

# 2021 Annual Groundwater Monitoring and Corrective Action Report

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

Prepared for:



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

**SCS ENGINEERS**

25221072.00 | July 29, 2022

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

## OVERVIEW OF CURRENT STATUS

### Ottumwa Generating Station, Zero Liquid Discharge 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. The groundwater monitoring system for the Zero Liquid Discharge Pond at the Ottumwa Generating Station (OGS) monitors a single existing CCR unit. Supporting information is provided in the text of the annual report.

Category	Rule Requirement	Site Status
<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 an SSI over background for one or more constituents listed in Appendix III to this part pursuant to §257.94(e):	
	(A) Identify those constituents listed in Appendix III to this part and the names of the monitoring wells associated with such an increase; and	<u>April 2021</u> Boron: MW-309 Calcium: MW-307, MW-308, MW-309 Chloride: MW-307, MW-308 Field pH: MW-309 Sulfate: MW-308, MW-309 Total Dissolved Solids: MW-307, MW-308, MW-309  <u>July 2021</u> Field pH: MW-307

Category	Rule Requirement	Site Status
		<u>October 2021</u> Boron: MW-309 Calcium: MW-307, MW-308, MW-309 Chloride: MW-307, MW-308 Field pH: MW-309 Sulfate: MW-308, MW-309 Total Dissolved Solids: MW-307, MW-308, MW-309
	(B) Provide the date when the assessment monitoring program was initiated for the CCR unit.	January 13, 2020
<b>Statistically Significant Levels (SSL) Above Groundwater Protection Standard (GPS)</b>	(iv) If it was determined that there was an SSL above the GPS for one or more constituents listed in Appendix IV to this part pursuant to §257.95(g) include all of the following:	
	(A) Identify those constituents listed in Appendix IV to this part and the names of the monitoring wells associated with such an increase;	<u>February 2021</u> Cobalt: MW-307 <u>April 2021</u> Cobalt: MW-307 <u>July 2021</u> Cobalt: MW-307 <u>October 2021</u> Cobalt: MW-307
	(B) Provide the date when the Assessment of Corrective Measures (ACM) was initiated for the CCR unit;	Not Applicable in 2021, Alternative Source Demonstration completed August 30, 2021. ACM initiated May 9, 2022
	(C) Provide the date when the public meeting was held for the ACM for the CCR unit; and	Not Applicable – ACM in progress
	(D) Provide the date when the ACM was completed for the CCR unit.	Not Applicable – ACM in progress

<b>Category</b>	<b>Rule Requirement</b>	<b>Site Status</b>
<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 applicable – ACM in progress in 2022
<b>Corrective Action</b>	(vi) Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.	Not applicable – ACM in progress in 2022

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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) Final Rule” published by the U.S. Environmental Protection Agency (U.S. EPA) in the *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities*; Final Rule, dated April 17, 2015 (U.S. EPA, 2015) and subsequent amendments. Specifically, this report was prepared to fulfill the requirements of 40 Code of Federal Regulations (CFR) 100 and 40 CFR 257.90(e) for inactive CCR surface impoundments. The applicable sections of the Rule are provided below in *italics*, followed by applicable information relative to the 2021 Annual Groundwater Monitoring and Corrective Action Report for the CCR unit.

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

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

- OGS ZLDP (inactive CCR surface impoundment)

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

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

## 2.0 BACKGROUND

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

- Geologic and hydrogeologic setting
- CCR Rule monitoring system

### 2.1 GEOLOGIC AND HYDROGEOLOGIC SETTING

#### 2.1.1 Regional Geologic Information

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

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



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

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

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

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

## 2.1.2 Site Information

Site boring logs indicate that the unconsolidated material at the site is thin (approximately 7 to 20 feet in thickness) and consists of overlying clay and sand. The unconsolidated material at these well locations is generally clay, silt, and sand, and the uppermost bedrock appears to be weathered. During excavation of CCR as part of the 2021 site closure activities, organic material such as buried trees and other vegetation were observed and removed from the southeast corner of the site. The total boring depths were between 15 and 28 feet and weathered bedrock was encountered at depths between 19 and 21 feet below ground surface at the downgradient monitoring wells, bedrock was encountered at 7 feet below ground surface at the upgradient/background monitoring well MW-301. Boring logs, well construction and development documentation for MW-301 and MW-307 through MW-309 are included in **Appendix B**.

IPL issued a Notification of Intent to Close for the OGS ZLD Pond in November 2020, and the OGS ZLD Pond was closed by removal in accordance with 40 CFR 257.102(c). The OGS ZLD Pond was dewatered and CCR material was removed and relocated to the OGS Ash Pond (completed in October 2021). A new low volume wastewater treatment pond was constructed in the former OGS ZLD Pond footprint, with a new geosynthetic pond liner. The new low volume wastewater treatment pond is not a CCR unit. Closure activities for the OGS ZLD Pond were completed in December 2021 and are documented in the April 14, 2022 Construction Documentation Report ZLDP Closure and Low Volume Wastewater Treatment Pond (LVWTP) Construction (SCS Engineers, 2022).

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**. These maps are based on water levels measured at all OGS monitoring wells, including the ZLDP compliance wells, Ash Pond compliance wells, and additional delineation wells installed for the Assessment of Corrective Measures (ACM) and selection of remedy for the Ash Pond CCR unit. 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. All of water level measurements

were collected from piezometer wells installed in the uppermost aquifer and reflect the potentiometric surface of the aquifer. The groundwater elevations do not necessarily reflect the water table elevations because measurements were not collected from water table wells.

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

## **2.2 CCR RULE MONITORING SYSTEM**

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

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

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

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

This report is submitted to fulfill the report requirement.

## **4.0 §257.90(e) ANNUAL REPORT REQUIREMENTS**

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

#### **4.1 §257.90(e)(1) SITE MAP**

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

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

#### **4.2 §257.90(e)(2) MONITORING SYSTEM CHANGES**

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

No new monitoring wells were installed and no wells were decommissioned as part of the groundwater monitoring program for the OGS ZLDP in 2021.

#### **4.3 §257.90(e)(3) SUMMARY OF SAMPLING EVENTS**

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

Four groundwater sampling events were completed for the inactive OGS ZLDP CCR unit in 2021. Two semiannual sampling events occurred in April 2021 and October 2021. Two assessment monitoring resampling events occurred in February 2021 and July 2021 for select parameters. As described in **Section 4.4**, the first round of assessment monitoring samples in December 2019 and an assessment monitoring program was established on January 13, 2020.

The sampling results for Appendix III and Appendix IV parameters in 2021 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 D**. Historical results for each monitoring well are summarized in **Appendix E**.

#### **4.4 §257.90(e)(4) MONITORING TRANSITION NARRATIVE**

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

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

U.S. EPA's Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at Resource Conservation and Recovery Act (RCRA) Facilities (EPA 530-R-09-007, March 2009) recommends the use of confidence intervals for comparison of assessment monitoring data to fixed Groundwater Protection Standard (GPS) values. Specifically, the suggested approach for comparing assessment groundwater monitoring data to GPS values based on long-term chronic health risk, such as drinking water Maximum Contaminant Levels (MCLs), is to compare the lower confidence limit around the arithmetic mean with the fixed GPS. A confidence interval approach was used once the four samples required for this method were obtained, starting in October of 2020.

Since the beginning of the assessment monitoring program in January 2020, the only assessment monitoring parameter for which a monitoring result exceeded the GPS was cobalt in the samples from MW-307. Cobalt exceeded the GPS in the samples from MW-307 for all four round assessment monitoring events in 2021. The most recent Lower Confidence Level (LCL) evaluation was completed for cobalt for the October 2021 event, evaluated in January 2022. The LCLs were calculated with Sanitas™ using historical concentrations measured since assessment monitoring began in December 2019, the October 2021 LCL evaluation is provided in **Appendix F**.

Cobalt was initially determined to be at a statistically significant level (SSL) above the GPS on June 1, 2021, based on the evaluation of the February 2021 monitoring results. On August 30, 2021, an ASD was completed for the cobalt (SSL) exceeding the GPS for samples collected in February, April, and July (August 30, 2021). The ASD attributed the cobalt in groundwater samples from MW-307 to the OGS Ash Pond CCR unit. Cobalt SSLs had previously been identified for the Ash Pond and the selection of a remedy is in progress. Based on the ASD, the OGS ZLPD CCR Unit remained in assessment monitoring in 2021.

## **4.5 §257.90(e)(5) OTHER REQUIREMENTS**

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

Additional potentially applicable requirements for the annual report, and the location of the requirement within the Rule, are provided in the following sections. For each cited section of the Rule, the portion referencing the annual report requirement is provided below in *italics*, followed by applicable information relative to the 2021 Annual Groundwater Monitoring and Corrective Action Report for the CCR Unit.

### **4.5.1 §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.

### **4.5.2 §257.90(e) General Requirements**

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

**Status of Groundwater Monitoring and Corrective Action Program.** The groundwater monitoring and corrective action program remained in assessment monitoring in 2021.

**Summary of Key Actions Completed.**

- Monitoring results review and statistical evaluation for the October 2020 monitoring event (January 15, 2021).
- Completion of the 2020 Annual Groundwater Monitoring and Corrective Action Report (May 26, 2021).
- Two groundwater sampling and analysis events for select parameters (February and July 2021).
- Two semiannual groundwater sampling and analysis events (April and October 2021).
- Monitoring results review and statistical evaluation for the February 2021 monitoring event (June 1, 2021).
- Monitoring results review and statistical evaluation for the April 2021 monitoring event (July 15, 2021).
- Completion of an Alternative Source Demonstration (ASD) for cobalt SSLs exceeding the GPS for samples collected in February, April, and July (August 30, 2021).
- Closure and removal of the ZLDP:
  - Dewatering of the ZLDP began in May 2021.
  - CCR removal from the ZLDP started in June 2021.
  - Organic material such as buried trees and other vegetation were observed and removed from the southeast corner of the site between June and October 2021.
  - CCR removal from ZLDP was substantially complete by October 9, 2021.
  - Dewatering pumping was completed on December 16, 2021.
  - New pond liner geosynthetics were effectively installed by December 16, 2021.

**Description of Any Problems Encountered:** No problems were encountered during the groundwater sampling events in 2021.

**Discussion of Actions to Resolve the Problems:** Not Applicable.

**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 (February 8, 2022).
- The existing groundwater monitoring network is being evaluated in light of the ZLDP closure and anticipated initiation of Corrective Action. As a result, additional monitoring wells may be installed during 2022.
- Initiation of ACM (May 9, 2022).

- Completion of ACM (August 2022, unless extension of up to 60 days is warranted)
- Two Semiannual Groundwater Sampling and Analysis Events (April and October 2022).
- Statistical evaluation and determination of any SSLs exceeding the GPS for the April 2022 monitoring event.

#### **4.5.3 §257.94(d) Alternative Detection Monitoring Frequency**

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

Not applicable. OGS ZLDP is no longer in detection monitoring program.

#### **4.5.4 §257.94(e)(2) Alternative Source Demonstration for Detection Monitoring**

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

Not applicable. OGS ZLDP is no longer in detection monitoring program.

#### **4.5.5 §257.95(c) Alternative Assessment Monitoring Frequency**

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

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

#### **4.5.6 §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 ZLDP are provided in **Table 5**. The laboratory reports are provided in **Appendix D**. Historical monitoring results are summarized in **Appendix E**.

Supplemental groundwater quality parameters were included in the monitoring program in 2021 to support the selection of remedy process for the OGS Ash Pond CCR unit. The results for the supplemental parameters are included in **Table 5** and in the laboratory reports in **Appendix D**.

#### **4.5.7 §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.*

On August 30, 2021, an ASD was completed for cobalt at MW-307 (**Appendix G**). The ASD addressed the observed cobalt concentrations above the GPS for monitoring events in February, April, and July 2021. The ASD concluded that, based on the available data, the most likely source of the GPS exceedance for cobalt at MW-307 was the adjacent Ash Pond, and not the OGS ZLDP. The ASD was produced prior to the discovery and subsequent evaluation of organic debris later in 2021 that is anticipated to result in a re-evaluation of the need for Corrective Action.

The OGS Ash Pond is currently in the corrective action process in response to the cobalt concentrations observed at the Ash Pond downgradient wells.

#### **4.5.8 §257.96(a) Extension of Time for Corrective Measures Assessment**

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

Not applicable. Corrective measures assessment was not initiated in 2021.

## **5.0 REFERENCES**

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

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

U.S. Environmental Protection Agency, 2015, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, April 2015.

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**Table 1. Groundwater Monitoring Well Network  
Ottumwa Generating Station - Zero Liquid Discharge 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-307	Downgradient	Compliance
MW-308	Downgradient	Compliance
MW-309	Downgradient	Compliance

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

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

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

Sample Dates	Compliance Wells			Background Well
	MW-307	MW-308	MW-309	MW-301
2/23/2021	R-A	--	--	--
4/14/2021	A	A	A	A
7/6/2021	R-A	--	--	--
10/7/2021	A	A	A	A
Total Samples	4	2	2	2

Abbreviations:

A = Required by Assessment Monitoring Program

R-A = Resample for the Assessment Monitoring Program

Created by: NDK

Date: 3/9/2021

Last revision by: RM

Date: 12/28/2021

Checked by: JAO

Date: 2/17/2022

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**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	655.36	655.84	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	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
<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: Created by: NDK Date: 1/15/2018  
 NM = not measured Last rev. by: NDK Date: 2/25/2022  
 NI = not installed Checked by: JAO Date: 2/25/2022  
 ND = Not surveyed

I:\25221072.00\Deliverables\2021 Federal Annual Report - OGS ZLDP\Tables\[Table 3\_GW Elevation Summary.xls]levels

**Table 4. Groundwater Gradients and Average Linear Velocity  
Ottumwa Generating Station - Zero Liquid Discharge Pond /  
SCS Engineers Project #25221072.00  
January - December 2021**

Sampling Dates	Northeast				
	h1 (ft)	h2 (ft)	Δl (ft)	Δh/Δl (ft/ft)	V (ft/d)
April 12-16, 2021	660.00	647.66	362.96	0.03	0.3
April 12-16, 2021	660.00	645.00	549.73	0.03	0.2
October 6-8, 2021	655.00	640.71	1020.11	0.01	0.1
October 6-8, 2021	650.00	640.00	515.20	0.02	0.2

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

Assumed Porosity, n
0.40

**Notes:**

- The two sets of data for each sampling date represent separate measurement locations along the northeast flow path.

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

ft = feet

ft/d = feet per day

K = hydraulic conductivity

n = effective porosity

V = groundwater flow velocity

h1, h2 = point interpreted groundwater

elevation at locations 1 and 2

Δl = distance between location 1 and 2

Δh/Δl = hydraulic gradient

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

Date: 12/29/2020  
 Date: 2/28/2022  
 Date: 2/28/2022

**Table 5. Groundwater Analytical Results Summary - 2021**  
**Ottumwa Generating Station - Zero Liquid Discharge Pond (ZLDP) / SCS Engineers Project #25221072.00**

Parameter Name	UPL Method	UPL	GPS	Background Well		Compliance Wells							
				MW-301		MW-307			MW-308		MW-309		
				4/14/2021	10/7/2021	2/23/2021	4/14/2021	7/6/2021	10/7/2021	4/14/2021	10/7/2021	4/14/2021	10/7/2021
<b>Appendix III</b>													
Boron, ug/L	P	820		690	800	--	200	--	230	220	200	1,400	1,300
Calcium, mg/L	P	78.7		96	100	--	250	--	240	230	230	130	120
Chloride, mg/L	P	86.8		150	180	--	210	--	240	150	170	57	67
Fluoride, mg/L	P	0.484		<0.28	<0.28	--	<0.28	--	<0.28	<0.28	<0.28	<0.28	<0.28
Field pH, Std. Units	P	6.87		6.26	6.26	6.50	6.59	7.05	6.71	6.70	6.83	7.00	7.18
Sulfate, mg/L	P	199		140	180	--	92	F1	110	270	290	360	400
Total Dissolved Solids, mg/L	P	628		620	670	--	1,000	--	1,000	1,100	1,000	940	950
<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
Arsenic, ug/L	P*	0.53	10	<0.75	<0.75	--	<0.75	--	<0.75	<0.75	<0.75	<0.75	<0.75
Barium, ug/L	P	68.8	2,000	52	61	--	160	--	140	140	130	52	47
Beryllium, ug/L	DQ	DQ	4	<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	--	<0.051	--	<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	1.3 J
Cobalt, ug/L	NP	4.10	6	0.29 J	0.48 J	64	46	60	48	0.16 J	0.22 J	2.3	2.0
Fluoride, mg/L	P*	0.484	4	<0.28	<0.28	--	<0.28	--	<0.28	<0.28	<0.28	<0.28	<0.28
Lead, ug/L	NP*	0.10	15	<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	--	14	--	14	16	16	8.9 J	7.5 J
Mercury, ug/L	DQ	DQ	2	<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	--	<1.3	<1.3	<1.3	<1.3	<1.3
Selenium, ug/L	P	8.55	50	6.5	7.5	--	<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	--	<0.26	<0.26	<0.26	<0.26	<0.26
Radium 226/228 Combined, pCi/L	P	2.15	5	0.598	1.04	--	3.08	--	3.90	2.87	3.22	1.05	1.60
<b>Additional Parameters Collected for Ash Pond Selection of Remedy</b>													
Cobalt - dissolved, ug/L				--	--	--	49	--	59	--	--	--	--
Iron, dissolved, ug/L				<36	<36	--	3,400	--	3,400	3,900	300	660	680
Iron, ug/L				49 J	<36	--	3,700	--	3,900	3,900	4,700	900	950
Magnesium, ug/L				34,000	36,000	--	30,000	--	28,000	26,000	24,000	19,000	18,000
Manganese, dissolved, ug/L				10	15	--	360	--	410	1,300	950	640	600
Manganese, ug/L				14	18	--	330	--	440	1,300	1,100	630	650
Potassium, ug/L				1,200	1,300	--	2,000	--	2,000	4,400	4,300	750	740
Sodium, ug/L				78,000	88,000	--	98,000	--	100,000	100,000	110,000	180,000	180,000
Bicarbonate Alkalinity, mg/L				170	210	--	490	--	550	370	410	280	300
Carbonate Alkalinity, mg/L				<4.6	<4.6	--	<4.6	--	<4.6	<4.6	<4.6	<4.6	<4.6
Total Alkalinity, mg/L				170	210	--	490	--	550	370	410	280	300

