundwater Elevation	feet	682.8	682.58	682.27	682.04	681.67	682.15	681.91	681.28	681.54	681.53	680.91	681.09	682.5	682.22	682.69	683.07	683.3	682.82	683.25	682.34	682.94	681.95
Oxygen, Dissolved	mg/L	4.04	2.55	3.43	3.72	4.87	5.74	4.34	2.88	4.16	6.52	3.18	4.71	4.12	5.68	8.32	4.94	7.28	5.31	5.14	4.2	5.99	4.17
Turbidity	NTU	1.82	1.51	0.52	0.9	0.6	0.47	0.38	0.79	1.03	0.66	0.52	0.63	2.91	0.77	1.87	1.6	1.43	1.33	0.87	0.02	1.61	8.9
pH at 25 Degrees C	Std. Units	6.5	6.4	6.5	6.7	6.8	6.7	6.5	6.4	6.4	6.6	--	6.5	6.6	--	7.1	7.1	6.7	--	6.6	6.4	6.8	6.5
Field Oxidation Potential	millivolts	244.1	74.6	58.6	91.3	30.2	148	67.2	41.4	200.7	105.5	-55.5	--	119.7	118.3	37.6	9.9	68	258.5	176.3	163.6	232.5	207.3
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	150	160	170	210
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1.9	<3.8	<4.6	<4.6
Total Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	150	160	170	210
Iron, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	50	<50	49	<36
Magnesium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	33000	38000	34000	36000
Manganese, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17	16	13	10	15
Potassium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1500	1500	1200	1300
Sodium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	77000	87000	--	88000
Cobalt, Dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.32	0.44	--	--
Iron, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<50	<50	<50	<36
Manganese, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16	19	14	18
Lithium, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22	--	--	--
Sodium	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	78000	--

Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-302																					
Number of Sampling Dates: 20																					
Parameter Name	Units	4/26/2016	6/23/2016	8/10/2016	10/26/2016	1/18/2017	4/19/2017	6/20/2017	8/22/2017	11/8/2017	4/18/2018	8/14/2018	8/29/2018	10/16/2018	1/8/2019	4/8/2019	10/24/2019	4/14/2020	10/8/2020	4/13/2021	10/7/2021
Boron	ug/L	1110	1130	1110	1180	1250	1200	1180	1250	1320	1200	1240	--	1100	--	1300	1200	1200	1300	1300	1200
Calcium	mg/L	193	177	171	184	188	184	175	179	183	177	185	--	146	--	200	180	180	180	180	170
Chloride	mg/L	258	258	276	270	259	281	253	264	254	246	--	259	214	--	240	220	220	230	190	200
Fluoride	mg/L	0.22	0.17	0.21	0.21	0.21	0.2	0.26	0.27	0.2	0.26	--	0.26	0.24	--	<0.23	<0.23	<0.23	<0.23	0.33	<0.28
Field pH	Std. Units	6.82	6.46	8.72	6.45	6.62	6.78	6.67	6.75	6.55	6.47	6.76	6.77	6.37	6.58	6.61	6.55	6.7	7	6.44	6.49
Sulfate	mg/L	752	865	835	819	777	907	858	858	786	899	--	847	785	--	840	810	790	840	360	850
Total Dissolved Solids	mg/L	1680	1480	1770	1650	1660	1670	1670	1620	1620	1690	--	1840	1400	--	1600	1600	1500	1700	1500	1300
Antimony	ug/L	0.088	0.12	0.1	<0.058	0.11	<0.026	0.052	0.036	--	<0.026	<0.15	--	0.26	--	<0.53	<0.53	<0.58	<0.51	<1.1	<1.1
Arsenic	ug/L	1.7	0.69	0.17	<0.1	0.23	0.25	0.083	0.19	--	0.16	0.3	--	1.9	--	<0.75	<0.75	<0.88	<0.88	<0.75	<0.75
Barium	ug/L	31.5	23	20.7	21.2	20.4	19.4	18.2	18.5	--	17.7	18.3	--	28.9	--	19	21	23	18	22	18
Beryllium	ug/L	<0.08	<0.08	<0.08	<0.08	<0.08	<0.012	<0.012	<0.012	--	<0.012	<0.12	--	0.22	--	<0.27	<0.27	<0.27	--	<0.27	<0.27
Cadmium	ug/L	0.25	0.21	0.28	0.24	0.15	0.2	0.19	0.21	--	0.22	0.21	--	0.67	--	0.21	0.2	0.23	0.2	0.26	0.23
Chromium	ug/L	2.1	0.82	0.64	0.64	0.58	1	0.58	0.7	--	0.46	0.48	--	1.6	--	<0.98	<0.98	1.4	<1.1	3	1.3
Cobalt	ug/L	2.6	1.4	1.1	1	0.94	0.95	0.86	0.88	--	0.9	1.5	--	4	--	1.2	2.7	5.3	1.5	5.5	2.2
Lead	ug/L	1.1	0.2	<0.19	<0.19	<0.19	0.2	0.081	<0.033	--	0.098	0.12	--	3.9	--	<0.27	0.29	1	<0.11	0.59	0.22
Lithium	ug/L	11.3	14.1	12.2	11.9	9.7	10.1	9.7	13.8	--	7.5	6.9	--	8.6	--	10	10	11	9.6	10	11
Mercury	ug/L	<0.039	<0.039	<0.039	<0.039	<0.039	<0.046	<0.046	<0.046	--	0.096	<0.083	--	--	<0.09	<0.1	<0.1	<0.1	--	<0.15	<0.15
Molybdenum	ug/L	0.68	0.6	0.46	0.46	0.5	0.44	0.38	0.51	--	0.59	0.54	--	<0.57	--	<1.1	<1.1	<1.1	<1.1	<1.3	1.7
Selenium	ug/L	0.23	<0.18	<0.18	<0.18	<0.18	<0.086	<0.086	<0.086	--	<0.086	<0.16	--	0.84	--	<1	<1	<1	<1	<0.96	1.2
Thallium	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	0.049	<0.036	<0.036	--	<0.036	<0.14	--	0.16	--	<0.27	<0.27	<0.26	<0.26	<0.26	0.56
Total Radium	pCi/L	1.03	0.527	0.606	0.211	0.136	0.776	1.29	1.61	--	0.746	1.12	--	0.299	--	0.116	0.752	1.26	0.447	0.901	1.45
Radium-226	pCi/L	0.4	0.375	0.26	0.211	0.136	0.342	0.13	0.406	--	0.251	0.624	--	0.191	--	0.116	0.134	0.499	0.158	0.486	1.32
Radium-228	pCi/L	0.631	0.152	0.346	-0.0147	-0.0781	0.434	1.16	1.2	--	0.495	0.499	--	0.108	--	-0.0591	0.619	0.759	0.289	0.415	<0.744
Collected By		--	--	0	--	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	1747	2228	2222	2279	2247	2220	2085	2991	2274	2248	2304	2357	1912	1473	2159	2184	1971	2100	2087	1920
Field Temperature	deg C	11.9	13.2	14.4	13.9	12.9	12.8	13.4	14	13.8	10.7	14.3	14.6	14.1	12.21	12.27	12.91	10.5	14.4	11.9	14.9
Groundwater Elevation	feet	655.63	655.65	655.52	655.67	655.46	656.35	655.65	655.13	655.4	655.71	656.05	655.89	656.91	656.03	657.23	660.14	656.45	655.8	656.05	654.86
Oxygen, Dissolved	mg/L	0.16	0.08	0.07	0.43	0.18	0.18	0.12	0.08	0.4	0.2	0.17	0.23	0.26	6.4	0.86	0.35	0.22	0.14	0.37	0.3
Turbidity	NTU	40.23	6.78	3.41	1.54	3.11	2.32	2.63	1.32	1.63	2.41	4.01	1.42	88.24	4.39	26.9	11.9	31.1	18.7	22.9	15.6
pH at 25 Degrees C	Std. Units	6.7	6.6	6.7	6.7	6.8	6.8	6.6	6.6	6.5	6.7	--	6.7	6.6	--	6.9	7.2	6.7	6.8	7.5	6.6
Field Oxidation Potential	millivolts	230.2	25	6.7	92.6	38.7	121.1	21	20.8	191.7	82.6	-336.6	--	114.2	70.2	68.3	-0.5	135.6	34.5	198.2	211.5
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	61	72	72	120
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1.9	<1.9	<3.2	<4.6
Total Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	61	72	72	120
Iron, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	500	100	350	65
Magnesium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	50000	57000	50000	46000
Manganese, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	110	130	110	110
Potassium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1500	1900	1500	1400
Sodium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	250000	280000	--	220000
Cobalt, Dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.81	--	--	--
Iron, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<50	<50	<36	<36
Manganese, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	200	140	200	120
Sodium	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	240000	--

Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-303																					
Number of Sampling Dates: 20																					
Parameter Name	Units	4/26/2016	6/23/2016	8/10/2016	10/26/2016	1/18/2017	4/19/2017	6/20/2017	8/22/2017	11/8/2017	4/18/2018	8/14/2018	8/29/2018	10/16/2018	1/8/2019	4/8/2019	10/24/2019	4/14/2020	10/8/2020	4/13/2021	10/7/2021
Boron	ug/L	417	579	726	811	738	577	834	1180	1070	987	1010	--	549	--	290	440	420	1100	420	860
Calcium	mg/L	179	172	180	204	173	226	210	200	234	212	213	--	195	--	170	170	170	210	160	190
Chloride	mg/L	109	155	234	230	190	141	186	268	185	198	--	64.8	57	--	22	35	47	210	29	140
Fluoride	mg/L	0.21	0.17	0.42	0.23	0.21	0.19	0.23	0.3	0.19	0.22	--	0.31	0.24	--	<0.23	<0.23	<0.23	0.26	<0.28	<0.28
Field pH	Std. Units	7.08	7.08	6.51	6.62	6.77	7.02	6.81	6.53	6.6	6.63	6.83	7.03	6.66	6.83	7	6.83	6.98	8.28	6.67	6.7
Sulfate	mg/L	183	190	200	208	168	333	284	215	348	328	--	164	389	--	260	180	180	190	140	170
Total Dissolved Solids	mg/L	856	988	1170	1120	1030	1170	1210	1220	1290	1300	--	832	1150	--	890	810	810	1100	720	720
Antimony	ug/L	0.23	0.32	0.25	0.14	0.19	0.16	0.19	0.3	--	0.098	0.16	--	0.2	--	<0.53	<0.53	<0.58	<0.51	<1.1	<1.1
Arsenic	ug/L	0.89	0.91	0.51	0.46	0.54	0.47	0.33	0.61	--	0.43	0.6	--	0.55	--	<0.75	<0.75	<0.88	<0.88	<0.75	<0.75
Barium	ug/L	68.2	78.5	88.1	98.8	75.3	79.1	76.4	83.8	--	69.5	77.3	--	95.2	--	54	77	64	94	63	80
Beryllium	ug/L	<0.08	<0.08	<0.08	<0.08	<0.08	<0.012	<0.012	0.015	--	0.017	<0.12	--	<0.089	--	<0.27	<0.27	<0.27	--	<0.27	<0.27
Cadmium	ug/L	0.24	0.28	0.47	0.59	0.31	0.81	0.52	0.57	--	0.44	0.36	--	0.24	--	0.092	0.21	0.18	0.46	0.12	0.28
Chromium	ug/L	0.74	0.83	0.73	<0.34	0.52	0.27	0.37	0.61	--	0.12	0.19	--	0.15	--	<0.98	<0.98	<1.1	<1.1	<1.1	<1.1
Cobalt	ug/L	2.2	2.5	2.6	3.1	2.6	1.8	1.9	2.8	--	2.1	2.2	--	1.7	--	0.42	1.2	0.87	2.4	0.43	4
Lead	ug/L	0.31	<0.19	<0.19	0.2	<0.19	0.068	0.07	0.19	--	0.069	0.13	--	<0.13	--	<0.27	<0.27	<0.27	<0.11	<0.21	<0.21
Lithium	ug/L	<4.9	8.3	5	5.8	<4.9	<2.9	3.4	8.1	--	<4.6	6.9	--	<4.6	--	<2.7	<2.7	4.7	5.6	4.1	5.8
Mercury	ug/L	<0.039	<0.039	<0.039	<0.039	<0.039	<0.046	<0.046	<0.046	--	<0.09	<0.083	--	--	<0.09	<0.1	<0.1	<0.1	--	<0.15	<0.15
Molybdenum	ug/L	3.3	3.6	0.77	0.87	0.64	3.9	0.81	0.64	--	0.61	0.98	--	5.5	--	7.5	5.2	3.6	<1.1	2.9	1.4
Selenium	ug/L	0.38	0.43	0.36	0.28	0.8	1.1	0.47	0.52	--	0.23	0.35	--	0.37	--	2.1	<1	5	<1	5.1	<0.96
Thallium	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	0.16	<0.036	<0.036	--	<0.036	<0.14	--	<0.099	--	<0.27	<0.27	<0.26	<0.26	<0.26	<0.26
Total Radium	pCi/L	0.806	0.426	1.56	0.944	0.805	1.62	1.62	2.36	--	0.529	1.82	--	2.04	--	0.391	0.321	0.229	0.654	0.51	0.916
Radium-226	pCi/L	0.163	0.0636	0.716	0	0.145	1.06	0.556	1.4	--	-0.088	1.02	--	0.478	--	0.172	0.0551	0.149	0.147	0.178	0.639
Radium-228	pCi/L	0.643	0.362	0.842	0.944	0.66	0.556	1.06	0.958	--	0.529	0.799	--	1.56	--	0.22	0.265	0.0801	0.507	0.333	<0.514
Collected By		--	--	0	--	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	965	1176	1655	1730	1611	1687	1670	2474	1896	1862	1833	1161	1573	750	1181	1287	1097	1602	1118	1343
Field Temperature	deg C	9.7	14.4	17.7	16.3	10.6	10.6	14.1	16.8	15.2	8.2	17.2	18.7	17.1	9.11	8.51	15.34	8.9	17	9.7	17.6
Groundwater Elevation	feet	652.42	652.89	651.76	652.17	651.74	654.57	652.42	650.58	651.34	652.47	652.57	655.07	656.17	654.65	655.55	653.86	654.08	650.37	653.82	649.8
Oxygen, Dissolved	mg/L	0.07	0.05	0.05	0.42	0.17	0.56	0.08	0.08	0.48	0.17	0.19	1.92	0.29	3.19	2.29	0.28	1.94	0.13	2.83	0.32
Turbidity	NTU	27.66	4.48	4.42	2.32	3.3	2.2	2.77	14.62	3.67	3.69	1.51	10.13	5.99	14.2	3.49	4.24	12.1	30.2	4.31	11.1
pH at 25 Degrees C	Std. Units	7	6.8	6.8	6.9	7.1	7.2	6.8	6.8	6.7	6.9	--	7.1	6.9	--	7.5	7.5	6.9	7	7	6.8
Field Oxidation Potential	millivolts	181.1	-20.5	31.5	14.8	21.3	99.5	8.6	20.9	176.8	3.2	-307.9	--	32.8	73.7	51.7	-5.1	104.3	-0.4	184.7	66.5
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	440	470	440	490
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1.9	<3.8	<4.6	<4.6
Total Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	440	470	440	490
Iron, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	310	44	120
Magnesium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	23000	31000	22000	26000
Manganese, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	220	1600	340	1800
Potassium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	960	1100	800	800
Sodium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	100000	150000	--	94000
Cobalt, Dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37	--	--	--
Iron, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<50	<50	<36	100
Manganese, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	260	1600	330	1900
Sodium	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	89000	--

Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-304																					
Number of Sampling Dates: 20																					
Parameter Name	Units	4/26/2016	6/23/2016	8/11/2016	10/27/2016	1/18/2017	4/19/2017	6/21/2017	8/22/2017	11/8/2017	4/18/2018	8/15/2018	8/29/2018	10/16/2018	1/8/2019	4/8/2019	10/23/2019	4/13/2020	10/8/2020	4/14/2021	10/8/2021
Boron	ug/L	965	968	911	991	995	1030	982	1040	1040	991	1000	--	930	--	1100	970	1000	1000	990	990
Calcium	mg/L	124	123	112	125	122	129	126	130	136	131	138	--	123	--	130	120	130	120	120	120
Chloride	mg/L	311	316	336	364	383	430	382	409	417	400	--	375	410	--	320	280	250	250	240	260
Fluoride	mg/L	0.84	0.77	0.95	0.89	0.82	0.88	1	0.89	0.96	0.92	--	1	1	--	1.3	0.74	1.1	1.1	1.1	<0.28
Field pH	Std. Units	7.3	7.07	7.34	6.96	7.05	7.27	7.29	6.72	7	6.9	7.34	7.22	6.86	7.16	7.17	7.05	7.12	7.88	6.94	6.97
Sulfate	mg/L	230	234	225	241	204	208	254	194	194	198	--	185	184	--	180	190	220	230	200	230
Total Dissolved Solids	mg/L	1190	1160	1180	1270	1230	1310	1240	1250	1270	1300	--	3680	1180	--	1100	1100	1000	1200	1000	760
Antimony	ug/L	0.069	0.13	0.1	<0.058	0.1	<0.026	0.06	0.035	--	<0.026	0.19	--	<0.078	--	<0.53	<0.53	<0.58	<0.51	<1.1	<1.1
Arsenic	ug/L	2.1	2.2	0.78	0.69	0.82	0.73	0.57	0.67	--	0.68	1.3	--	0.96	--	<0.75	0.83	0.96	<0.88	<0.75	0.88
Barium	ug/L	104	106	86.4	97.6	92.4	94.9	87.1	91.5	--	88.5	87.4	--	91	--	80	80	80	74	80	79
Beryllium	ug/L	<0.08	<0.08	<0.08	<0.08	<0.08	<0.012	<0.012	<0.012	--	0.026	0.21	--	<0.089	--	<0.27	<0.27	<0.27	--	<0.27	<0.27
Cadmium	ug/L	<0.029	<0.029	0.072	<0.029	<0.029	<0.018	<0.018	<0.018	--	<0.018	0.17	--	0.073	--	<0.077	<0.039	<0.039	<0.049	<0.051	<0.051
Chromium	ug/L	4.5	7.1	0.92	0.79	0.69	0.56	0.6	0.43	--	2	5.9	--	1.4	--	1.6	2	3.5	<1.1	<1.1	<1.1
Cobalt	ug/L	0.89	1.1	<0.5	<0.5	<0.5	0.37	0.36	0.3	--	0.39	0.92	--	0.45	--	0.4	0.5	0.57	0.41	0.43	0.42
Lead	ug/L	0.5	0.82	<0.19	<0.19	<0.19	0.13	0.081	0.041	--	0.37	0.81	--	0.66	--	<0.27	0.27	0.5	<0.11	<0.21	<0.21
Lithium	ug/L	5.1	7.5	<4.9	<4.9	<4.9	<2.9	<2.9	5.3	--	<4.6	<4.6	--	<4.6	--	3.3	2.8	4.8	3.1	3.3	4
Mercury	ug/L	<0.039	<0.039	<0.039	<0.039	<0.039	<0.046	<0.046	<0.046	--	<0.09	<0.083	--	--	<0.09	<0.1	<0.1	<0.1	--	<0.15	<0.15
Molybdenum	ug/L	2.5	2.4	1.6	1.4	1.5	1.5	1.5	1.6	--	2	2.4	--	1.9	--	1.5	2.3	2	1.5	1.7	2
Selenium	ug/L	0.23	0.32	<0.18	0.19	<0.18	0.17	0.14	0.21	--	<0.086	0.5	--	0.26	--	<1	<1	<1	<1	<0.96	<0.96
Thallium	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	0.042	<0.036	<0.036	--	<0.036	0.15	--	<0.099	--	<0.27	<0.27	<0.26	<0.26	<0.26	<0.26
Total Radium	pCi/L	1.66	1.56	2.39	1.52	2.94	2.44	3.55	3.2	--	2.08	3.74	--	2.76	--	2.42	2.58	2.46	2.41	2.49	3.49
Radium-226	pCi/L	0.706	0.431	0.465	0.327	1.33	0.894	1.62	1.2	--	1.22	1.78	--	1.21	--	1.23	1.08	1.2	1.21	1.24	1.84
Radium-228	pCi/L	0.952	1.13	1.92	1.19	1.61	1.55	1.93	2	--	0.862	1.96	--	1.55	--	1.19	1.5	1.26	1.2	1.25	1.65
Collected By		--	--	0	--	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	1580	1958	1948	2057	2052	2139	2029	2881	2205	2141	2085	2123	2058	1368	1876	1871	1764	1675	1797	1617
Field Temperature	deg C	13	13.3	13.4	13	12.9	13.4	13.3	13.4	13.3	12.8	15.1	13.7	13.5	12.81	13.75	13.64	11.9	13.6	13.1	13.8
Groundwater Elevation	feet	655.37	656.53	653.79	655.03	654.5	657.48	654.75	652.39	653.03	655.55	656.35	657.82	658.2	656.28	659.33	657.71	656.42	652.95	654.34	649.53
Oxygen, Dissolved	mg/L	0.13	0.05	0.06	0.47	0.16	0.12	0.1	0.08	0.25	0.15	0.21	0.16	0.11	0.72	0.41	0.44	0.24	0.18	0.2	0.32
Turbidity	NTU	61.01	92.4	2.66	1.46	1.17	1.95	1.64	0.92	3.88	39.29	81.42	55.94	17.12	4.38	57.9	18.9	54.1	11.1	16.9	7.3
pH at 25 Degrees C	Std. Units	7	7	7.1	7	7.2	7.2	7.2	7	6.9	7	--	7.1	7	--	7.5	7.7	7.1	7.2	7.1	7.1
Field Oxidation Potential	millivolts	-97.5	-109	67.9	-105.1	-79.3	-40.5	-66.6	-10.1	162.7	137.5	35.5	--	-114.5	-62.1	-58.3	-57.5	-119.8	-113	-97.5	-78.7
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	370	380	360	470
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1.9	<3.8	<4.6	<4.6
Total Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	370	380	360	470
Iron, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5200	4200	4500	3700
Magnesium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	43000	40000	40000	36000
Manganese, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3700	3800	3800	3400
Potassium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7700	7800	8200	6800
Sodium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	210000	210000	--	190000
Cobalt, Dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.37	--	--	--
Iron, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4600	4200	4500	3900
Manganese, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3700	3800	3600	3000
Sodium	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	210000	--

Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-305																					
Number of Sampling Dates: 20																					
Parameter Name	Units	4/26/2016	6/23/2016	8/11/2016	10/27/2016	1/18/2017	4/19/2017	6/21/2017	8/23/2017	11/8/2017	4/18/2018	8/15/2018	10/16/2018	1/8/2019	4/8/2019	10/23/2019	3/13/2020	4/13/2020	10/9/2020	4/16/2021	10/6/2021
Boron	ug/L	888	906	832	878	956	907	889	903	925	886	911	835	--	1000	880	--	920	900	860	880
Calcium	mg/L	98.1	92.1	88.8	93.2	98.5	96.2	93.8	95.8	99.5	97.6	102	96.2	--	110	100	--	100	110	110	110
Chloride	mg/L	310	312	316	325	289	312	290	295	282	289	265	281	--	250	280	--	270	290	240	230
Fluoride	mg/L	0.35	0.29	0.33	0.37	0.35	0.38	0.4	0.48	0.4	0.4	0.44	0.4	--	0.75	<0.23	--	0.35	0.38	0.37	<0.28
Field pH	Std. Units	7.23	6.94	7.18	6.94	6.96	7.3	7.06	6.88	7.01	6.9	7.21	6.86	6.99	7.06	6.91	7.02	7	7.44	6.92	6.94
Sulfate	mg/L	65.7	71.3	74	79.5	90	109	121	124	138	147	139	129	--	110	76	--	63	93	120	150
Total Dissolved Solids	mg/L	1040	982	1040	1010	1020	1040	1010	1040	1040	1070	1060	1070	--	1000	1000	--	960	1100	900	680
Antimony	ug/L	0.14	0.2	0.19	0.094	0.18	0.063	0.12	0.12	--	0.089	<0.15	0.096	--	<0.53	<0.53	--	<0.58	<0.51	<1.1	<1.1
Arsenic	ug/L	2.4	1.7	0.57	0.52	0.57	0.61	0.37	0.51	--	0.51	0.72	0.66	--	<0.75	<0.75	--	<0.88	<0.88	<0.75	0.75
Barium	ug/L	131	120	108	115	117	115	110	114	--	116	118	125	--	120	110	--	110	120	130	120
Beryllium	ug/L	<0.08	<0.08	<0.08	<0.08	<0.08	<0.012	<0.012	<0.012	--	<0.012	<0.12	<0.089	--	<0.27	<0.27	--	<0.27	--	<0.27	<0.27
Cadmium	ug/L	0.051	<0.029	0.1	<0.029	<0.029	0.052	0.039	0.034	--	0.054	0.086	0.044	--	<0.077	0.087	--	0.14	0.097	0.12	<0.051
Chromium	ug/L	1.3	0.8	0.62	1.3	<0.34	0.36	0.22	0.45	--	0.26	0.41	0.3	--	<0.98	<0.98	--	<1.1	<1.1	<1.1	<1.1
Cobalt	ug/L	14.8	15.1	13.7	14.8	15.2	14.6	14.4	14.7	--	14.5	15.6	17.2	16.4	17	17	18	16	17	18	18
Lead	ug/L	0.53	<0.19	<0.19	0.25	<0.19	0.093	<0.033	0.039	--	0.12	0.31	<0.13	--	<0.27	<0.27	--	0.27	<0.11	<0.21	0.29
Lithium	ug/L	<4.9	<4.9	<4.9	<4.9	<4.9	<2.9	<2.9	<2.9	--	<4.6	<4.6	<4.6	--	<2.7	<2.7	2.3	3.2	<2.5	2.6	3.1
Mercury	ug/L	<0.039	<0.039	<0.039	<0.039	<0.039	<0.046	<0.046	<0.046	--	<0.09	<0.09	--	<0.09	<0.1	<0.1	--	<0.1	--	<0.15	<0.15
Molybdenum	ug/L	4.9	5.2	4.9	5.6	5.9	5.8	5.8	6	--	7.1	6.5	7.3	--	7.2	7.2	--	6.9	7.9	8.2	8.1
Selenium	ug/L	0.38	0.37	0.28	0.32	0.34	0.39	0.16	0.26	--	0.12	0.36	0.33	--	<1	<1	--	<1	<1	<0.96	<0.96
Thallium	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	0.34	0.29	0.36	--	0.32	0.33	0.33	--	0.33	0.38	--	0.35	0.35	0.36	0.37
Total Radium	pCi/L	0.693	0.716	2.17	1.3	1.46	0.673	0.996	1.08	--	0.676	1.33	1.56	--	0.685	0.383	--	0.909	0.483	0.327	1.66
Radium-226	pCi/L	0.281	0.127	0.583	0.714	0.162	0.494	0.301	0.291	--	0.278	0.96	0.635	--	0.339	0.186	--	0.42	0.217	0.279	0.835
Radium-228	pCi/L	0.412	0.589	1.59	0.589	1.3	0.179	0.695	0.793	--	0.398	0.366	0.921	--	0.347	0.197	--	0.489	0.265	0.0482	0.823
Collected By		--	--	0	--	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	1469	1796	1769	1831	1794	1822	1730	2422	1738	1840	1832	1836	1235	1728	1794	1788	1772	1810	1799	1629
Field Temperature	deg C	13.1	13.2	13.1	13	12.8	13.2	13.3	13.3	13.2	12.8	14.8	13.9	12.43	13.8	13.2	12.4	9.1	14	12.9	13.7
Groundwater Elevation	feet	661.67	662.36	660.78	661.37	660.87	663.27	661.26	659	659.76	660.99	661.56	663.37	662.13	664.01	663.21	661.41	662.44	659.81	661.15	654.83
Oxygen, Dissolved	mg/L	0.11	0.05	0.07	0.47	0.09	0.15	0.06	0.12	0.2	0.15	0.18	0.09	0.81	0.59	0.42	0.2	0.28	0.13	0.16	0.44
Turbidity	NTU	35.09	5.77	1.32	0.84	0.5	0.51	1.9	0.58	2.68	7.37	14.9	6.96	4.76	21.7	6.21	42.68	21.7	12.9	8.17	3.8
pH at 25 Degrees C	Std. Units	7.1	7	7.1	7.2	7.3	7.4	7.1	7.1	7	7.3	7	7.1	--	7	7.5	--	7.2	7.2	7.1	7.1
Field Oxidation Potential	millivolts	52.5	-20.2	-38.9	5.8	24.2 mV	17.6	-4.5	-51.3	146.1	-32.7	31	-26.8	36.4	32.6	-6.7	192.6	6.6	-13	43.6	46.9
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	300	470	500
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1.9	<3.8	<4.6	<4.6
Total Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	460	300	470	500
Iron, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	390	330	200	170	75
Magnesium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	47000	48000	47000	44000
Manganese, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3100	3400	3600	3800	3300
Potassium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7600	8300	7900	7000
Sodium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	210000	210000	--	180000
Cobalt, Dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16	16	17	20	17
Iron, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	51	66	63	85	150
Manganese, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3200	3300	3600	3500	3200
Lithium, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<2.3	--	--	--	--
Sodium	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	200000	--