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

**Abbreviations:**

UPL = Upper Prediction Limit  
 -- = Not Analyzed  
 P = Parametric UPL with 1-of-2 retesting  
 GPS = Groundwater Protection Standard  
 mg/L = milligrams per liter  
 LOQ = Limit of Quantitation

DQ = Double Quantification Rule (not detected in background)  
 NP = Nonparametric UPL (highest background value)  
 LOD = Limit of Detection  
 MNA = Monitored Natural Attenuation  
 ug/L = micrograms per liter

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

**Notes:**

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

Created by: NDK	Date: 5/21/2021
Last revision by: RM	Date: 2/17/2022
Checked by: JAO	Date: 2/17/2022
Proj Mgr QA/QC: TK	Date: 3/19/2022

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

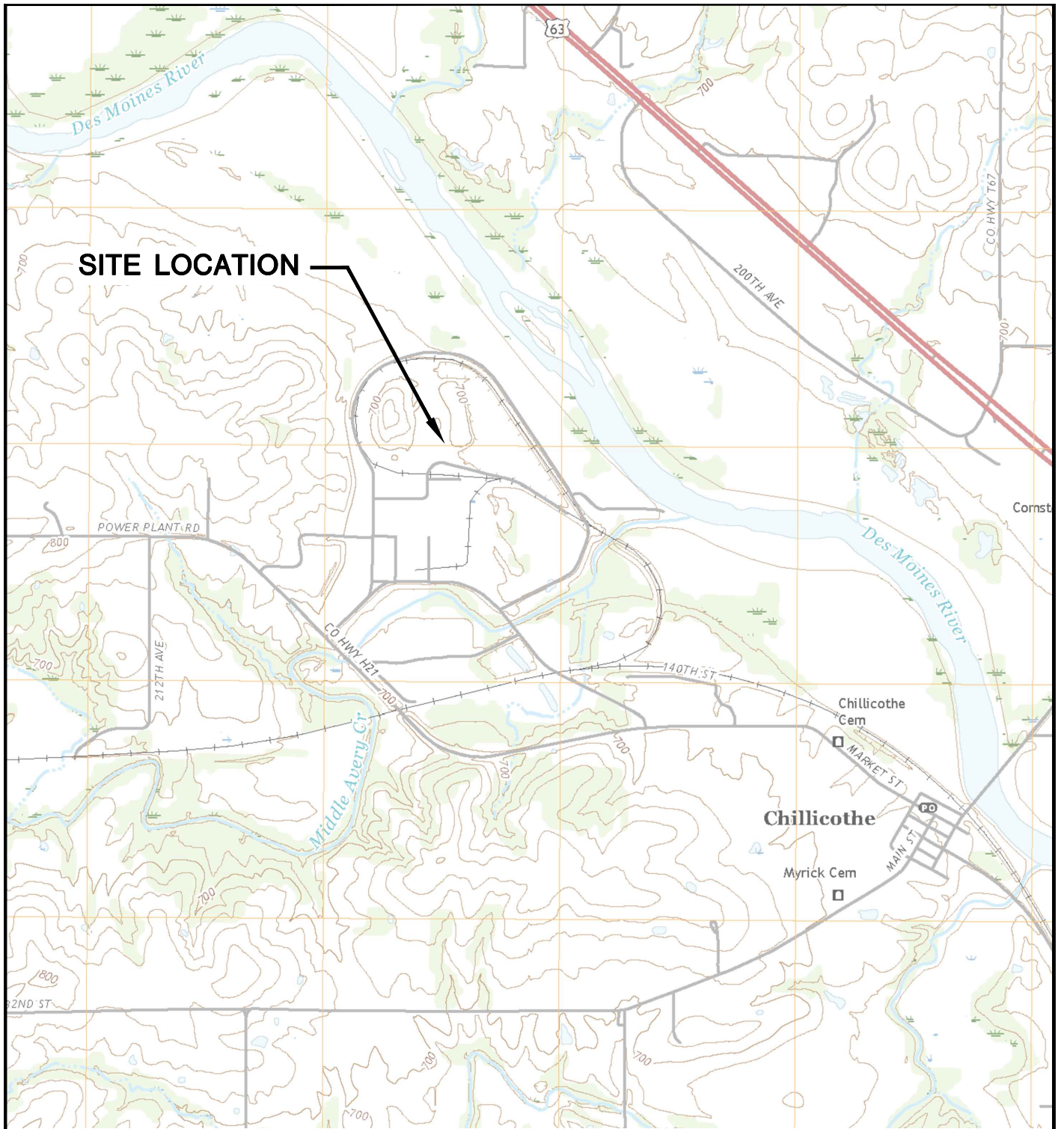
Well	Sample Date	Groundwater Elevation (feet)	Field Temperature (deg C)	Field pH (Std. Units)	Oxygen, Dissolved (mg/L)	Field Specific Conductance (umhos/cm)	Field Oxidation Potential (mV)	Turbidity (NTU)
MW-301	4/14/2021	682.94	9.1	6.26	5.99	1,062	232.5	1.61
	10/7/2021	681.95	17.90	6.26	4.17	1062	207.3	8.90
MW-307	2/23/2021	646.80	12.20	6.50	0.20	1632	0.8	2.41
	4/14/2021	649.53	11.5	6.59	0.41	1,675	-39.9	21.2
	7/6/2021	647.03	13.2	7.05	0.21	1,705	14.7	17.91
	10/7/2021	644.49	14.40	6.71	0.19	1552	-23.8	10.00
MW-308	4/15/2021	647.66	11.5	6.70	0.44	1,598	-49.3	4.47
	10/7/2021	641.81	13.00	6.83	0.17	1453	-26.1	12.80
MW-309	4/14/2021	646.46	11.7	7.00	0.36	1,411	-40.6	9.32
	10/7/2021	640.71	13.10	7.18	0.21	1297	-8.1	19.60

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

Date: 3/9/2021  
 Date: 12/28/2021  
 Date: 2/18/2022

## Figures

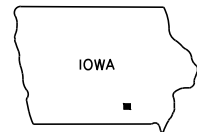
- 1 Site Location Map
- 2 Site Plan and Monitoring Well Locations–Zero Liquid Discharge Pond
- 3 Shallow Potentiometric Surface, April 12-16, 2021
- 4 Deep Potentiometric Surface, April 12-16, 2021
- 5 Shallow Potentiometric Surface, October 6-8, 2021
- 6 Deep Potentiometric Surface, October 6-8, 2021



**SITE LOCATION**

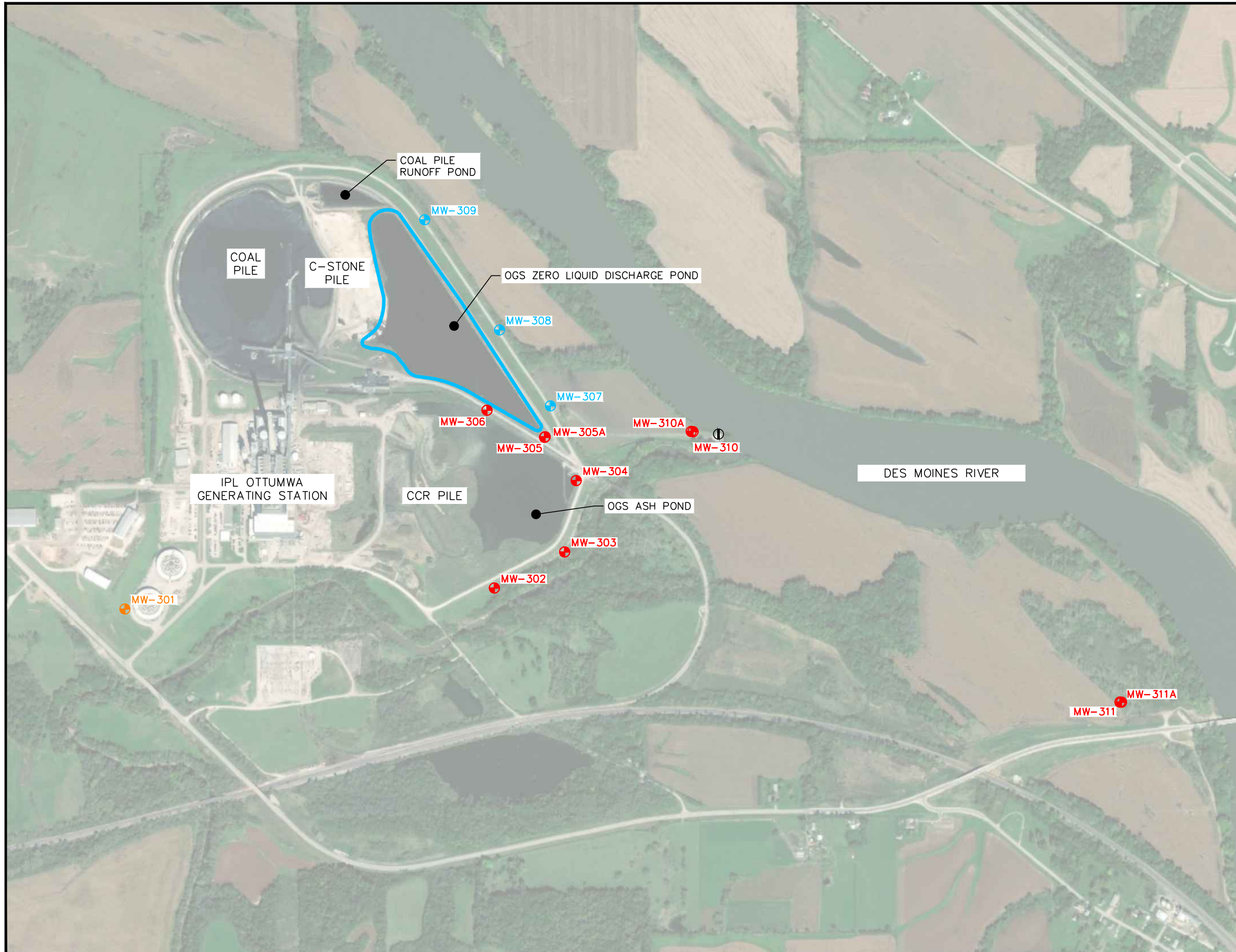


CHILLICOTHE QUADRANGLE  
 IOWA—WAPELLO CO.  
 7.5 MINUTE SERIES (TOPOGRAPHIC)  
 2018  
 SCALE: 1" = 2,000'



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							



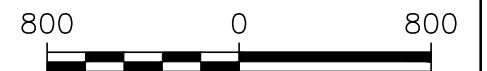


LEGEND

- CCR UNIT
- CCR ZLDP MONITORING WELL
- ⊕ CCR ASH POND MONITORING WELL
- ⊕ CCR BACKGROUND MONITORING WELL
- ⊕ RIVER ELEVATION MEASUREMENT LOCATION

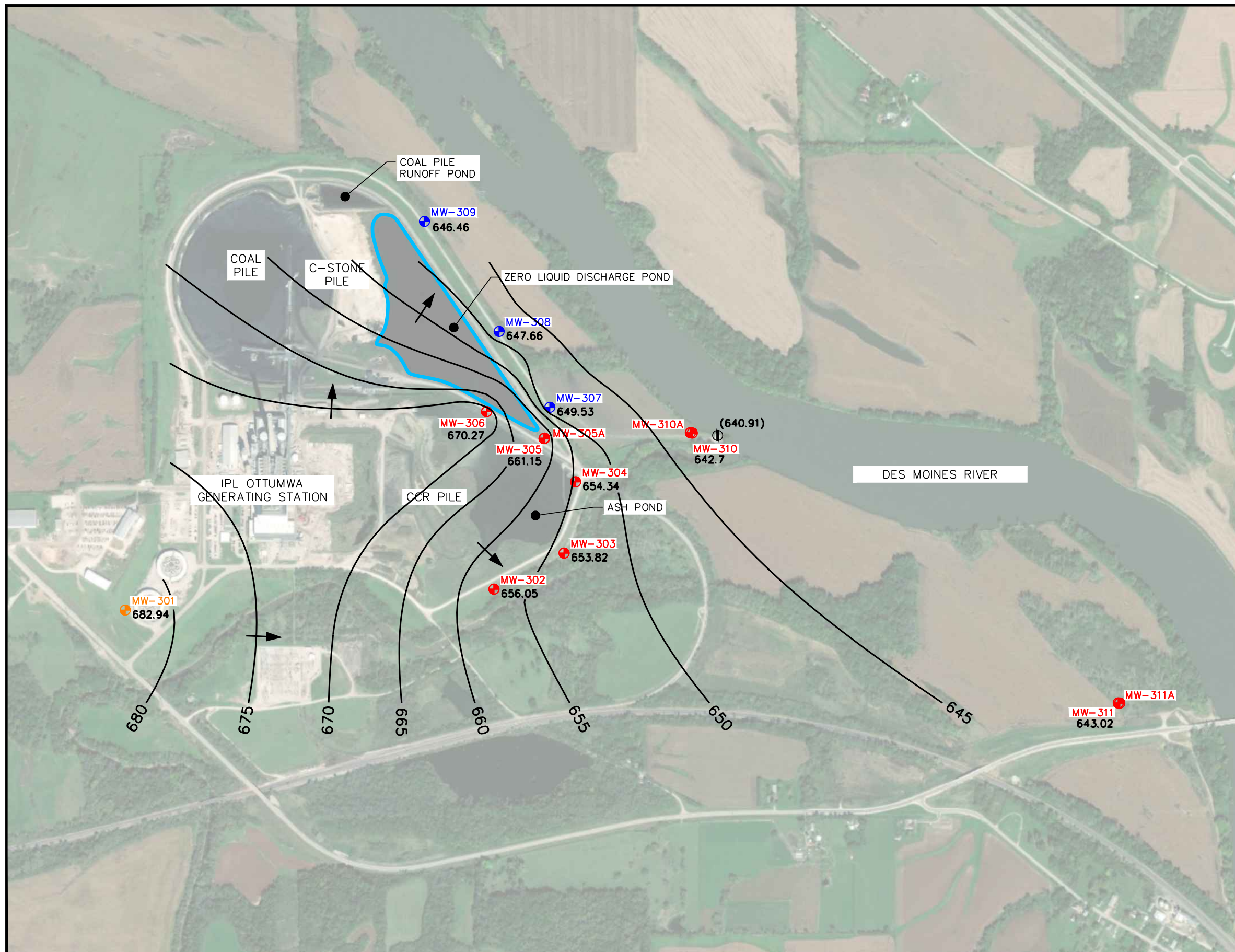
NOTES:

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



SCALE: 1" = 800'

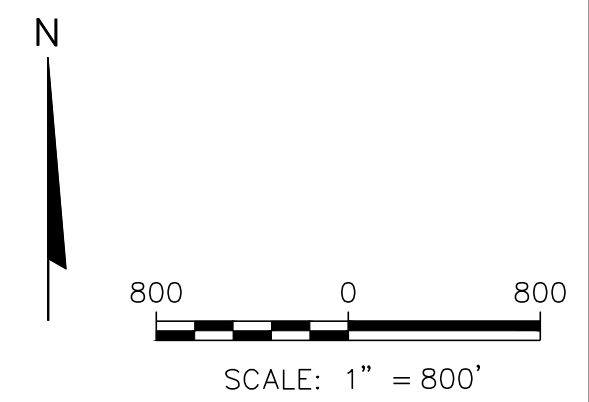
PROJECT NO. 25221072.00	DRAWN BY: BSS	<b>SCS ENGINEERS</b> 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA	FIGURE SITE PLAN AND MONITORING WELL LOCATIONS-ZERO LIQUID DISCHARGE POND 2
DRAWN: 11/15/2019	CHECKED BY: MDB				
REVISED: 08/11/2021	APPROVED BY: TK 8/17/2021				



- 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

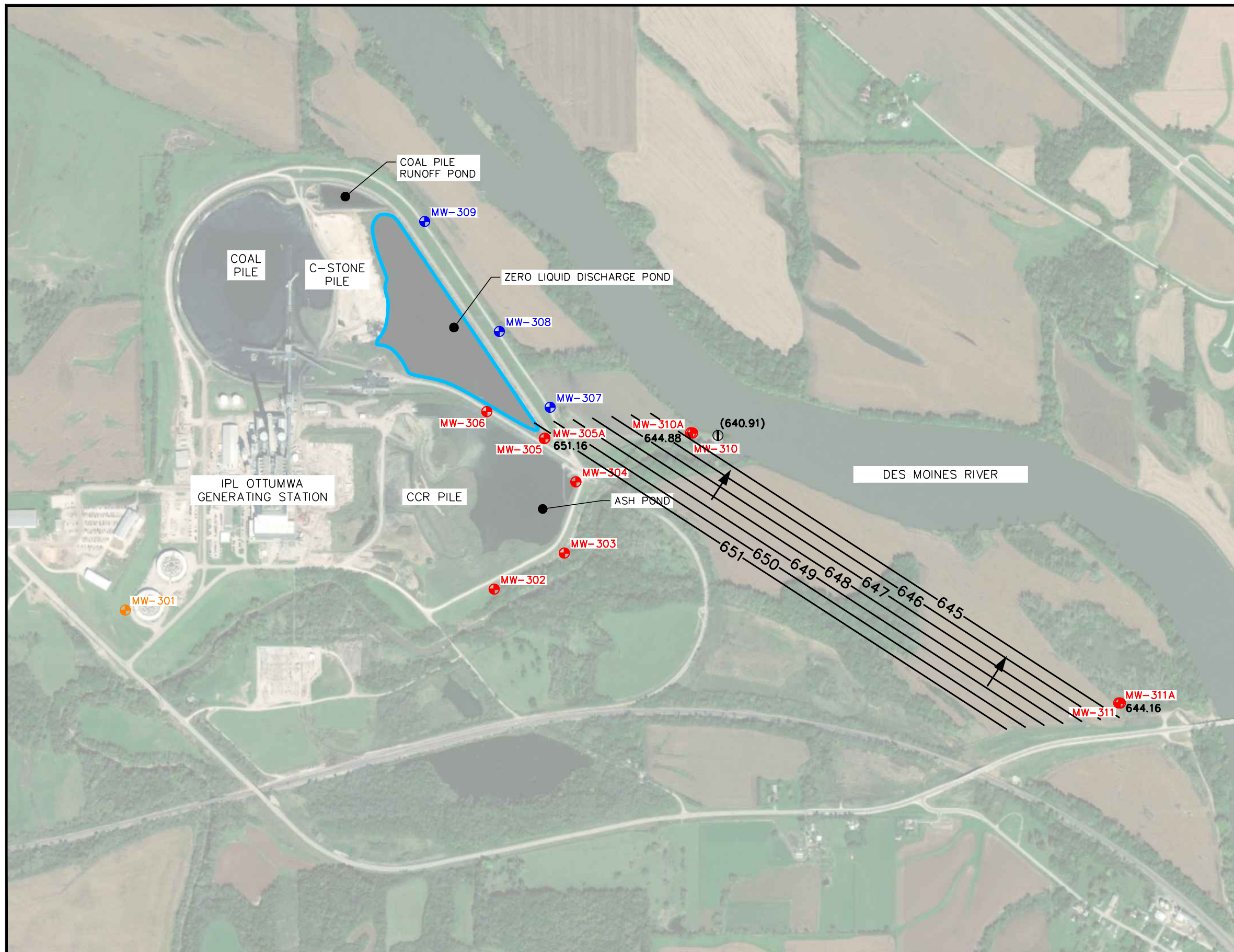
**NOTE:**

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



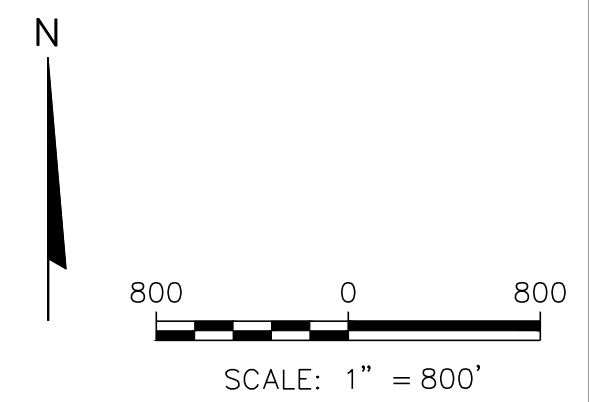
PROJECT NO.	25221072.00	DRAWN BY:	KP	<b>ENGINEER</b>	<b>SCS ENGINEERS</b> 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	<b>CLIENT</b>	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	<b>SITE</b>	ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA	SHALLOW POTENTIOMETRIC SURFACE APRIL 12-16, 2021	FIGURE
DRAWN:	05/26/2021	CHECKED BY:	NDK								3
REVISED:	08/11/2021	APPROVED BY:	TK 8/17/2021								

\\Mad\_s01\data\Projects\25221072.00\Drawings\Potentiometric Surface 2021 - LDP.dwg, 7/11/2021 10:54:37 AM



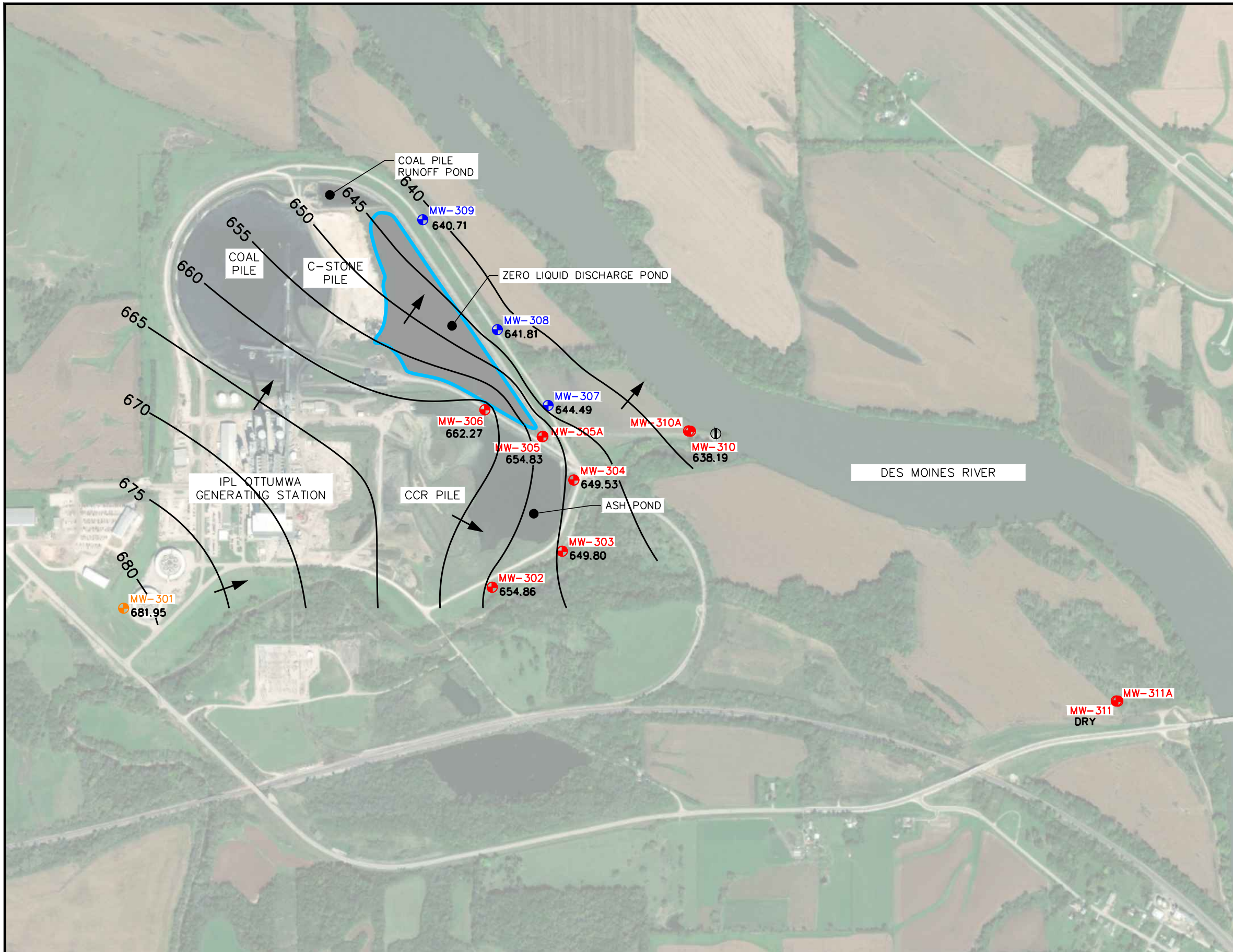
LEGEND	
	CCR UNIT
	CCR ZLDP MONITORING WELL
	CCR ASH POND MONITORING WELL
	CCR BACKGROUND MONITORING WELL
	RIVER ELEVATION MEASUREMENT LOCATION
<b>(640.91)</b>	RIVER ELEVATION (APRIL 16, 2021)
<b>651.09</b>	POTENTIOMETRIC ELEVATION AT WELL (APRIL 12-16, 2021)
	POTENTIOMETRIC SURFACE CONTOUR
	APPROXIMATE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

NOTE:  
 1. THE BACKGROUND MONITORING WELL FOR THE OGS ZLDP 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: TK 8/17/2021					

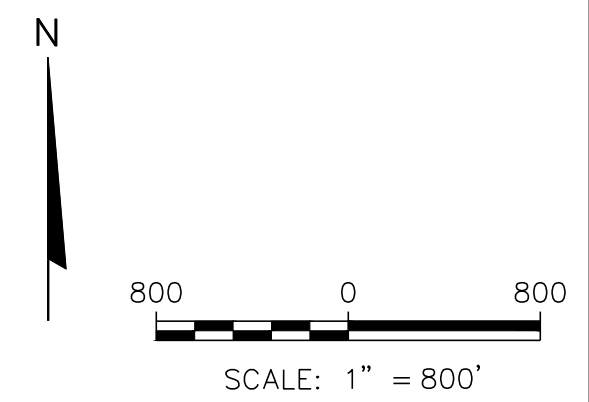
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LEGEND	
	CCR UNIT
	CCR ZLDP MONITORING WELL
	CCR ASH POND MONITORING WELL
	CCR BACKGROUND MONITORING WELL
	RIVER ELEVATION MEASUREMENT LOCATION
<b>651.09</b>	POTENTIOMETRIC ELEVATION AT WELL (OCTOBER 6-8, 2021)
	POTENTIOMETRIC SURFACE CONTOUR
	APPROXIMATE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

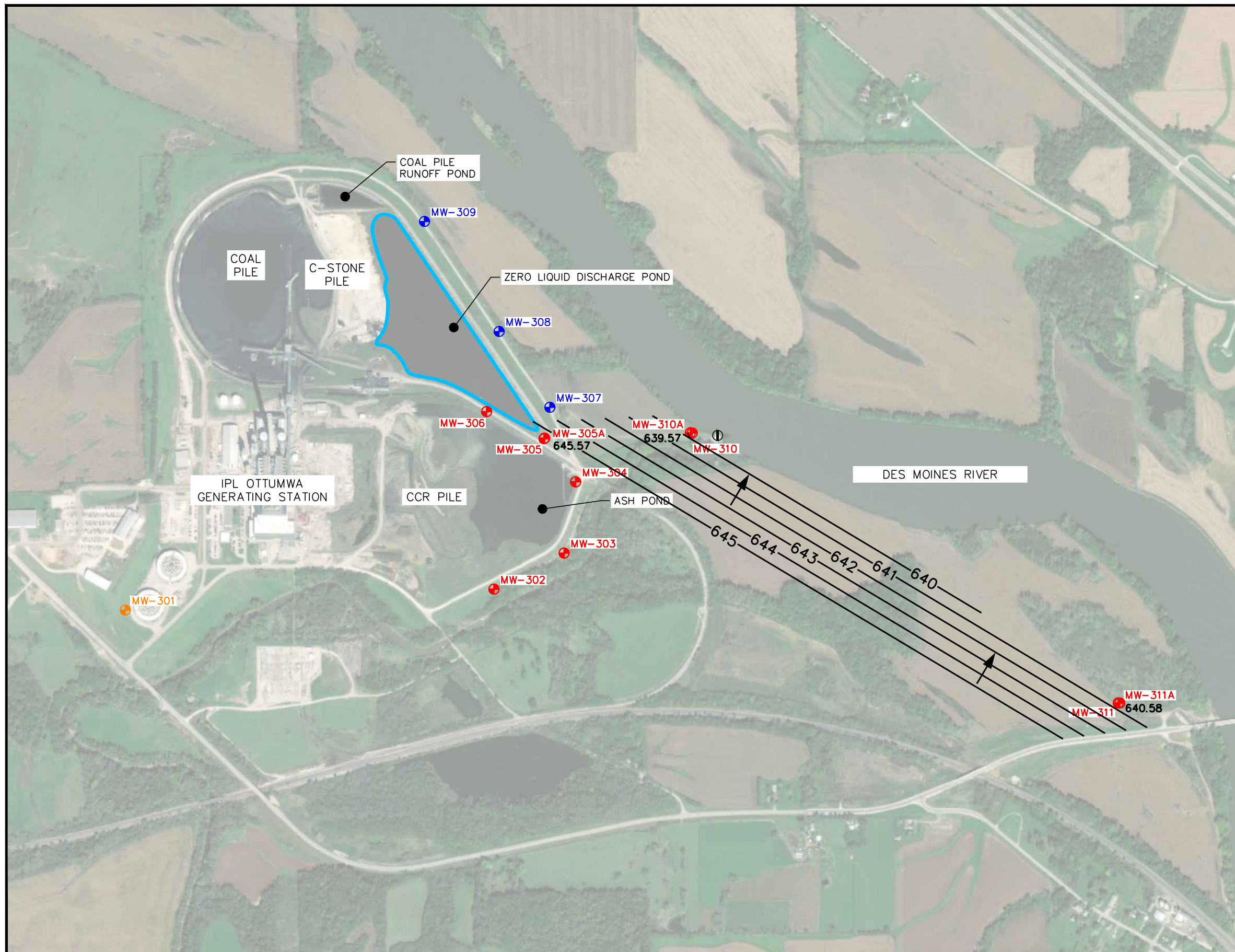
NOTE:

1. THE BACKGROUND MONITORING WELL FOR THE OGS ZLDP 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 3/19/2022					

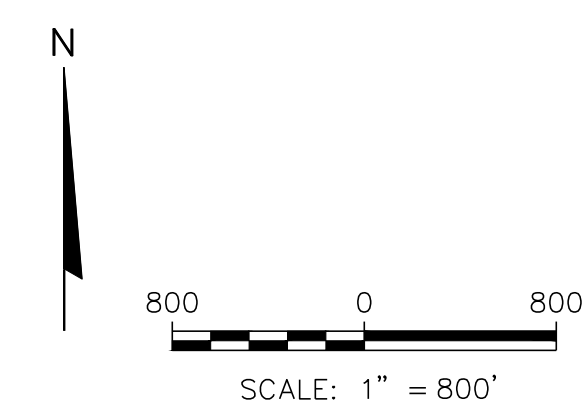
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LEGEND	
	CCR UNIT
	CCR ZLDP MONITORING WELL
	CCR ASH POND MONITORING WELL
	CCR BACKGROUND MONITORING WELL
	RIVER ELEVATION MEASUREMENT LOCATION
<b>651.09</b>	POTENTIOMETRIC ELEVATION AT WELL (OCTOBER 6-8, 2021)
	POTENTIOMETRIC SURFACE CONTOUR
	APPROXIMATE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


NOTE:

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



PROJECT NO. 25221072.00	DRAWN BY: KP	 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 6
DRAWN: 10/28/2021	CHECKED BY: NDK					
REVISED: 10/28/2021	APPROVED BY: TK 3/19/2022					

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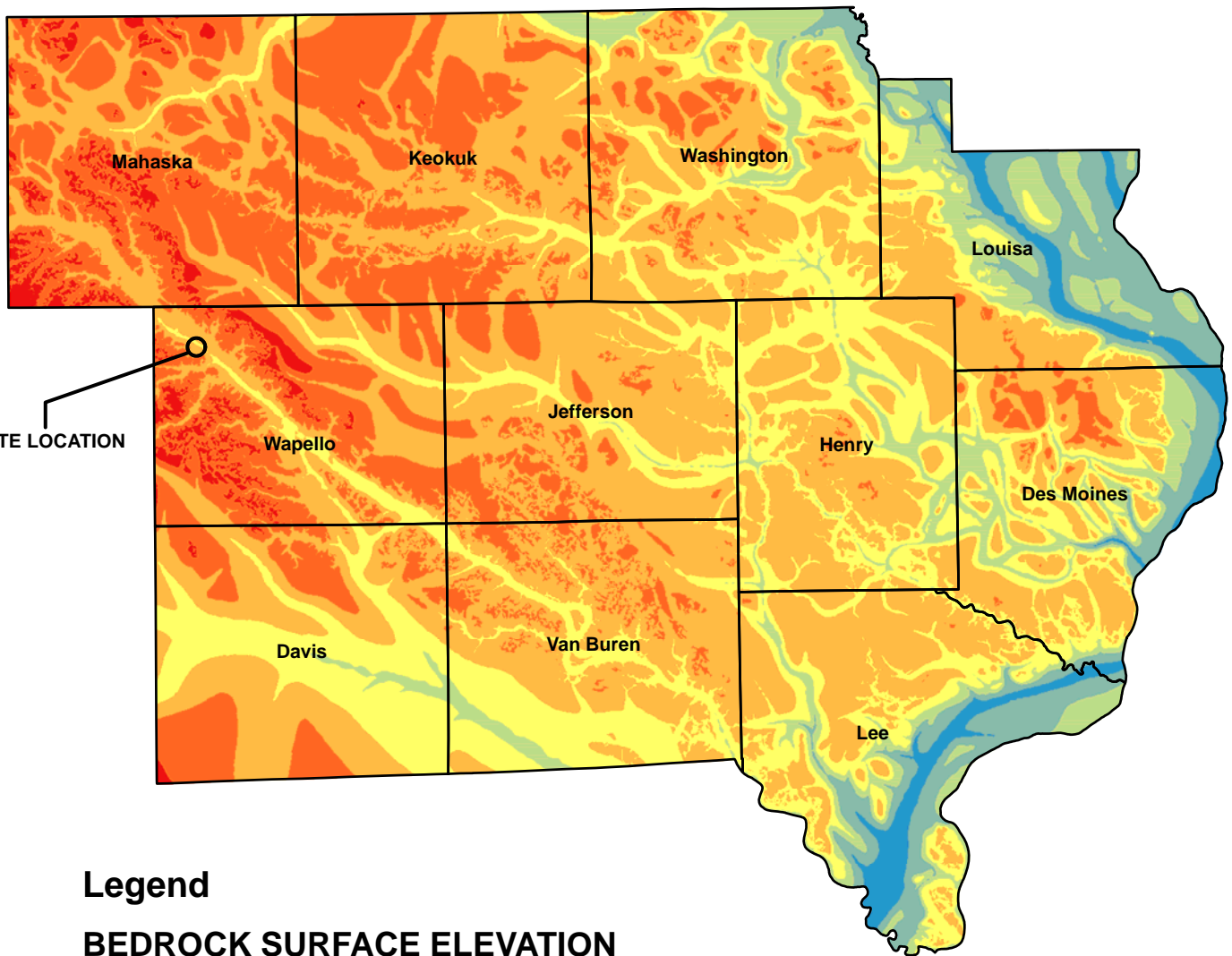
Appendix A  
Summary of Regional Hydrogeologic Stratigraphy

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

Age of Rocks	Hydrogeologic Unit	General Thickness (feet)	Name of Rock Unit*	Type of Rock
Quaternary (0-1 million years old)	Surficial Aquifers • Alluvial • Buried-Channel • Drift	0 to 320	Undifferentiated	<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.