**Single Location**

**Name: IPL - Ottumwa Generating Station**

Location ID: MW-305A						
Number of Sampling Dates: 5						
Parameter Name	Units	3/13/2020	4/14/2020	10/9/2020	4/15/2021	10/8/2021
Boron	ug/L	250	280	180	190	200
Calcium	mg/L	100	130	150	150	150
Chloride	mg/L	40	89	120	140	130
Fluoride	mg/L	0.77	0.73	0.73	0.56	<0.28
Field pH	Std. Units	8.09	7.63	7.46	7.05	6.9
Sulfate	mg/L	40	93	130	150	140
Total Dissolved Solids	mg/L	400	570	660	780	730
Antimony	ug/L	1.3	0.88	<0.51	<1.1	<1.1
Arsenic	ug/L	<0.88	<0.88	<0.88	<0.75	<0.75
Barium	ug/L	70	80	75	80	84
Beryllium	ug/L	<0.27	<0.27	--	<0.27	<0.27
Cadmium	ug/L	<0.039	<0.039	<0.049	<0.051	<0.051
Chromium	ug/L	<1.1	<1.1	<1.1	<1.1	<1.1
Cobalt	ug/L	2.4	2.7	1.5	0.5	0.94
Lead	ug/L	0.68	<0.27	<0.11	<0.21	<0.21
Lithium	ug/L	14	16	13	17	17
Mercury	ug/L	<0.1	<0.1	--	<0.15	<0.15
Molybdenum	ug/L	9	17	6.4	5.5	4.2
Selenium	ug/L	2.3	1.7	<1	<0.96	<0.96
Thallium	ug/L	<0.26	<0.26	<0.26	<0.26	<0.26
Total Radium	pCi/L	1.97	1.26	2.05	2.67	2.96
Radium-226	pCi/L	1.23	1.03	1.92	2.33	2.45
Radium-228	pCi/L	0.735	0.23	0.132	0.34	0.514
Field Specific Conductance	umhos/cm	745	807	1102	1224	1145
Field Temperature	deg C	11.8	11.2	14.2	12.4	14.7
Groundwater Elevation	feet	--	--	648.01	651.16	645.57
Oxygen, Dissolved	mg/L	3.79	2.26	0.19	0.88	2.02
Turbidity	NTU	63.2	4.91	0	1.02	14.3
pH at 25 Degrees C	Std. Units	--	7.3	7.3	7.2	7
Field Oxidation Potential	millivolts	204.2	106.7	11	158.3	147.8
Bicarbonate Alkalinity as CaCO3	mg/L	--	270	340	300	300
Carbonate Alkalinity as CaCO3	mg/L	--	<1.9	<3.8	<4.2	<4.6
Total Alkalinity as CaCO3	mg/L	--	270	340	300	300
Iron, total	ug/L	720	64	64	<36	<36
Magnesium, total	ug/L	--	28000	31000	29000	26000
Manganese, dissolved	ug/L	150	240	160	87	120
Potassium, total	ug/L	--	3800	4200	3600	3400
Sodium, total	ug/L	--	46000	64000	--	52000
Cobalt, Dissolved	ug/L	2.1	2.8	--	--	--
Iron, dissolved	ug/L	<50	<50	<50	<36	<36
Manganese, total	ug/L	180	260	150	78	100
Lithium, dissolved	ug/L	15	--	--	--	--
Sodium	ug/L	--	--	--	68000	--

Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-306																						
Number of Sampling Dates: 21																						
Parameter Name	Units	4/26/2016	6/23/2016	8/11/2016	10/27/2016	1/18/2017	4/19/2017	6/21/2017	8/23/2017	11/8/2017	4/18/2018	8/15/2018	10/16/2018	1/8/2019	4/8/2019	10/23/2019	4/14/2020	10/9/2020	2/23/2021	4/13/2021	7/6/2021	10/8/2021
Boron	ug/L	540	575	574	702	809	814	784	822	881	919	915	862	--	1100	980	1000	1100	--	1000	--	730
Calcium	mg/L	101	88.5	85	90	85.9	81.3	75.6	73.9	73.1	74.1	78.9	80	--	95	77	73	80	--	74	--	130
Chloride	mg/L	85.8	77.6	67.9	64.9	57.2	58.5	56	54.4	50.4	54.4	58.2	83.3	--	98	47	41	43	--	35	--	180
Fluoride	mg/L	0.11	<0.073	0.086	0.11	0.087	0.11	<0.1	0.15	0.11	0.11	0.13	<0.19	--	0.27	<0.23	<0.23	<0.23	--	<0.28	--	<0.28
Field pH	Std. Units	7.08	6.17	6.72	6.44	6.51	6.79	6.71	6.46	6.49	6.42	6.74	6.42	6.65	6.66	6.74	6.68	6.54	6.34 SU	6.42	7.44	6.66
Sulfate	mg/L	264	271	266	277	285	300	282	264	274	289	275	285	--	270	280	310	360	--	370	--	460
Total Dissolved Solids	mg/L	899	849	846	864	828	819	775	769	773	805	840	884	--	930	870	820	900	--	880	--	1100
Antimony	ug/L	0.2	0.25	0.18	0.12	0.18	0.051	0.13	0.1	--	0.094	<0.15	0.1	--	<0.53	<0.53	<0.58	<0.51	--	<1.1	--	<1.1
Arsenic	ug/L	2.2	1.7	0.44	0.4	0.47	0.42	0.41	0.38	--	0.38	0.65	0.6	--	<0.75	0.78	<0.88	<0.88	--	<0.75	--	<0.75
Barium	ug/L	93	80.5	58	60.5	56.4	54.3	48.7	47.4	--	48.2	51.6	56	--	58	51	48	49	--	49	--	71
Beryllium	ug/L	<0.08	<0.08	<0.08	<0.08	<0.08	<0.012	<0.012	<0.012	--	<0.012	<0.12	<0.089	--	<0.27	<0.27	<0.27	--	--	<0.27	--	<0.27
Cadmium	ug/L	0.87	0.98	0.93	0.91	0.74	0.72	0.65	0.72	--	0.88	0.76	0.96	--	1.1	0.89	0.83	0.92	--	0.95	--	1.7
Chromium	ug/L	1.9	2.3	0.82	0.6	0.68	0.52	0.57	0.58	--	0.37	0.7	0.46	--	<0.98	1	<1.1	<1.1	--	<1.1	--	<1.1
Cobalt	ug/L	8.3	7.7	6.4	6.6	6	5.7	5.2	5	--	4.8	5.5	6.4	6.2	6.9	6.2	5.5	5.9	5.6	5.6	5.8	11
Lead	ug/L	0.74	0.74	<0.19	<0.19	<0.19	0.038	0.1	<0.033	--	0.04	0.2	<0.13	--	<0.27	0.34	0.37	<0.11	--	<0.21	--	<0.21
Lithium	ug/L	<4.9	<4.9	<4.9	<4.9	<4.9	<2.9	<2.9	<2.9	--	<4.6	<4.6	<4.6	--	<2.7	<2.7	<2.3	<2.5	--	<2.5	--	<2.5
Mercury	ug/L	<0.039	<0.039	<0.039	<0.039	<0.039	<0.046	<0.046	<0.046	--	<0.09	<0.083	--	<0.09	<0.1	<0.1	<0.1	--	--	<0.15	--	<0.15
Molybdenum	ug/L	4.8	4.8	4.5	4.8	4.7	4.7	4.6	4.4	--	5.7	4.7	5.1	--	4.3	4.9	4.4	5.6	--	5.1	--	6.1
Selenium	ug/L	0.3	0.3	<0.18	0.24	0.2	<0.086	0.088	0.13	--	<0.086	0.21	0.22	--	<1	<1	<1	<1	--	<0.96	--	<0.96
Thallium	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	0.14	0.082	<0.036	--	0.083	<0.14	0.12	--	<0.27	<0.27	<0.26	<0.26	--	<0.26	--	<0.26
Total Radium	pCi/L	1.14	1.25	0.958	0.868	0.435	0.213	1.03	1.3	--	0.305	0.985	0.693	--	0.155	0.624	0.0738	0.889	--	0.334	--	0.794
Radium-226	pCi/L	0.179	0.475	0	0.253	-0.15	0.0761	0	0.517	--	0.305	0.482	0.263	--	0.0529	-0.00408	0.0738	0.163	--	0.0205	--	<0.439
Radium-228	pCi/L	0.962	0.774	0.958	0.615	0.435	0.137	1.03	0.784	--	-0.109	0.503	0.43	--	0.102	0.624	-0.118	0.727	--	0.313	--	0.657
Collected By		--	--	0	--	0	0	0	0	--	--	--	--	--	--	--	--	--	--	--	--	--
Field Specific Conductance	umhos/cm	960	1271	1228	1262	1215	1210	1151	1576	1186	1228	1271	1340	965	1350	1266	1158	1294	1277	1339	1357	1506
Field Temperature	deg C	9.7	12.7	12.8	13.5	13.6	13.2	13.4	13.2	13.6	13.1	14.6	13.4	13.31	13.63	13.12	11.7	13.4	13.4 Degrees C	12.7	14.3	14.7
Groundwater Elevation	feet	670.86	670.64	670.35	670.21	669.89	670.69	669.94	668.77	669.04	668.92	668.66	670.24	669.84	670.96	671.28	670.71	670.18	669.86 ft	670.27	661.87	662.27
Oxygen, Dissolved	mg/L	0.07	0.07	0.02	0.4	0.13	0.21	0.07	0.08	0.18	0.14	0.15	0.08	0.47	0.92	0.29	0.21	0.12	0.5	0.14	0.33	0.4
Turbidity	NTU	25.21	8.19	1.89	1	0.49	0.13	0.14	0.74	0.82	0.59	3.95	7.07	0.89	28.5	12.3	15.7	14	2.86	8.99	1.37	6.7
pH at 25 Degrees C	Std. Units	6.6	6.6	6.6	6.7	6.9	7	6.8	6.7	6.5	6.9	6.6	6.7	--	6.6	7.4	6.8	6.8	--	6.8	--	6.7
Field Oxidation Potential	millivolts	174.7	56	8.6	43.3	44.2	70.9	15.1	-10.5	174.1	14.2	22.8	13.3	59.5	49.1	-0.5	49.7	41.4	64.2	92	119.2	86
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	160	--	270	--	270
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1.9	<3.8	--	<4.6	--	<4.6
Total Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	280	160	--	270	--	270
Iron, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	590	340	--	220	--	<360
Magnesium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	26000	23000	--	25000	--	43000
Manganese, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16000	15000	--	15000	--	31000
Potassium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3700	3800	--	3500	--	3700
Sodium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	160000	170000	--	--	--	170000
Cobalt, Dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.4	5.1	--	6.1	--	9.9
Iron, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	140	100	--	110	--	100
Manganese, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16000	16000	--	15000	--	30000
Sodium	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	170000	--	--



Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-310										
Number of Sampling Dates: 9										
Parameter Name	Units	10/24/2019	2/5/2020	3/12/2020	4/13/2020	10/12/2020	2/23/2021	4/13/2021	7/6/2021	10/6/2021
Boron	ug/L	720	620	--	550	800	--	360	--	520
Calcium	mg/L	230	160	--	200	180	--	210	--	130
Chloride	mg/L	150	120	--	130	150	--	250	--	120
Fluoride	mg/L	0.31	0.85	--	1.1	1	--	1.3	--	<0.28
Field pH	Std. Units	7.15	7.08	6.89	7	7.07	7.11 SU	7.07	8.23	7.2
Sulfate	mg/L	610	530	--	590	570	--	720	--	470
Total Dissolved Solids	mg/L	260	1200	--	1300	1200	--	1600	--	930
Antimony	ug/L	<0.53	<0.58	--	<0.58	0.61	--	<1.1	--	<1.1
Arsenic	ug/L	0.78	<0.88	--	<0.88	0.94	--	0.97	--	1.1
Barium	ug/L	76	53	--	62	55	--	92	--	53
Beryllium	ug/L	<0.27	<0.27	--	<0.27	--	--	<0.27	--	<0.27
Cadmium	ug/L	0.22	0.12	--	0.16	0.29	--	0.51	--	0.21
Chromium	ug/L	<0.98	<1.1	--	<1.1	<1.1	--	<1.1	--	<1.1
Cobalt	ug/L	0.57	0.32	0.32	0.24	0.38	--	0.75	--	0.72
Lead	ug/L	<0.27	<0.27	--	<0.27	<0.11	--	<0.21	--	<0.21
Lithium	ug/L	35	42	46	48	42	37	58	52	52
Mercury	ug/L	<0.1	<0.1	--	<0.1	--	--	<0.15	--	<0.15
Molybdenum	ug/L	26	29	--	31	39	--	83	--	70
Selenium	ug/L	5	3.3	--	4.5	2.4	--	2.4	--	2.3
Thallium	ug/L	<0.27	<0.26	--	<0.26	<0.26	--	<0.26	--	<0.26
Total Radium	pCi/L	0.411	0.0344	--	0.271	0.429	--	0	--	0.539
Radium-226	pCi/L	-0.0393	0.0344	--	0.0494	0.0766	--	-0.0354	--	<0.511
Radium-228	pCi/L	0.411	-0.137	--	0.222	0.353	--	-0.0334	--	<0.462
Field Specific Conductance	umhos/cm	1906	1723	1902	1823	1709	962	2362	1852	1425
Field Temperature	deg C	13.74	12.49	12.8	10.3	13.9	13.6 Degrees C	12.6	13	15.4
Groundwater Elevation	feet	649.31 ft	644.71	645.45	645.91	638.46	638.77 ft	642.7	639.32	638.19
Oxygen, Dissolved	mg/L	0.41	0.68	0.3	0.22	0.16	0.09	0.46	0.21	0.48
Turbidity	NTU	2.29	0.9	2.77	0.87	0.02	0.02	2.38	0	1
pH at 25 Degrees C	Std. Units	7.2	7.1	--	7	7.3	--	7.4	--	7.1
Field Oxidation Potential	millivolts	-9.3	42.2	252.2	179.4	146.5	91.3	161	88.6	96.8
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	190	410	--	130	--	250
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	<1.9	<3.8	--	<4.6	--	<4.6
Total Alkalinity as CaCO3	mg/L	--	--	--	190	410	--	130	--	250
Iron, total	ug/L	--	--	--	<50	<50	--	<36	--	<36
Magnesium, total	ug/L	--	--	--	86000	76000	--	100000	--	55000
Manganese, dissolved	ug/L	--	--	250	280	350	--	330	--	830
Potassium, total	ug/L	--	--	--	12000	12000	--	17000	--	9900
Sodium, total	ug/L	--	--	--	100000	100000	--	--	--	110000
Cobalt, Dissolved	ug/L	--	--	0.31	0.23	--	--	--	--	--
Iron, dissolved	ug/L	--	--	<50	<50	<50	--	<36	--	<36
Manganese, total	ug/L	--	--	260	280	390	--	290	--	350
Lithium, dissolved	ug/L	--	--	45	--	44	--	63	--	45
Sodium	ug/L	--	--	--	--	--	--	150000	--	--

**Single Location**

**Name: IPL - Ottumwa Generating Station**

Location ID: MW-310A						
Number of Sampling Dates: 5						
Parameter Name	Units	3/13/2020	4/14/2020	10/12/2020	4/15/2021	10/8/2021
Boron	ug/L	1500	1600	1700	1500	1500
Calcium	mg/L	82	87	94	82	80
Chloride	mg/L	140	130	130	120	130
Fluoride	mg/L	1.7	1.8	2	1.9	0.28
Field pH	Std. Units	7.73	7.85	7.48	7.47	7.65
Sulfate	mg/L	1200	1100	1100	1100	1200
Total Dissolved Solids	mg/L	2300	2300	2200	2300	1800
Antimony	ug/L	<0.58	<0.58	<0.51	<1.1	<1.1
Arsenic	ug/L	<0.88	<0.88	<0.88	<0.75	<0.75
Barium	ug/L	16	16	16	14	12
Beryllium	ug/L	<0.27	<0.27	--	<0.27	<0.27
Cadmium	ug/L	<0.039	<0.039	<0.049	<0.051	<0.051
Chromium	ug/L	<1.1	<1.1	<1.1	<1.1	<1.1
Cobalt	ug/L	0.63	0.39	0.43	0.48	0.45
Lead	ug/L	<0.27	<0.27	<0.11	<0.21	<0.21
Lithium	ug/L	250	290	240	270	280
Mercury	ug/L	<0.1	<0.1	--	<0.15	<0.15
Molybdenum	ug/L	2.6	2.7	3	5	1.9
Selenium	ug/L	<1	<1	<1	<0.96	<0.96
Thallium	ug/L	<0.26	<0.26	<0.26	<0.26	<0.26
Total Radium	pCi/L	3.43	3.9	4.46	4.44	5.41
Radium-226	pCi/L	3.27	3.48	3.9	4.14	4.35
Radium-228	pCi/L	0.157	0.418	0.563	0.293	1.07
Field Specific Conductance	umhos/cm	3160	2915	3122	3106	2808
Field Temperature	deg C	12.5	8.8	13.1	12.5	15.6
Groundwater Elevation	feet	--	--	640.2	644.88	639.57
Oxygen, Dissolved	mg/L	6.28	6.39	0.48	0.98	6.21
Turbidity	NTU	109	--	0	2.25	15
pH at 25 Degrees C	Std. Units	--	7.5	7.7	7.7	7.7
Field Oxidation Potential	millivolts	178.9	146.1	89.7	160.2	143.1
Bicarbonate Alkalinity as CaCO3	mg/L	--	320	260	340	370
Carbonate Alkalinity as CaCO3	mg/L	--	<1.9	<3.8	<4.6	<4.6
Total Alkalinity as CaCO3	mg/L	--	320	260	340	370
Iron, total	ug/L	99	230	280	<36	<140
Magnesium, total	ug/L	--	41000	45000	37000	36000
Manganese, dissolved	ug/L	53	39	29	39	30
Potassium, total	ug/L	--	9900	11000	9200	8900
Sodium, total	ug/L	--	630000	620000	--	570000
Cobalt, Dissolved	ug/L	0.67	0.4	--	--	--
Iron, dissolved	ug/L	<50	220	<50	<36	38
Manganese, total	ug/L	51	38	31	34	26
Lithium, dissolved	ug/L	250	--	230	300	240
Sodium	ug/L	--	--	--	600000	--

Single Location


Name: IPL - Ottumwa Generating Station

Location ID: MW-311							
Number of Sampling Dates: 6							
Parameter Name	Units	10/24/2019	2/5/2020	3/13/2020	4/13/2020	10/12/2020	4/14/2021
Boron	ug/L	<110	<100	--	<100	<80	64
Calcium	mg/L	170	130	--	170	160	160
Chloride	mg/L	13	14	--	13	14	11
Fluoride	mg/L	<0.23	<0.23	--	<0.23	<0.23	<0.28
Field pH	Std. Units	6.95	6.72	7.11	6.86	6.93	6.66
Sulfate	mg/L	47	54	--	54	70	75
Total Dissolved Solids	mg/L	530	520	--	570	640	590
Antimony	ug/L	<0.53	<0.58	--	<0.58	<0.51	<1.1
Arsenic	ug/L	<0.75	<0.88	--	<0.88	1.7	<0.75
Barium	ug/L	200	160	--	180	220	180
Beryllium	ug/L	<0.27	<0.27	--	<0.27	--	<0.27
Cadmium	ug/L	0.04	<0.039	--	<0.039	0.12	<0.051
Chromium	ug/L	<0.98	<1.1	--	<1.1	<1.1	<1.1
Cobalt	ug/L	0.78	0.11	<0.091	<0.091	2.2	<0.091
Lead	ug/L	<0.27	<0.27	--	<0.27	1.8	<0.21
Lithium	ug/L	4.7	2.9	4.7	6.2	4.6	5.9
Mercury	ug/L	<0.1	<0.1	--	<0.1	--	<0.15
Molybdenum	ug/L	<1.1	<1.1	--	<1.1	<1.1	<1.3
Selenium	ug/L	<1	1.2	--	<1	<1	2.1
Thallium	ug/L	<0.27	<0.26	--	<0.26	<0.26	<0.26
Total Radium	pCi/L	0.386	0.108	--	0.17	0.738	0.194
Radium-226	pCi/L	0.0831	0.0368	--	0.0742	0.247	0.0364
Radium-228	pCi/L	0.303	0.0711	--	0.0963	0.491	0.158
Field Specific Conductance	umhos/cm	926	891	877	912	1024	945
Field Temperature	deg C	13.88	10.21	10	8.8	14.4	9.3
Groundwater Elevation	feet	647.8	645	644.18	646.79	638.73	643.02
Oxygen, Dissolved	mg/L	0.29	2.11	0.23	0.29	7.12	1.18
Turbidity	NTU	3.88	1.89	3.44	0.44	0	0.78
pH at 25 Degrees C	Std. Units	7	7.1	--	6.9	6.9	6.9
Field Oxidation Potential	millivolts	-24.7	21	222.6	103.4	-53	179.8
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	460	290	450
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	<1.9	<3.8	<4.6
Total Alkalinity as CaCO3	mg/L	--	--	--	460	290	450
Iron, total	ug/L	--	--	<50	<50	630	<36
Magnesium, total	ug/L	--	--	--	40000	40000	36000
Manganese, dissolved	ug/L	--	--	21	39	75	<4.4
Potassium, total	ug/L	--	--	--	620	810	650
Sodium, total	ug/L	--	--	--	5000	5100	--
Cobalt, Dissolved	ug/L	--	--	0.11	<0.091	--	--
Iron, dissolved	ug/L	--	--	<50	<50	<50	<36
Manganese, total	ug/L	--	--	20	41	180	<4.4
Lithium, dissolved	ug/L	--	--	8	--	--	--
Sodium	ug/L	--	--	--	--	--	5200

Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-311A									
Number of Sampling Dates: 8									
Parameter Name	Units	3/13/2020	4/13/2020	6/30/2020	10/8/2020	2/25/2021	4/16/2021	7/7/2021	10/8/2021
Boron	ug/L	1400	1500	--	1600	--	1500	--	1400
Calcium	mg/L	44	48	--	51	--	42	--	40
Chloride	mg/L	130	140	--	150	--	130	--	140
Fluoride	mg/L	3.4	4.1	3.7	4.4	3.9	4	3.8	2
Field pH	Std. Units	7.85	8.4	7.64	8.33	7.55 SU	7.76	8.19	8.12
Sulfate	mg/L	1200	1200	--	1200	--	1100	--	1100
Total Dissolved Solids	mg/L	2300	2400	--	2400	--	2200	--	2000
Antimony	ug/L	<0.58	<0.58	--	<0.51	--	<1.1	--	<1.1
Arsenic	ug/L	<0.88	<0.88	--	<0.88	--	<0.75	--	<0.75
Barium	ug/L	20	20	--	15	--	12	--	8.7
Beryllium	ug/L	<0.27	<0.27	--	--	--	<0.27	--	<0.27
Cadmium	ug/L	<0.039	<0.039	--	<0.049	--	<0.051	--	<0.051
Chromium	ug/L	<1.1	<1.1	--	<1.1	--	<1.1	--	<1.1
Cobalt	ug/L	0.19	0.13	--	0.12	--	0.13	--	<0.19
Lead	ug/L	<0.27	<0.27	--	<0.11	--	<0.21	--	<0.21
Lithium	ug/L	260	310	--	240	--	290	--	290
Mercury	ug/L	<0.1	<0.1	--	--	--	<0.15	--	<0.15
Molybdenum	ug/L	1.2	2.8	--	3.1	--	<1.3	--	<1.3
Selenium	ug/L	<1	<1	--	<1	--	<0.96	--	<0.96
Thallium	ug/L	<0.26	<0.26	--	<0.26	--	<0.26	--	<0.26
Total Radium	pCi/L	1.47	2.31	--	3.1	--	3.85	--	4.44
Radium-226	pCi/L	1.42	2.1	--	2.22	--	3.25	--	3.67
Radium-228	pCi/L	0.0555	0.214	--	0.88	--	0.6	--	0.774
Field Specific Conductance	umhos/cm	3336	3027	3391	3177	3243	3332	3381	2930
Field Temperature	deg C	12.1	7.9	12.6	12.7	11.5 Degrees C	12.3	14.2	15.1
Groundwater Elevation	feet	--	--	647.73	641.09	641.16 ft	644.16	642.38	640.58
Oxygen, Dissolved	mg/L	2.29	3.87	1.51	0.44	3.23	0.77	0.42	1.68
Turbidity	NTU	7.74	3.19	1.43	0	0.02	0.02	0	9.6
pH at 25 Degrees C	Std. Units	--	7.9	--	7.9	--	7.8	--	7.9
Field Oxidation Potential	millivolts	206	115.8	23.4	39.6	129.7	146.9	80.8	140.7
Bicarbonate Alkalinity as CaCO3	mg/L	--	360	--	400	--	370	--	380
Carbonate Alkalinity as CaCO3	mg/L	--	<1.9	--	<3.8	--	<4.6	--	<4.6
Total Alkalinity as CaCO3	mg/L	--	360	--	400	--	370	--	380
Iron, total	ug/L	<50	<50	--	<50	--	<36	--	<140
Magnesium, total	ug/L	--	23000	--	25000	--	21000	--	20000
Manganese, dissolved	ug/L	20	22	--	5.8	--	6.2	--	5.5
Potassium, total	ug/L	--	9000	--	10000	--	8300	--	7700
Sodium, total	ug/L	--	710000	--	700000	--	--	--	670000
Cobalt, Dissolved	ug/L	0.36	0.12	--	--	--	--	--	--
Iron, dissolved	ug/L	<50	<50	--	<50	--	<36	--	<36
Manganese, total	ug/L	20	13	--	8.3	--	6.1	--	<18
Lithium, dissolved	ug/L	250	--	--	230	--	330	--	250
Sodium	ug/L	--	--	--	--	--	720000	--	--



Appendix E  
Statistical Evaluation

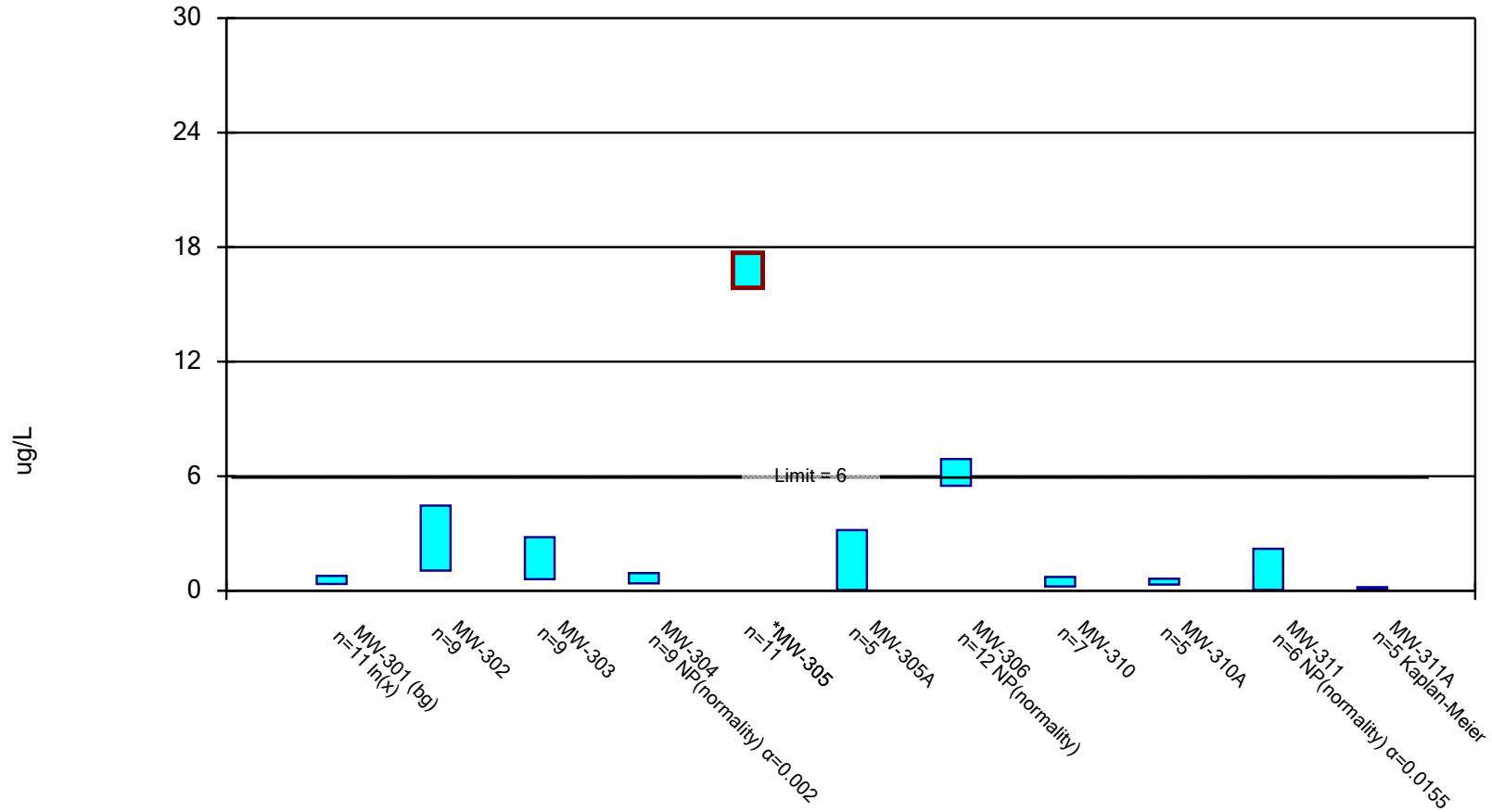
# Confidence Interval

Ottumwa Generating Station    Client: SCS Engineers    Data: OGS\_CP\_Export\_201122    Printed 12/13/2021, 10:56 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Cobalt (ug/L)	MW-301 (bg)	0.7766	0.3567	6	No	11	0	None	ln(x)	0.01	Param.
Cobalt (ug/L)	MW-302	4.458	1.053	6	No	9	0	None	No	0.01	Param.
Cobalt (ug/L)	MW-303	2.802	0.6024	6	No	9	0	None	No	0.01	Param.
Cobalt (ug/L)	MW-304	0.92	0.39	6	No	9	0	None	No	0.002	NP (normality)
<b>Cobalt (ug/L)</b>	<b>MW-305</b>	<b>17.71</b>	<b>15.87</b>	<b>6</b>	<b>Yes</b>	<b>11</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.01</b>	<b>Param.</b>
Cobalt (ug/L)	MW-305A	3.177	0.03936	6	No	5	0	None	No	0.01	Param.
Cobalt (ug/L)	MW-306	6.9	5.5	6	No	12	0	None	No	0.01	NP (normality)
Cobalt (ug/L)	MW-310	0.7172	0.2257	6	No	7	0	None	No	0.01	Param.
Cobalt (ug/L)	MW-310A	0.6303	0.3217	6	No	5	0	None	No	0.01	Param.
Cobalt (ug/L)	MW-311	2.2	0.0455	6	No	6	50	None	No	0.0155	NP (normality)
Cobalt (ug/L)	MW-311A	0.1819	0.09143	6	No	5	20	Kapla...	No	0.01	Param.
Fluoride (mg/L)	MW-301 (bg)	0.44	0.22	4	No	9	55.56	None	No	0.002	NP (NDs)
Fluoride (mg/L)	MW-302	0.33	0.23	4	No	9	55.56	None	No	0.002	NP (NDs)
Fluoride (mg/L)	MW-303	0.31	0.22	4	No	9	55.56	None	No	0.002	NP (NDs)
Fluoride (mg/L)	MW-304	1.3	0.28	4	No	9	11.11	None	No	0.002	NP (normality)
Fluoride (mg/L)	MW-305	0.5044	0.2586	4	No	9	22.22	Kapla...	ln(x)	0.01	Param.
Fluoride (mg/L)	MW-305A	0.8789	0.2251	4	No	5	20	Kapla...	No	0.01	Param.
Fluoride (mg/L)	MW-306	0.28	0.11	4	No	9	66.67	Kapla...	No	0.002	NP (NDs)
Fluoride (mg/L)	MW-310	1.337	0.2768	4	No	6	16.67	Kapla...	No	0.01	Param.
Fluoride (mg/L)	MW-310A	2	0.28	4	No	5	0	None	No	0.031	NP (normality)
Fluoride (mg/L)	MW-311	0.28	0.23	4	No	5	100	None	No	0.031	NP (NDs)
Fluoride (mg/L)	MW-311A	4.4	2	4	No	8	0	None	No	0.004	NP (normality)
Lithium (ug/L)	MW-301 (bg)	24.7	18.57	40	No	11	0	None	No	0.01	Param.
Lithium (ug/L)	MW-302	10.8	8.003	40	No	9	0	None	No	0.01	Param.
Lithium (ug/L)	MW-303	5.734	2.895	40	No	9	44.44	Kapla...	No	0.01	Param.
Lithium (ug/L)	MW-304	4.018	2.791	40	No	9	33.33	Kapla...	No	0.01	Param.
Lithium (ug/L)	MW-305	4.6	2.5	40	No	10	60	Kapla...	No	0.011	NP (NDs)
Lithium (ug/L)	MW-305A	18.44	12.36	40	No	5	0	None	No	0.01	Param.
Lithium (ug/L)	MW-306	4.6	2.3	40	No	9	100	None	No	0.002	NP (NDs)
Lithium (ug/L)	MW-310	53.05	38.51	40	No	9	0	None	No	0.01	Param.
<b>Lithium (ug/L)</b>	<b>MW-310A</b>	<b>300.7</b>	<b>231.3</b>	<b>40</b>	<b>Yes</b>	<b>5</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.01</b>	<b>Param.</b>
Lithium (ug/L)	MW-311	6.439	3.227	40	No	6	0	None	No	0.01	Param.
<b>Lithium (ug/L)</b>	<b>MW-311A</b>	<b>324.5</b>	<b>231.5</b>	<b>40</b>	<b>Yes</b>	<b>5</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.01</b>	<b>Param.</b>
Total Radium (pCi/L)	MW-301 (bg)	1.012	0.289	5	No	10	0	None	No	0.01	Param.
Total Radium (pCi/L)	MW-302	1.219	0.3569	5	No	9	0	None	No	0.01	Param.
Total Radium (pCi/L)	MW-303	1.306	0.3105	5	No	9	0	None	ln(x)	0.01	Param.
Total Radium (pCi/L)	MW-304	3.201	2.228	5	No	9	0	None	ln(x)	0.01	Param.
Total Radium (pCi/L)	MW-305	1.381	0.4	5	No	9	0	None	No	0.01	Param.
Total Radium (pCi/L)	MW-305A	3.292	1.072	5	No	5	0	None	No	0.01	Param.
Total Radium (pCi/L)	MW-306	0.8591	0.2193	5	No	9	0	None	No	0.01	Param.
Total Radium (pCi/L)	MW-310	0.585	-0.0235	5	No	6	0	None	No	0.01	Param.
Total Radium (pCi/L)	MW-310A	5.568	3.088	5	No	5	0	None	No	0.01	Param.
Total Radium (pCi/L)	MW-311	0.7484	-0.11	5	No	5	0	None	No	0.01	Param.
Total Radium (pCi/L)	MW-311A	5.02	1.048	5	No	5	0	None	No	0.01	Param.

## Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.\* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt Analysis Run 12/13/2021 10:55 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

# Confidence Interval

Constituent: Cobalt (ug/L)    Analysis Run 12/13/2021 10:56 PM    View: OGS - Ash Pond  
 Ottumwa Generating Station    Client: SCS Engineers    Data: OGS\_CP\_Export\_201122

	MW-301 (bg)	MW-302	MW-303	MW-304	MW-305	MW-305A	MW-306	MW-310	MW-310A
4/18/2018	0.46 (J)	0.9 (J)	2.1	0.39 (J)	14.5		4.8		
8/14/2018	1.4	1.5	2.2						
8/15/2018				0.92 (J)	15.6		5.5		
10/16/2018	0.36 (J)	4	1.7	0.45 (J)	17.2		6.4		
1/8/2019					16.4		6.2		
4/8/2019	0.44 (J)	1.2	0.42 (J)	0.4 (J)	17		6.9		
10/23/2019				0.5	17		6.2		
10/24/2019	0.6	2.7	1.2					0.57	
2/5/2020	1.1							0.32 (J)	
3/12/2020	0.43 (J)							0.32 (J)	
3/13/2020					18	2.4			0.63
4/13/2020				0.57	16			0.24 (J)	
4/14/2020	0.52	5.3	0.87			2.7	5.5		0.39 (J)
10/8/2020	0.41 (J)	1.5	2.4	0.41 (J)					
10/9/2020					17	1.5	5.9		
10/12/2020								0.38 (J)	0.43 (J)
2/23/2021							5.6		
4/13/2021		5.5	0.43 (J)				5.6	0.75	
4/14/2021	0.29 (J)			0.43 (J)					
4/15/2021						0.5			0.48 (J)
4/16/2021					18				
7/6/2021							5.8		
10/6/2021					18			0.72	
10/7/2021	0.48 (J)	2.2	4						
10/8/2021				0.42 (J)		0.94	11		0.45 (J)
Mean	0.59	2.756	1.702	0.4989	16.79	1.608	6.283	0.4714	0.476
Std. Dev.	0.3426	1.764	1.139	0.1678	1.101	0.9361	1.578	0.2069	0.09209
Upper Lim.	0.7766	4.458	2.802	0.92	17.71	3.177	6.9	0.7172	0.6303
Lower Lim.	0.3567	1.053	0.6024	0.39	15.87	0.03936	5.5	0.2257	0.3217



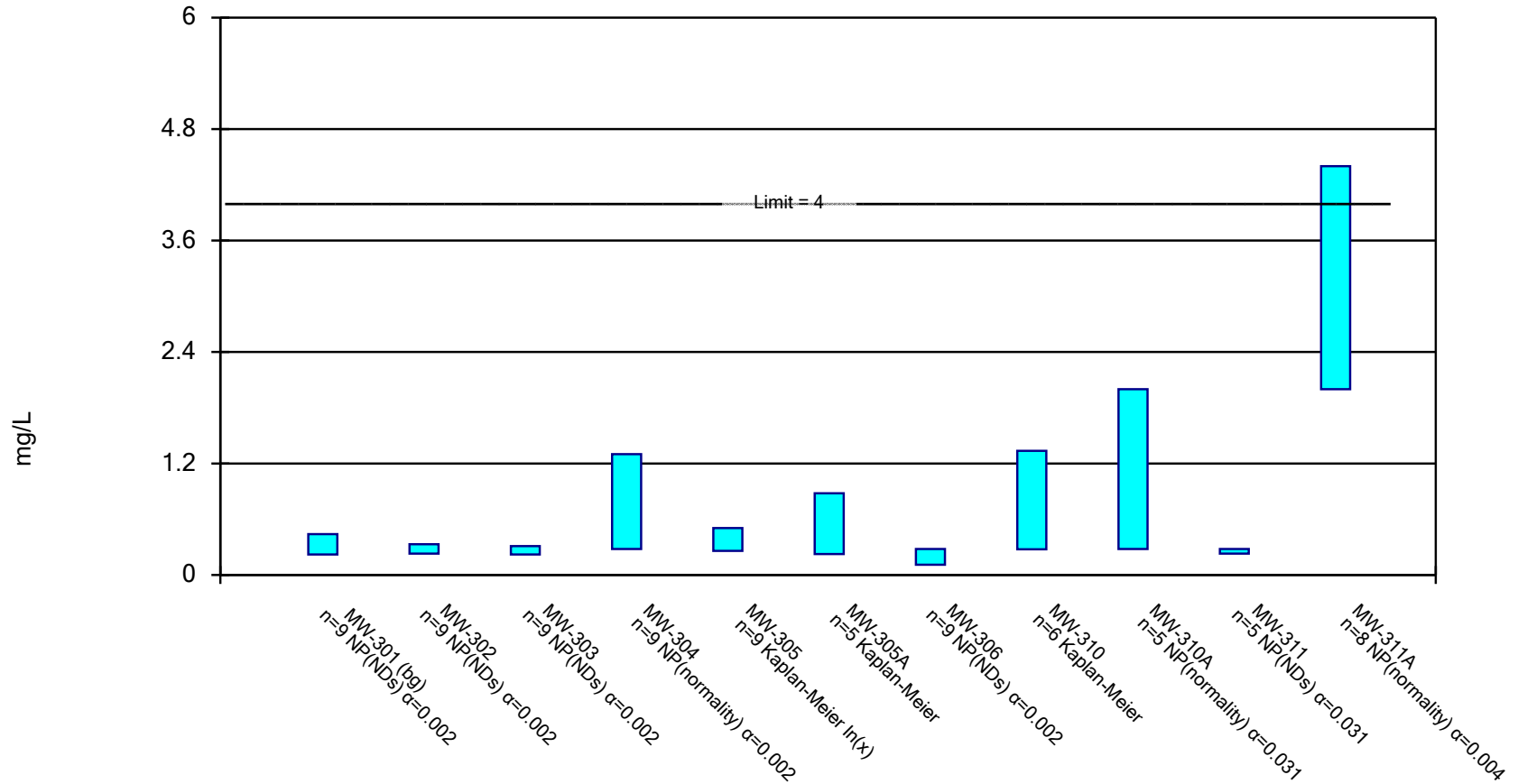
# Confidence Interval

Constituent: Cobalt (ug/L) Analysis Run 12/13/2021 10:56 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

	MW-311	MW-311A
4/18/2018		
8/14/2018		
8/15/2018		
10/16/2018		
1/8/2019		
4/8/2019		
10/23/2019		
10/24/2019	0.78	
2/5/2020	0.11 (J)	
3/12/2020		
3/13/2020	<0.091 (U)	0.19 (J)
4/13/2020	<0.091 (U)	0.13 (J)
4/14/2020		
10/8/2020		0.12 (J)
10/9/2020		
10/12/2020	2.2	
2/23/2021		
4/13/2021		
4/14/2021	<0.091 (U)	
4/15/2021		
4/16/2021		0.13 (J)
7/6/2021		
10/6/2021		
10/7/2021		
10/8/2021		<0.19 (U)
Mean	0.5377	0.133
Std. Dev.	0.8639	0.03493
Upper Lim.	2.2	0.1819
Lower Lim.	0.0455	0.09143

## 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: Fluoride Analysis Run 12/13/2021 10:55 PM View: OGS - Ash Pond  
 Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

# Confidence Interval

Constituent: Fluoride (mg/L) Analysis Run 12/13/2021 10:56 PM View: OGS - Ash Pond  
 Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

	MW-301 (bg)	MW-302	MW-303	MW-304	MW-305	MW-305A	MW-306	MW-310	MW-310A
4/18/2018	0.22	0.26	0.22	0.92	0.4		0.11 (J)		
8/15/2018					0.44		0.13 (J)		
8/29/2018	0.27	0.26	0.31	1					
10/16/2018	0.3	0.24	0.24	1	0.4		<0.19 (U)		
4/8/2019	0.44 (J)	<0.23 (U)	<0.23 (U)	1.3	0.75		0.27 (J)		
10/23/2019				0.74	<0.23 (U)		<0.23 (U)		
10/24/2019	<0.23 (U)	<0.23 (U)	<0.23 (U)					0.31 (J)	
2/5/2020								0.85	
3/13/2020						0.77			1.7
4/13/2020				1.1	0.35 (J)			1.1	
4/14/2020	<0.23 (U)	<0.23 (U)	<0.23 (U)			0.73	<0.23 (U)		1.8
6/30/2020									
10/8/2020	<0.23 (U)	<0.23 (U)	0.26 (J)	1.1					
10/9/2020					0.38 (J)	0.73	<0.23 (U)		
10/12/2020								1	2
2/25/2021									
4/13/2021		0.33 (J)	<0.28 (U)				<0.28 (U)	1.3	
4/14/2021	<0.28 (U)			1.1					
4/15/2021						0.56			1.9
4/16/2021					0.37 (J)				
7/7/2021									
10/6/2021					<0.28 (U)			<0.28 (U)	
10/7/2021	<0.28 (U)	<0.28 (U)	<0.28 (U)						
10/8/2021				<0.28 (U)		<0.28 (U)	<0.28 (U)		0.28 (J)
<b>Mean</b>	0.2756	0.2544	0.2533	0.9489	0.4	0.614	0.2167	0.8067	1.536
<b>Std. Dev.</b>	0.06803	0.03358	0.03082	0.2934	0.1463	0.2035	0.06225	0.4225	0.711
<b>Upper Lim.</b>	0.44	0.33	0.31	1.3	0.5044	0.8789	0.28	1.337	2
<b>Lower Lim.</b>	0.22	0.23	0.22	0.28	0.2586	0.2251	0.11	0.2768	0.28

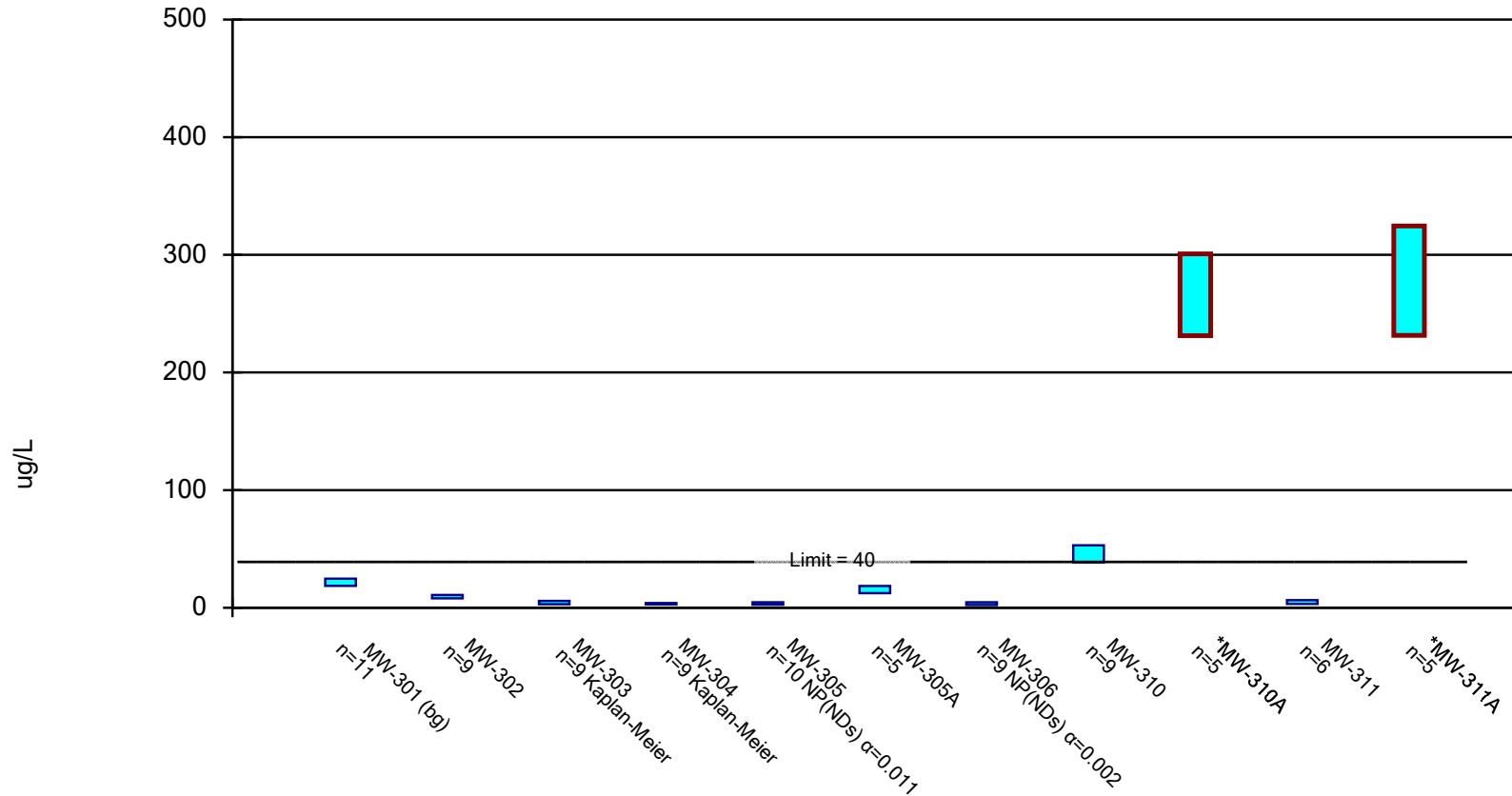
# Confidence Interval

Constituent: Fluoride (mg/L) Analysis Run 12/13/2021 10:56 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

	MW-311	MW-311A
4/18/2018		
8/15/2018		
8/29/2018		
10/16/2018		
4/8/2019		
10/23/2019		
10/24/2019	<0.23 (U)	
2/5/2020	<0.23 (U)	
3/13/2020		3.4
4/13/2020	<0.23 (U)	4.1
4/14/2020		
6/30/2020		3.7
10/8/2020		4.4
10/9/2020		
10/12/2020	<0.23 (U)	
2/25/2021		3.9
4/13/2021		
4/14/2021	<0.28 (U)	
4/15/2021		
4/16/2021		4
7/7/2021		3.8
10/6/2021		
10/7/2021		
10/8/2021		2
<b>Mean</b>	0.24	3.663
<b>Std. Dev.</b>	0.02236	0.7328
<b>Upper Lim.</b>	0.28	4.4
<b>Lower Lim.</b>	0.23	2

## Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.\* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium Analysis Run 12/13/2021 10:55 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

# Confidence Interval

Constituent: Lithium (ug/L)    Analysis Run 12/13/2021 10:56 PM    View: OGS - Ash Pond  
 Ottumwa Generating Station    Client: SCS Engineers    Data: OGS\_CP\_Export\_201122

	MW-301 (bg)	MW-302	MW-303	MW-304	MW-305	MW-305A	MW-306	MW-310	MW-310A
4/18/2018	19.1	7.5 (J)	<4.6 (U)	<4.6 (U)	<4.6 (U)		<4.6 (U)		
8/14/2018	26.5	6.9 (J)	6.9 (J)						
8/15/2018				<4.6 (U)	<4.6 (U)		<4.6 (U)		
10/16/2018	19.4	8.6 (J)	<4.6 (U)	<4.6 (U)	<4.6 (U)		<4.6 (U)		
4/8/2019	15	10	<2.7 (U)	3.3 (J)	<2.7 (U)		<2.7 (U)		
10/23/2019				2.8 (J)	<2.7 (U)		<2.7 (U)		
10/24/2019	24	10	<2.7 (U)					35	
2/5/2020	17							42	
3/12/2020	21							46	
3/13/2020					2.3 (J)	14			250
4/13/2020				4.8 (J)	3.2 (J)			48	
4/14/2020	24	11	4.7 (J)			16	<2.3 (U)		290
10/8/2020	23	9.6 (J)	5.6 (J)	3.1 (J)					
10/9/2020					<2.5 (U)	13	<2.5 (U)		
10/12/2020								42	240
2/23/2021								37	
4/13/2021		10	4.1 (J)				<2.5 (U)	58	
4/14/2021	23			3.3 (J)					
4/15/2021						17			270
4/16/2021					2.6 (J)				
7/6/2021								52	
10/6/2021					3.1 (J)			52	
10/7/2021	26	11	5.8 (J)						
10/8/2021				4 (J)		17	<2.5 (U)		280
<b>Mean</b>	21.64	9.4	4.633	3.9	3.29	15.4	3.222	45.78	266
<b>Std. Dev.</b>	3.674	1.447	1.378	0.7794	0.941	1.817	1.04	7.53	20.74
<b>Upper Lim.</b>	24.7	10.8	5.734	4.018	4.6	18.44	4.6	53.05	300.7
<b>Lower Lim.</b>	18.57	8.003	2.895	2.791	2.5	12.36	2.3	38.51	231.3

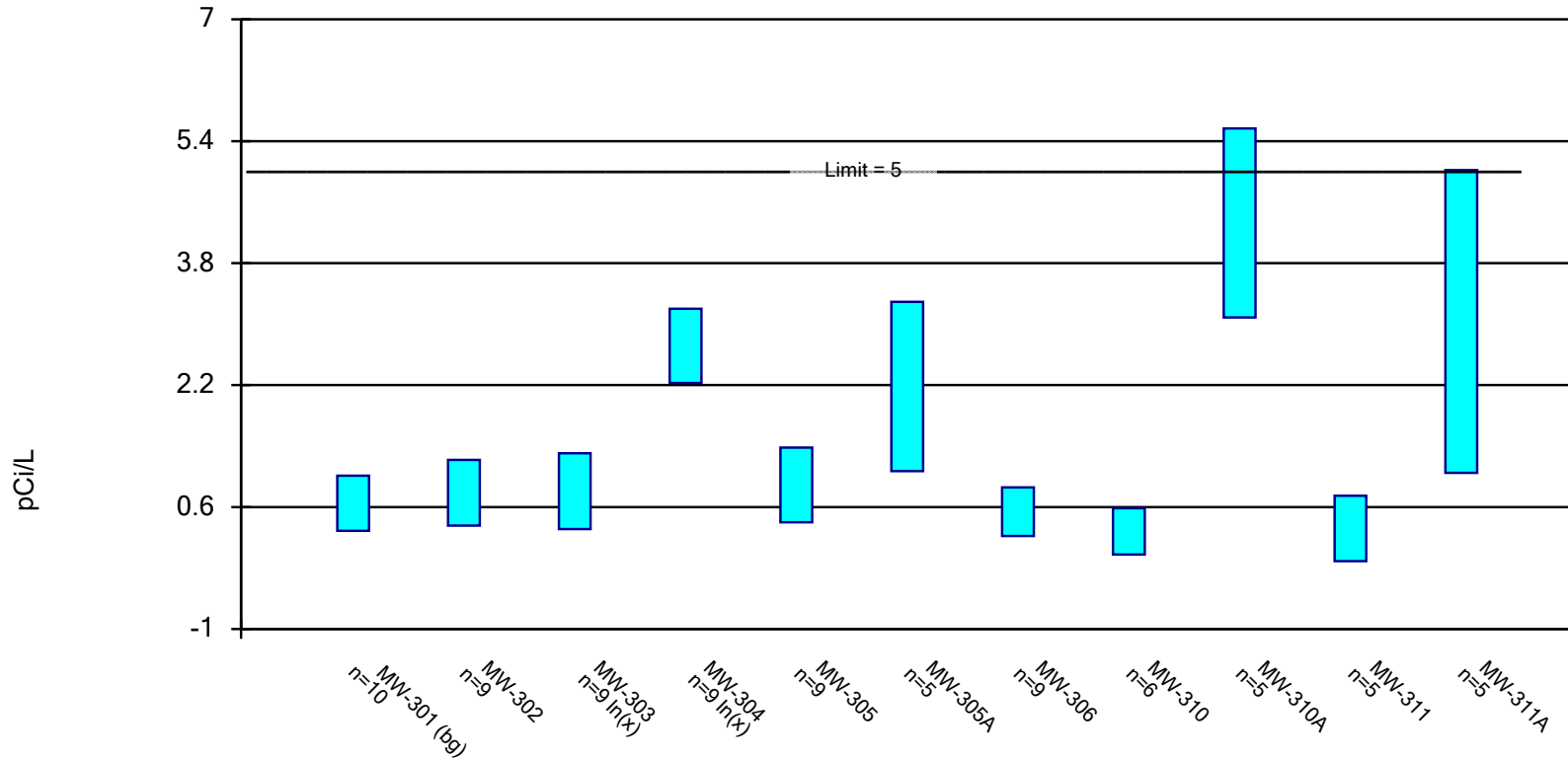
# Confidence Interval

Constituent: Lithium (ug/L) Analysis Run 12/13/2021 10:56 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

	MW-311	MW-311A
4/18/2018		
8/14/2018		
8/15/2018		
10/16/2018		
4/8/2019		
10/23/2019		
10/24/2019	4.7 (J)	
2/5/2020	2.9 (J)	
3/12/2020		
3/13/2020	4.7 (J)	260
4/13/2020	6.2 (J)	310
4/14/2020		
10/8/2020		240
10/9/2020		
10/12/2020	4.6 (J)	
2/23/2021		
4/13/2021		
4/14/2021	5.9 (J)	
4/15/2021		
4/16/2021		290
7/6/2021		
10/6/2021		
10/7/2021		
10/8/2021		290
<b>Mean</b>	4.833	278
<b>Std. Dev.</b>	1.169	27.75
<b>Upper Lim.</b>	6.439	324.5
<b>Lower Lim.</b>	3.227	231.5

### Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Total Radium    Analysis Run 12/13/2021 10:55 PM    View: OGS - Ash Pond  
Ottumwa Generating Station    Client: SCS Engineers    Data: OGS\_CP\_Export\_201122



# Confidence Interval

Constituent: Total Radium (pCi/L)    Analysis Run 12/13/2021 10:56 PM    View: OGS - Ash Pond  
 Ottumwa Generating Station    Client: SCS Engineers    Data: OGS\_CP\_Export\_201122

	MW-301 (bg)	MW-302	MW-303	MW-304	MW-305	MW-305A	MW-306	MW-310	MW-310A
4/18/2018	0.513	0.746	0.529	2.08	0.676		0.305		
8/14/2018	1.19	1.12	1.82						
8/15/2018				3.74	1.33		0.985		
10/16/2018	1.16	0.299	2.04	2.76	1.56		0.693		
4/8/2019	0.0956	0.116	0.391	2.42	0.685		0.155		
10/23/2019				2.58	0.383		0.624		
10/24/2019	0.956	0.752	0.321					0.411	
2/5/2020	0.228							0.0344	
3/13/2020						1.97			3.43
4/13/2020				2.46	0.909			0.271	
4/14/2020	0.315	1.26	0.229			1.26	0.0738		3.9
10/8/2020	0.407	0.447	0.654	2.41					
10/9/2020					0.483	2.05	0.889		
10/12/2020								0.429	4.46
4/13/2021		0.901	0.51				0.334	0	
4/14/2021	0.598			2.49					
4/15/2021						2.67			4.44
4/16/2021					0.327				
10/6/2021					1.66			0.539	
10/7/2021	1.04	1.45	0.916						
10/8/2021				3.49		2.96	0.794		5.41
<b>Mean</b>	0.6503	0.7879	0.8233	2.714	0.8903	2.182	0.5392	0.2807	4.328
<b>Std. Dev.</b>	0.4049	0.4464	0.6603	0.5443	0.5078	0.6625	0.3313	0.2215	0.74
<b>Upper Lim.</b>	1.012	1.219	1.306	3.201	1.381	3.292	0.8591	0.585	5.568
<b>Lower Lim.</b>	0.289	0.3569	0.3105	2.228	0.4	1.072	0.2193	-0.0235	3.088

# Confidence Interval

Constituent: Total Radium (pCi/L) Analysis Run 12/13/2021 10:56 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

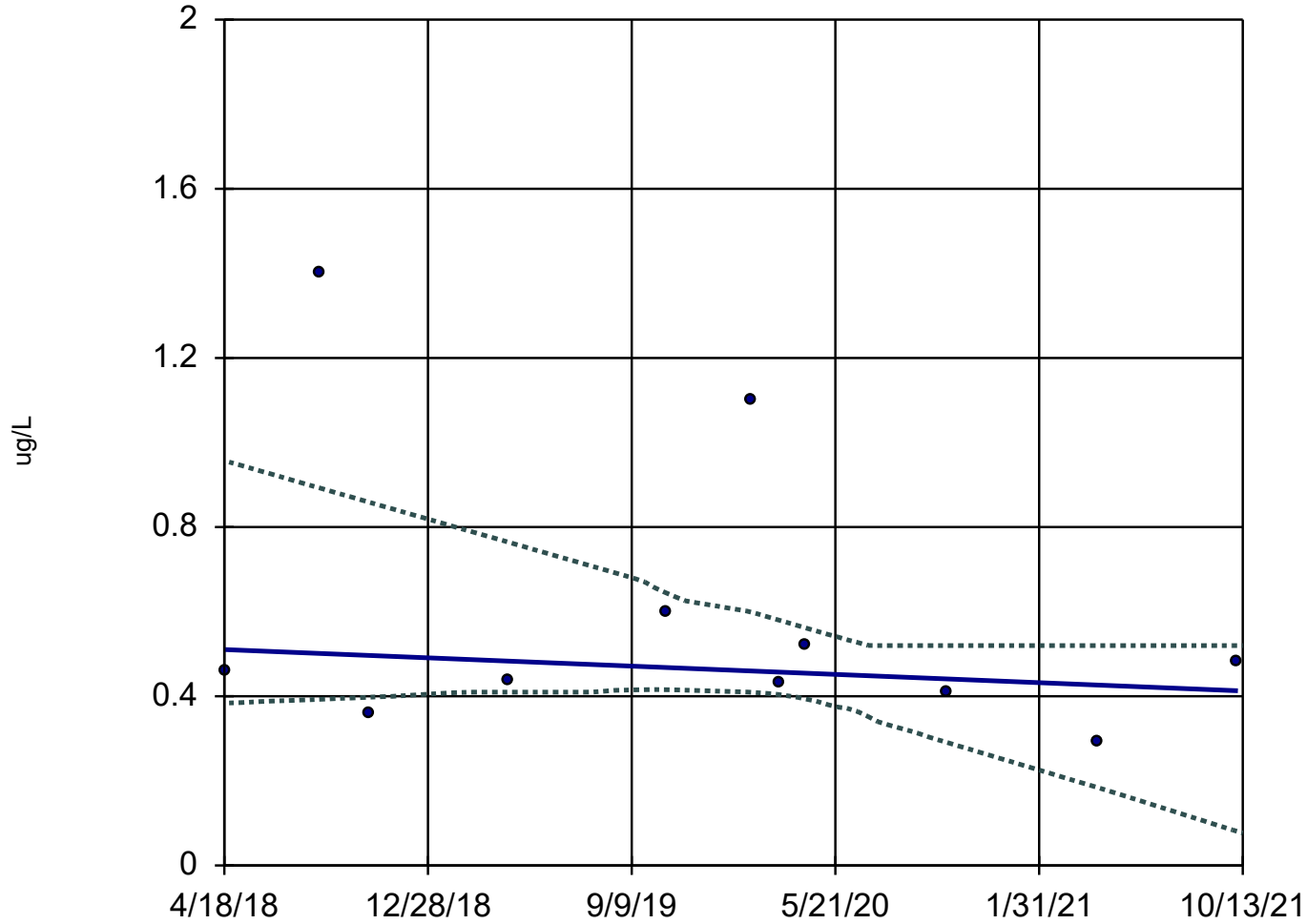
	MW-311	MW-311A
4/18/2018		
8/14/2018		
8/15/2018		
10/16/2018		
4/8/2019		
10/23/2019		
10/24/2019	0.386	
2/5/2020	0.108	
3/13/2020		1.47
4/13/2020	0.17	2.31
4/14/2020		
10/8/2020		3.1
10/9/2020		
10/12/2020	0.738	
4/13/2021		
4/14/2021	0.194	
4/15/2021		
4/16/2021		3.85
10/6/2021		
10/7/2021		
10/8/2021		4.44
Mean	0.3192	3.034
Std. Dev.	0.2561	1.185
Upper Lim.	0.7484	5.02
Lower Lim.	-0.11	1.048

# Trend Test

Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122 Printed 1/2/2022, 2:34 PM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Cobalt (ug/L)	MW-301 (bg)	-0.02805	-13	-31	No	11	0	n/a	n/a	0.02	NP
Cobalt (ug/L)	MW-302	0.5007	15	23	No	9	0	n/a	n/a	0.02	NP
Cobalt (ug/L)	MW-303	-0.2181	0	23	No	9	0	n/a	n/a	0.02	NP
Cobalt (ug/L)	MW-304	-0.00...	0	23	No	9	0	n/a	n/a	0.02	NP
Cobalt (ug/L)	MW-305	0.7045	29	31	No	11	0	n/a	n/a	0.02	NP
Cobalt (ug/L)	MW-305A	-1.375	-6	-10	No	5	0	n/a	n/a	0.02	NP
Cobalt (ug/L)	MW-306	0.1098	11	35	No	12	0	n/a	n/a	0.02	NP
Cobalt (ug/L)	MW-310	0.1023	6	17	No	7	0	n/a	n/a	0.02	NP
Cobalt (ug/L)	MW-310A	-0.021	0	10	No	5	0	n/a	n/a	0.02	NP
Cobalt (ug/L)	MW-311	-0.05425	-4	-13	No	6	50	n/a	n/a	0.02	NP
Cobalt (ug/L)	MW-311A	-0.03994	-7	-10	No	5	20	n/a	n/a	0.02	NP

### Cobalt MW-301 (bg)



n = 11  
Slope = -0.02805  
units per year.  
Mann-Kendall  
statistic = -13  
critical = -31  
Trend not sig-  
nificant at 98%  
confidence level  
( $\alpha = 0.01$  per  
tail).