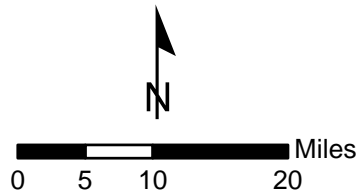


**Legend**

**BEDROCK SURFACE ELEVATION**

ELEVATION ABOVE MEAN SEA LEVEL IN FEET

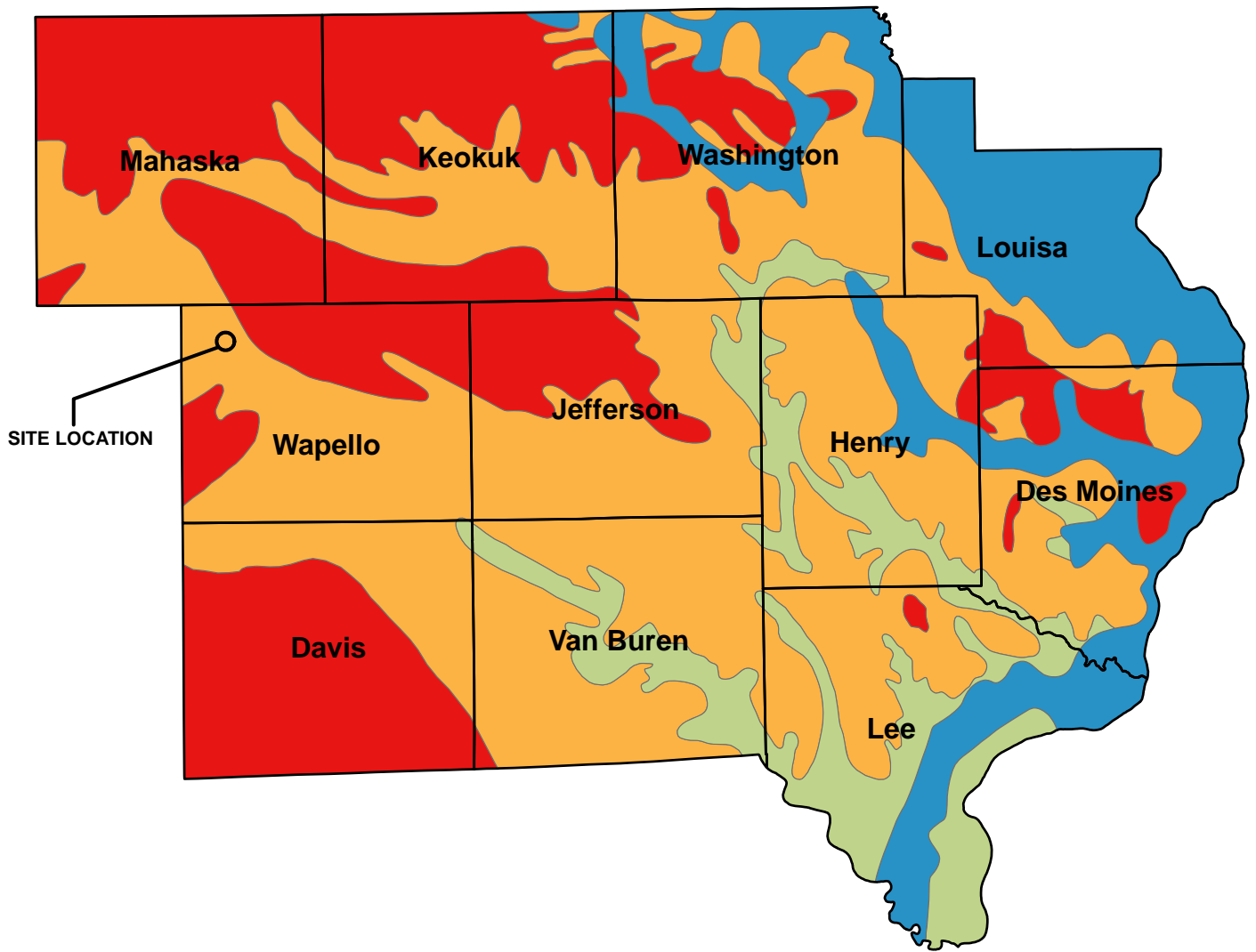
- BELOW 300
- 300 TO 400
- 400 TO 500
- 500 TO 600
- 600 TO 700
- 700 TO 800
- 800 TO 900



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>	
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>	

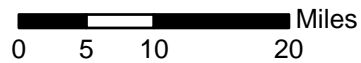
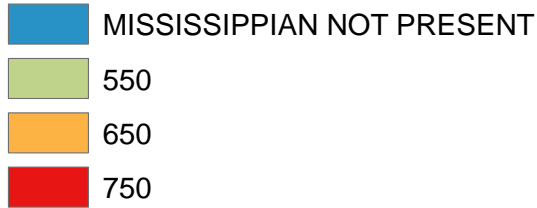




## Legend

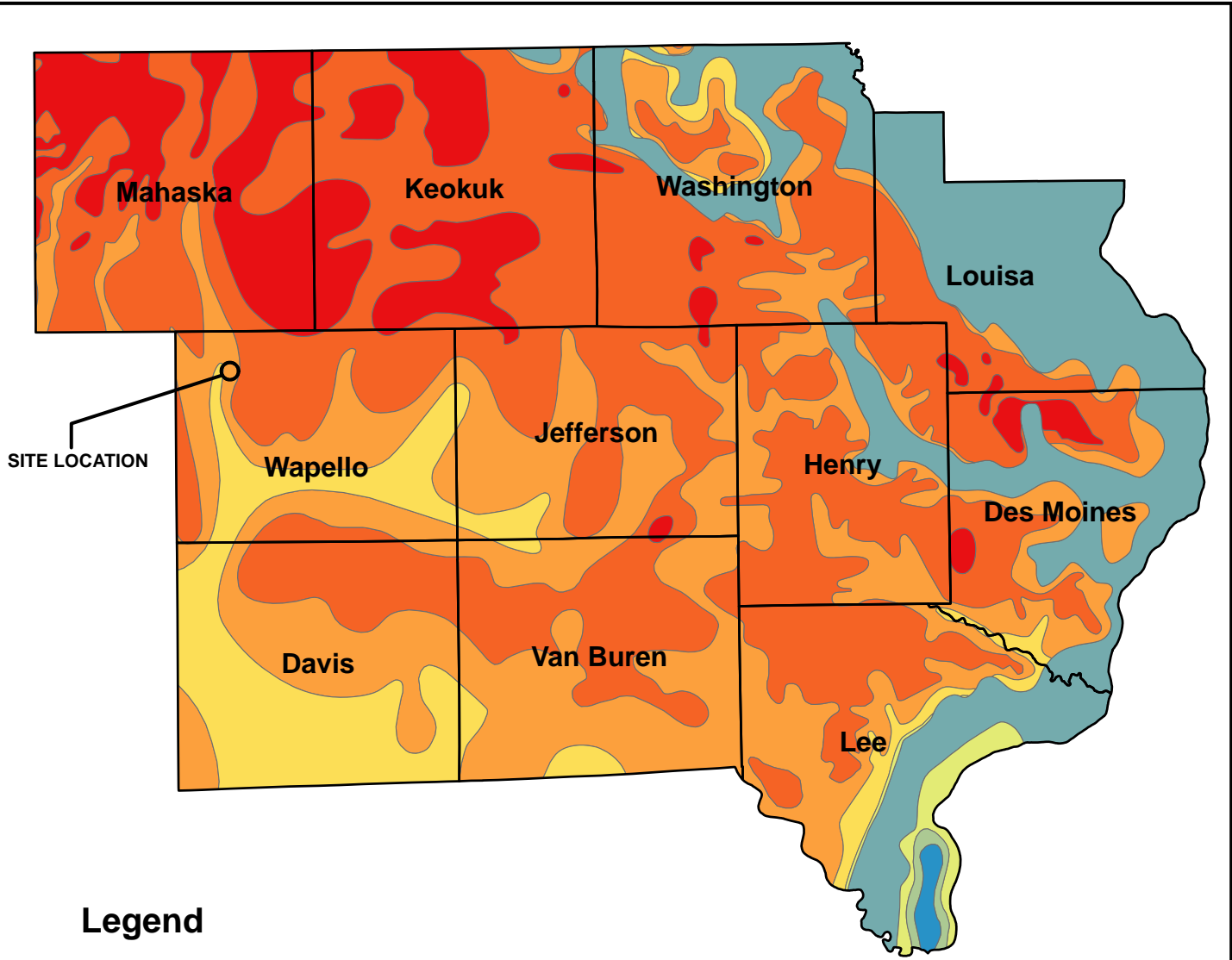
### MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE

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

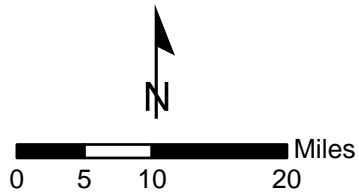
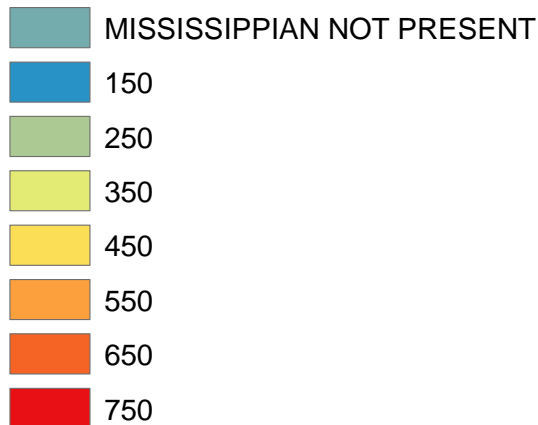
<b>CLIENT</b>	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	<b>SITE</b>	OTTUMWA GENERATING STATION OTTUMWA, IOWA	SE IOWA REGIONAL MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE ELEVATION	
	PROJECT NO. 25215053.03		DRAWN BY: JB	<b>ENGINEER</b>	<b>SCS ENGINEERS</b>
DRAWN: 07/29/13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



**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>	Drilling Method <b>4-1/4 hollow stem auger</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</b> , T <b>73</b> N, R <b>15</b> W			Long _____ ° _____ ' _____ "		
Facility ID		County <b>Wapello</b>	Civil Town/City/ or Village <b>Ottumwa</b>		

Sample Number and Type	Length A.t. & 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										
S1	10	woh 1 3 9	1-6	SANDY SILT WITH GRAVEL, gray (7.5YR 6/1), gravel is fine.	ML								W		
S2	13	24 50	7-8	WEATHERED SANDSTONE, very weak, light gray matrix (10YR 7/1), secondary color very dark gray 910YR 3/1), massive.									W		
S3	5	50	9-11		SANDSTONE								W		
S4	6	50	12-13										W		
S5	4	50	14-15										W		
				Endo of Boring at 15 feet bgs.											

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

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

Environmental Consultants and Contractors

**SOIL BORING LOG INFORMATION**

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

Facility/Project Name <b>IPL-Ottumwa Generating Station</b> SCS#: 25216148.00		License/Permit/Monitoring Number		Boring Number <b>MW-307</b>	
Boring Drilled By: Name of crew chief (first, last) and Firm <b>Mike Mueller Cascade Drilling</b>		Date Drilling Started <b>10/25/2016</b>		Date Drilling Completed <b>10/25/2016</b>	
Unique Well No.		DNR Well ID No.		Common Well Name <b>MW-307</b>	
Final Static Water Level <b>Feet</b>		Surface Elevation <b>655.1 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>401,707 N, 1,903,070 E S/C/N</b>		Lat <input type="checkbox"/> ° <input type="checkbox"/> ' <input type="checkbox"/> "		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
NE 1/4 of SE 1/4 of Section 26, T 73 N, R 15 W		Long <input type="checkbox"/> ° <input type="checkbox"/> ' <input type="checkbox"/> "		Feet <input type="checkbox"/> S <input type="checkbox"/> W	
Facility ID		County <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		
S1	24	22 32	1	POORLY GRADED SAND WITH GRAVEL, tan, fine to coarse sand and gravel, (construction fill sand to fill in hydrovac hole cleared to 8.5 ft bgs).	SP										
			2												
S2	14	41 44	11	LEAN CLAY, dark yellowish brown (10YR 4/4), slightly dense.	CL										
			12												

water level 6.5 ft bgs.

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

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

Environmental Consultants and Contractors

**SOIL BORING LOG INFORMATION**

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

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

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

water @ 6.5 ft bgs.

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

Signature 	Firm <b>SCS Engineers</b> 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 Fax:
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Route To:  Watershed/Wastewater  Waste Management   
 Remediation/Redevelopment  Other

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

Facility ID	County <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		
			1-9	Hydrovac borehole to 10 ft bgs.											
S1	33 67		10-11	LEAN CLAY, very dark grayish brown (10YR 3/2), trace sand.	CL						W				
S2	22 22		13-14								W				

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

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

Environmental Consultants and Contractors

**SOIL BORING LOG INFORMATION**

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


Facility/Project Name <b>IPL-Ottumwa Generating Station</b> SCS#: 25216148.00		License/Permit/Monitoring Number		Boring Number <b>B-309X</b>	
Boring Drilled By: Name of crew chief (first, last) and Firm <b>Mike Mueller Cascade Drilling</b>		Date Drilling Started <b>10/26/2016</b>		Date Drilling Completed <b>10/26/2016</b>	
Unique Well No.		DNR Well ID No.		Common Well Name	
Final Static Water Level Feet		Surface Elevation Feet		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>N, 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	
NE 1/4 of SE 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	U S C S	Graphic Log	Well Diagram	PID/FID	Soil Properties					RQD/ Comments
									Standard Penetration	Moisture Content	Liquid Limit	Plasticity Index	P 200	
S1	12	13 34	1	POORLY GRADED SAND WITH GRAVEL, tan, fine to coarse sand and gravel, (construction fill sand to fill in hydrovac hole cleared to 9 ft bgs).	SP									
			2											
			3											
S2	18	33 33	4	LEAN CLAY, dark brown (10YR 3/3), medium dense.	CL									
			5											
			6											
			7	SILT, dark brown (10YR 3/3), some clay.	ML									
			8											
			9											

Water at 6.5 ft bgs

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

Signature 	Firm <b>SCS Engineers</b> 2830 Dairy Drive Madison, WI 53711	Tel: (608) 224-2830 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>

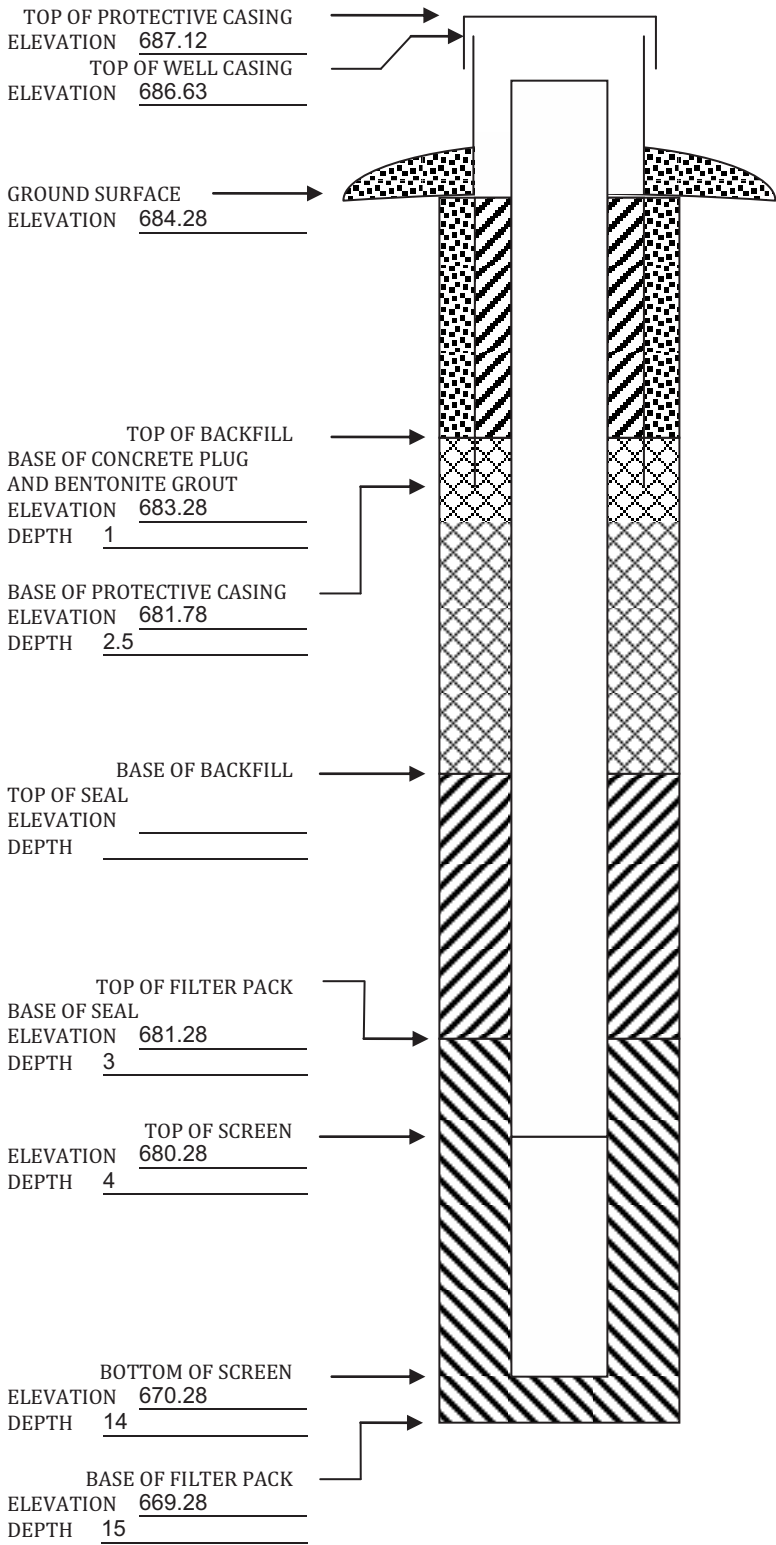
**Attachments: Driller's log, Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.**