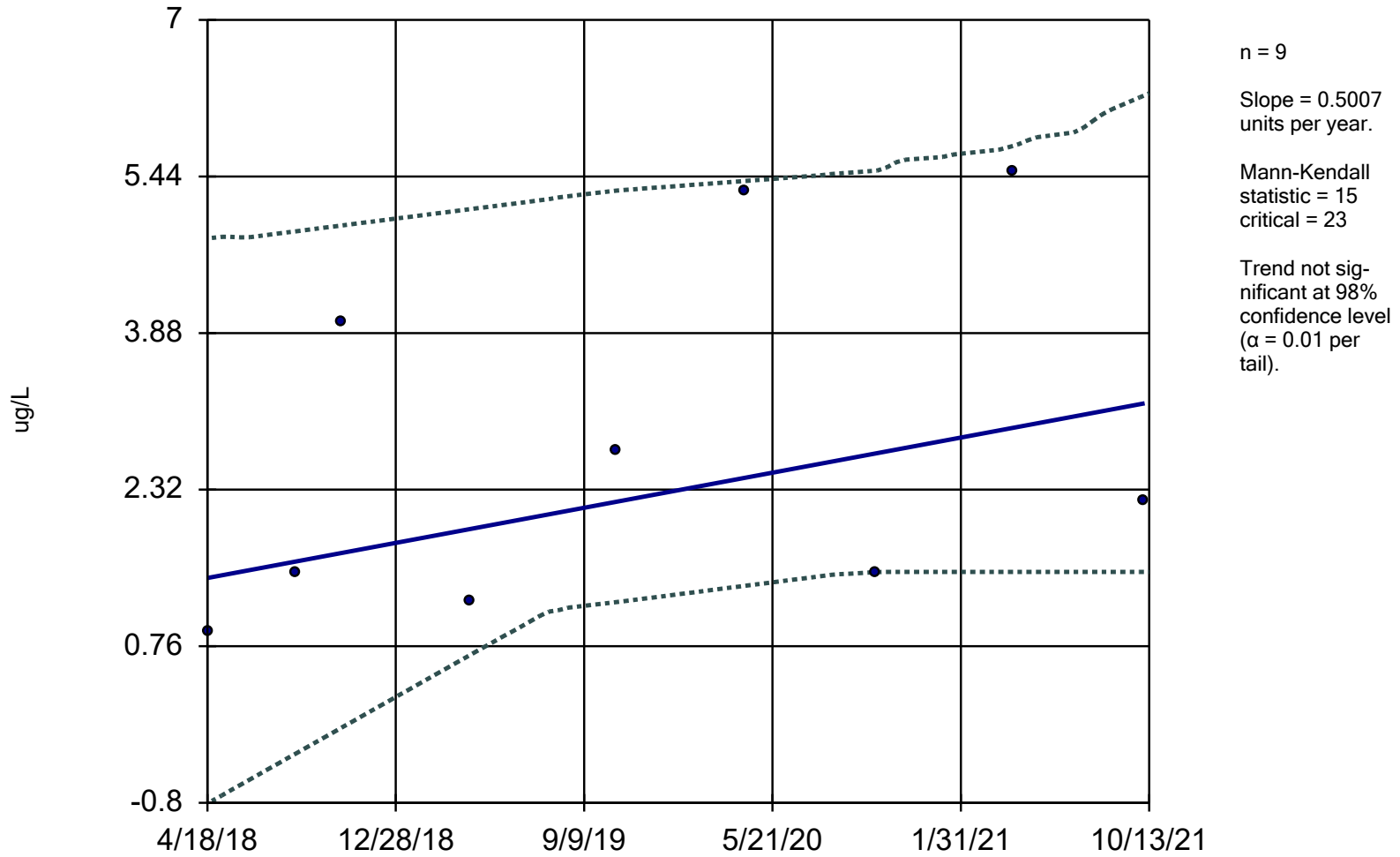
# Sen's Slope Estimator

Constituent: Cobalt (ug/L) Analysis Run 1/2/2022 2:34 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

MW-301 (bg)

4/18/2018	0.46 (J)
8/14/2018	1.4
10/16/2018	0.36 (J)
4/8/2019	0.44 (J)
10/24/2019	0.6
2/5/2020	1.1
3/12/2020	0.43 (J)
4/14/2020	0.52
10/8/2020	0.41 (J)
4/14/2021	0.29 (J)
10/7/2021	0.48 (J)

### Cobalt MW-302



Sen's Slope and 95% Confidence Band Analysis Run 1/2/2022 2:33 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

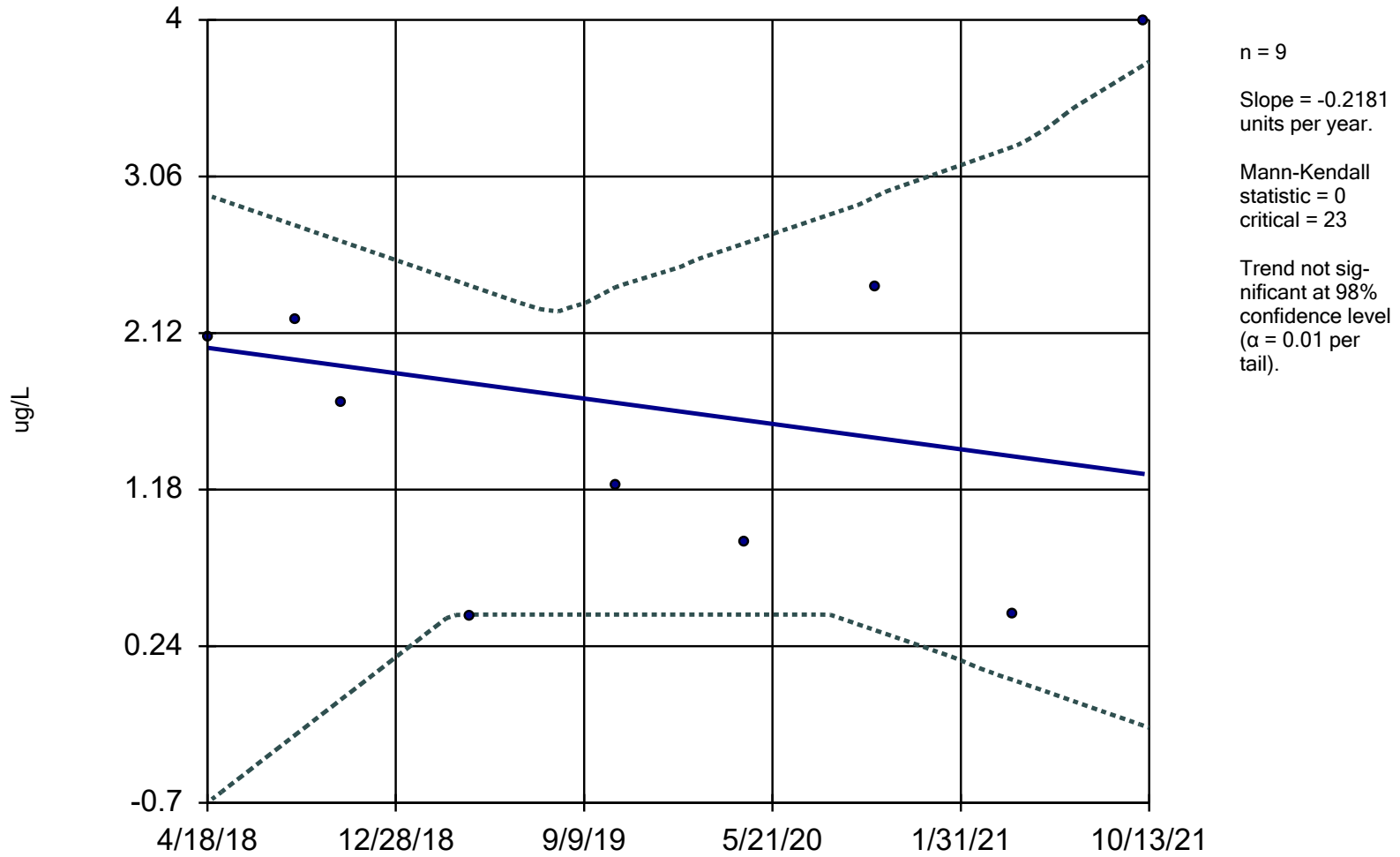
# Sen's Slope Estimator

Constituent: Cobalt (ug/L) Analysis Run 1/2/2022 2:34 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

MW-302

4/18/2018	0.9 (J)
8/14/2018	1.5
10/16/2018	4
4/8/2019	1.2
10/24/2019	2.7
4/14/2020	5.3
10/8/2020	1.5
4/13/2021	5.5
10/7/2021	2.2

### Cobalt MW-303





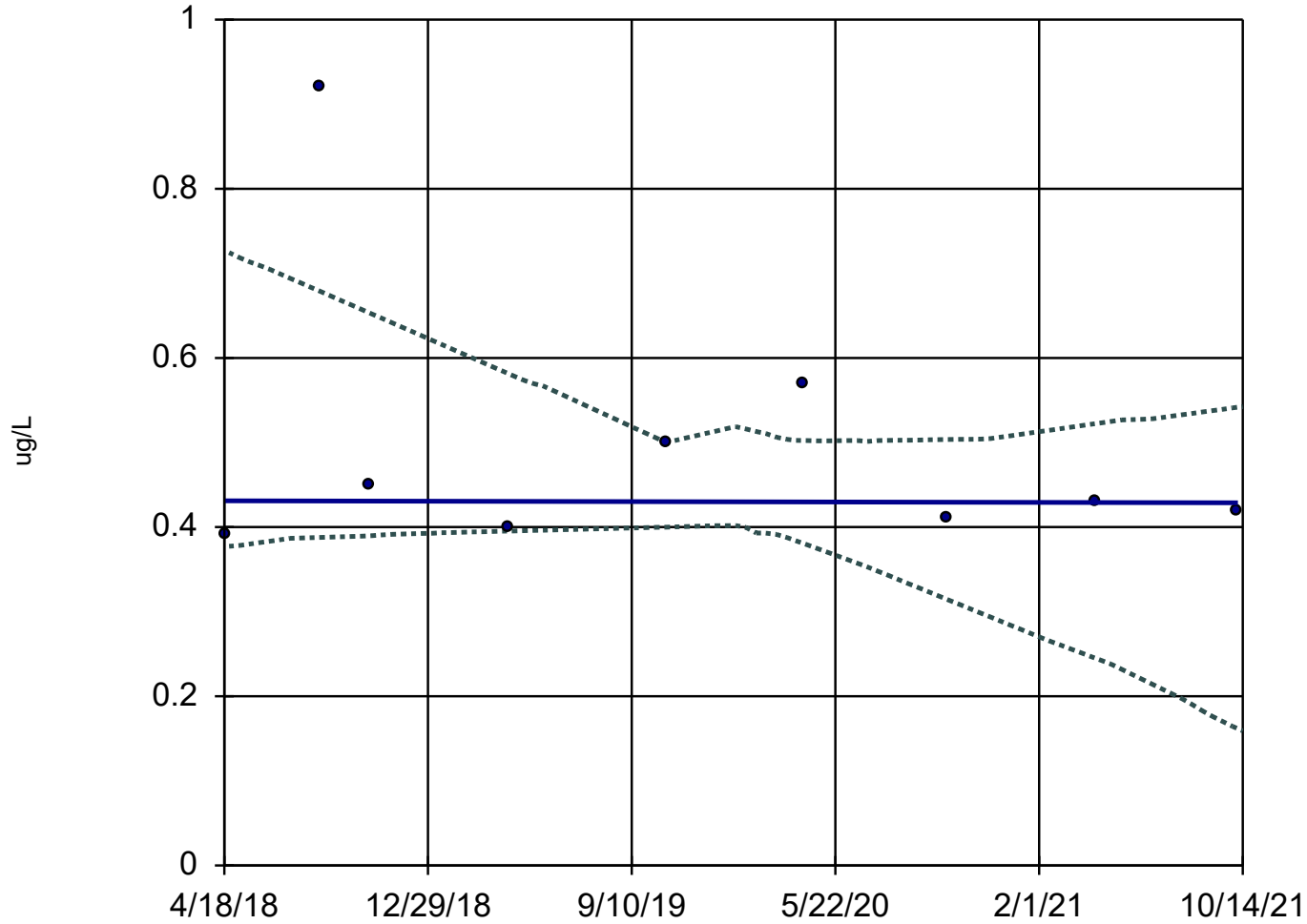
# Sen's Slope Estimator

Constituent: Cobalt (ug/L) Analysis Run 1/2/2022 2:34 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

MW-303

4/18/2018	2.1
8/14/2018	2.2
10/16/2018	1.7
4/8/2019	0.42 (J)
10/24/2019	1.2
4/14/2020	0.87
10/8/2020	2.4
4/13/2021	0.43 (J)
10/7/2021	4

### Cobalt MW-304



n = 9  
Slope = -0.0006824  
units per year.  
Mann-Kendall  
statistic = 0  
critical = 23  
Trend not sig-  
nificant at 98%  
confidence level  
( $\alpha = 0.01$  per  
tail).

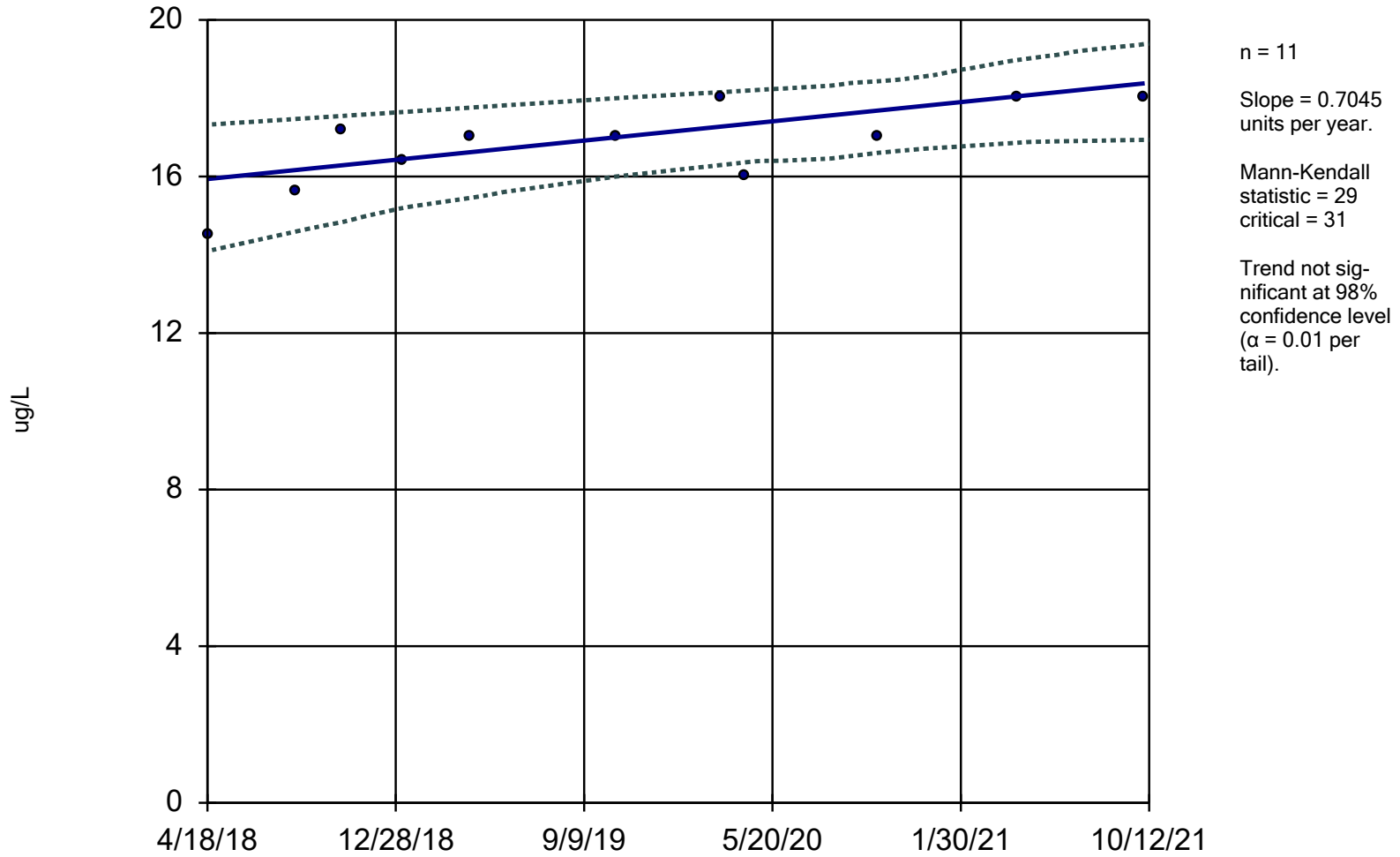
# Sen's Slope Estimator

Constituent: Cobalt (ug/L) Analysis Run 1/2/2022 2:34 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

MW-304

4/18/2018	0.39 (J)
8/15/2018	0.92 (J)
10/16/2018	0.45 (J)
4/8/2019	0.4 (J)
10/23/2019	0.5
4/13/2020	0.57
10/8/2020	0.41 (J)
4/14/2021	0.43 (J)
10/8/2021	0.42 (J)

### Cobalt MW-305



Sen's Slope and 95% Confidence Band Analysis Run 1/2/2022 2:33 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

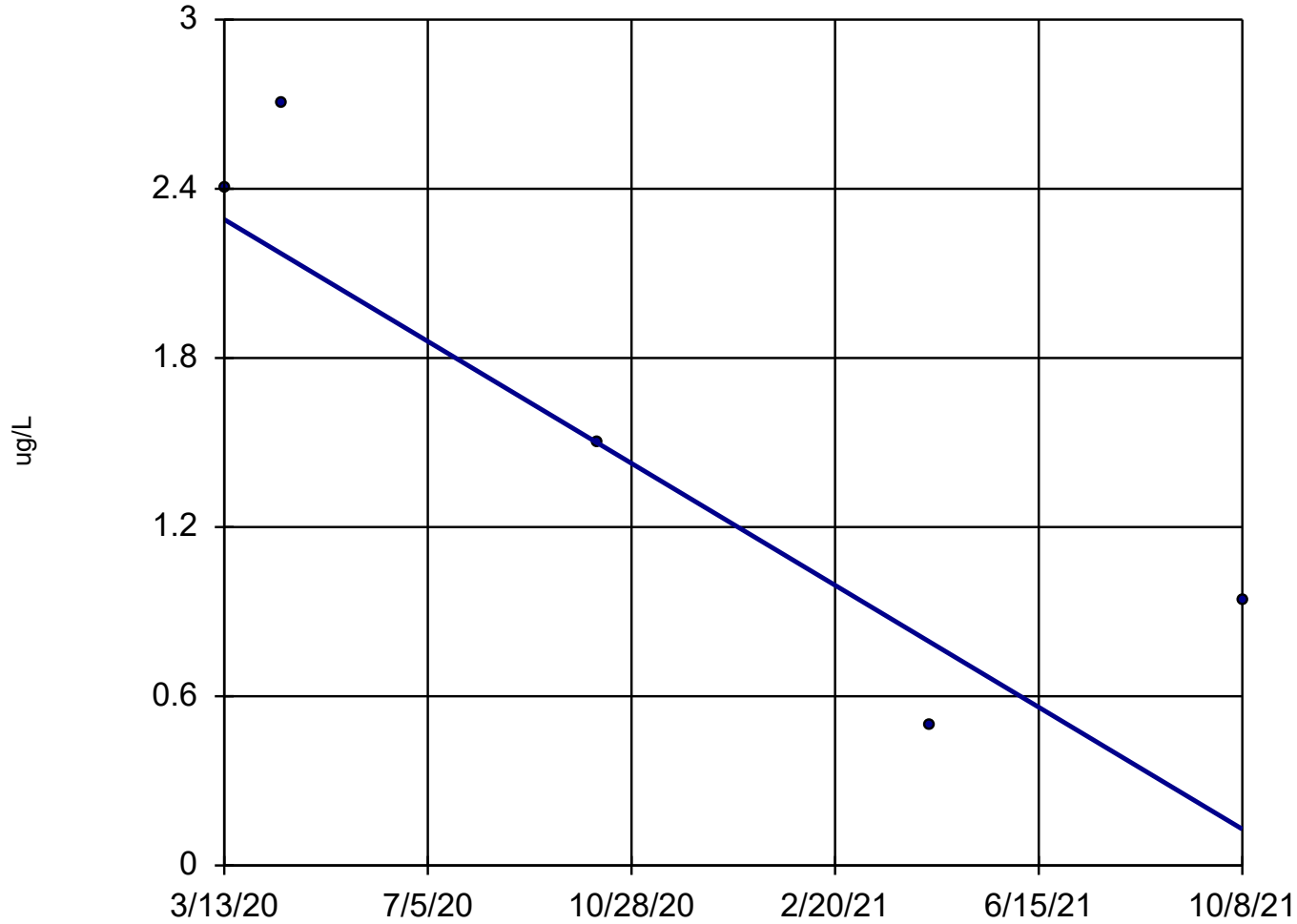
# Sen's Slope Estimator

Constituent: Cobalt (ug/L) Analysis Run 1/2/2022 2:34 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

MW-305

4/18/2018	14.5
8/15/2018	15.6
10/16/2018	17.2
1/8/2019	16.4
4/8/2019	17
10/23/2019	17
3/13/2020	18
4/13/2020	16
10/9/2020	17
4/16/2021	18
10/6/2021	18

### Cobalt MW-305A



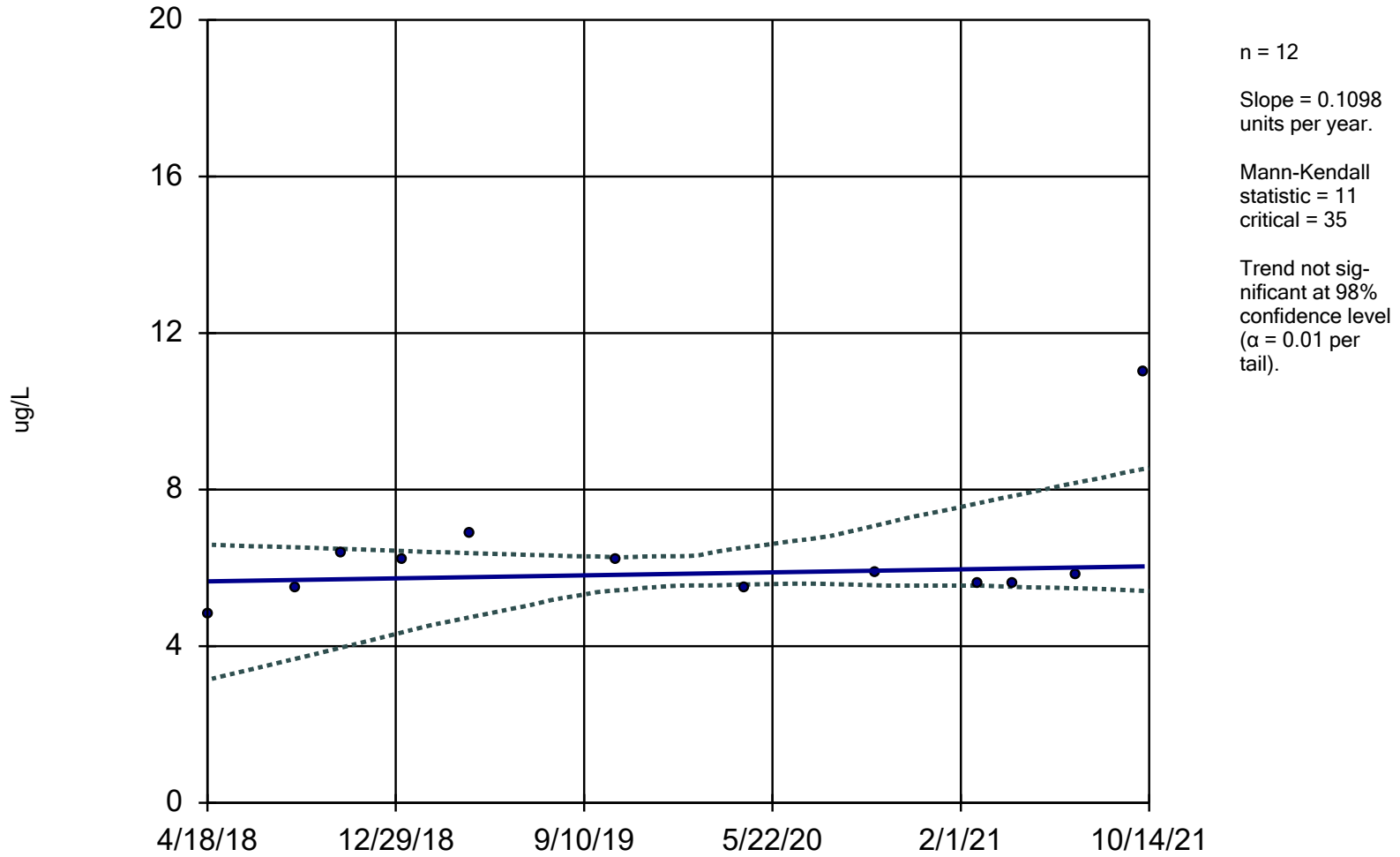
n = 5  
Slope = -1.375  
units per year.  
Mann-Kendall  
statistic = -6  
critical = -10  
Trend not sig-  
nificant at 98%  
confidence level  
( $\alpha = 0.01$  per  
tail).