**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-307

Dates Started: 10/25/16 Date Completed: 10/25/16

A. SURVEYED LOCATIONS AND ELEVATIONS B. SOIL BORING INFORMATION

Locations (± 0.5 ft): Specify corner of site: NE of Parcel 00305262020000
Distance & direction along boundary: 683' W
Distance & direction from boundary to wall: 296' S
Elevations (± 0.01 ft MSL): Ground Surface: 655.08
Top of protective casing: 657.58
Top of well casing: 657.56
Benchmark elevation:
Benchmark description:

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

C. MONITORING WELL INSTALLATION

Casing material: PVC sch 40
Length of casing: 22 ft
Outside casing diameter: 2.38"
Inside casing diameter: 2"
Casing joint type: threaded
Casing/screen joint type: threaded
Screen material: PVC
Screen opening size: 0.010"
Screen length: 5 ft
Depth of well: 27 ft
Filter Pack:
Material: Red Flint
Grain size: #40
Volume: 200 lbs
Seal (minimum 3 ft length above filter pack):
Material: 3/8 inch bentonite chips

Placement method: Gravity
Volume: 250 lbs
Backfill (if different from seal):
Material:
Placement method:
Volume:
Surface seal design:
Material of protective casing: Steel 6 inch
Material of grout between protective casing and well casing: sand
Protective cap:
Material: Steel, vented
Vented: Yes No Locking: Yes No
Well Cap:
Material: PVC
Vented: Yes No

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

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

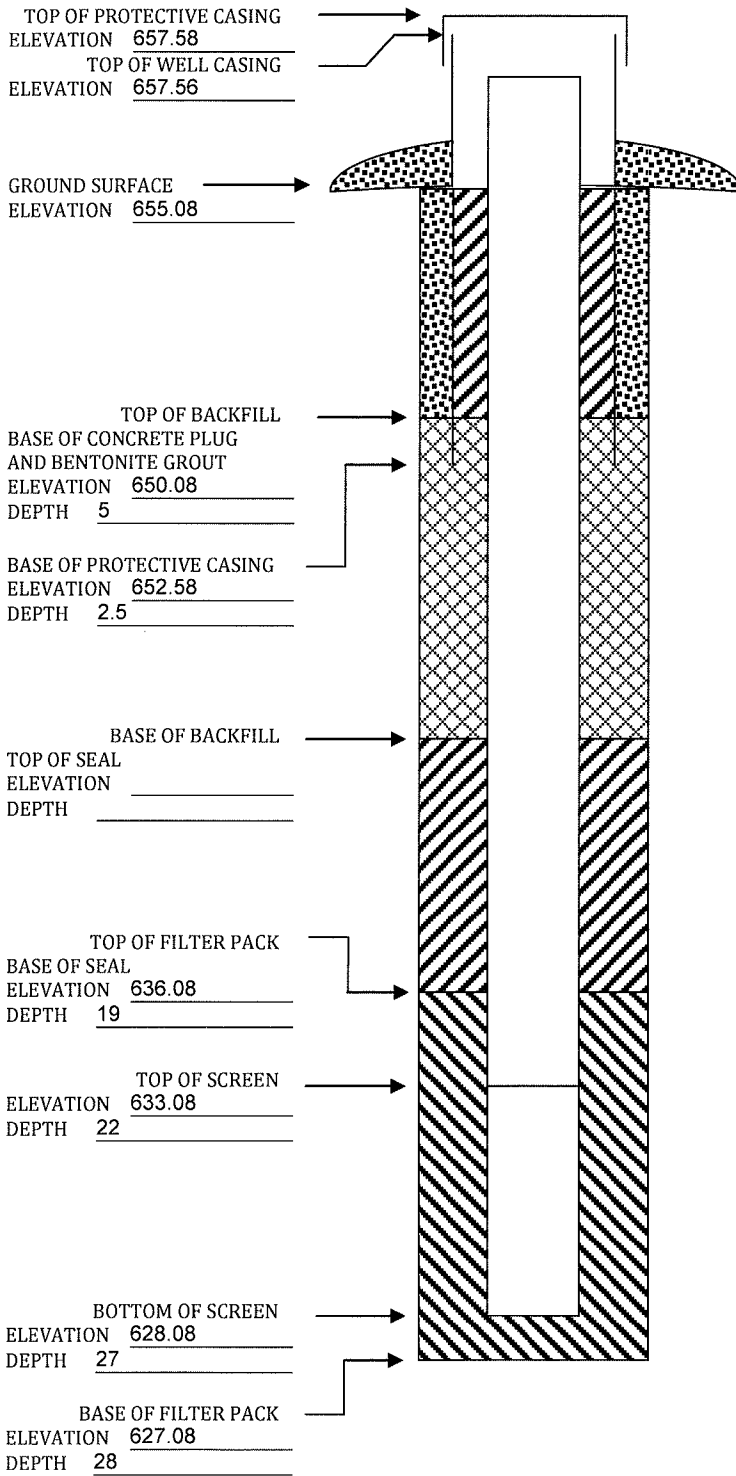
Attachments: Driller's log, Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.

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

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

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

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







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

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

**A. SURVEYED LOCATIONS AND ELEVATIONS**

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

**B. SOIL BORING INFORMATION**

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

**C. MONITORING WELL INSTALLATION**

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

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

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

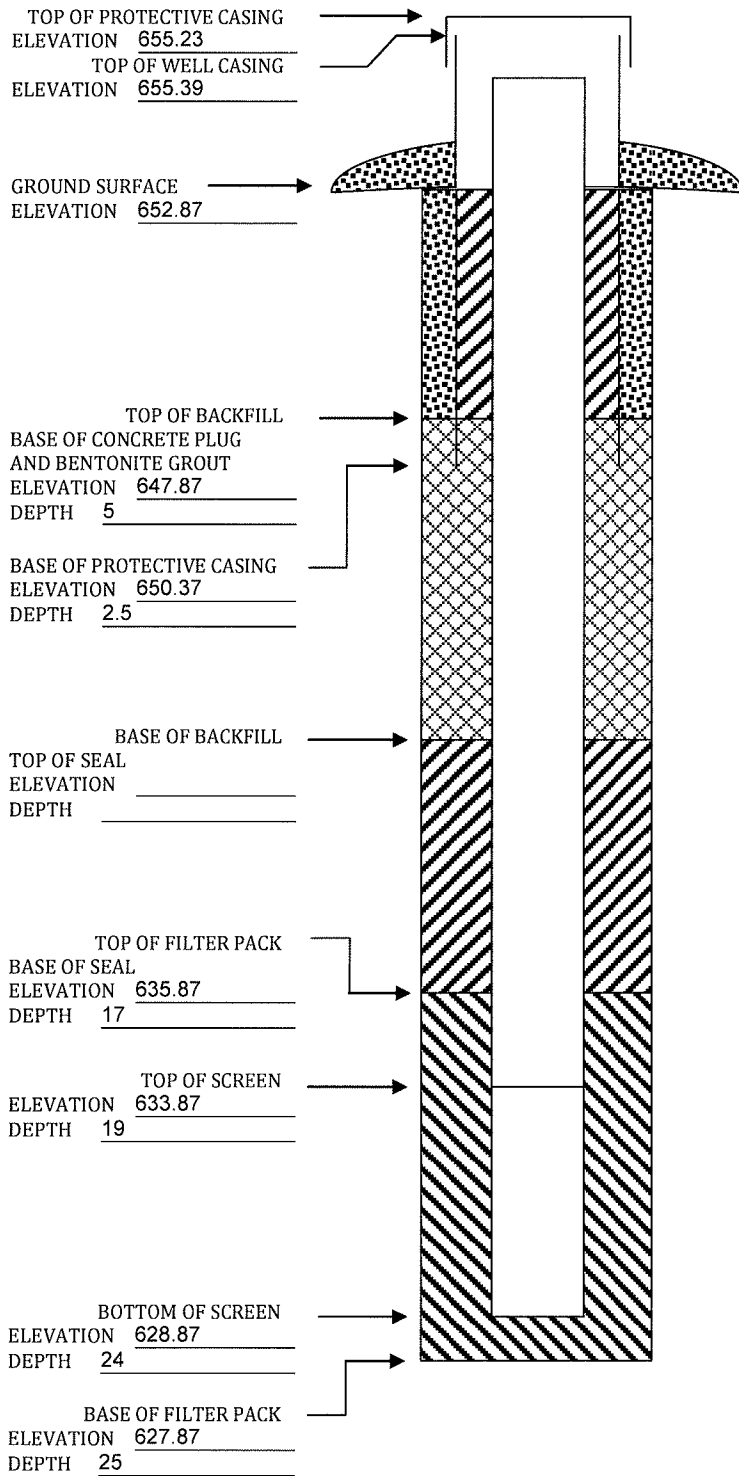
**Attachments: Driller's log, Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.**

**Please mail completed for to:** Iowa Department of Natural Resources, Land Quality Bureau, 502 E 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-309
Dates Started: 10/27/16 Date Completed: 10/27/16

A. SURVEYED LOCATIONS AND ELEVATIONS B. SOIL BORING INFORMATION

Locations (± 0.5 ft):
Specify corner of site: NE of Parcel 003052620204000
Distance & direction along boundary: 480' W
Distance & direction from boundary to wall: 438' S
Elevations (± 0.01 ft MSL):
Ground Surface: 652.45
Top of protective casing: 654.97
Top of well casing: 654.94
Benchmark elevation:
Benchmark description:

Name & Address of Construction Company:
Cascade Drilling, LP
301 Alderson St
Schofield, WI 54476
Name of Driller: Mike Mueller
Drilling Method: HSA
Drilling Fluid: NA
Bore Hole Diameter: 8 inch
Soil Sampling Method: Spoon
Depth of Boring: 27.5 ft

C. MONITORING WELL INSTALLATION

Casing material: PVC sch 40
Length of casing: 21.5 ft
Outside casing diameter: 2.38"
Inside casing diameter: 2"
Casing joint type: threaded
Casing/screen joint type: threaded
Screen material: PVC
Screen opening size: 0.010"
Screen length: 5 ft
Depth of well: 26.5 ft
Filter Pack:
Material: Red Flint
Grain size: #40
Volume: 200 lbs
Seal (minimum 3 ft length above filter pack):
Material: 3/8 inch bentonite chips

Placement method: Gravity
Volume: 600 lbs
Backfill (if different from seal):
Material:
Placement method:
Volume:
Surface seal design:
Material of protective casing: Steel 6 inch
Material of grout between protective casing and well casing: sand
Protective cap:
Material: Steel, vented
Vented: [X] Yes [ ] No Locking: [ ] Yes [ ] No
Well Cap:
Material: PVC
Vented: [ ] Yes [X] No

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

Water level: 9.87 Stabilization Time: 5 minutes
Well development method: surged with bailer and pumped
Average depth of frostline: 3.5'

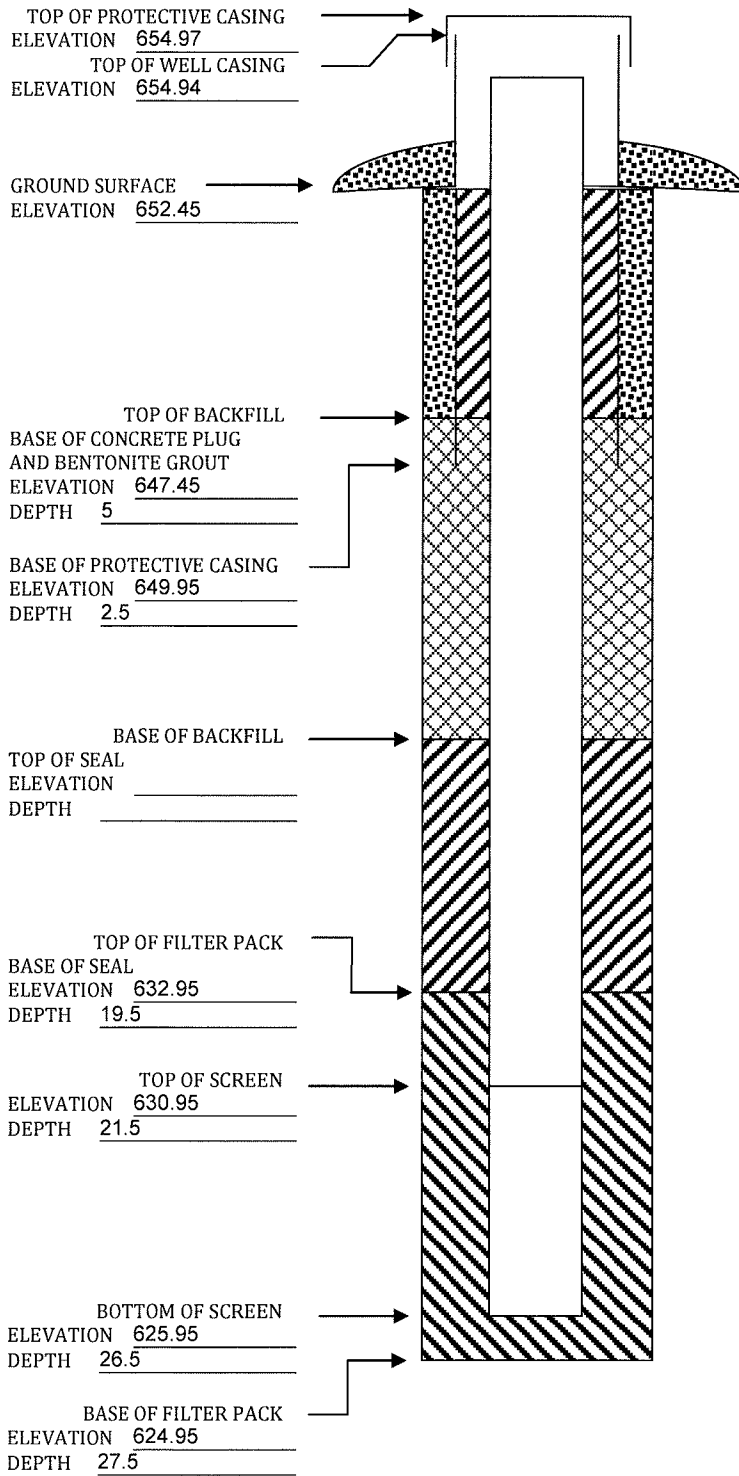
Attachments: Driller's log, Pipe schedules and grouting schedules. 8 1/2x11 inch map showing locations of all monitoring wells and piezometers.


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

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

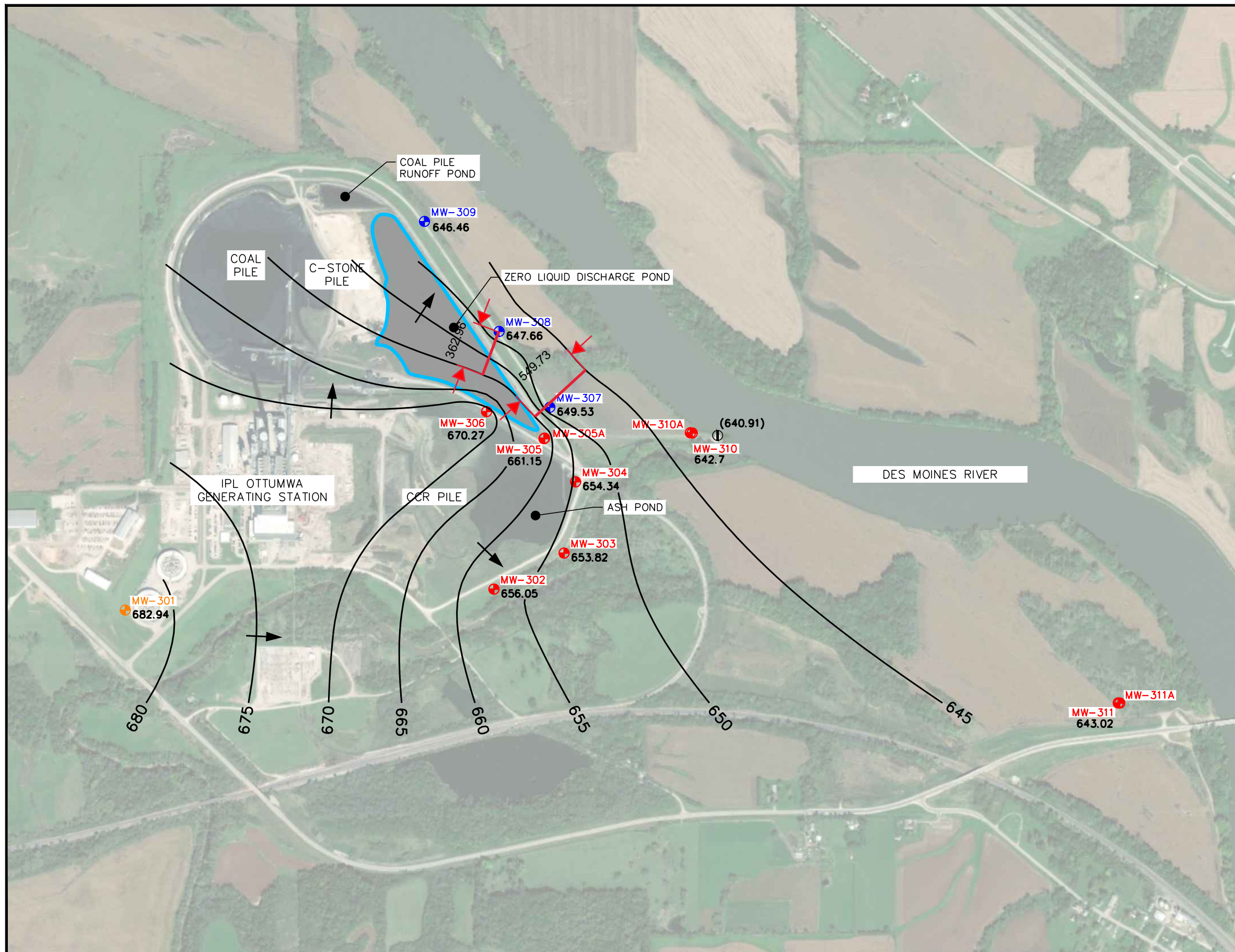
ELEVATIONS: ± 0.01 ft MSL  
DEPTHS: ± 0.1 ft FROM GROUND SURFACE

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





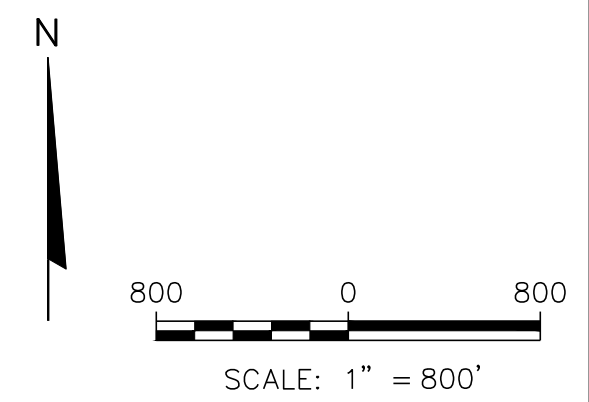
Appendix C  
Horizontal Gradient Measurement Locations



- LEGEND**
- CCR UNIT
  - CCR ZLDP MONITORING WELL
  - CCR ASH POND MONITORING WELL
  - CCR BACKGROUND MONITORING WELL
  - D 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

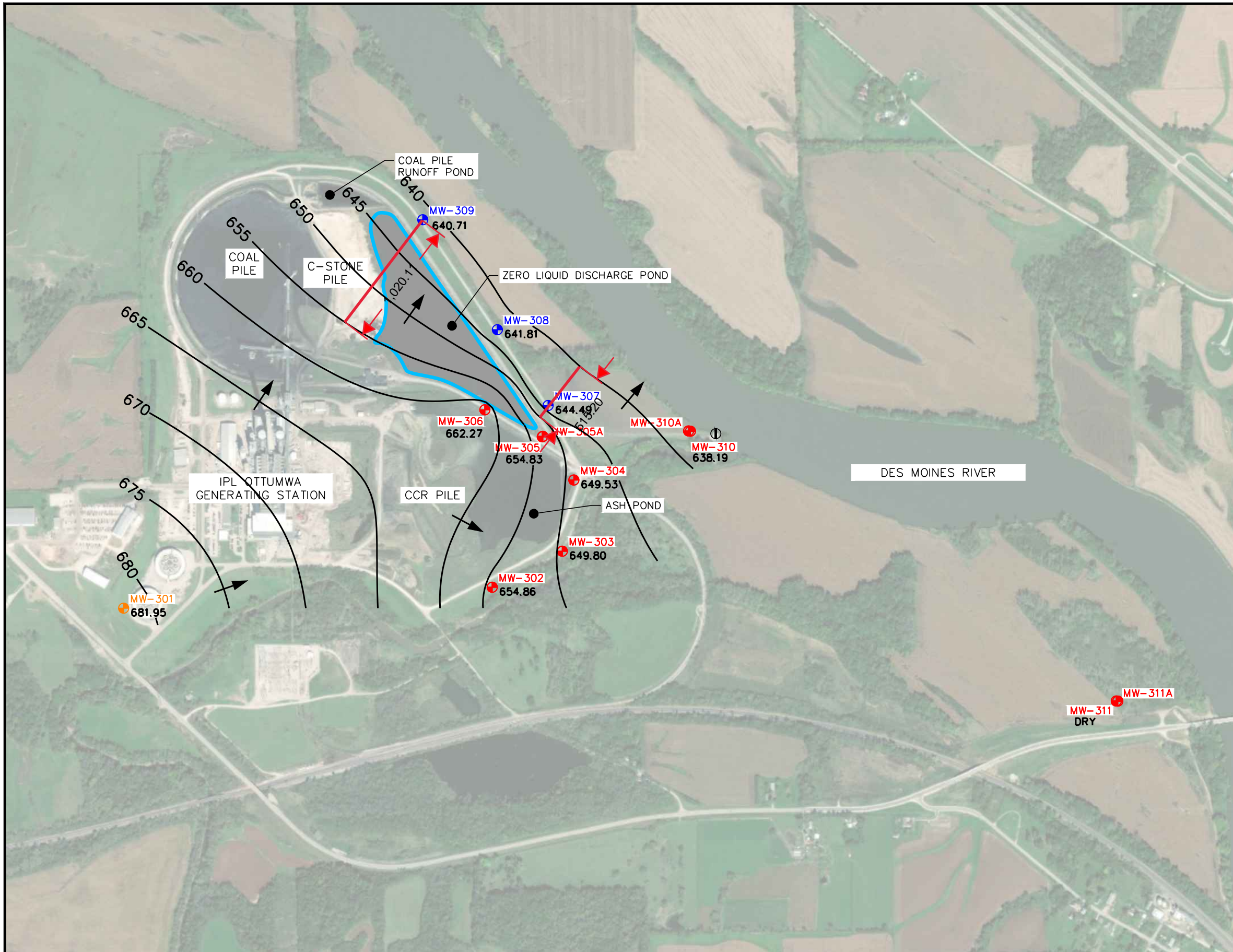
**NOTE:**

- THE BACKGROUND MONITORING WELL FOR THE OGS ZLDP 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	FIGURE		
DRAWN:	05/26/2021	CHECKED BY:	NDK							APPROVED BY:	TK 8/17/2021	APRIL 12-16, 2021	3
REVISED:	08/11/2021												

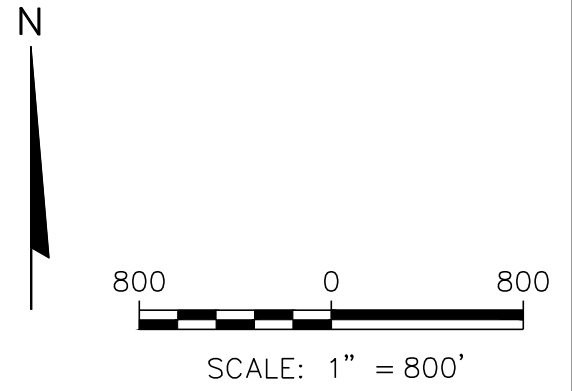
\\Mad\_s01\data\Projects\25221072.00\Drawings\Potentiometric Surface 2021 - LDP.dwg, 7/11/2021 10:54:37 AM



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


**NOTE:**

1. THE BACKGROUND MONITORING WELL FOR THE OGS ZLDP 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 OCTOBER 6-8, 2021	FIGURE
DRAWN:	10/28/2021	CHECKED BY:	NDK								5
REVISED:	01/05/2022	APPROVED BY:									

I:\25221072.00\Drawings\Potentiometric Surface 2021 - LDP.dwg, 1/5/2022 9:13:22 AM



Appendix D  
Analytical Laboratory Reports



## D1 February 2021 Assessment Monitoring

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-201014-1

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 1:51:21 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.*



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# Case Narrative

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

Job ID: 310-201014-1

---

**Job ID: 310-201014-1**

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**Laboratory: Eurofins TestAmerica, Cedar Falls**

---

**Narrative**

**Job Narrative**  
**310-201014-1**

**Comments**

No additional comments.

**Receipt**

The sample was received on 2/24/2021 6:00 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 3.4° C.

**Metals**

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

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
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# Sample Summary

Client: SCS Engineers

Job ID: 310-201014-1

Project/Site: Ottumwa Generating Station 25221072

---

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-201014-1	MW-307	Water	02/23/21 13:02	02/24/21 18:00	

---

- 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: 310-201014-1

**Client Sample ID: MW-307**

**Lab Sample ID: 310-201014-1**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cobalt	64		0.50	0.091	ug/L	1		6020A	Total/NA
Ground Water Elevation	646.80				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	0.8				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.20				mg/L	1		Field Sampling	Total/NA
pH, Field	6.50				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1632				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	12.2				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	2.41				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: 310-201014-1

**Client Sample ID: MW-307**

**Lab Sample ID: 310-201014-1**

Date Collected: 02/23/21 13:02

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	64		0.50	0.091	ug/L		03/01/21 09:00	03/02/21 14:21	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	646.80				ft			02/23/21 13:02	1
Oxidation Reduction Potential	0.8				millivolts			02/23/21 13:02	1
Oxygen, Dissolved, Client Supplied	0.20				mg/L			02/23/21 13:02	1
pH, Field	6.50				SU			02/23/21 13:02	1
Specific Conductance, Field	1632				umhos/cm			02/23/21 13:02	1
Temperature, Field	12.2				Degrees C			02/23/21 13:02	1
Turbidity, Field	2.41				NTU			02/23/21 13:02	1



## Definitions/Glossary

Client: SCS Engineers

Job ID: 310-201014-1

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: 310-201014-1

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

**Lab Sample ID: MB 310-308150/1-A**  
**Matrix: Water**  
**Analysis Batch: 308465**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 308150**

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 14:14	1

**Lab Sample ID: LCS 310-308150/2-A**  
**Matrix: Water**  
**Analysis Batch: 308465**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 308150**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cobalt	200	219		ug/L		109	80 - 120

**Lab Sample ID: 310-201014-1 MS**  
**Matrix: Water**  
**Analysis Batch: 308465**

**Client Sample ID: MW-307**  
**Prep Type: Total/NA**  
**Prep Batch: 308150**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Cobalt	64		200	277		ug/L		106	75 - 125

**Lab Sample ID: 310-201014-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 308465**

**Client Sample ID: MW-307**  
**Prep Type: Total/NA**  
**Prep Batch: 308150**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Cobalt	64		200	281		ug/L		108	75 - 125	2	20

# QC Association Summary

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

Job ID: 310-201014-1

## Metals

### Prep Batch: 308150

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-201014-1	MW-307	Total/NA	Water	3010A	
MB 310-308150/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-308150/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-201014-1 MS	MW-307	Total/NA	Water	3010A	
310-201014-1 MSD	MW-307	Total/NA	Water	3010A	

### Analysis Batch: 308465

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-201014-1	MW-307	Total/NA	Water	6020A	308150
MB 310-308150/1-A	Method Blank	Total/NA	Water	6020A	308150
LCS 310-308150/2-A	Lab Control Sample	Total/NA	Water	6020A	308150
310-201014-1 MS	MW-307	Total/NA	Water	6020A	308150
310-201014-1 MSD	MW-307	Total/NA	Water	6020A	308150

## Field Service / Mobile Lab

### Analysis Batch: 308123

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-201014-1	MW-307	Total/NA	Water	Field Sampling	

# Lab Chronicle

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

Job ID: 310-201014-1

**Client Sample ID: MW-307**

**Lab Sample ID: 310-201014-1**

**Date Collected: 02/23/21 13:02**

**Matrix: Water**

**Date Received: 02/24/21 18:00**

<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			308150	03/01/21 09:00	JNR	TAL CF
Total/NA	Analysis	6020A		1	308465	03/02/21 14:21	SAD	TAL CF
Total/NA	Analysis	Field Sampling		1	308123	02/23/21 13:02	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: 310-201014-1

## 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: 310-201014-1

Method	Method Description	Protocol	Laboratory
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



310-201014 Chain of Custody

**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: <u>Ottumwa Generating Station</u>
<b>Receipt Information:</b>			
Date/Time Received:	DATE <u>2-21-21</u>	TIME <u>1800</u>	Received By: <u>ET</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>3.1</u>	Corrected Temp (°C):	<u>3.1</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>			

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Client Information		Sampler		Lab PM:		Carrier Tracking No(s):		COC No.	
Client Contact: Meghan Blodgett		Phone: 264-993-0855		Fredrick, Sandie		310-58024-17087.1		310-58024-17087.1	
Company: SCS Engineers		E-Mail: sandra.fredrick@eurofinsnet.com		State of Origin:		Page: Page 1 of 1		Job #:	
Address: 2830 Dairy Drive		Due Date Requested:		Analysis Requested		Total Number of containers		Preservation Codes:	
City: Madison		TAT Requested (days):		Perform MS/MSD (Yes or No)		6029A - Cobalt		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
State, Zip: WI, 53718		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		Field Filtered Sample (Yes or No)		D		M - Hexane N - None O - AshNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
Phone: 264-993-0855		PO #: 25221072		Matrix (W-Water, S-Solid, O-Wastewater, B-Biofluids, A-Air)		X		Special Instructions/Note:	
Email: mblodgett@scsengineers.com		WC #: 31011020		Sample Type (C=Comp, G=Grab)		W			
Project Name: Ottumwa Generating Station 25221072		Sample Date		Preservation Code:		W			
Site: MW-307		Sample Time		Matrix		W			
		2-23-21 13:02		Water		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**  
 Relinquished by: *Tawnten Buszka* Date: 2-24-21 12:30  
 Relinquished by: Company: SCS  
 Relinquished by: Company: SCS  
 Relinquished by: Company: SCS

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



## Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-201014-1

**Login Number: 201014**

**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	





## D2 April 2021 Assessment Monitoring

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-204547-1

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 3:09:03 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.*



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# Case Narrative

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

Job ID: 310-204547-1

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## Job ID: 310-204547-1

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### Laboratory: Eurofins TestAmerica, Cedar Falls

#### Narrative

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#### Job Narrative 310-204547-1

#### 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 2.6° C.

#### HPLC/IC

Method 9056A: The following samples were diluted due to the nature of the sample matrix: MW-307 (310-204547-1), MW-308 (310-204547-2) and MW-309 (310-204547-3). Elevated reporting limits (RLs) are provided.

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

#### Metals

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

#### General Chemistry

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

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# Sample Summary

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

Job ID: 310-204547-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-204547-1	MW-307	Water	04/14/21 12:30	04/16/21 17:00	
310-204547-2	MW-308	Water	04/14/21 13:55	04/16/21 17:00	
310-204547-3	MW-309	Water	04/14/21 13:25	04/16/21 17:00	

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# Detection Summary

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

Job ID: 310-204547-1

## Client Sample ID: MW-307

## Lab Sample ID: 310-204547-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	210		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	92	F1	5.0	2.5	mg/L	5		9056A	Total/NA
Barium	160		2.0	0.30	ug/L	1		6020A	Total/NA
Boron	200		100	58	ug/L	1		6020A	Total/NA
Calcium	250		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	46		0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	14		10	2.5	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1000		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	649.53				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-39.9				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.41				mg/L	1		Field Sampling	Total/NA
pH, Field	6.59				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1675				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	11.5				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	21.2				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-308

## Lab Sample ID: 310-204547-2

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	270		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	140		2.0	0.30	ug/L	1		6020A	Total/NA
Boron	220		100	58	ug/L	1		6020A	Total/NA
Calcium	230		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.16	J	0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	16		10	2.5	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1100		30	26	mg/L	1		SM 2540C	Total/NA
pH	7.1	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	647.66				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-49.3				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.44				mg/L	1		Field Sampling	Total/NA
pH, Field	6.70				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1598				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	11.5				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	4.47				NTU	1		Field Sampling	Total/NA

## Client Sample ID: MW-309

## Lab Sample ID: 310-204547-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	57		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	360		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	52		2.0	0.30	ug/L	1		6020A	Total/NA
Boron	1400		100	58	ug/L	1		6020A	Total/NA
Calcium	130		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	2.3		0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	8.9	J	10	2.5	ug/L	1		6020A	Total/NA
Total Dissolved Solids	940		30	26	mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	646.46				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-40.6				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.36				mg/L	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Detection Summary

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

Job ID: 310-204547-1

**Client Sample ID: MW-309 (Continued)**

**Lab Sample ID: 310-204547-3**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
pH, Field	7.00				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1411				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	11.7				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	9.32				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: 310-204547-1