# Sen's Slope Estimator

Constituent: Cobalt (ug/L) Analysis Run 1/2/2022 2:34 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

	MW-305A
3/13/2020	2.4
4/14/2020	2.7
10/9/2020	1.5
4/15/2021	0.5
10/8/2021	0.94

### Cobalt MW-306



Sen's Slope and 95% Confidence Band Analysis Run 1/2/2022 2:33 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122



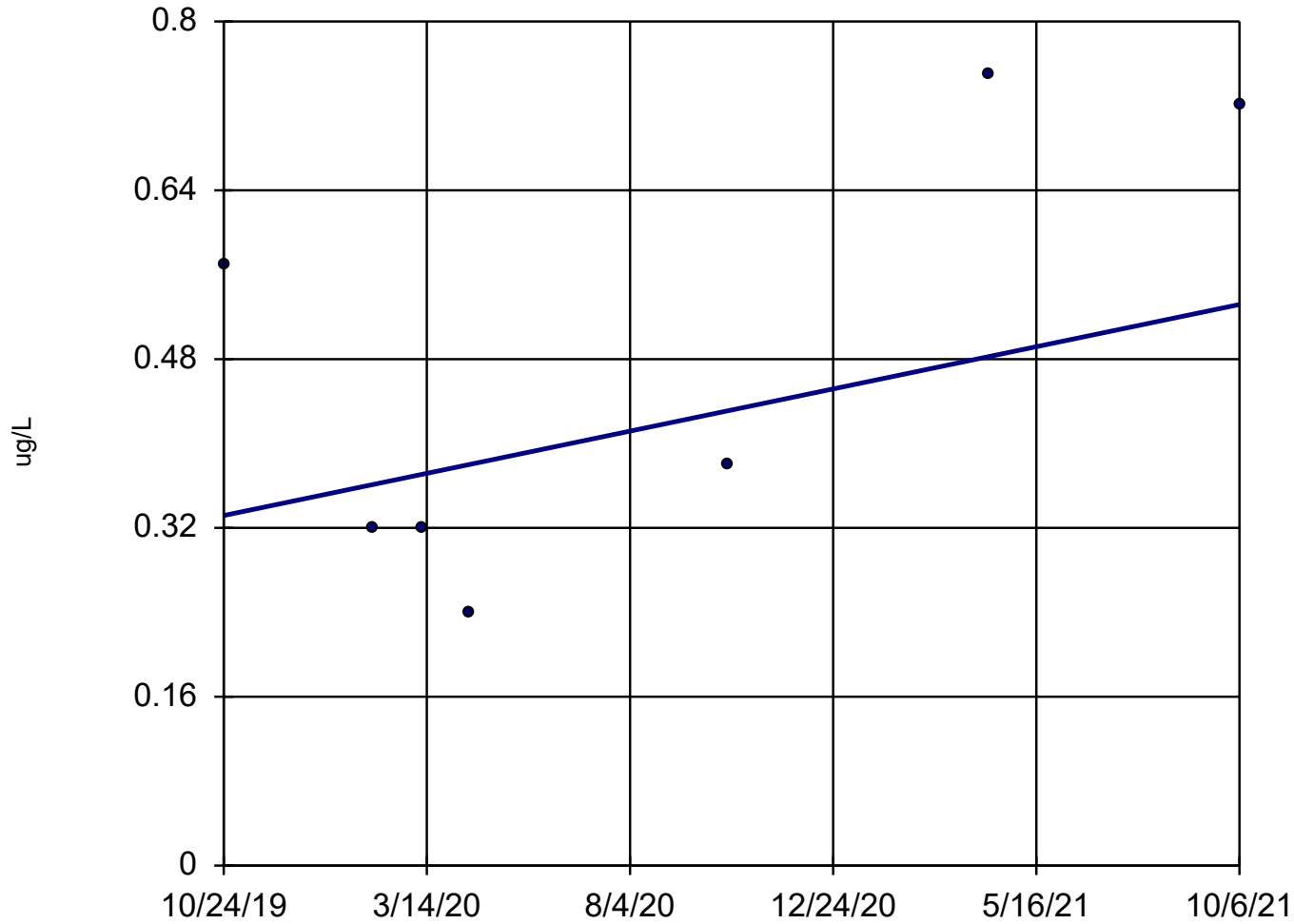
# Sen's Slope Estimator

Constituent: Cobalt (ug/L) Analysis Run 1/2/2022 2:34 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

MW-306

4/18/2018	4.8
8/15/2018	5.5
10/16/2018	6.4
1/8/2019	6.2
4/8/2019	6.9
10/23/2019	6.2
4/14/2020	5.5
10/9/2020	5.9
2/23/2021	5.6
4/13/2021	5.6
7/6/2021	5.8
10/8/2021	11

### Cobalt MW-310



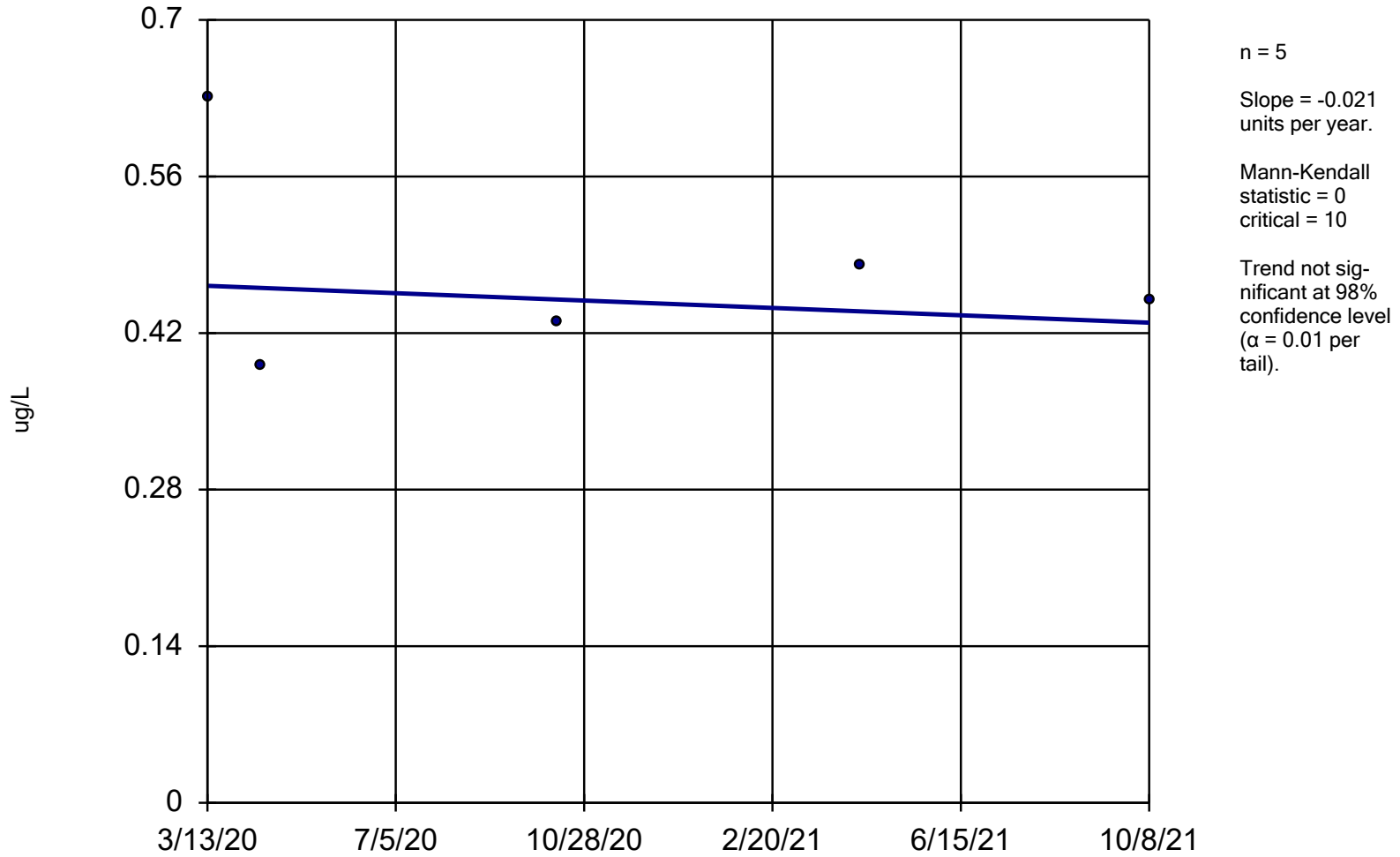
n = 7  
Slope = 0.1023  
units per year.  
Mann-Kendall  
statistic = 6  
critical = 17  
Trend not sig-  
nificant at 98%  
confidence level  
( $\alpha = 0.01$  per  
tail).

# Sen's Slope Estimator

Constituent: Cobalt (ug/L) Analysis Run 1/2/2022 2:34 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

	MW-310
10/24/2019	0.57
2/5/2020	0.32 (J)
3/12/2020	0.32 (J)
4/13/2020	0.24 (J)
10/12/2020	0.38 (J)
4/13/2021	0.75
10/6/2021	0.72

### Cobalt MW-310A



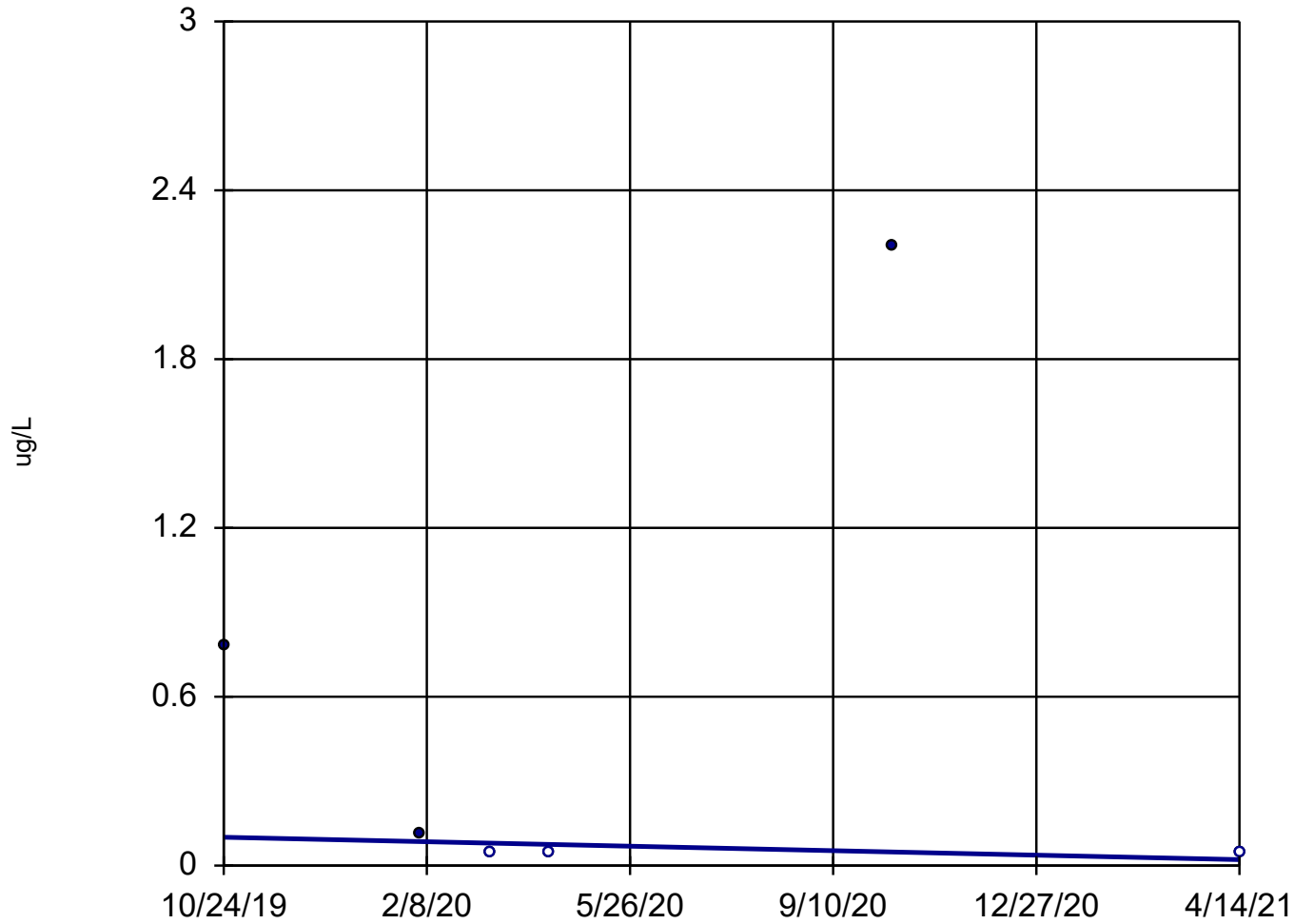
Sen's Slope Estimator Analysis Run 1/2/2022 2:33 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

# Sen's Slope Estimator

Constituent: Cobalt (ug/L) Analysis Run 1/2/2022 2:34 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

	MW-310A
3/13/2020	0.63
4/14/2020	0.39 (J)
10/12/2020	0.43 (J)
4/15/2021	0.48 (J)
10/8/2021	0.45 (J)

### Cobalt MW-311



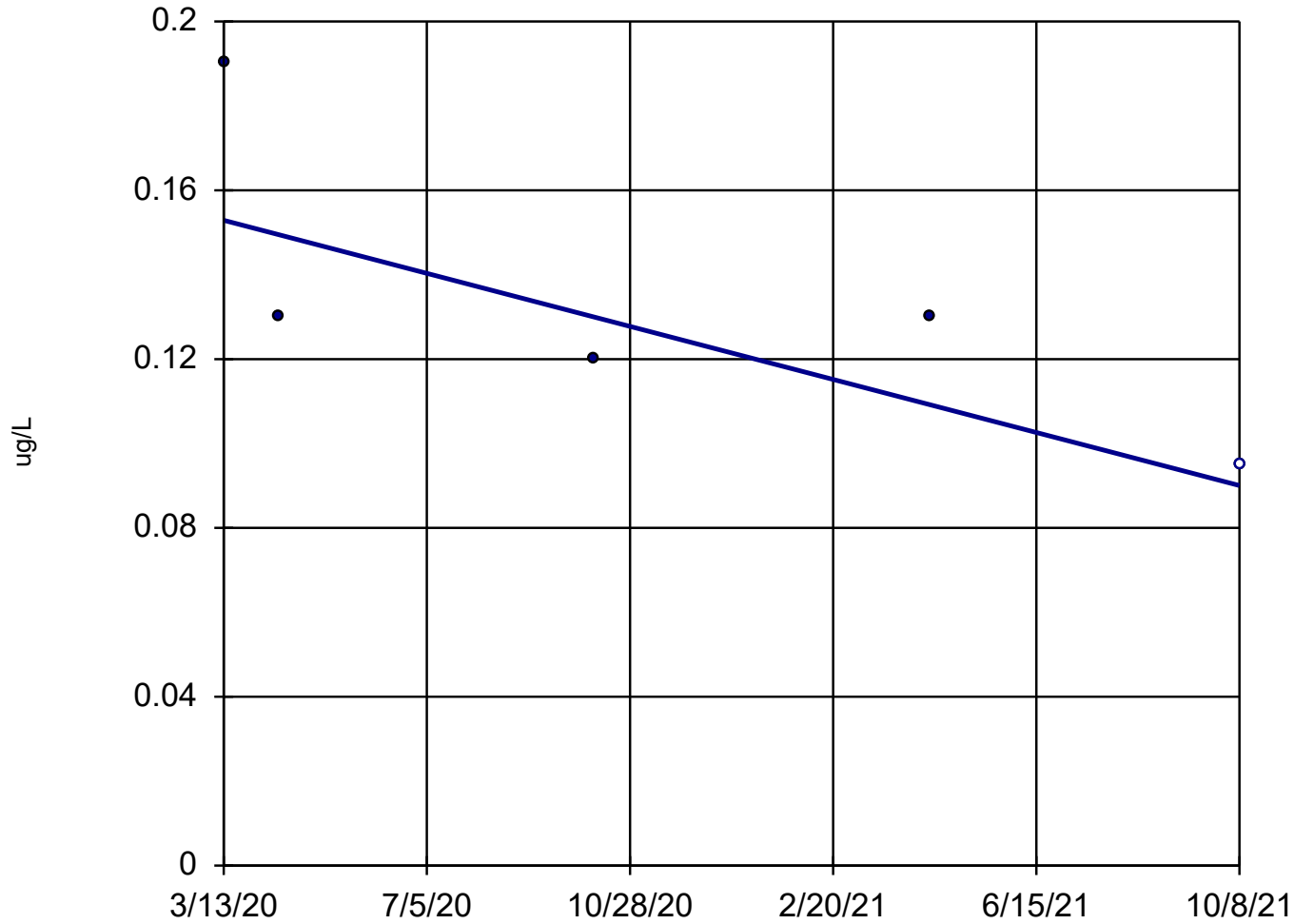
n = 6  
Slope = -0.05425  
units per year.  
Mann-Kendall  
statistic = -4  
critical = -13  
Trend not sig-  
nificant at 98%  
confidence level  
( $\alpha = 0.01$  per  
tail).

# Sen's Slope Estimator

Constituent: Cobalt (ug/L) Analysis Run 1/2/2022 2:34 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

	MW-311
10/24/2019	0.78
2/5/2020	0.11 (J)
3/13/2020	<0.091 (U)
4/13/2020	<0.091 (U)
10/12/2020	2.2
4/14/2021	<0.091 (U)

### Cobalt MW-311A




n = 5  
Slope = -0.03994  
units per year.  
Mann-Kendall  
statistic = -7  
critical = -10  
Trend not sig-  
nificant at 98%  
confidence level  
( $\alpha = 0.01$  per  
tail).



# Sen's Slope Estimator

Constituent: Cobalt (ug/L) Analysis Run 1/2/2022 2:34 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

	MW-311A
3/13/2020	0.19 (J)
4/13/2020	0.13 (J)
10/8/2020	0.12 (J)
4/16/2021	0.13 (J)
10/8/2021	<0.19 (U)



Appendix F  
Alternative Source Demonstration

# Alternative Source Demonstration April 2021 Assessment Monitoring

Ash 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**

25221072.00 | October 13, 2021

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

## Table of Contents

Section	Page
<b>PE Certification</b> .....	<b>iii</b>
<b>1.0 Introduction</b> .....	<b>1</b>
1.1 §257.95(g)(3) Alternative Source Demonstration Requirements.....	1
1.2 Site Information and Map.....	1
1.3 Statistically Significant Levels Identified.....	2
1.4 Overview of Alternative Source Demonstration Approach.....	3
<b>2.0 Background</b> .....	<b>3</b>
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.....	5
2.4 Groundwater Flow Direction.....	5
<b>3.0 Methodology and Analysis Review</b> .....	<b>5</b>
3.1 Sampling and Field Analysis Review.....	5
3.2 Laboratory Analysis Review.....	6
3.3 Statistical Evaluation Review.....	6
3.4 Summary of the Methodology and Analysis Review Findings.....	6
<b>4.0 Alternative Sources</b> .....	<b>6</b>
4.1 Potential Causes for the Statistically Significant Level Above GPS.....	6
4.1.1 Natural Variation.....	6
4.1.2 Man-Made Alternative Source.....	7
4.2 Lines of Evidence.....	7
4.2.1 Distribution of Lithium in Groundwater at OGS.....	7
4.2.2 Background Lithium Concentrations in Bedrock Aquifer.....	7
4.2.3 Correlation of Downgradient Piezometer Water Quality with Regional Bedrock Water Quality.....	8
4.2.4 Vertical Groundwater Flow Patterns.....	9
<b>5.0 Alternative Source Demonstration Conclusions</b> .....	<b>9</b>
<b>6.0 Site Groundwater Monitoring Recommendations</b> .....	<b>9</b>
<b>7.0 References</b> .....	<b>10</b>

### Tables

Table 1.	Groundwater Analytical Results Summary
Table 2.	Historical Analytical Results for Lithium
Table 3.	Groundwater Elevations – CCR Rule Monitoring Well Networks
Table 4.	Vertical Hydraulic Gradients at Well Clusters
Table 5.	Ottumwa Midland Landfill Groundwater Analytical Results

## Figures



- Figure 1. Site Location Map
- Figure 2. Site Plan and Monitoring Well Locations
- Figure 3. Shallow Potentiometric Surface – April 12-16, 2021
- Figure 4. Deep Potentiometric Surface – April 12-16, 2021

## Appendices

- Appendix A CCR Well Trend Plot
- Appendix B Regional Geologic and Hydrogeologic Background Information
- Appendix C Lithium Lower Confidence Limit Evaluation
- Appendix D Stiff and Piper Diagrams

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# PE CERTIFICATION

 <p>10/12/21</p>	<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 hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.</p>	
		10/12/2021
	(signature)	(date)
	<p>Eric J. Nelson (printed or typed name)</p>	
	<p>License number 23136</p> <p>My license renewal date is December 31, 2022.</p>	
<p>Pages or sheets covered by this seal: Alternative Source Demonstration, April 2021</p>		
<p>Assessment Ash Pond,</p>		
<p>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 (U.S. EPA, 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*.

### 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 lithium concentrations exceeding the groundwater protection standards (GPSs) during assessment monitoring under the CCR Rule. Lithium was detected at a statistically significant level (SSL) above the GPS in samples from monitoring wells MW-310A and MW-311A.

### 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 Ash Pond, which is an active existing CCR surface impoundment, there is one inactive CCR surface impoundment at OGS (OGS Zero Liquid Discharge Pond [ZLDP]). There are no existing or closed CCR landfills or closed CCR surface impoundments at the site.



The Ash Pond and ZLDP are currently undergoing closure activities, which began in spring of 2021.

The CCR surface impoundments at OGS are monitored using single-unit groundwater monitoring systems. The single-unit system for the Ash Pond is designed to detect monitored constituents at the waste boundary of the facility as required by 40 CFR 257.91(d). The monitoring system also includes two downgradient monitoring wells near the property boundary, and three deeper monitoring wells adjacent to other wells in the system. Overall, the groundwater monitoring system for the OGS Ash Pond consists of one upgradient and 10 downgradient monitoring wells.

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**.

In response to the detection of cobalt at SSLs above the GPS in compliance wells for the Ash Pond, IPL has completed an Assessment of Corrective Measures (ACM) for the Ash Pond, and is currently in the process of selecting a remedy to address the cobalt GPS exceedances. The lithium GPS exceedances were identified in downgradient monitoring wells installed to investigate the nature and extent of cobalt in groundwater.

### **1.3 STATISTICALLY SIGNIFICANT LEVELS IDENTIFIED**

SSLs above the GPS were identified for two wells in the OGS Ash Pond groundwater monitoring system based on the April 2021 assessment monitoring events:

- Lithium: MW-310A and MW-311A

Individual lithium concentrations above the GPS were identified at one additional monitoring well (MW-310) during the April 2021 assessment monitoring event; however, the lithium concentrations to date at MW-310 do not represent an SSL over the GPS. Fluoride was detected at a concentration equal to the GPS in the April 2021 event; however, fluoride has not been determined to be at an SSL above the GPS.

The April 2021 constituent concentrations and the established benchmark concentrations are provided in **Table 1**. The constituent concentrations with SSIs above the background concentrations and/or exceedances of the GPSs are highlighted in the table. Concentration trends for lithium are shown in **Appendix A**.

The determination that lithium was at an SSL above the GPS for MW-310A and MW-311A was based on a comparison of the lower confidence limit (LCL) for the mean to the GPS, as shown in **Appendix C**.

## 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**)

The CCR Rule constituent results from background and compliance sampling for parameters with GPS exceedances are provided in **Table 2**, and concentration trends are shown in **Appendix A**. Laboratory reports for the eight background monitoring events were included in the 2017 Annual Groundwater Monitoring and Corrective Action Report submitted in January 2018 (SCS Engineers [SCS], 2018). The laboratory reports for the April 2021 assessment monitoring events will be included in the 2021 Annual Groundwater Monitoring and Corrective Action Report which will be submitted in January 2022.

## 2.0 BACKGROUND

To provide context for the ASD, the following background information is provided, 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-311 were installed to intersect the bedrock aquifer or unconsolidated material in contact with the bedrock aquifer at the site. Monitoring wells MW-305A, MW-310A, and MW-311A were installed to intersect the bedrock aquifer and are approximately 30 feet deeper than adjacent monitoring wells MW-305, MW-310, and MW-311. 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 80 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 OGS Ash Pond were included in the 2020 Annual Groundwater Monitoring and Corrective Action Report (SCS, 2021).

## 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 ten downgradient monitoring wells for the OGS Ash Pond. The background well is MW-301. The downgradient wells are MW-302, MW-303, MW-304, MW-305, MW-306, MW-310, MW-311, MW-305A, MW-310A, and MW-311A.

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 in the downgradient wells range from approximately 14.5 to 56 feet, measured from the top of the well casing.

The background well (MW-301) is located west of the OGS Ash Pond. Downgradient wells MW-302, MW-303, MW-304, MW-305, and MW-306 are located along the southeastern, eastern, and northeastern edges of the OGS Ash Pond. These downgradient wells were installed as close as practicable to the pond boundaries considering the site layout (**Figure 2**). Downgradient wells MW-310 and MW-311 were installed near the property boundary. Downgradient wells MW-305A, MW-310A, and MW-311A were installed adjacent to MW-305, MW-310, and MW-311, respectively, and each is approximately 30 feet deeper than the adjacent well. These deeper wells were installed to provide data on vertical groundwater flow and variations in groundwater quality.

## 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 ZLDP CCR Unit.

The additional monitoring wells at OGS (MW-307 through MW-309) were installed as downgradient monitoring wells for the CCR groundwater monitoring system evaluating the OGS ZLDP. The total boring depths were between 28 and 30 feet. The active OGS Ash Pond and the inactive OGS ZLDP share the same upgradient (background) monitoring well, MW-301.

## 2.4 GROUNDWATER FLOW DIRECTION

The shallow and deep potentiometric surfaces for the April 12-16, 2021, water level measurements are shown on **Figures 3** and **4**, respectively. The potentiometric surface maps show shallow groundwater flow moving generally to the east, generally towards the Des Moines River but with local influence from the OGS Ash Pond. Deeper groundwater flow moves generally towards the Des Moines River.

The April 2021 groundwater elevation data for the CCR monitoring wells are provided in **Table 3**. Calculated vertical gradients for the April 2020 through April 2021 water level measurement events are provided in **Table 4**. At well nest MW-305/MW-305A, near the Ash Pond, vertical gradients indicate downward flow, potentially driven by the water level in the Ash Pond. At the MW-310/MW-310A and MW-311/MW-311A well nests, near the river, the vertical gradients have generally indicated upward flow, consistent with groundwater discharge to the river.

## 3.0 METHODOLOGY AND ANALYSIS REVIEW

To evaluate the potential that an SSI is due to a source other than the regulated CCR Unit, 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 a 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 another field error. Field blank sample results were also reviewed for an indication of potential contamination from sampling equipment or containers. Based on the review of the field notes and results, SCS did not identify that the concentrations exceeding the GPS were due to a sampling error.

Because lithium 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 April 2021 assessment monitoring events were reviewed to determine if any laboratory analysis error or issue may have caused or contributed to an observed SSI for lithium. 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 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.

## **3.3 STATISTICAL EVALUATION REVIEW**

The review of the statistical results and methods include a quality control check of the following:

- Input analytical data vs. laboratory analytical reports
- Statistical method and process for each SSL

Based on the review of the statistical evaluation, SCS did not identify errors or issues in the statistical evaluation that caused or contributed to the determination that lithium at monitoring wells MW-310A and MW-311A was at an SSL above the GPS. An evaluation of the lower confidence limit (LCL) for the mean was completed for lithium and the LCLs were calculated with Sanitas™ using historical concentrations measured since assessment monitoring began in April 2018. The LCL for the mean for lithium exceeded the GPS at monitoring wells MW-310A and MW-311A; therefore, lithium is present in groundwater samples from these wells at an SSL above the GPS. This evaluation is provided in **Appendix C**.

## **3.4 SUMMARY OF THE METHODOLOGY AND ANALYSIS REVIEW FINDINGS**

In summary, there were no changes to the determination that lithium concentrations were at an SSL above the GPS at MW-310A and MW-311A based on the methodology and analysis review. No errors or issues causing or contributing to the reported SSLs were identified by SCS.

## **4.0 ALTERNATIVE SOURCES**

This section of the report discusses the potential alternative sources for the SSIs at the downgradient monitoring wells, including natural variation and man-made alternative sources.

### **4.1 POTENTIAL CAUSES FOR THE STATISTICALLY SIGNIFICANT LEVEL ABOVE GPS**

#### **4.1.1 Natural Variation**

Lithium is naturally present in the aquifer based on previous observations in the area. Based on regional and local information, discussed below, natural variation appears to be a likely cause of the lithium SSIs for wells MW-310A and MW-311A. The lines of evidence supporting this finding are presented in **Section 4.2**.

### 4.1.2 Man-Made Alternative Source

Man-made alternative sources that could potentially contribute to the lithium SSIs could include the inactive OGS ZLDP 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 available groundwater quality data, none of these sources has been demonstrated to be the primary cause of the observed GPS exceedances.

## 4.2 LINES OF EVIDENCE

Lines of evidence supporting the conclusion that the GPS exceedances for lithium are due to natural background water quality include the following:

1. No lithium GPS exceedances have been detected at monitoring wells MW-302, MW-303, MW-304, MW-305, MW-306, or MW-305A, located adjacent to the OGS Ash Pond, as would be expected if the OGS Ash Pond was the source of elevated lithium at wells located further downgradient.
2. The lithium concentrations detected in samples from MW-310A and MW-311A are well within the range of concentrations naturally present in the Mississippian aquifer based on results from background monitoring wells in the same aquifer at the nearby Ottumwa Midland Landfill (OML).
3. Analysis of major anions and cations indicates that the water quality in deep piezometers MW-310A and MW-311A is similar to regional water quality for the Mississippian aquifer and different from water quality in the shallower on-site wells.
4. Vertical gradients at monitoring well pairs MW-310/MW-310A and MW-311/MW-311A during the 2020 and 2021 water level measurement events indicate that groundwater flow is at least intermittently upward from the Mississippian bedrock into the overlying unconsolidated material.

### 4.2.1 Distribution of Lithium in Groundwater at OGS

No lithium GPS exceedances have been detected at monitoring wells MW-302, MW-303, MW-304, MW-305, MW-306, or MW-305A, located adjacent to the OGS Ash Pond, as would be expected if the OGS Ash Pond was the source of elevated lithium. Lithium has only been detected at concentrations above the GPS in bedrock wells installed closer to the river. Concentrations of lithium in the downgradient wells near the Ash Pond have consistently been lower than in the upgradient well (MW-301) or in the bedrock wells near the river (MW-310A and MW-311A), as shown in **Table 2**.

### 4.2.2 Background Lithium Concentrations in Bedrock Aquifer

The lithium concentrations detected in samples from MW-310A and MW-311A are well within the range of concentrations naturally present in the Mississippian aquifer based on results from background monitoring wells in the same aquifer at the nearby OML. CCR Rule background monitoring wells at OML, located approximately 5 miles east of OGS, are also screened in the upper portion of the Mississippian bedrock aquifer, and lithium concentrations detected in samples from MW-310A and MW-311A are well within the range of concentrations naturally present in the aquifer. Lithium concentrations detected in the background monitoring wells at OML are summarized in **Table 5**.

### 4.2.3 Correlation of Downgradient Piezometer Water Quality with Regional Bedrock Water Quality

Analysis of major anions and cations indicates that the water quality in deep piezometers MW-310A and MW-311A is similar to regional water quality for the Mississippian aquifer and different from water quality in the shallower on-site wells.

The U.S. Geological Survey (USGS) documented regional water quality in the Ottumwa area in Open-File Report 82-1014, Hydrology of Area 38, of the Western Region, Interior Coal Province of Iowa and Missouri (USGS, 1983). An excerpt from this report is included in **Appendix B**. OGS is located within the area of investigation, and a chapter from the report addressed water quality in the Mississippian limestone aquifer. The USGS investigation did not include an assessment of lithium concentrations but did include evidence that groundwater quality within the Mississippian aquifer in the area is highly variable. Large concentration ranges were reported for several parameters within the Mississippian aquifer in the study area, including:

- Chloride concentrations ranging from 0.5 to 3,570 milligrams per liter (mg/L), with an average of 137 mg/L
- Sulfate concentrations ranging from 22 to 4,500 mg/L, with an average of 1,697 mg/L
- Sodium concentrations ranging from 6.8 to 2,660 mg/L, with an average of 584 mg/L

Within the regional study area, the USGS report documents that neither the Pennsylvanian nor the Mississippian aquifer is a significant source of potable water. Concentrations of dissolved solids averaged 3,140 mg/L in water from wells completed in the Mississippian aquifer. Sulfate and sodium were the dominant ionic species.

**Appendix D** includes Stiff and Piper diagrams comparing the concentrations of major cations and anions at monitoring wells MW-310A and MW-311A with average concentrations in the Mississippian aquifer as reported in USGS Open-File Report 82-1014. These plots show that the dominant ions detected in samples from MW-310A and MW-311A are more similar to those in the regional aquifer than to those at MW-310 and MW-311. This indicates that the concentrations detected at MW-310A and MW-311A are likely representative of natural background conditions.

Analysis of the major anions and cations indicates that the water quality in the deep piezometers, MW-310A and MW-311A, is different from the water quality in the other CCR Rule monitoring wells at the OGS Ash Pond, suggesting it is on a different flow path.

The Piper and Stiff Diagrams in **Appendix D** show major cations and anions in groundwater samples from shallow and deep monitoring wells. These plots show the dominant ions detected in samples from MW-310A and MW-311A are mostly different than the other monitoring wells sampled at the site.

In the Piper Diagram, MW-310A and MW-311A plots in the bottom right side (high sodium) of the cation ternary plot and the other wells are grouped close to the center. Relative to the other monitoring wells, MW-310A and MW-311A are significantly higher in sodium and lower in calcium and magnesium. In the anion ternary plot, most of the wells plot along the center or the bottom left side but MW-310A and MW-311A are shifted upwards near the carbonate-bicarbonate line. Relative to the other monitoring wells, MW-310A and MW-311A are higher in sulfate and lower in carbonate-bicarbonate.

In the Stiff diagrams, The MW-310A and MW-311A plots have significantly different shapes than the other monitoring wells, primarily due to the higher sodium relative to calcium and magnesium. On the anion side of the Stiff diagrams, the MW-310A and MW-311A plots show less dominance of carbonate-bicarbonate and chloride with more contribution from sulfate relative to the other wells with the exception of MW310 and MW-306. This difference is less pronounced at MW-310/MW-310A, consistent with the effects of mixing due to intermittent upward groundwater flow discussed in **Section 4.2.5**.

The difference in the major anions and cations between MW-310A/MW-311A and the other wells suggests that these wells may not be downgradient from or along the same flow path as the upgradient well and the monitoring wells closer to the CCR Unit. This finding is consistent with the apparent vertical flow directions at the location and depth of MW-310A and MW-311A.

#### **4.2.4 Vertical Groundwater Flow Patterns**

Vertical gradients at monitoring well pairs MW-310/MW-310A and MW-311/MW-311A during the water level measurement events April 2020 through April 2021 indicate that groundwater flow is generally upward from the Mississippian bedrock into the overlying unconsolidated material (**Table 4**). Flow appears to be moving upward from the bedrock aquifer and the water quality at MW-310A and MW-311A may be strongly influenced by the water quality in the deeper bedrock east and southeast of the site.

The upward vertical gradient is consistent with the pattern of lithium concentrations detected at MW-310/ MW-310A. Concentrations detected at MW-310 are higher than at other shallow monitoring wells on site, but lower than concentrations detected at MW-310A (**Table 2** and **Appendix A**). This indicates that the somewhat elevated concentrations at MW-310 are likely due to mixing between shallow groundwater with lower lithium concentrations and groundwater with higher lithium concentrations intermittently flowing upward from the Mississippian bedrock.

### **5.0 ALTERNATIVE SOURCE DEMONSTRATION CONCLUSIONS**

The lines of evidence discussed above regarding the SSIs reported for the lithium concentrations in downgradient monitoring wells MW-310A and MW-311A demonstrate that the SSIs are likely due to naturally occurring lithium in the Mississippian aquifer at the OGS site.

### **6.0 SITE GROUNDWATER MONITORING RECOMMENDATIONS**

An assessment of corrective measures, in accordance with section 257.96 of the CCR Rule, is already in progress at OGS due to the detection of cobalt GPS exceedances not discussed in this ASD. In accordance with section 257.95(g)(3)(ii) of the CCR Rule, additional assessment of corrective measures is not required to address the lithium GPS exceedances discussed in this ASD. This ASD report will be included in the 2021 Annual Report due January 31, 2022.



## 7.0 REFERENCES

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

SCS Engineers, 2018, 2017 Annual Groundwater Monitoring and Corrective Action Report, Ottumwa Generating Station, Ottumwa, IA, January 2018.

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U.S. Geological Survey, 1983, Hydrology of Area 28, Western Region, Interior Coal Province, Iowa and Missouri, Iowa City, Iowa, May 1983.

## Tables

- 1 Groundwater Analytical Results Summary
- 2 Historical Analytical Results for Lithium
- 3 Groundwater Elevations – CCR Rule Monitoring Networks
- 4 Vertical Hydraulic Gradients at Well Clusters
- 5 Ottumwa Midland Landfill Groundwater Analytical Results

**Table 1. Groundwater Analytical Results Summary  
Ottumwa Generating Station Ash Pond / SCS Engineers Project #25221072.00**

Parameter Name	UPL Method	UPL	GPS	Background Well	Compliance Wells					Delineation Well	Compliance Well	Delineation Wells				
				MW-301	MW-302	MW-303	MW-304	MW-305	MW-305A	MW-306	MW-310	MW-310A	MW-311	MW-311A		
				4/14/2021	4/13/2021	4/13/2021	4/14/2021	4/16/2021	4/15/2021	4/13/2021	4/13/2021	4/15/2021	4/14/2021	4/16/2021		
<b>Appendix III</b>																
Boron, ug/L	P	820		690	1,300	420	990	860	190	1,000	360	1,500	64 J	1,500		
Calcium, mg/L	P	78.7		96	180	160	120	110	150	74	210	82	160	42		
Chloride, mg/L	P	86.8		150	190	29	240	240	140	35	250	120	11	130		
Fluoride, mg/L	P	0.484		<0.28	0.33 J	<0.28	1.1	0.37 J	0.56	<0.28	1.3	1.9	<0.28	4.0		
Field pH, Std. Units	P	6.87		6.26	6.44	6.67	6.94	6.92	7.05	6.42	7.07	7.47	6.66	7.76		
Sulfate, mg/L	P	199		140	360	140	200	120	150	370	720	1,100	75	1,100		
Total Dissolved Solids, mg/L	P	628		620	1,500	720	1,000	900	780	880	1,600	2,300	590	2,200		
<b>Appendix IV</b>																
Antimony, ug/L	P*	0.22	6	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1		
Arsenic, ug/L	P*	0.53	10	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	<0.75	0.97 J	<0.75	<0.75	<0.75		
Barium, ug/L	P	68.8	2,000	52	22	63	80	130	80	49	92	14	180	12		
Beryllium, ug/L	DQ	DQ	4	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27	<0.27		
Cadmium, ug/L	NP*	0.12	5	<0.051	0.26	0.12	<0.051	0.12	<0.051	0.95	0.51	<0.051	<0.051	<0.051		
Chromium, ug/L	P	1.07	100	<1.1	3.0 J	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1		
Cobalt, ug/L	NP	4.1	6	0.29 J	5.5	0.43 J	0.43 J	18	0.5	5.6	0.75	0.48 J	<0.091	0.13 J		
Fluoride, mg/L	P	0.48	4	<0.28	0.33 J	<0.28	1.1	0.37 J	0.56	<0.28	1.3	1.9	<0.28	4.0		
Lead, ug/L	NP*	0.10	15	<0.21	0.59	<0.21	<0.21	<0.21	<0.21	<0.21	<0.21	<0.21	<0.21	<0.21		
Lithium, ug/L	P	34.2	40	23	10	4.1 J	3.3 J	2.6 J	17	<2.5	58	270	5.9 J	290		
Mercury, ug/L	DQ	DQ	2	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15		
Molybdenum, ug/L	P	1.74	100	<1.3	<1.3	2.9	1.7 J	8.2	5.5	5.1	83	5.0	<1.3	<1.3		
Selenium, ug/L	P	8.55	50	6.5	<0.96	5.1	<0.96	<0.96	<0.96	<0.96	2.4 J	<0.96	2.1 J	<0.96		
Thallium, ug/L	NP*	0.14	2	<0.26	<0.26	<0.26	<0.26	0.36 J	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26		
Radium 226/228 Combined, pCi/L	P	2.15	5	0.598	0.901	0.510	2.49	0.327	2.67	0.334	0.00	4.44	0.194	3.85		
<b>Additional Parameters Collected for Selection of Remedy</b>																
Cobalt - dissolved, ug/L	UPL or GPS not applicable			--	--	--	--	20	--	6.1	--	--	--	--		
Lithium - dissolved, ug/L				--	--	--	--	--	--	--	--	63	300	--	330	
Iron, dissolved, ug/L				<36	<36	<36	4,500	85 J	<36	110	<36	110	<36	<36	<36	<36
Iron, ug/L				49 J	350	44 J	4,500	170	<36	220	<36	<36	<36	<36	<36	
Magnesium ug/L				34,000	50,000	22,000	40,000	47,000	29,000	25,000	100,000	37,000	36,000	21,000		
Manganese, dissolved, ug/L				10	110	340	3,800	3,800	87	15,000	330	39	<4.4	6.2 J		
Manganese, ug/L				14	200	330	3,600	3,500	78	15,000	290	34	<4.4	6.1 J		
Potassium, ug/L				1,200	1,500	800	8,200	7,900	3,600	3,500	17,000	9,200	650	8,300		
Sodium, ug/L				78,000	240,000	89,000	210,000	200,000	68,000	170,000	150,000	600,000	5,200	720,000		
Bicarbonate Alkalinity, mg/L				170	72	440	360	470	300	270	130	340	450	370		
Carbonate Alkalinity, mg/L				<4.6	<3.2	<4.6	<4.6	<4.6	<4.2	<4.6	<4.6	<4.6	<4.6	<4.6		
Total Alkalinity, mg/L	170	72	440	360	470	300	270	130	340	450	370					

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

**Table 1. Groundwater Analytical Results Summary  
Ottumwa Generating Station Ash Pond / SCS Engineers Project #25221072.00**

**Abbreviations:**

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

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

**Lab Notes:**

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

**Notes:**

1. An individual result above the UPL or GPS does not constitute an SSI above background or statistically significant level above the GPS. See the accompanying text for identification of statistically significant results.
2. GPS is the United States Environmental Protection Agency (USEPA) Maximum Contamination Level (MCLs), if established; otherwise, the values from 40 CFR 257.95(h)(2).
3. Interwell UPLs calculated based on results from background well MW-301.
4. Compliance wells represent the groundwater monitoring network at the boundary of the CCR unit. The delineation wells were installed during the selection of remedy process as an extension of the downgradient groundwater monitoring network.

Created by: <u>NDK</u>	Date: <u>5/1/2018</u>
Last revision by: <u>NDK</u>	Date: <u>5/21/2021</u>
Checked by: <u>RM</u>	Date: <u>5/21/2021</u>
Proj Mgr QA/QC: <u>TK</u>	Date: <u>2/28/2021</u>

**Table 2. Historical Analytical Results for Lithium  
Ottumwa Generating Station, Ash Pond**

Well Group	Well	Collection Date	Lithium (µg/L)
Background	MW-301	4/26/2016	22.8
		6/23/2016	28.7
		8/10/2016	27.6
		10/26/2016	25.5
		1/18/2017	20.1
		4/19/2017	21.8
		6/20/2017	24.9
		8/23/2017	27.9
		4/18/2018	19.1
		8/14/2018	26.5
		10/16/2018	19.4
		4/8/2019	15.0
		10/24/2019	24.0
		2/5/2020	17.0
		3/12/2020	21.0
		4/14/2020	24.0
10/8/2020	23.0		
4/14/2021	23.0		
Compliance	MW-302	4/26/2016	11.3
		6/23/2016	14.1
		8/10/2016	12.2
		10/26/2016	11.9
		1/18/2017	9.70 J
		4/19/2017	10.1
		6/20/2017	9.70 J
		8/22/2017	13.8
		4/18/2018	7.50 J
		8/14/2018	6.90 J
		10/16/2018	8.60 J
		4/8/2019	10.0
		10/24/2019	10.0
		4/14/2020	11.0
		10/8/2020	9.60 J
		4/13/2021	10.0

**Table 2. Historical Analytical Results for Lithium  
Ottumwa Generating Station, Ash Pond**

Well Group	Well	Collection Date	Lithium (µg/L)
Compliance	MW-303	4/26/2016	<4.90
		6/23/2016	8.30 J
		8/10/2016	5.00 J
		10/26/2016	5.80 J
		1/18/2017	<4.90
		4/19/2017	<2.90
		6/20/2017	3.40 J
		8/22/2017	8.10 J
		4/18/2018	<4.60
		8/14/2018	6.90 J
		10/16/2018	<4.60
		4/8/2019	<2.70
		10/24/2019	<2.70
		4/14/2020	4.70 J
		10/8/2020	5.60 J
		4/13/2021	4.10 J
	MW-304	4/26/2016	5.10 J
		6/23/2016	7.50 J
		8/11/2016	<4.90
		10/27/2016	<4.90
		1/18/2017	<4.90
		4/19/2017	<2.90
		6/21/2017	<2.90
		8/22/2017	5.30 J
		4/18/2018	<4.60
		8/15/2018	<4.60
		10/16/2018	<4.60
		4/8/2019	3.30 J
10/23/2019	2.80 J		
4/13/2020	4.80 J		
10/8/2020	3.10 J		
4/14/2021	3.30 J		

**Table 2. Historical Analytical Results for Lithium  
Ottumwa Generating Station, Ash Pond**

Well Group	Well	Collection Date	Lithium (µg/L)
Compliance	MW-305	4/26/2016	<4.90
		6/23/2016	<4.90
		8/11/2016	<4.90
		10/27/2016	<4.90
		1/18/2017	<4.90
		4/19/2017	<2.90
		6/21/2017	<2.90
		8/23/2017	<2.90
		4/18/2018	<4.60
		8/15/2018	<4.60
		10/16/2018	<4.60
		4/8/2019	<2.70
		10/23/2019	<2.70
		3/13/2020	2.30 J
		4/13/2020	3.20 J
		10/9/2020	<2.50
		4/16/2021	2.60 J
		MW-305A	3/13/2020
	4/14/2020		16
	10/9/2020		13
	4/15/2021		17
	MW-306	4/26/2016	<4.90
		6/23/2016	<4.90
		8/11/2016	<4.90
		10/27/2016	<4.90
		1/18/2017	<4.90
		4/19/2017	<2.90
		6/21/2017	<2.90
		8/23/2017	<2.90
		4/18/2018	<4.60
		8/15/2018	<4.60
		10/16/2018	<4.60
		4/8/2019	<2.70
10/23/2019		<2.70	
4/14/2020		<2.30	
10/9/2020		<2.50	
4/13/2021	<2.50		

**Table 2. Historical Analytical Results for Lithium  
Ottumwa Generating Station, Ash Pond**

Well Group	Well	Collection Date	Lithium (µg/L)
Compliance	MW-310	10/24/2019	35
		2/5/2020	42
		3/12/2020	46
		4/13/2020	48
		10/12/2020	42
		2/23/2021	37
		4/13/2021	58
		7/6/2021	52
	MW-310A	3/13/2020	250
		4/14/2020	290
		10/12/2020	240
		4/15/2021	270
	MW-311	10/24/2019	4.70 J
		2/5/2020	2.90 J
		3/12/2020	4.70 J
		4/13/2020	6.20 J
		10/12/2020	4.60 J
		4/13/2021	5.90 J
	MW-311A	3/13/2020	260
		4/13/2020	310
10/8/2020		240	
4/16/2021		290	

Abbreviations:

µg/L = micrograms per liter or parts per billion (ppb)

Created by: ZTW  
 Last revision by: ZTW  
 Scientist check by: NDK

Date: 9/22/2021  
 Date: 9/24/2021  
 Date: 9/24/2021



**Table 3. Groundwater Elevations - CCR Rule Monitoring Well Networks  
IPL - Ottumwa Generating Station / SCS Engineers Project #25221072.00**

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
<b>Top of Well Casing Elevation / Surface Water Reference Elevation (feet amsl)</b>	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
<b>Screen Length (ft)</b>	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
<b>Total Depth (ft from top of casing)</b>	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
<b>Top of Well Screen Elevation (ft)</b>	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
<b>Measurement Date</b>															
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	NM	647.73
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	638.16
February 23, 2021	NM	NM	NM	NM	NM	NM	669.86	646.80	NM	NM	638.77	NM	NM	641.16	NM
April 12 - 16, 2021	682.94	656.05	653.82	654.34	661.15	651.16	670.27	649.53	647.66	646.46	642.70	644.88	643.02	644.16	640.91
July 6, 2021	NM	NM	NM	NM	NM	NM	661.87	647.03	NM	NM	639.32	NM	NM	642.38	NM
<b>Bottom of Well Elevation (ft)</b>	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: NDK	Date: 1/15/20218
Last rev. by: RM	Date: 8/10/2021
Checked by: NDK	Date: 8/11/2021
Proj Mgr QA/QC: TK	Date: 8/17/2021

\\10.2.18.8\data\Projects\25221072.00\Deliverables\2021 Feb and April OGS ZLDP ASD\Tables\[3\_wlstat\_OGS.xls]levels

**Table 4. Vertical Hydraulic Gradients at Well Clusters  
Ottumwa Generating Station / SCS Engineers Project #25221072.00**

Well Pair		Vertical Hydraulic Gradient (feet/foot) <sup>(1,2)</sup>			
Shallower Well	Deeper Well	April 1, 2020	April 13-14, 2020	October 5-12, 2020	April 12-16, 2021
MW-305	MW-305A	-0.183	-0.289	-0.390	-0.330
MW-310	MW-310A	-0.064	0.052	0.057	0.072
MW-311	MW-311A	-0.036	0.054	0.078	0.038

Notes:

(1) A negative value indicates a downward gradient; a positive value indicates an upward gradient.

Created by:           MDB            
 Last rev. by:           NDK            
 Checked by:           JSN          

Date:           5/14/2020            
 Date:           9/24/2021            
 Date:           9/24/2021

**Table 5. Ottumwa Midland Landfill Groundwater Analytical  
Results IPL - Ottumwa Midland Landfill  
Ottumwa, Iowa**

<b>Well Group</b>	<b>Well</b>	<b>Collection Date</b>	<b>Lithium (µg/L)</b>
Background	MW-102M	5/4/2016	46.7
		6/22/2016	80.7
		8/10/2016	52.3
		10/26/2016	75.4
		1/18/2017	71.8
		4/20/2017	73.6
		6/21/2017	52.7
		8/22/2017	54.0
		11/8/2017	--
		4/17/2018	--
		10/16/2018	--
		4/18/2019	--
		10/15/2019	--
	MW-122M	5/5/2016	450
		6/23/2016	332
		8/10/2016	601
		10/26/2016	544
		1/18/2017	679
		4/20/2017	643
		6/21/2017	640
		8/22/2017	667
		11/8/2017	--
		4/17/2018	--
		10/16/2018	--
4/17/2019	--		
10/15/2019	--		

Abbreviations:

µg/L = micrograms per liter or parts per billion (ppb)

mg/L = milligrams per liter or parts per million (ppm)

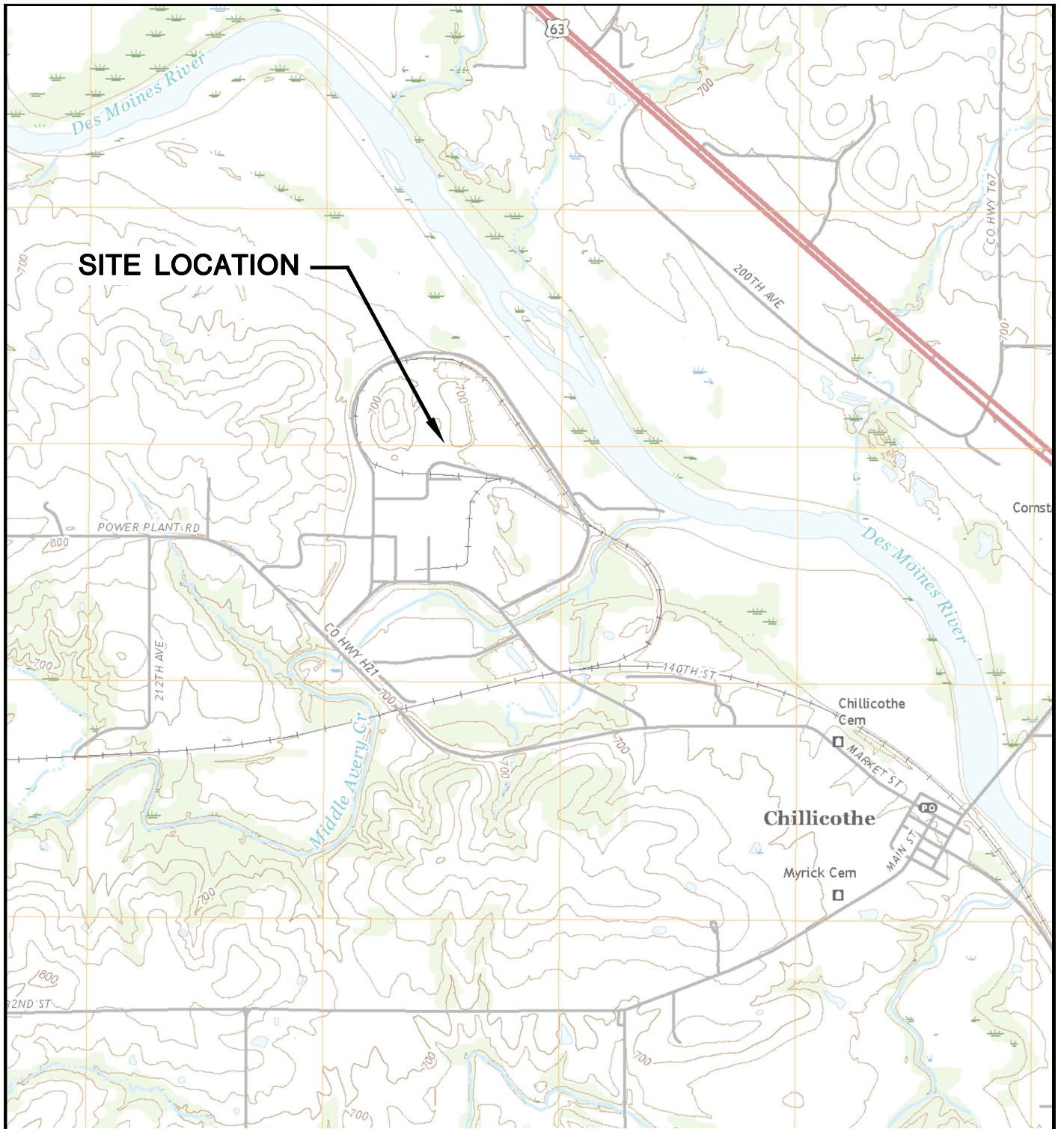
-- = not analyzed

Created by: MDB  
 Last revision by: MDB  
 Checked by: NDK

Date: 5/26/2020  
 Date: 5/26/2020  
 Date: 5/28/2020

## Figures

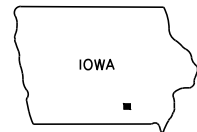
- 1 Site Location Map
- 2 Site Plan and Monitoring Well Locations
- 3 Shallow Potentiometric Surface – April 12-16, 2021
- 4 Deep Potentiometric Surface – April 12-16, 2021



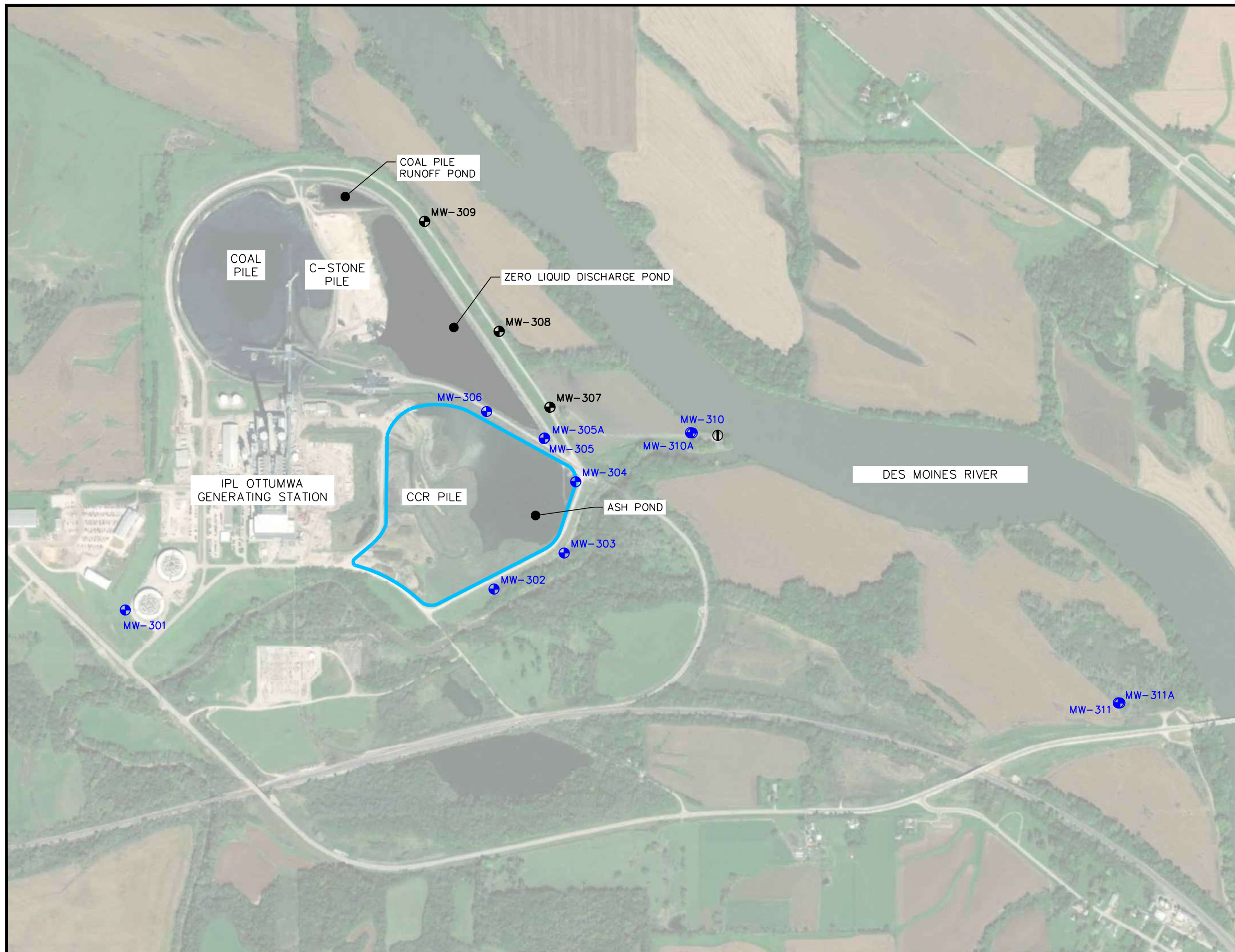
**SITE LOCATION**



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



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

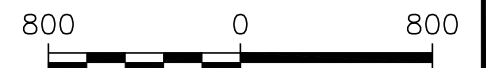


LEGEND

- CCR UNIT
- OGS ASH POND CCR MONITORING WELL
- ⊕ ADDITIONAL CCR MONITORING WELL
- Ⓧ RIVER ELEVATION MEASUREMENT LOCATION

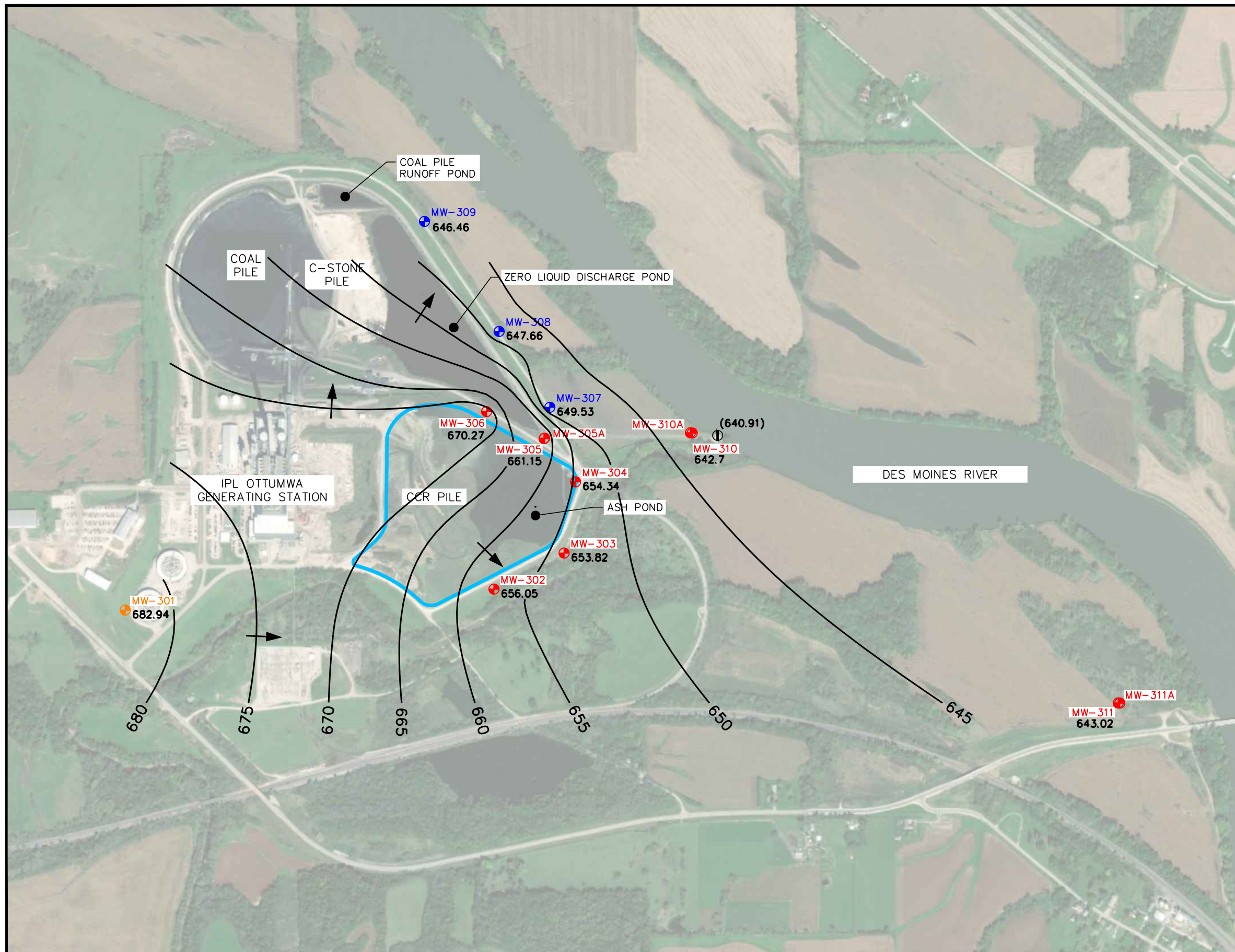
NOTES:

1. 2014 AERIAL PHOTOGRAPH SOURCES: ESRI, DIGITALGLOBE, GEOEYE, 1-CUBED, USDA FSA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY.
2. 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.
3. MONITORING WELLS MW-303 AND MW-305 WERE INSTALLED BY CASCADE DRILLING LLP. UNDER THE SUPERVISION OF SCS ENGINEERS ON DECEMBER 7-8, 2015.
4. 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.
5. MONITORING WELLS MW-310 AND MW-311 WERE INSTALLED BY ROBERTS ENVIRONMENTAL DRILLING ON AUGUST 27, 2019.
6. MONITORING WELLS MW-305A, MW-310A, AND MW-311A WERE INSTALLED BY ROBERTS ENVIRONMENTAL DRILLING BETWEEN FEBRUARY 27, 2020 AND MARCH 3, 2020.