**Client Sample ID: MW-307**

**Lab Sample ID: 310-204547-1**

Date Collected: 04/14/21 12:30

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	210		5.0	2.2	mg/L			04/23/21 13:39	5
Fluoride	<0.28		0.50	0.28	mg/L			04/23/21 13:39	5
Sulfate	92	F1	5.0	2.5	mg/L			04/23/21 13:39	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		04/19/21 08:26	04/20/21 19:43	1
Arsenic	<0.75		2.0	0.75	ug/L		04/19/21 08:26	04/20/21 19:43	1
Barium	160		2.0	0.30	ug/L		04/19/21 08:26	04/20/21 19:43	1
Beryllium	<0.27		1.0	0.27	ug/L		04/19/21 08:26	04/20/21 19:43	1
Boron	200		100	58	ug/L		04/19/21 08:26	04/21/21 15:36	1
Cadmium	<0.051		0.10	0.051	ug/L		04/19/21 08:26	04/20/21 19:43	1
Calcium	250		0.50	0.19	mg/L		04/19/21 08:26	04/20/21 19:43	1
Chromium	<1.1		5.0	1.1	ug/L		04/19/21 08:26	04/20/21 19:43	1
Cobalt	46		0.50	0.091	ug/L		04/19/21 08:26	04/20/21 19:43	1
Lead	<0.21		0.50	0.21	ug/L		04/19/21 08:26	04/20/21 19:43	1
Lithium	14		10	2.5	ug/L		04/19/21 08:26	04/20/21 19:43	1
Molybdenum	<1.3		2.0	1.3	ug/L		04/19/21 08:26	04/20/21 19:43	1
Selenium	<0.96		5.0	0.96	ug/L		04/19/21 08:26	04/20/21 19:43	1
Thallium	<0.26		1.0	0.26	ug/L		04/19/21 08:26	04/21/21 15:36	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 14:04	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1000		30	26	mg/L			04/19/21 13:42	1
pH	6.8	HF	0.1	0.1	SU			04/16/21 20:02	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	649.53				ft			04/14/21 12:30	1
Oxidation Reduction Potential	-39.9				millivolts			04/14/21 12:30	1
Oxygen, Dissolved, Client Supplied	0.41				mg/L			04/14/21 12:30	1
pH, Field	6.59				SU			04/14/21 12:30	1
Specific Conductance, Field	1675				umhos/cm			04/14/21 12:30	1
Temperature, Field	11.5				Degrees C			04/14/21 12:30	1
Turbidity, Field	21.2				NTU			04/14/21 12:30	1



# Client Sample Results

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

Job ID: 310-204547-1

**Client Sample ID: MW-308**

**Lab Sample ID: 310-204547-2**

Date Collected: 04/14/21 13:55

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>150</b>		5.0	2.2	mg/L			04/23/21 14:26	5
Fluoride	<0.28		0.50	0.28	mg/L			04/23/21 14:26	5
<b>Sulfate</b>	<b>270</b>		5.0	2.5	mg/L			04/23/21 14:26	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		04/19/21 08:26	04/20/21 19:46	1
Arsenic	<0.75		2.0	0.75	ug/L		04/19/21 08:26	04/20/21 19:46	1
<b>Barium</b>	<b>140</b>		2.0	0.30	ug/L		04/19/21 08:26	04/20/21 19:46	1
Beryllium	<0.27		1.0	0.27	ug/L		04/19/21 08:26	04/20/21 19:46	1
<b>Boron</b>	<b>220</b>		100	58	ug/L		04/19/21 08:26	04/21/21 15:38	1
Cadmium	<0.051		0.10	0.051	ug/L		04/19/21 08:26	04/20/21 19:46	1
<b>Calcium</b>	<b>230</b>		0.50	0.19	mg/L		04/19/21 08:26	04/20/21 19:46	1
Chromium	<1.1		5.0	1.1	ug/L		04/19/21 08:26	04/20/21 19:46	1
<b>Cobalt</b>	<b>0.16</b>	<b>J</b>	0.50	0.091	ug/L		04/19/21 08:26	04/20/21 19:46	1
Lead	<0.21		0.50	0.21	ug/L		04/19/21 08:26	04/20/21 19:46	1
<b>Lithium</b>	<b>16</b>		10	2.5	ug/L		04/19/21 08:26	04/20/21 19:46	1
Molybdenum	<1.3		2.0	1.3	ug/L		04/19/21 08:26	04/20/21 19:46	1
Selenium	<0.96		5.0	0.96	ug/L		04/19/21 08:26	04/20/21 19:46	1
Thallium	<0.26		1.0	0.26	ug/L		04/19/21 08:26	04/21/21 15:38	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 14:06	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>1100</b>		30	26	mg/L			04/19/21 13:42	1
<b>pH</b>	<b>7.1</b>	<b>HF</b>	0.1	0.1	SU			04/16/21 19:59	1

### Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Ground Water Elevation</b>	<b>647.66</b>				ft			04/14/21 13:55	1
<b>Oxidation Reduction Potential</b>	<b>-49.3</b>				millivolts			04/14/21 13:55	1
<b>Oxygen, Dissolved, Client Supplied</b>	<b>0.44</b>				mg/L			04/14/21 13:55	1
<b>pH, Field</b>	<b>6.70</b>				SU			04/14/21 13:55	1
<b>Specific Conductance, Field</b>	<b>1598</b>				umhos/cm			04/14/21 13:55	1
<b>Temperature, Field</b>	<b>11.5</b>				Degrees C			04/14/21 13:55	1
<b>Turbidity, Field</b>	<b>4.47</b>				NTU			04/14/21 13:55	1

# Client Sample Results

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

Job ID: 310-204547-1

**Client Sample ID: MW-309**

**Lab Sample ID: 310-204547-3**

Date Collected: 04/14/21 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	57		5.0	2.2	mg/L			04/23/21 14:41	5
Fluoride	<0.28		0.50	0.28	mg/L			04/23/21 14:41	5
Sulfate	360		5.0	2.5	mg/L			04/23/21 14:41	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		04/19/21 08:26	04/20/21 19:48	1
Arsenic	<0.75		2.0	0.75	ug/L		04/19/21 08:26	04/20/21 19:48	1
Barium	52		2.0	0.30	ug/L		04/19/21 08:26	04/20/21 19:48	1
Beryllium	<0.27		1.0	0.27	ug/L		04/19/21 08:26	04/20/21 19:48	1
Boron	1400		100	58	ug/L		04/19/21 08:26	04/21/21 15:41	1
Cadmium	<0.051		0.10	0.051	ug/L		04/19/21 08:26	04/20/21 19:48	1
Calcium	130		0.50	0.19	mg/L		04/19/21 08:26	04/20/21 19:48	1
Chromium	<1.1		5.0	1.1	ug/L		04/19/21 08:26	04/20/21 19:48	1
Cobalt	2.3		0.50	0.091	ug/L		04/19/21 08:26	04/20/21 19:48	1
Lead	<0.21		0.50	0.21	ug/L		04/19/21 08:26	04/20/21 19:48	1
Lithium	8.9	J	10	2.5	ug/L		04/19/21 08:26	04/20/21 19:48	1
Molybdenum	<1.3		2.0	1.3	ug/L		04/19/21 08:26	04/20/21 19:48	1
Selenium	<0.96		5.0	0.96	ug/L		04/19/21 08:26	04/20/21 19:48	1
Thallium	<0.26		1.0	0.26	ug/L		04/19/21 08:26	04/21/21 15:41	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 14:08	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	940		30	26	mg/L			04/19/21 13:42	1
pH	7.3	HF	0.1	0.1	SU			04/16/21 17:04	1

## Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	646.46				ft			04/14/21 13:25	1
Oxidation Reduction Potential	-40.6				millivolts			04/14/21 13:25	1
Oxygen, Dissolved, Client Supplied	0.36				mg/L			04/14/21 13:25	1
pH, Field	7.00				SU			04/14/21 13:25	1
Specific Conductance, Field	1411				umhos/cm			04/14/21 13:25	1
Temperature, Field	11.7				Degrees C			04/14/21 13:25	1
Turbidity, Field	9.32				NTU			04/14/21 13:25	1

# Definitions/Glossary

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

Job ID: 310-204547-1

## Qualifiers

### HPLC/IC

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F1	MS and/or MSD recovery exceeds control limits.

### 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: 310-204547-1

## 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

**Lab Sample ID: 310-204547-1 MS**  
**Matrix: Water**  
**Analysis Batch: 314219**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	210		25.0	219	4	mg/L		28	80 - 120
Fluoride	<0.28		5.00	4.67		mg/L		93	80 - 120
Sulfate	92	F1	25.0	111	F1	mg/L		78	80 - 120

**Lab Sample ID: 310-204547-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 314219**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	210		25.0	221	4	mg/L		37	80 - 120	1	15
Fluoride	<0.28		5.00	5.03		mg/L		101	80 - 120	7	15
Sulfate	92	F1	25.0	113		mg/L		84	80 - 120	1	15

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

**Lab Sample ID: MB 310-313149/1-A**  
**Matrix: Water**  
**Analysis Batch: 313453**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 313149**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<1.1		2.0	1.1	ug/L		04/19/21 08:26	04/20/21 18:14	1
Arsenic	<0.75		2.0	0.75	ug/L		04/19/21 08:26	04/20/21 18:14	1
Barium	<0.30		2.0	0.30	ug/L		04/19/21 08:26	04/20/21 18:14	1
Beryllium	<0.27		1.0	0.27	ug/L		04/19/21 08:26	04/20/21 18:14	1
Cadmium	<0.051		0.10	0.051	ug/L		04/19/21 08:26	04/20/21 18:14	1
Calcium	<0.19		0.50	0.19	mg/L		04/19/21 08:26	04/20/21 18:14	1
Chromium	<1.1		5.0	1.1	ug/L		04/19/21 08:26	04/20/21 18:14	1
Cobalt	<0.091		0.50	0.091	ug/L		04/19/21 08:26	04/20/21 18:14	1
Lead	<0.21		0.50	0.21	ug/L		04/19/21 08:26	04/20/21 18:14	1
Lithium	<2.5		10	2.5	ug/L		04/19/21 08:26	04/20/21 18:14	1
Molybdenum	<1.3		2.0	1.3	ug/L		04/19/21 08:26	04/20/21 18:14	1
Selenium	<0.96		5.0	0.96	ug/L		04/19/21 08:26	04/20/21 18:14	1

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# QC Sample Results

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

Job ID: 310-204547-1

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

**Lab Sample ID: MB 310-313149/1-A**  
**Matrix: Water**  
**Analysis Batch: 313453**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 313149**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	<0.26		1.0	0.26	ug/L		04/19/21 08:26	04/20/21 18:14	1

**Lab Sample ID: MB 310-313149/1-A**  
**Matrix: Water**  
**Analysis Batch: 313546**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 313149**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	<58		100	58	ug/L		04/19/21 08:26	04/21/21 14:53	1

**Lab Sample ID: LCS 310-313149/2-A**  
**Matrix: Water**  
**Analysis Batch: 313453**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 313149**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Antimony	200	202		ug/L		101	80 - 120
Arsenic	200	208		ug/L		104	80 - 120
Barium	100	108		ug/L		108	80 - 120
Beryllium	100	101		ug/L		101	80 - 120
Cadmium	100	104		ug/L		104	80 - 120
Calcium	2.00	1.71		mg/L		86	80 - 120
Chromium	100	104		ug/L		104	80 - 120
Cobalt	100	102		ug/L		102	80 - 120
Lead	200	204		ug/L		102	80 - 120
Lithium	200	197		ug/L		98	80 - 120
Molybdenum	200	204		ug/L		102	80 - 120
Selenium	400	403		ug/L		101	80 - 120
Thallium	200	216		ug/L		108	80 - 120

**Lab Sample ID: LCS 310-313149/2-A**  
**Matrix: Water**  
**Analysis Batch: 313546**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 313149**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Boron	200	198		ug/L		99	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	Limits
Mercury	1.67	1.53		ug/L		92	80 - 120

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# QC Sample Results

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

Job ID: 310-204547-1

## 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 310-313064/59  
 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

# QC Association Summary

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

Job ID: 310-204547-1

## HPLC/IC

### Analysis Batch: 314219

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204547-1	MW-307	Total/NA	Water	9056A	
310-204547-2	MW-308	Total/NA	Water	9056A	
310-204547-3	MW-309	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	
310-204547-1 MS	MW-307	Total/NA	Water	9056A	
310-204547-1 MSD	MW-307	Total/NA	Water	9056A	

## Metals

### Prep Batch: 313149

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204547-1	MW-307	Total/NA	Water	3010A	
310-204547-2	MW-308	Total/NA	Water	3010A	
310-204547-3	MW-309	Total/NA	Water	3010A	
MB 310-313149/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-313149/2-A	Lab Control Sample	Total/NA	Water	3010A	

### Analysis Batch: 313453

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204547-1	MW-307	Total/NA	Water	6020A	313149
310-204547-2	MW-308	Total/NA	Water	6020A	313149
310-204547-3	MW-309	Total/NA	Water	6020A	313149
MB 310-313149/1-A	Method Blank	Total/NA	Water	6020A	313149
LCS 310-313149/2-A	Lab Control Sample	Total/NA	Water	6020A	313149

### Analysis Batch: 313546

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204547-1	MW-307	Total/NA	Water	6020A	313149
310-204547-2	MW-308	Total/NA	Water	6020A	313149
310-204547-3	MW-309	Total/NA	Water	6020A	313149
MB 310-313149/1-A	Method Blank	Total/NA	Water	6020A	313149
LCS 310-313149/2-A	Lab Control Sample	Total/NA	Water	6020A	313149

### Prep Batch: 313631

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204547-1	MW-307	Total/NA	Water	7470A	
310-204547-2	MW-308	Total/NA	Water	7470A	
310-204547-3	MW-309	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
310-204547-1	MW-307	Total/NA	Water	7470A	313631
310-204547-2	MW-308	Total/NA	Water	7470A	313631
310-204547-3	MW-309	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

# QC Association Summary

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

Job ID: 310-204547-1

## General Chemistry

### Analysis Batch: 313064

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204547-3	MW-309	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
310-204547-1	MW-307	Total/NA	Water	SM 4500 H+ B	
310-204547-2	MW-308	Total/NA	Water	SM 4500 H+ B	
LCS 310-313078/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

### Analysis Batch: 313222

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204547-1	MW-307	Total/NA	Water	SM 2540C	
310-204547-2	MW-308	Total/NA	Water	SM 2540C	
310-204547-3	MW-309	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: 313742

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204547-1	MW-307	Total/NA	Water	Field Sampling	
310-204547-2	MW-308	Total/NA	Water	Field Sampling	
310-204547-3	MW-309	Total/NA	Water	Field Sampling	



# Lab Chronicle

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

Job ID: 310-204547-1

**Client Sample ID: MW-307**

**Lab Sample ID: 310-204547-1**

**Date Collected: 04/14/21 12:30**

**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	Analysis	9056A		5	314219	04/23/21 13:39	JNR	TAL CF
Total/NA	Prep	3010A			313149	04/19/21 08:26	JNR	TAL CF
Total/NA	Analysis	6020A		1	313453	04/20/21 19:43	SAD	TAL CF
Total/NA	Prep	3010A			313149	04/19/21 08:26	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 15:36	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 14:04	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 20:02	GRS	TAL CF
Total/NA	Analysis	Field Sampling		1	313742	04/14/21 12:30	SLD	TAL CF

**Client Sample ID: MW-308**

**Lab Sample ID: 310-204547-2**

**Date Collected: 04/14/21 13:55**

**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	Analysis	9056A		5	314219	04/23/21 14:26	JNR	TAL CF
Total/NA	Prep	3010A			313149	04/19/21 08:26	JNR	TAL CF
Total/NA	Analysis	6020A		1	313453	04/20/21 19:46	SAD	TAL CF
Total/NA	Prep	3010A			313149	04/19/21 08:26	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 15:38	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 14:06	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 19:59	GRS	TAL CF
Total/NA	Analysis	Field Sampling		1	313742	04/14/21 13:55	SLD	TAL CF

**Client Sample ID: MW-309**

**Lab Sample ID: 310-204547-3**

**Date Collected: 04/14/21 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 14:41	JNR	TAL CF
Total/NA	Prep	3010A			313149	04/19/21 08:26	JNR	TAL CF
Total/NA	Analysis	6020A		1	313453	04/20/21 19:48	SAD	TAL CF
Total/NA	Prep	3010A			313149	04/19/21 08:26	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 15:41	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 14:08	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	313064	04/16/21 17:04	AJW	TAL CF
Total/NA	Analysis	Field Sampling		1	313742	04/14/21 13:25	SLD	TAL CF

# Lab Chronicle

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

Job ID: 310-204547-1

**Laboratory References:**

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

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# Accreditation/Certification Summary

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

Job ID: 310-204547-1

## 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: 310-204547-1

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



310-204547 Chain of Custody

Cooler/Sample Receipt and Temperature Log

Client Information		
Client: <u>SOS Engineers</u>		
City/State: <u>Madison WI</u>	Project: <u>Ottumwa Gen. Station</u>	
Receipt Information		
Date/Time Received: <u>4-16-21 1100</u>	Received By: <u>EN</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>AB-79</u>
Multiple Coolers?	<input checked="" 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 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-307, MW-308, MW-309</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>2.6</u>	
Corrected Temp (°C):	<u>2.4</u>	
Exceptions Noted		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
Additional Comments		

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

Eurofins TestAmerica, Cedar Falls

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

<b>Client Information</b>		Sampler: <u>Tamten Buscke</u>		Lab PM: <u>Fredrick, Sandie</u>		Carrier Tracking No(s): <u>310-59843-17489 1</u>	
Client Contact: <u>Megnan Blodgett</u>		Phone: <u>769-993-0855</u>		E-Mail: <u>sandira.fredrick@eurofinset.com</u>		State of Origin:	
Company: <u>SCS Engineers</u>		PWSID:		Analysis Requested:		COC No: <u>310-59843-17489 1</u>	
Address: <u>2830 Dairy Drive</u>		Due Date Requested:		Field Filtered Sample (Yes or No)		Total Number of Containers: <u>X</u>	
City: <u>Madison</u>		TAT Requested (days):		Perform MS/MSD (Yes or No)		Special Instructions/Note:	
State, Zip: <u>WI, 53718</u>		Compliance Project: <u>Δ Yes Δ No</u>		903 - Radium-226 (GFC)		M - Hexane	
Phone: <u>769-993-0855</u>		PO #: <u>25221072</u>		904 - Radium-228 (GFC)		N - None	
Email: <u>mblodgett@scsengineers.com</u>		WO #: <u>        </u>		5056A - ORGM_280 - Chloride Fluoride & Sulfate		O - AsNaO2	
Project Name: <u>Ottumwa Generating Station - 25221072</u>		Project #: <u>31011020</u>		6020A, 7470A		P - Na2SO4S	
Site: <u>OUS</u>		SSOW#: <u>        </u>		2540C_Calc'd, SM4500_H+		Q - NaHSO4	
<b>Sample Identification</b>		Sample Date		Sample Time		Sample Matrix	
MW-307		4-14-21		12:30		Water	
MW-308		4-14-21		13:55		Water	
MW-309		4-14-21		15:25		Water	
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)		<input type="checkbox"/> Poison B		<input checked="" type="checkbox"/> Unknown		<input type="checkbox"/> Radiological	
Empty Kit Relinquished by		Date:		Time:		Method of Shipment:	
Relinquished by: <u>Tamten Buscke</u>		Date/Time: <u>4-16-21 14:00</u>		Company: <u>SCS</u>		Date/Time: <u>4-16-21 1700</u>	
Relinquished by:		Date/Time:		Company:		Date/Time:	
Relinquished by:		Date/Time:		Company:		Date/Time:	
Custody Seals Intact: <u>Δ Yes Δ No</u>		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		Return To Client <input checked="" type="checkbox"/> Archive For <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Months	
Special Instructions/QC Requirements:		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)		Return To Client <input type="checkbox"/> Archive For <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Months		Special Instructions/Note:	



**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: 310-204547-1

**Login Number: 204547**

**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

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: 310-204547-2

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 7:38:06 AM*

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

### LINKS

Review your project  
results through  
**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.*

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# Case Narrative

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

Job ID: 310-204547-2

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## Job ID: 310-204547-2

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### Laboratory: Eurofins TestAmerica, Cedar Falls

#### Narrative

#### Job Narrative 310-204547-2

#### 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 2.6° 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. (LCS 160-506413/1-A) and (LCSD 160-506413/2-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-307 (310-204547-1), MW-308 (310-204547-2), MW-309 (310-204547-3), (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-307 (310-204547-1), MW-308 (310-204547-2) and MW-309 (310-204547-3). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep-21: Radium 226 Prep Batch 160-506413: Insufficient sample volume was available to perform a sample duplicate (DUP) for the following samples: MW-307 (310-204547-1), MW-308 (310-204547-2) and MW-309 (310-204547-3). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

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

# Sample Summary

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

Job ID: 310-204547-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-204547-1	MW-307	Water	04/14/21 12:30	04/16/21 17:00	
310-204547-2	MW-308	Water	04/14/21 13:55	04/16/21 17:00	
310-204547-3	MW-309	Water	04/14/21 13:25	04/16/21 17:00	

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# Detection Summary

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

Job ID: 310-204547-2

**Client Sample ID: MW-307**

**Lab Sample ID: 310-204547-1**

No Detections.