SCALE: 1" = 800'

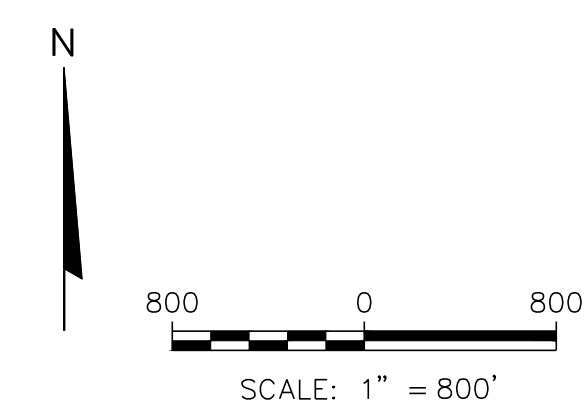
PROJECT NO. 25220083.00	DRAWN BY: BSS	<b>ENGINEER</b> 	<b>CLIENT</b> INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	<b>SITE</b> ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA	SITE PLAN AND MONITORING WELL LOCATIONS	FIGURE
DRAWN: 11/15/2019	CHECKED BY: MDB					2
REVISED: 12/03/2020	APPROVED BY: TK 3/11/2021					



- LEGEND
- CCR UNIT
  - CCR MONITORING WELL
  - CCR ZLDP MONITORING WELL
  - CCR BACKGROUND MONITORING WELL
  - ⊕ RIVER ELEVATION MEASUREMENT LOCATION
  - (640.91)** RIVER ELEVATION (APRIL 16, 2021)
  - 651.09** POTENTIOMETRIC ELEVATION AT WELL (APRIL 12-16, 2021)
  - POTENTIOMETRIC SURFACE CONTOUR
  - ➔ APPROXIMATE GROUNDWATER FLOW DIRECTION

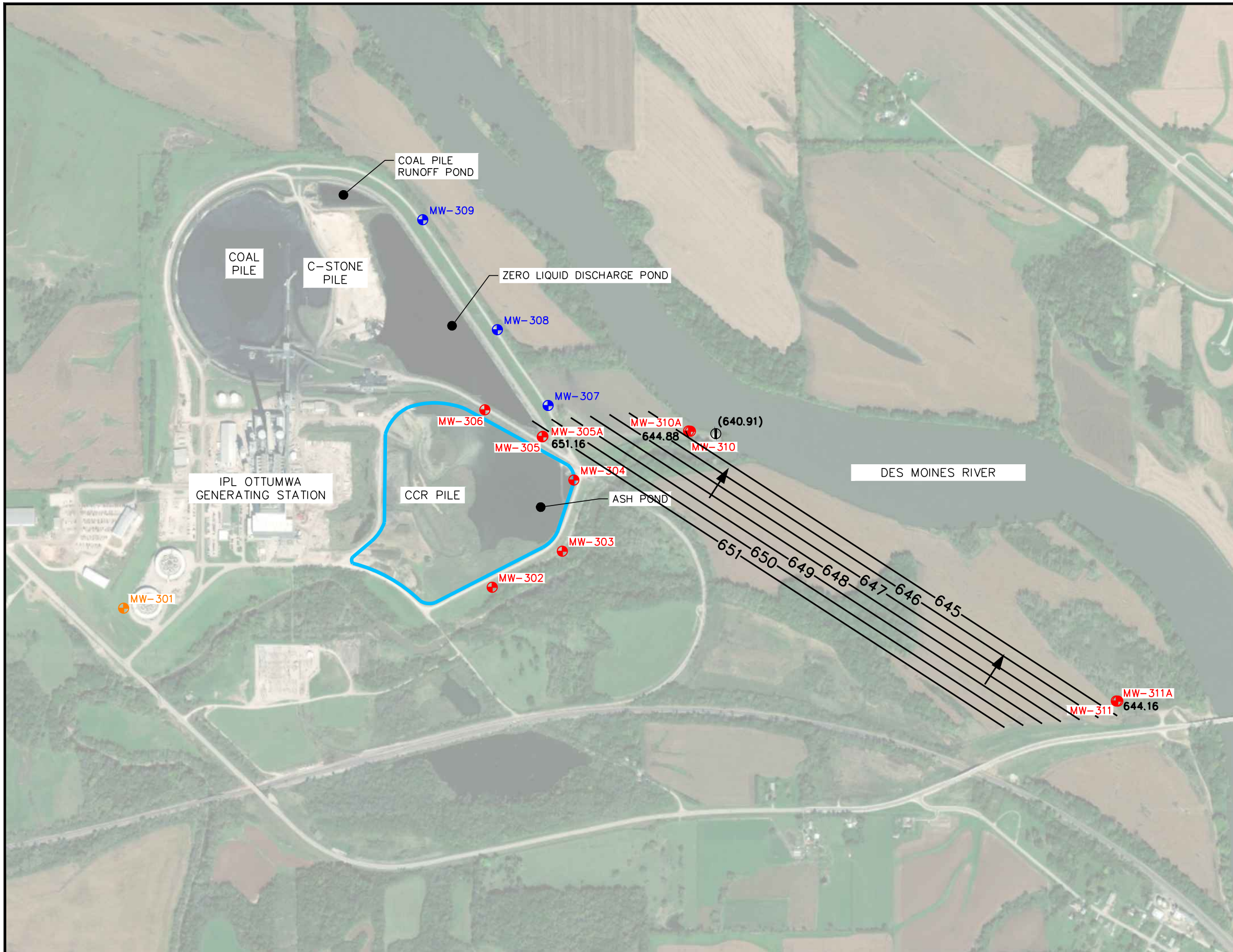
NOTE:

- THE BACKGROUND MONITORING WELL FOR THE OGS ASH POND IS MW-301



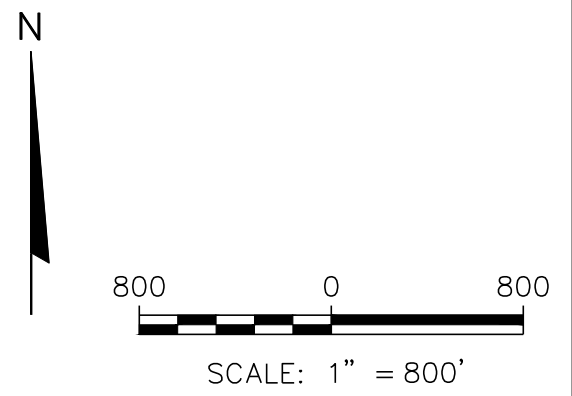
PROJECT NO.	25221072.00	DRAWN BY:	KP	<b>ENGINEER</b>	<b>SCS ENGINEERS</b> 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	<b>CLIENT</b>	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	<b>SITE</b>	ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA	SHALLOW POTENTIOMETRIC SURFACE APRIL 12-16, 2021	FIGURE
DRAWN:	05/26/2021	CHECKED BY:	NDK								3
REVISED:	08/11/2021	APPROVED BY:									

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LEGEND	
	CCR UNIT
	CCR MONITORING WELL
	CCR BACKGROUND MONITORING WELL
	ADDITIONAL MONITORING WELL
	RIVER ELEVATION MEASUREMENT LOCATION
<b>(640.91)</b>	RIVER ELEVATION (APRIL 16, 2021)
<b>651.09</b>	POTENTIOMETRIC ELEVATION AT WELL (APRIL 12-16, 2021)
	POTENTIOMETRIC SURFACE CONTOUR
	APPROXIMATE GROUNDWATER FLOW DIRECTION

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



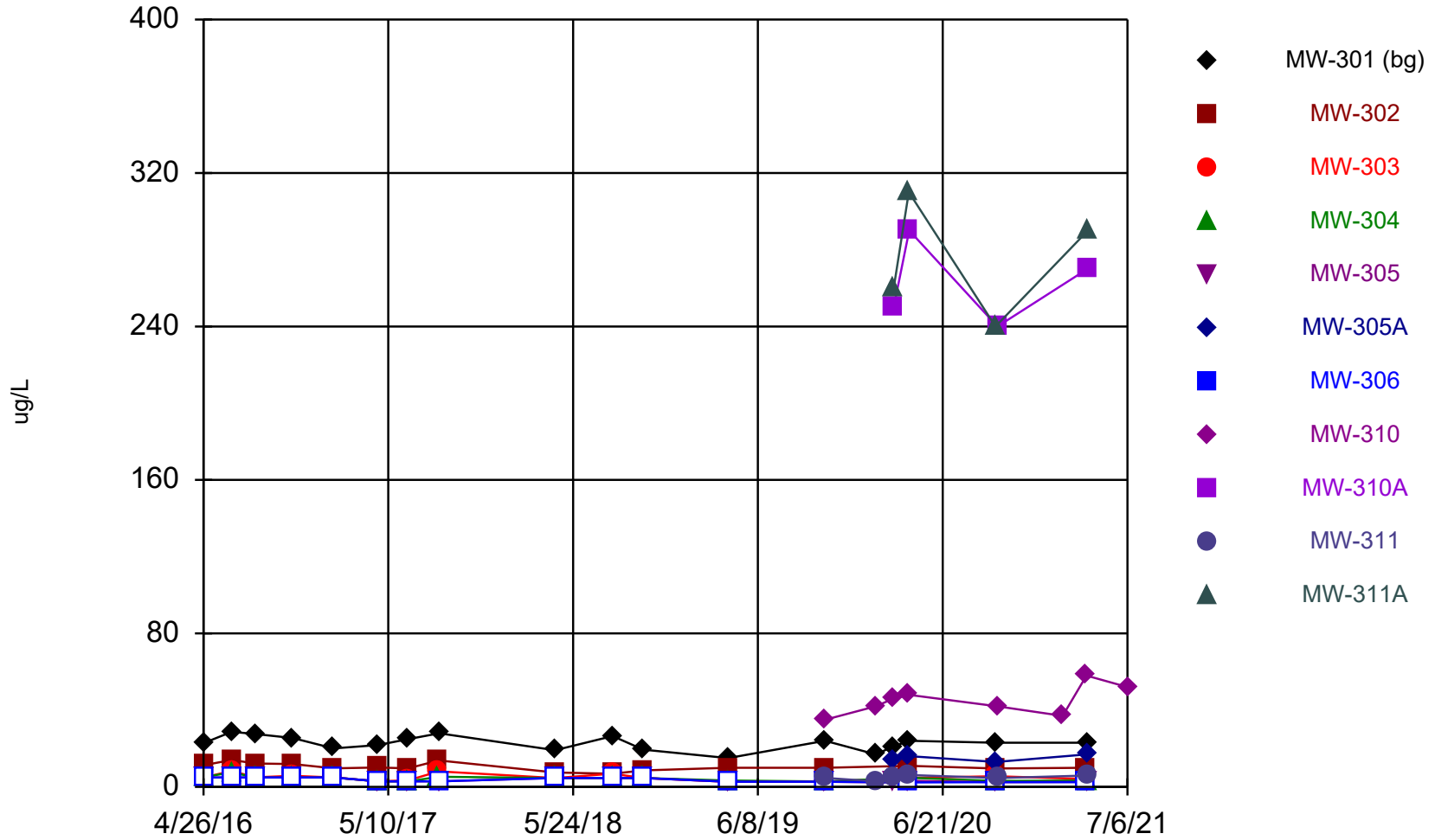
PROJECT NO. 25221072.00	DRAWN BY: KP	<b>SCS ENGINEERS</b> 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA	DEEP POTENTIOMETRIC SURFACE APRIL 12-16, 2021	FIGURE
DRAWN: 05/26/2021	CHECKED BY: NDK					4
REVISED: 08/11/2021	APPROVED BY:					

\\Mad:\s01\data\Projects\25221072.00\Drawings\Potentiometric Surface 2021.dwg, 1/11/2021 10:5:11 AM



Appendix A  
CCR Well Trend Plot

# Lithium




Time Series Analysis Run 9/24/2021 1:30 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122



# Time Series

Constituent: Lithium (ug/L) Analysis Run 9/24/2021 1:31 PM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

	MW-311	MW-311A
4/26/2016		
6/23/2016		
8/10/2016		
8/11/2016		
10/26/2016		
10/27/2016		
1/18/2017		
4/19/2017		
6/20/2017		
6/21/2017		
8/22/2017		
8/23/2017		
4/18/2018		
8/14/2018		
8/15/2018		
10/16/2018		
4/8/2019		
10/23/2019		
10/24/2019	4.7 (J)	
2/5/2020	2.9 (J)	
3/12/2020		
3/13/2020	4.7 (J)	260
4/13/2020	6.2 (J)	310
4/14/2020		
10/8/2020		240
10/9/2020		
10/12/2020	4.6 (J)	
2/23/2021		
4/13/2021		
4/14/2021	5.9 (J)	
4/15/2021		
4/16/2021		290
7/6/2021		



## Appendix B

# Regional Geologic and Hydrogeologic Background Information

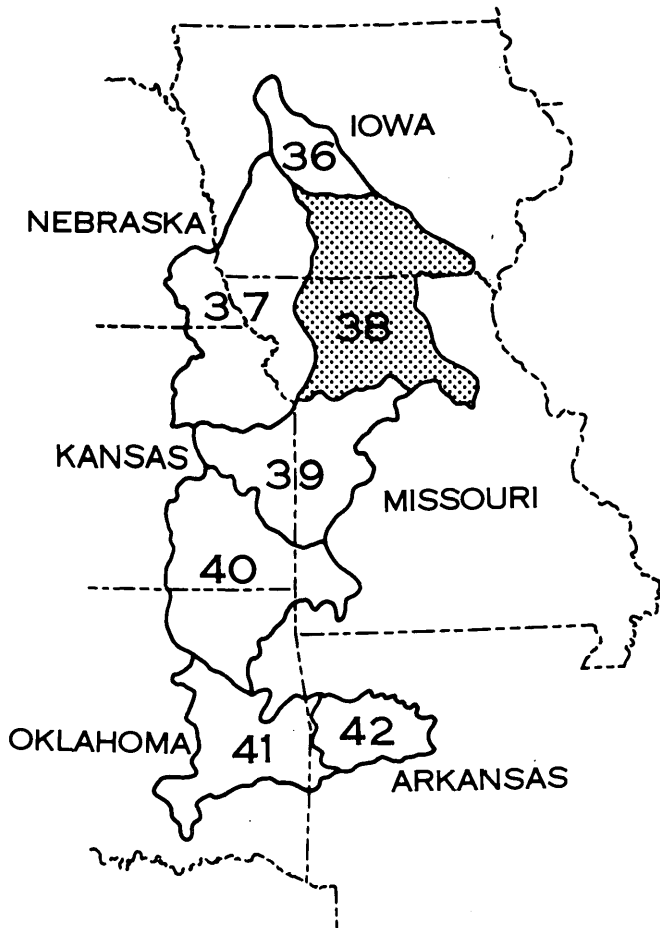
**Table OGS-2. Regional Hydrogeologic Stratigraphy  
Ottumwa Midland Landfill / SCS Engineers Project #25215053.01**

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

\*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.

# HYDROLOGY OF AREA 38, WESTERN REGION, INTERIOR COAL PROVINCE IOWA AND MISSOURI



- CHARITON RIVER
- DES MOINES RIVER
- THOMPSON RIVER
- GRAND RIVER
- ELK FORK SALT RIVER



UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

WATER-RESOURCES INVESTIGATIONS  
OPEN-FILE REPORT 82-1014

**7.0 QUALITY OF GROUND WATER--Continued**  
*7.3 Mississippian and Pennsylvanian Aquifers*

**Chemical Quality of Water from Mississippian and Pennsylvanian Aquifers is Variable and Generally Not Potable**

*Dissolved-solids concentrations in water from the Mississippian aquifer ranged from 370 to 8,220 milligrams per liter and in water from the Pennsylvanian aquifer dissolved-solids concentrations ranged from 250 to 6,790 milligrams per liter; sulfate and sodium are the dominant ionic species in water from both aquifers.*

The quality of water in the Mississippian and Pennsylvanian aquifers is variable from place to place, but the water generally is not potable. The areal extent of Mississippian and Pennsylvanian bedrock throughout Area 38 is significant (figure 7.3-1). Neither the Pennsylvanian nor the Mississippian aquifer is a significant source of potable water in Area 38. Limited data for bedrock wells make it difficult to adequately define the characteristics of bedrock water throughout Area 38; however a general data analysis has been provided.

Minimum, maximum and average values for major chemical constituents in water from the Mississippian and Pennsylvanian aquifers are shown in tables 7.3-1 and 7.3-2. Ion-distribution diagrams are shown in figures 7.3-2 and 7.3-3 for both bedrock aquifers. These diagrams are designed to represent simultaneously the total solute concentration and the proportions assigned to each ionic species for a group of analyses.

Concentrations of dissolved solids averaged 3,140 mg/L (milligrams per liter) in water from wells completed in the Mississippian aquifer. The median pH was 7.2, and the average alkalinity was 345 mg/L. Sulfate concentrations ranged from 22 to 4,500 mg/L and sodium concentrations ranged from 6.8 to 2,660 mg/L. Sulfate and sodium are the dominant ionic species as they comprise 40 and 27 percent of the total solute concentration (93 milliequivalents per liter) in water from a typical well. Results of 70 chemical analyses of water from wells completed in the Mississippian aquifer in Iowa were used to compile figure 7.3-2.

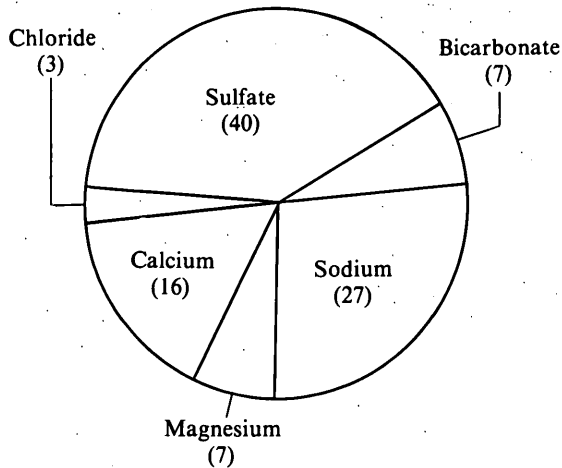
The Mississippian aquifer is composed principal-

ly of carbonate rocks (limestone and dolomite). In Iowa, the aquifer can be divided into upper and lower units. The upper unit contains some gypsum and anhydrite beds that significantly affect the chemical quality of water (Cagle and Heinritz, 1978).

Concentrations of dissolved solids averaged 2,340 mg/L in water from wells completed in the Pennsylvanian aquifer. The median pH was 7.5 and the average alkalinity was 360 mg/L. Sulfate concentrations ranged from 1 to 4,000 mg/L and sodium concentrations ranged from 5.5 to 2,400 mg/L. Sodium and sulfate are the dominant ionic species as they comprise 35 and 31 percent of the total solute concentration (72 milliequivalents per liter) in water from a typical well. Results of 98 chemical analyses of water from wells completed in the Pennsylvanian aquifer, 76 in Iowa and 22 in Missouri, were used to compile figure 7.3-3.

The Pennsylvanian bedrock in Area 38 is composed predominately of impermeable shale beds, which are a regional confining bed that separates the surficial aquifer from underlying aquifers. However, limestone and sandstone beds are aquifers of local and subregional extent in parts of south-central Iowa (Cagle and Heinritz, 1978). Sources of the sodium and sulfate ions are ion exchange for sodium and pyrite for sulfate. Wells that penetrate clay and shale generally obtain water with excessive dissolved solids directly from the shale layers, which have large cation-exchange capabilities (Hem, 1970). Pyrite is commonly associated with biogenic deposits such as coal, which were deposited under extreme reducing conditions.





VALUES, IN PERCENTAGE OF TOTAL MILLEQUIVALENTS PER LITER

Figure 7.3-2 Average chemical composition for water from wells in the Mississippian aquifer.

Table 7.3-1 Summary of water-quality data available for the Mississippian aquifer.

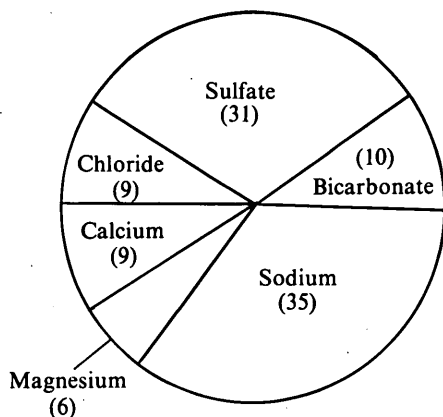
[Concentrations in milligrams per liter unless otherwise specified; < = less than ]

Constituent	Range	Average	Number of samples
Iron (Fe)	0.02 - 50	6.3	70
Manganese (Mn)	0.01 - 1.4	0.17	70
Calcium (Ca)	10 - 642	279	70
Magnesium (Mg)	3.1 - 340	77	70
Sodium (Na)	6.8 - 2,660	584	70
Potassium (K)	0.2 - 45	14	68
Bicarbonate (HCO <sub>3</sub> )	168 - 1,350	420	70
Sulfate (SO <sub>4</sub> )	22 - 4,500	1,697	70
Chloride (Cl)	0.5 - 3,570	137	70
Nitrate (NO <sub>3</sub> )	<0.1 - 150	4.5	70
pH	6.3 - 8.0	(median)7.2	66
Hardness (CaCO <sub>3</sub> )	38 - 2,950	1,029	69
Alkalinity (CaCO <sub>3</sub> )	138 - 1,100	345	70
Dissolved solids	370 - 8,220	3,138	66
Specific conductance (micromhos per centimeter at 25° Celsius)	370 - 9,000	3,850	63

Table 7.3-2 Summary of water-quality data available for the Pennsylvanian aquifer.

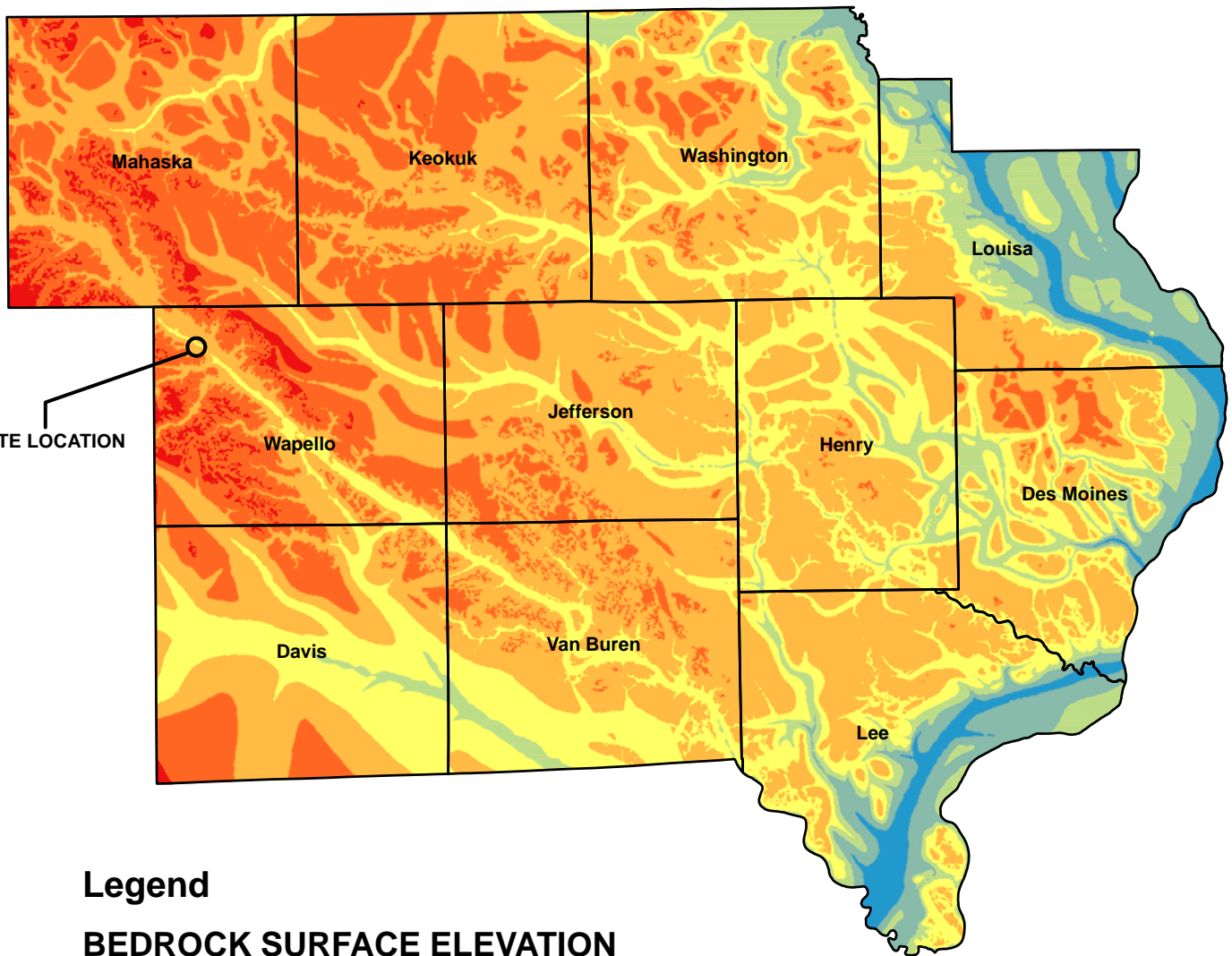
[Concentrations in milligrams per liter unless otherwise specified; < = less than ]

Constituent	Range	Average	Number of samples
Iron (Fe)	0.01 - 22	2.5	96
Manganese (Mn)	0.01 - 2.3	0.16	95
Calcium (Ca)	2.4 - 460	133	97
Magnesium (Mg)	1.5 - 394	48	97
Sodium (Na)	5.5 - 2,400	574	96
Potassium (K)	0.9 - 38	8.5	84
Bicarbonate (HCO <sub>3</sub> )	120 - 1,240	437	94
Sulfate (SO <sub>4</sub> )	1 - 4,000	1,046	97
Chloride (Cl)	0.5 - 3,060	222	98
Nitrate (NO <sub>3</sub> )	<0.1 - 200	4.3	97
pH	6.5 - 8.3	(median)7.5	95
Hardness (CaCO <sub>3</sub> )	29 - 2,000	528	96
Alkalinity (CaCO <sub>3</sub> )	98 - 1,080	360	98
Dissolved solids	250 - 6,790	2,339	98
Specific conductance (micromhos per centimeter at 25° Celsius)	350 - 7,700	3,075	75



VALUES, IN PERCENTAGE OF TOTAL MILLEQUIVALENTS PER LITER

Figure 7.3-3 Average chemical composition for water from wells in the Pennsylvanian aquifer.

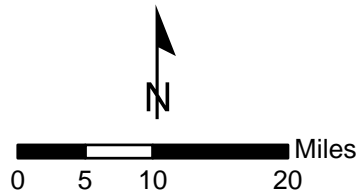


**Legend**

**BEDROCK SURFACE ELEVATION**

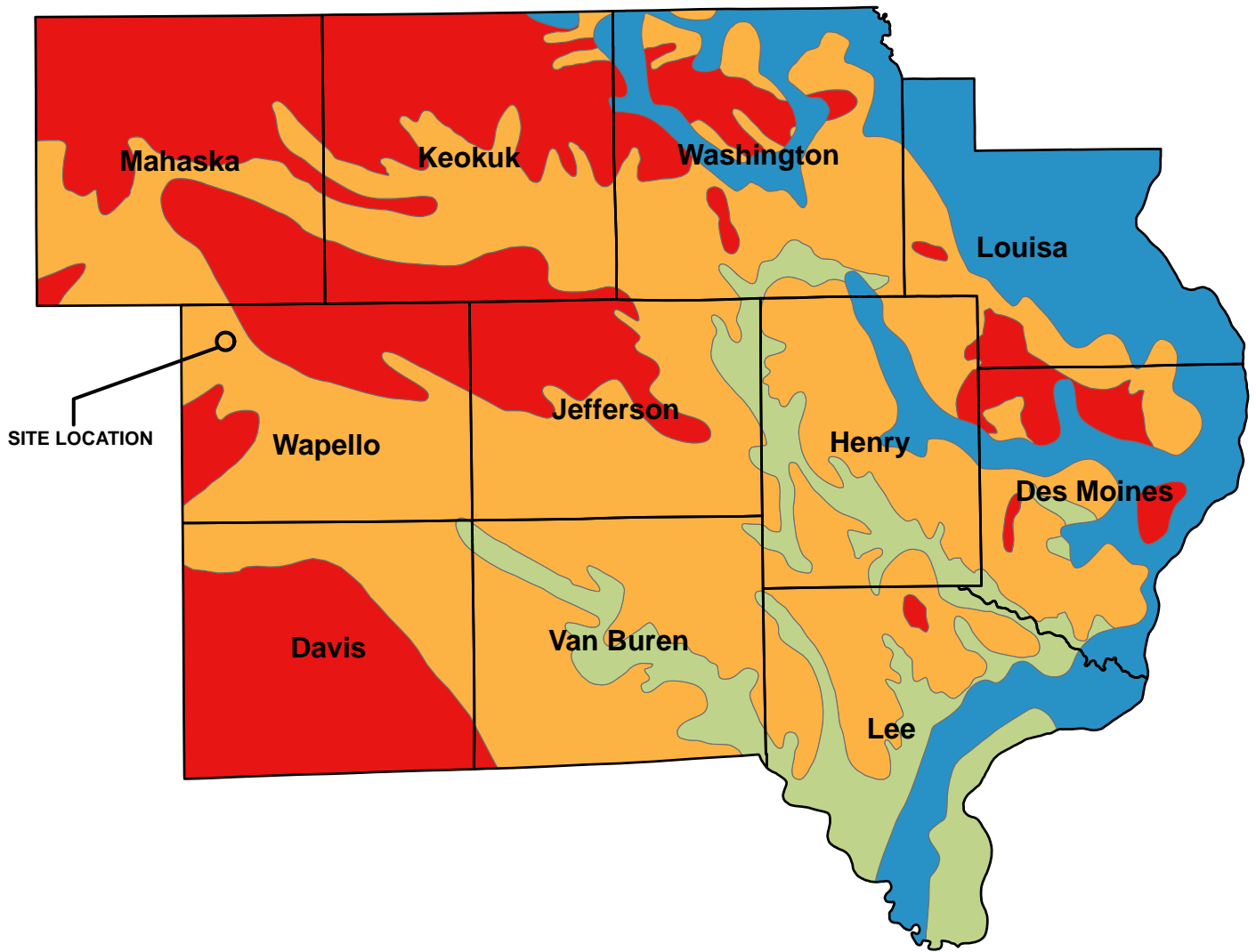
ELEVATION ABOVE MEAN SEA LEVEL IN FEET

- 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

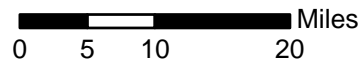
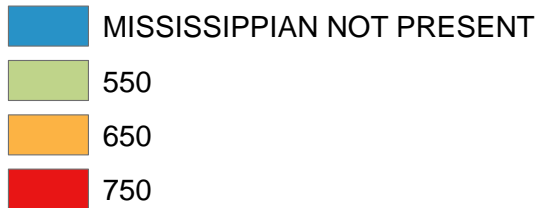
<b>CLIENT</b>	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	<b>SITE</b>	OTTUMWA GENERATING STATION OTTUMWA, IOWA	<b>SE IOWA REGIONAL BEDROCK SURFACE ELEVATION</b>
PROJECT NO. 25215053.03	DRAWN BY: JB	<b>ENGINEER</b>	<b>SCS ENGINEERS</b>	
DRAWN: 07/29/13	CHECKED BY: MDB		2830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



## Legend

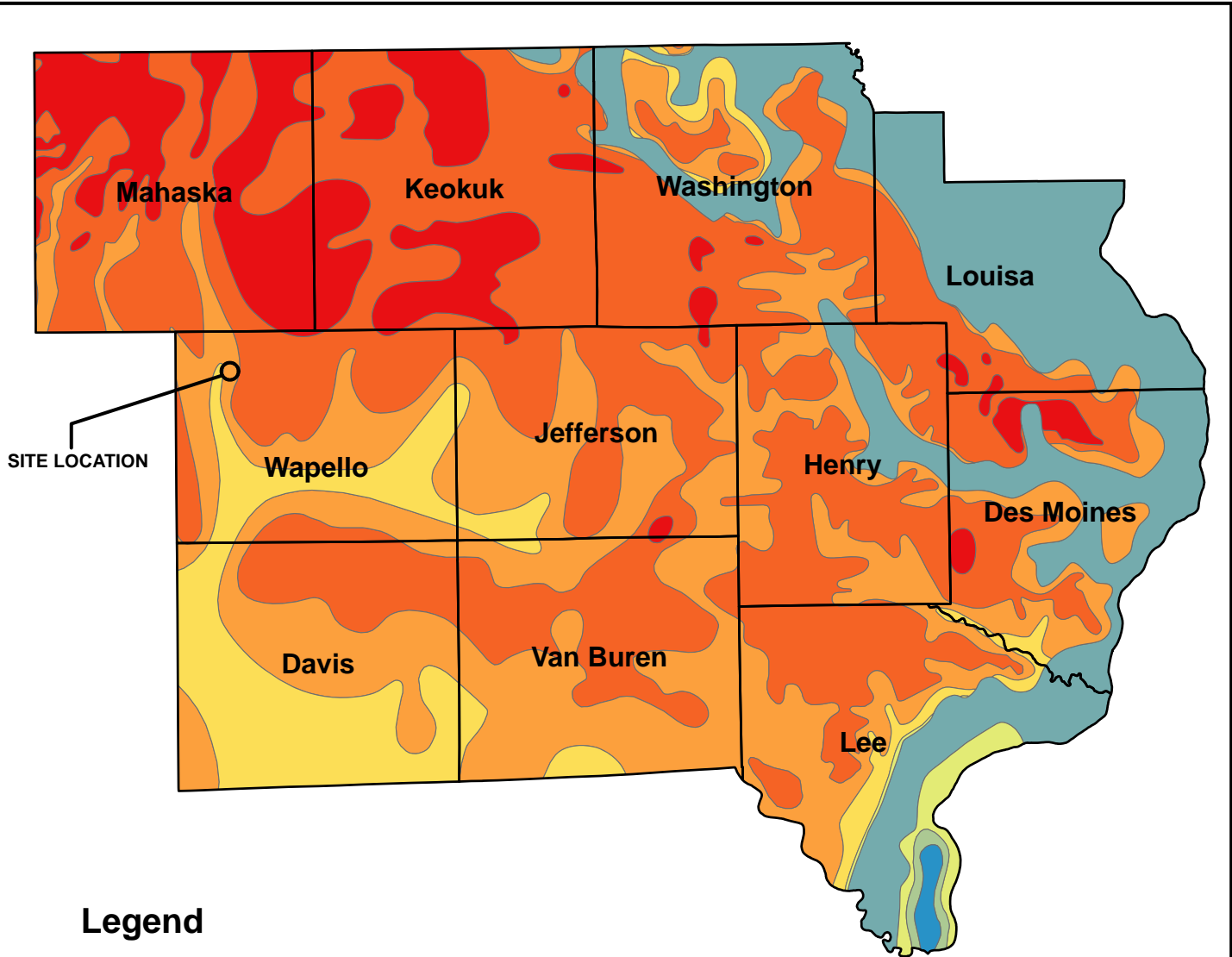
### MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE

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

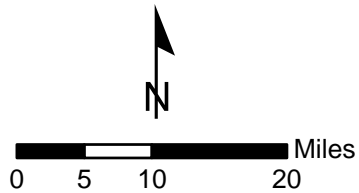
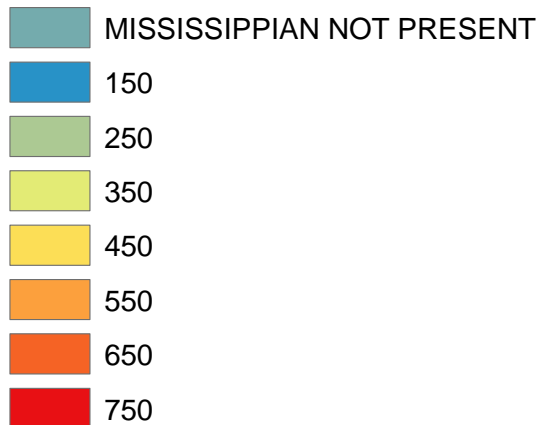
CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE	OTTUMWA GENERATING STATION OTTUMWA, IOWA	SE IOWA REGIONAL MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE ELEVATION	
	PROJECT NO. 25215053.03		DRAWN BY: JB	<b>SCS ENGINEERS</b>	FIGURE
DRAWN: 07/29/13	CHECKED BY: MDB				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



Appendix C  
Lithium Lower Confidence Limit Evaluation

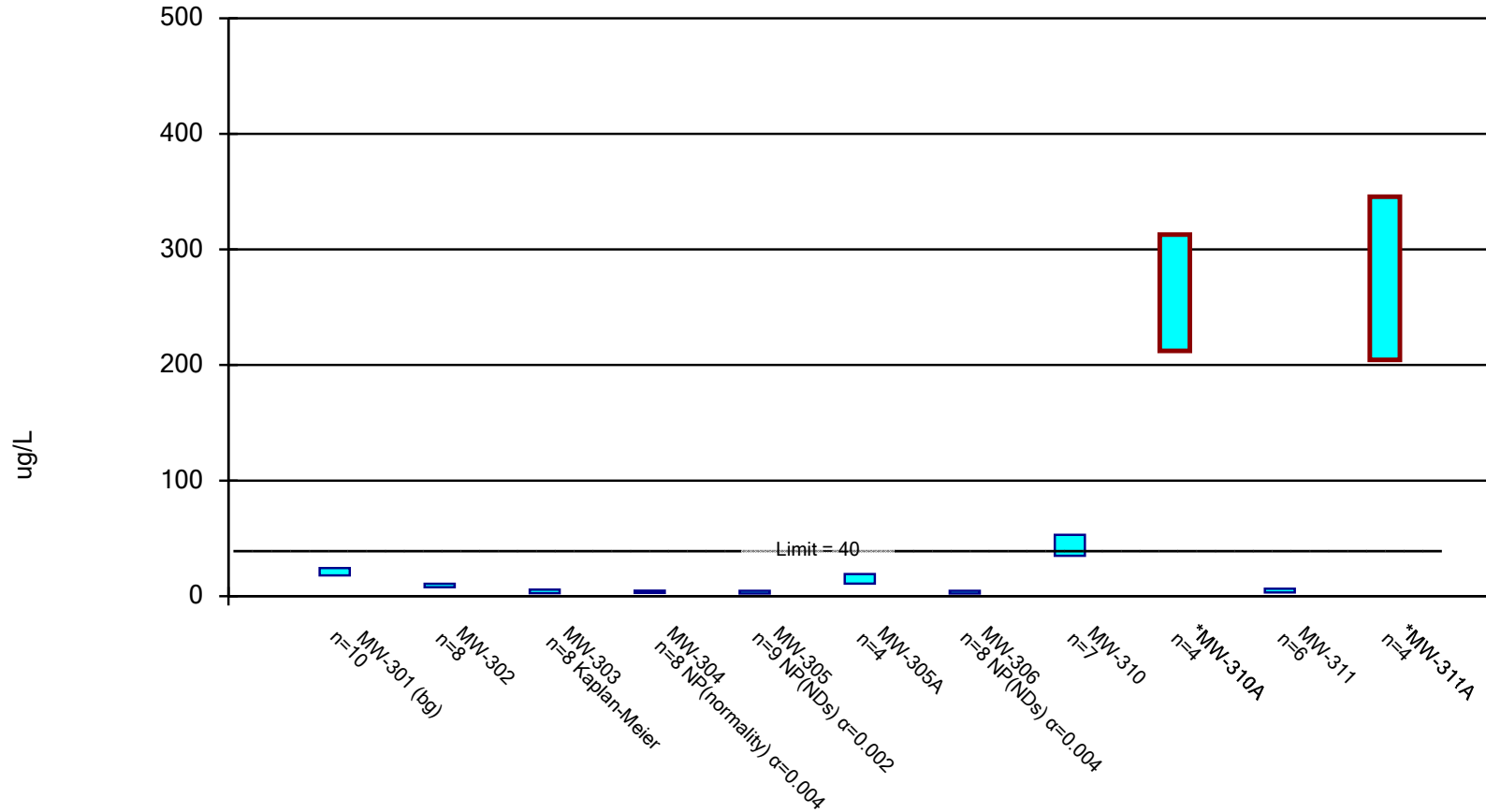
# Confidence Interval

Ottumwa Generating Station    Client: SCS Engineers    Data: OGS\_CP\_Export\_201122    Printed 6/10/2021, 9:53 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Lithium (ug/L)	MW-301 (bg)	24.38	18.02	40	No	10	0	No	0.01	Param.
Lithium (ug/L)	MW-302	10.69	7.709	40	No	8	0	No	0.01	Param.
Lithium (ug/L)	MW-303	5.673	2.585	40	No	8	50	No	0.01	Param.
Lithium (ug/L)	MW-304	4.8	2.8	40	No	8	37.5	No	0.004	NP (normality)
Lithium (ug/L)	MW-305	4.6	2.3	40	No	9	66.67	No	0.002	NP (NDs)
Lithium (ug/L)	MW-305A	19.15	10.85	40	No	4	0	No	0.01	Param.
Lithium (ug/L)	MW-306	4.6	2.3	40	No	8	100	No	0.004	NP (NDs)
Lithium (ug/L)	MW-310	53.12	34.88	40	No	7	0	No	0.01	Param.
<b>Lithium (ug/L)</b>	<b>MW-310A</b>	<b>312.8</b>	<b>212.2</b>	<b>40</b>	<b>Yes</b>	<b>4</b>	<b>0</b>	<b>No</b>	<b>0.01</b>	<b>Param.</b>
Lithium (ug/L)	MW-311	6.439	3.227	40	No	6	0	No	0.01	Param.
<b>Lithium (ug/L)</b>	<b>MW-311A</b>	<b>345.6</b>	<b>204.4</b>	<b>40</b>	<b>Yes</b>	<b>4</b>	<b>0</b>	<b>No</b>	<b>0.01</b>	<b>Param.</b>

## Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.\* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium    Analysis Run 6/10/2021 9:52 AM    View: OGS - Ash Pond  
Ottumwa Generating Station    Client: SCS Engineers    Data: OGS\_CP\_Export\_201122

# Confidence Interval

Constituent: Lithium (ug/L) Analysis Run 6/10/2021 9:53 AM View: OGS - Ash Pond  
 Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122


	MW-301 (bg)	MW-302	MW-303	MW-304	MW-305	MW-305A	MW-306	MW-310	MW-310A
4/18/2018	19.1	7.5 (J)	<4.6 (U)	<4.6 (U)	<4.6 (U)		<4.6 (U)		
8/14/2018	26.5	6.9 (J)	6.9 (J)						
8/15/2018				<4.6 (U)	<4.6 (U)		<4.6 (U)		
10/16/2018	19.4	8.6 (J)	<4.6 (U)	<4.6 (U)	<4.6 (U)		<4.6 (U)		
4/8/2019	15	10	<2.7 (U)	3.3 (J)	<2.7 (U)		<2.7 (U)		
10/23/2019				2.8 (J)	<2.7 (U)		<2.7 (U)		
10/24/2019	24	10	<2.7 (U)					35	
2/5/2020	17							42	
3/12/2020	21							46	
3/13/2020					2.3 (J)	14			250
4/13/2020				4.8 (J)	3.2 (J)			48	
4/14/2020	24	11	4.7 (J)			16	<2.3 (U)		290
10/8/2020	23	9.6 (J)	5.6 (J)	3.1 (J)					
10/9/2020					<2.5 (U)	13	<2.5 (U)		
10/12/2020								42	240
2/23/2021								37	
4/13/2021		10	4.1 (J)				<2.5 (U)	58	
4/14/2021	23			3.3 (J)					
4/15/2021						17			270
4/16/2021					2.6 (J)				
Mean	21.2	9.2	4.487	3.887	3.311	15	3.312	44	262.5
Std. Dev.	3.559	1.407	1.397	0.8323	0.9955	1.826	1.074	7.681	22.17
Upper Lim.	24.38	10.69	5.673	4.8	4.6	19.15	4.6	53.12	312.8
Lower Lim.	18.02	7.709	2.585	2.8	2.3	10.85	2.3	34.88	212.2



# Confidence Interval

Constituent: Lithium (ug/L) Analysis Run 6/10/2021 9:53 AM View: OGS - Ash Pond  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

	MW-311	MW-311A
4/18/2018		
8/14/2018		
8/15/2018		
10/16/2018		
4/8/2019		
10/23/2019		
10/24/2019	4.7 (J)	
2/5/2020	2.9 (J)	
3/12/2020		
3/13/2020	4.7 (J)	260
4/13/2020	6.2 (J)	310
4/14/2020		
10/8/2020		240
10/9/2020		
10/12/2020	4.6 (J)	
2/23/2021		
4/13/2021		
4/14/2021	5.9 (J)	
4/15/2021		
4/16/2021		290
Mean	4.833	275
Std. Dev.	1.169	31.09
Upper Lim.	6.439	345.6
Lower Lim.	3.227	204.4

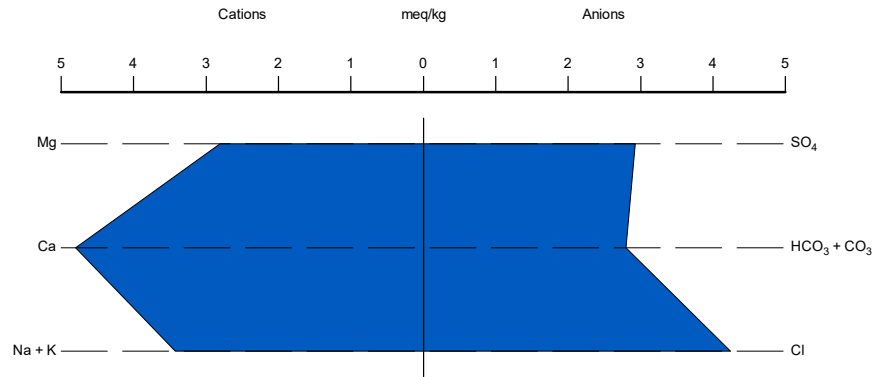


Appendix D  
Stiff and Piper Diagrams

Ottumwa Generating Station – Ash Pond  
Stiff Diagrams – April 2021 Groundwater Sampling event

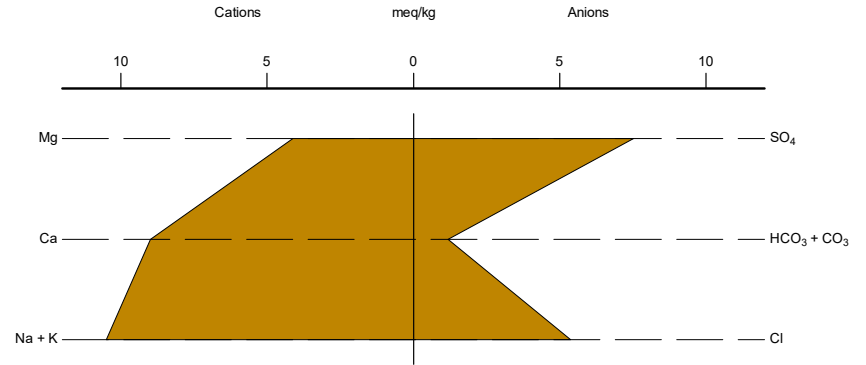
MW-301

Stiff Diagram



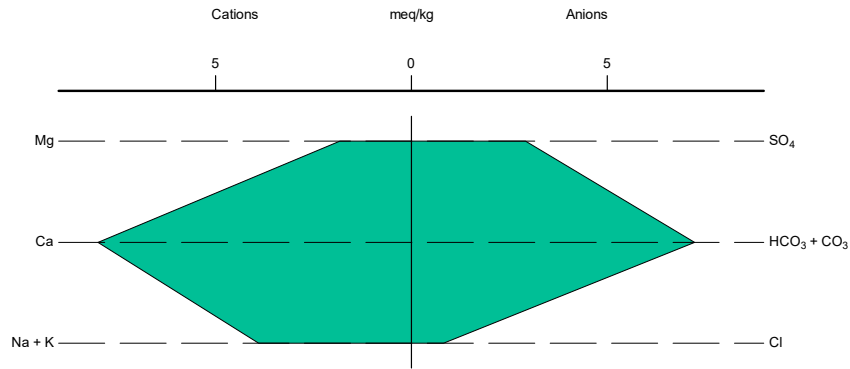
MW-302

Stiff Diagram



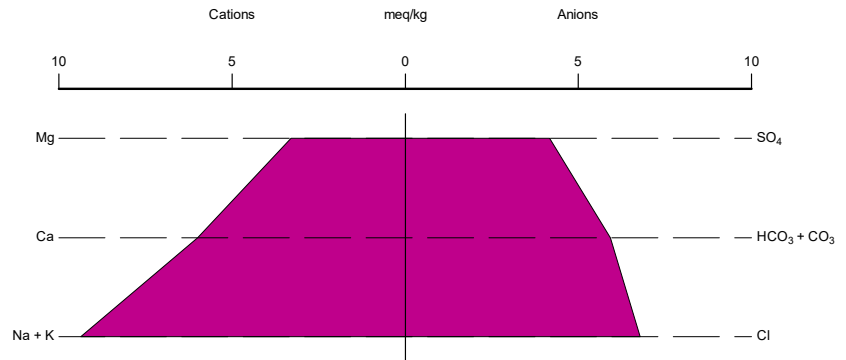
Stiff Diagram

MW-303



MW-304

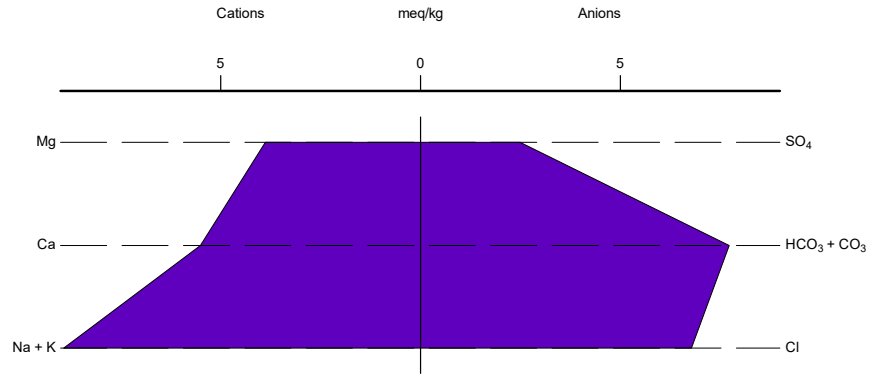
Stiff Diagram



Ottumwa Generating Station – Ash Pond  
Stiff Diagrams – April 2021 Groundwater Sampling event

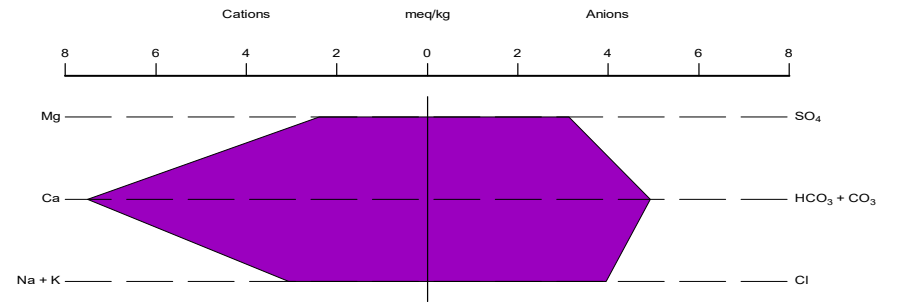
MW-305

Stiff Diagram



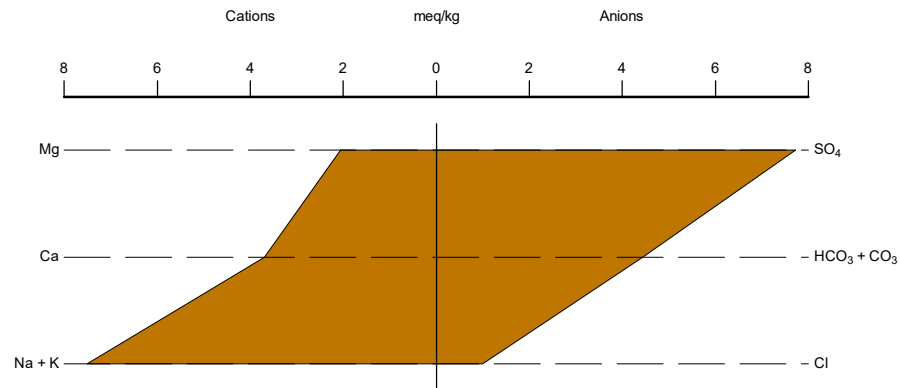
MW-305A

Stiff Diagram



MW-306

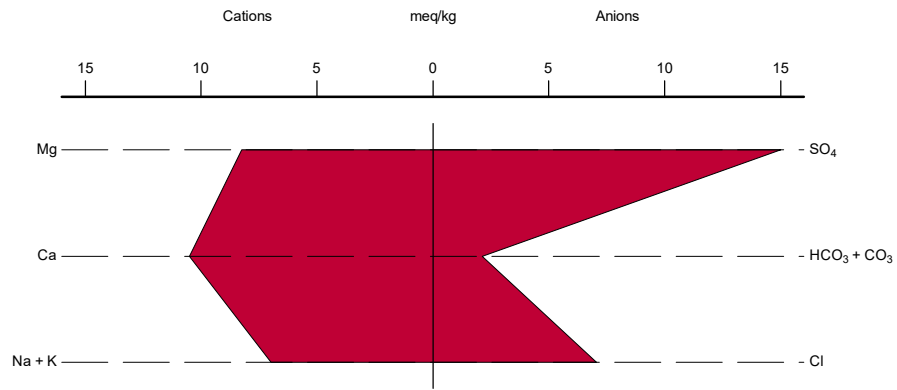
Stiff Diagram



Ottumwa Generating Station – Ash Pond  
Stiff Diagrams – April 2021 Groundwater Sampling event

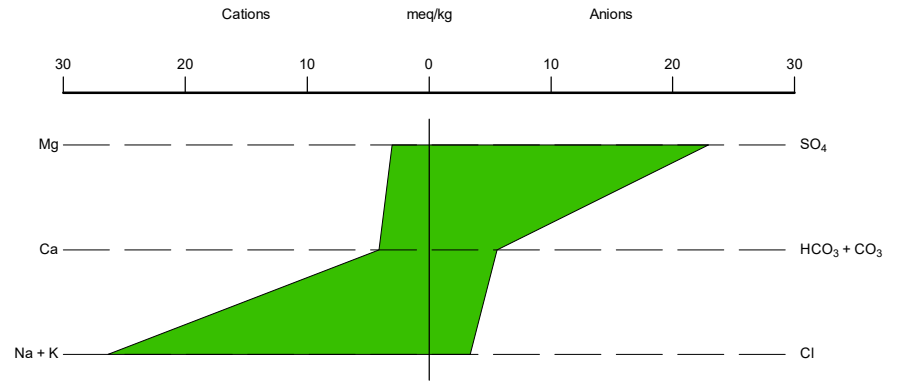
MW-310

Stiff Diagram



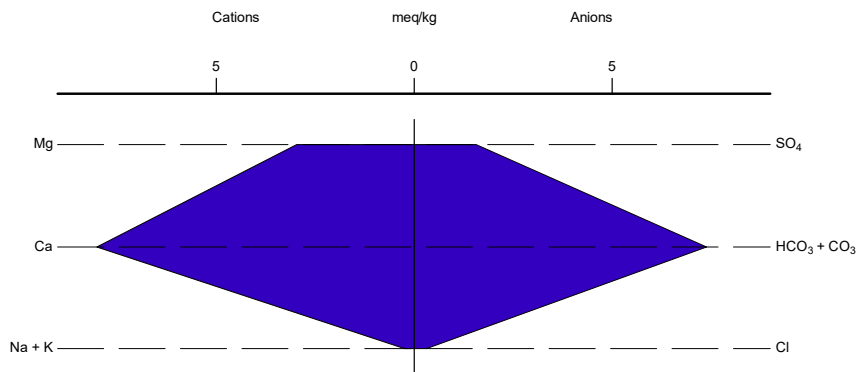
MW-310A

Stiff Diagram



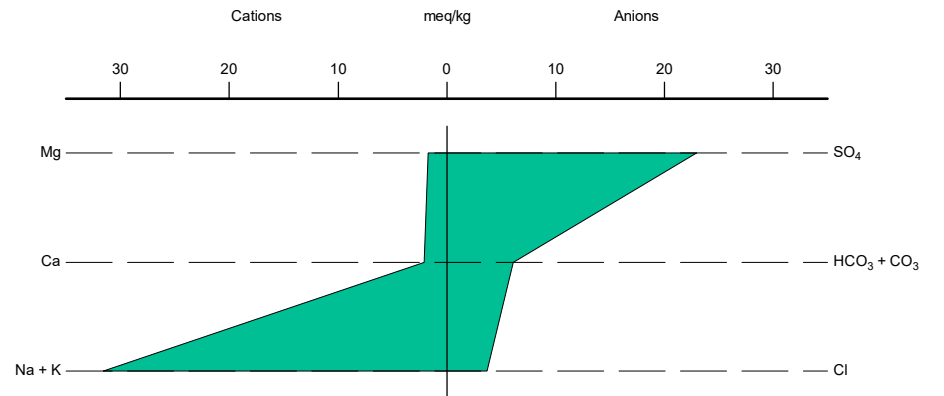
MW-311

Stiff Diagram



MW-311A

Stiff Diagram



### Piper Diagram