**Client Sample ID: MW-308**

**Lab Sample ID: 310-204547-2**

No Detections.

**Client Sample ID: MW-309**

**Lab Sample ID: 310-204547-3**

No Detections.

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This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls

# Client Sample Results

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

Job ID: 310-204547-2

**Client Sample ID: MW-307**

**Lab Sample ID: 310-204547-1**

Date Collected: 04/14/21 12:30

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	1.99		0.268	0.323	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	77.9		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	1.09		0.356	0.369	1.00	0.458	pCi/L	04/21/21 10:55	05/06/21 20:32	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	77.9		40 - 110					04/21/21 10:55	05/06/21 20:32	1
Y Carrier	79.3		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	3.08		0.446	0.490	5.00	0.458	pCi/L		05/17/21 21:22	1

# Client Sample Results

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

Job ID: 310-204547-2

**Client Sample ID: MW-308**

**Lab Sample ID: 310-204547-2**

Date Collected: 04/14/21 13:55

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	1.36		0.293	0.317	1.00	0.215	pCi/L	04/21/21 10:34	05/15/21 10:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	45.2		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	1.51		0.584	0.600	1.00	0.797	pCi/L	04/21/21 10:55	05/06/21 20:32	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	45.2		40 - 110					04/21/21 10:55	05/06/21 20:32	1
Y Carrier	84.1		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	2.87		0.653	0.679	5.00	0.797	pCi/L		05/17/21 21:22	1



# Client Sample Results

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

Job ID: 310-204547-2

**Client Sample ID: MW-309**

**Lab Sample ID: 310-204547-3**

Date Collected: 04/14/21 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	0.604		0.165	0.174	1.00	0.151	pCi/L	04/21/21 10:34	05/15/21 10:53	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	73.6		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	0.448	U	0.335	0.338	1.00	0.527	pCi/L	04/21/21 10:55	05/06/21 20:32	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	73.6		40 - 110					04/21/21 10:55	05/06/21 20:32	1
Y Carrier	84.9		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	1.05		0.373	0.380	5.00	0.527	pCi/L		05/17/21 21:22	1

# Definitions/Glossary

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

Job ID: 310-204547-2

## 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: 310-204547-2

## 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		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB 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 %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
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 %Yield	LCS Qualifier	Limits		Prepared	Analyzed	Dil Fac		
Ba Carrier	69.7		40 - 110					04/21/21 10:34	05/15/21 11:00

**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 %Yield	LCSD Qualifier	Limits		Prepared	Analyzed	Dil Fac				
Ba Carrier	71.2		40 - 110					04/21/21 10:55	05/06/21 20:29	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		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB 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 %Yield	MB Qualifier	Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	71.5		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			

# QC Sample Results

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

Job ID: 310-204547-2

## 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: 310-204547-2

## Rad

### Prep Batch: 506413

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204547-1	MW-307	Total/NA	Water	PrecSep-21	
310-204547-2	MW-308	Total/NA	Water	PrecSep-21	
310-204547-3	MW-309	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
310-204547-1	MW-307	Total/NA	Water	PrecSep_0	
310-204547-2	MW-308	Total/NA	Water	PrecSep_0	
310-204547-3	MW-309	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: 310-204547-2

## Client Sample ID: MW-307

Date Collected: 04/14/21 12:30

Date Received: 04/16/21 17:00

## Lab Sample ID: 310-204547-1

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: MW-308

Date Collected: 04/14/21 13:55

Date Received: 04/16/21 17:00

## Lab Sample ID: 310-204547-2

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 10:53	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: MW-309

Date Collected: 04/14/21 13:25

Date Received: 04/16/21 17:00

## Lab Sample ID: 310-204547-3

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

### 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: 310-204547-2

## 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: 310-204547-2

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:

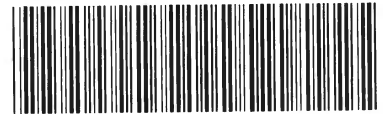
- TAL SL = Eurofins TestAmerica, St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566







Environment Testing  
TestAmerica



310-204547 Chain of Custody

**Cooler/Sample Receipt and Temperature Log**

Client Information		
Client: <u>SOS Engineers</u>		
City/State: <u>Madison WI</u>	Project: <u>Ottumwa Gen. Station</u>	
Receipt Information		
Date/Time Received: <u>4-16-21 1100</u>	Received By: <u>EN</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>AB-79</u>
Multiple Coolers?	<input checked="" 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 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-307, MW-308, MW 309</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>2.6</u>	
Corrected Temp (°C):	<u>2.4</u>	
Exceptions Noted		
1) If temperature exceeds criteria, was sample(s) received same day of sampling? <input type="checkbox"/> Yes <input type="checkbox"/> No		
a) If yes: Is there evidence that the chilling process began? <input type="checkbox"/> Yes <input type="checkbox"/> No		
2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) <input type="checkbox"/> Yes <input type="checkbox"/> No		
NOTE: If yes, contact PM before proceeding. If no, proceed with login		
Additional Comments		

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

Eurofins TestAmerica, Cedar Falls

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

<b>Client Information</b>		Sampler: <u>Tamten Buscke</u>		Lab PM: <u>Fredrick, Sandie</u>		Carrier Tracking No(s): <u>310-59843-17489 1</u>	
Client Contact: <u>Meghan Blodgett</u>		Phone: <u>264-943-0855</u>		E-Mail: <u>sandra.fredrick@eurofinset.com</u>		State of Origin:	
Company: <u>SCS Engineers</u>		PWSID:		Analysis Requested:		COC No: <u>310-59843-17489 1</u>	
Address: <u>2830 Dairy Drive</u>		Due Date Requested:		Field Filtered Sample (Yes or No)		Page: <u>Page 1 of 1</u>	
City: <u>Madison</u>		TAT Requested (days):		Perform MS/MSD (Yes or No)		Job #:	
State, Zip: <u>WI, 53718</u>		Compliance Project: <u>Δ Yes Δ No</u>		903 - Radium-226 (GFC)		Preservation Codes:	
Phone: <u>264-943-0855</u>		PO #: <u>25221072</u>		904 - Radium-228 (GFC)		A - HCL	
Email: <u>mblodgett@scsengineers.com</u>		WO #: <u>045</u>		5056A - ORGM_280 - Chloride Fluoride & Sulfate		M - Hexane	
Project Name: <u>Ottumwa Generating Station - 25221072</u>		Project #: <u>31011020</u>		6020A, 7470A		N - None	
Site: <u>045</u>		SSOW#:		2540C_Calcd, SM4500_H+		O - AsNaO2	
<b>Sample Identification</b>		Sample Date		Sample Time		Sample Type (C=comp, G=grab)	
Matrix (W=water, S=solid, O=wastefl, BI=tissue, A=ur)		Preservation Code:		Matrix		P - Na2S4S	
MW-307		4-14-21		12:30		G	
MW-308		4-14-21		13:55		G	
MW-309		4-14-21		15:25		G	
Special Instructions/Note:		Total Number of Containers:		Special Instructions/Note:		Q - Na2SO3	
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)		Return To Client <input type="checkbox"/>		Disposal By Lab <input checked="" type="checkbox"/>		R - Na2SO3	
Deliverable Requested: I, II, III, IV, Other (specify)		Poison B <input type="checkbox"/>		Unknown <input type="checkbox"/>		S - H2SO4	
Empty Kit Relinquished by		Date:		Method of Shipment:		T - TSP Dodecahydrate	
Relinquished by: <u>Tamten Buscke</u>		Date/Time: <u>4-16-21 14:00</u>		Company: <u>SCS</u>		U - Acetone	
Relinquished by:		Date/Time:		Company:		V - MCAA	
Relinquished by:		Date/Time:		Company:		W - pH 4-5	
Custody Seals Intact: <u>Δ Yes Δ No</u>		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		X - other (specify)	



**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: 310-204547-2

**Login Number: 204547**

**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: 310-204547-2

**Login Number: 204547**

**List Number: 2**

**Creator: Mazariegos, Leonel A**

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

**List Creation: 04/20/21 02:51 PM**

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



# Tracer/Carrier Summary

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

Job ID: 310-204547-2

## 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)
310-204547-1	MW-307	77.9
310-204547-2	MW-308	45.2
310-204547-3	MW-309	73.6
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

#### 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)
310-204547-1	MW-307	77.9	79.3
310-204547-2	MW-308	45.2	84.1
310-204547-3	MW-309	73.6	84.9
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

#### 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: 310-204547-3

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 9:35:14 AM

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.*

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# Case Narrative

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

Job ID: 310-204547-3

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**Job ID: 310-204547-3**

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**Laboratory: Eurofins TestAmerica, Cedar Falls**

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**Narrative**

**Job Narrative**  
**310-204547-3**

**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 2.6° C.

**Metals**

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

**General Chemistry**

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

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# Sample Summary

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

Job ID: 310-204547-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-204547-1	MW-307	Water	04/14/21 12:30	04/16/21 17:00	
310-204547-2	MW-308	Water	04/14/21 13:55	04/16/21 17:00	
310-204547-3	MW-309	Water	04/14/21 13:25	04/16/21 17:00	

- 1
- 2
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- 4
- 5
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- 7
- 8
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- 10
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- 13
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# Detection Summary

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

Job ID: 310-204547-3

## Client Sample ID: MW-307

## Lab Sample ID: 310-204547-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	98000		1000	610	ug/L	1		6020A	Total/NA
Potassium	2000		500	150	ug/L	1		6020A	Total/NA
Iron	3700		100	36	ug/L	1		6020A	Total/NA
Magnesium	30000		500	100	ug/L	1		6020A	Total/NA
Manganese	330		10	4.4	ug/L	1		6020A	Total/NA
Cobalt	49		0.50	0.091	ug/L	1		6020A	Dissolved
Iron	3400		100	36	ug/L	1		6020A	Dissolved
Manganese	360		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-308

## Lab Sample ID: 310-204547-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	100000		1000	610	ug/L	1		6020A	Total/NA
Potassium	4400		500	150	ug/L	1		6020A	Total/NA
Iron	3900		100	36	ug/L	1		6020A	Total/NA
Magnesium	26000		500	100	ug/L	1		6020A	Total/NA
Manganese	1300		10	4.4	ug/L	1		6020A	Total/NA
Iron	3900		100	36	ug/L	1		6020A	Dissolved
Manganese	1300		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-309

## Lab Sample ID: 310-204547-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	180000		1000	610	ug/L	1		6020A	Total/NA
Potassium	750		500	150	ug/L	1		6020A	Total/NA
Iron	900		100	36	ug/L	1		6020A	Total/NA
Magnesium	19000		500	100	ug/L	1		6020A	Total/NA
Manganese	630		10	4.4	ug/L	1		6020A	Total/NA
Iron	660		100	36	ug/L	1		6020A	Dissolved
Manganese	640		10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	280		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	280		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: 310-204547-3

**Client Sample ID: MW-307**

**Lab Sample ID: 310-204547-1**

Date Collected: 04/14/21 12:30

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	98000		1000	610	ug/L		04/19/21 08:26	04/21/21 15:36	1
Potassium	2000		500	150	ug/L		04/19/21 08:26	04/20/21 19:43	1
Iron	3700		100	36	ug/L		04/19/21 08:26	04/20/21 19:43	1
Magnesium	30000		500	100	ug/L		04/19/21 08:26	04/20/21 19:43	1
Manganese	330		10	4.4	ug/L		04/19/21 08:26	04/20/21 19:43	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	49		0.50	0.091	ug/L		04/19/21 08:16	04/26/21 19:32	1
Iron	3400		100	36	ug/L		04/19/21 08:16	04/26/21 19:32	1
Manganese	360		10	4.4	ug/L		04/19/21 08:16	04/26/21 19:32	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	490		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	490		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: 310-204547-3

**Client Sample ID: MW-308**

**Lab Sample ID: 310-204547-2**

Date Collected: 04/14/21 13:55

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	100000		1000	610	ug/L		04/19/21 08:26	04/21/21 15:38	1
Potassium	4400		500	150	ug/L		04/19/21 08:26	04/20/21 19:46	1
Iron	3900		100	36	ug/L		04/19/21 08:26	04/20/21 19:46	1
Magnesium	26000		500	100	ug/L		04/19/21 08:26	04/20/21 19:46	1
Manganese	1300		10	4.4	ug/L		04/19/21 08:26	04/20/21 19:46	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	3900		100	36	ug/L		04/19/21 08:16	04/26/21 19:35	1
Manganese	1300		10	4.4	ug/L		04/19/21 08:16	04/26/21 19:35	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

# Client Sample Results

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

Job ID: 310-204547-3

**Client Sample ID: MW-309**

**Lab Sample ID: 310-204547-3**

Date Collected: 04/14/21 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	180000		1000	610	ug/L		04/19/21 08:26	04/21/21 15:41	1
Potassium	750		500	150	ug/L		04/19/21 08:26	04/20/21 19:48	1
Iron	900		100	36	ug/L		04/19/21 08:26	04/20/21 19:48	1
Magnesium	19000		500	100	ug/L		04/19/21 08:26	04/20/21 19:48	1
Manganese	630		10	4.4	ug/L		04/19/21 08:26	04/20/21 19:48	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	660		100	36	ug/L		04/19/21 08:16	04/26/21 19:37	1
Manganese	640		10	4.4	ug/L		04/19/21 08:16	04/26/21 19:37	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	280		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	280		10	4.6	mg/L			04/26/21 10:52	1

## Definitions/Glossary

Client: SCS Engineers

Job ID: 310-204547-3

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: 310-204547-3

## 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
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
Cobalt	100	113		ug/L		113	80 - 120
Iron	200	225		ug/L		112	80 - 120
Manganese	100	108		ug/L		108	80 - 120

**Lab Sample ID: MB 310-313149/1-A**  
**Matrix: Water**  
**Analysis Batch: 313453**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 313149**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sodium	<610		1000	610	ug/L		04/19/21 08:26	04/20/21 18:14	1
Potassium	<150		500	150	ug/L		04/19/21 08:26	04/20/21 18:14	1
Iron	<36		100	36	ug/L		04/19/21 08:26	04/20/21 18:14	1
Magnesium	<100		500	100	ug/L		04/19/21 08:26	04/20/21 18:14	1
Manganese	<4.4		10	4.4	ug/L		04/19/21 08:26	04/20/21 18:14	1

**Lab Sample ID: LCS 310-313149/2-A**  
**Matrix: Water**  
**Analysis Batch: 313453**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 313149**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sodium	2000	2020		ug/L		101	80 - 120
Potassium	2000	1940		ug/L		97	80 - 120
Iron	200	212		ug/L		106	80 - 120
Magnesium	2000	1880		ug/L		94	80 - 120
Manganese	100	99.7		ug/L		100	80 - 120

## 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 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
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



# QC Sample Results

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

Job ID: 310-204547-3

## Method: SM 2320B - Alkalinity (Continued)

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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# QC Association Summary

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

Job ID: 310-204547-3

## Metals

### Prep Batch: 313144

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204547-1	MW-307	Dissolved	Water	3010A	
310-204547-2	MW-308	Dissolved	Water	3010A	
310-204547-3	MW-309	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: 313149

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204547-1	MW-307	Total/NA	Water	3010A	
310-204547-2	MW-308	Total/NA	Water	3010A	
310-204547-3	MW-309	Total/NA	Water	3010A	
MB 310-313149/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-313149/2-A	Lab Control Sample	Total/NA	Water	3010A	

### Analysis Batch: 313453

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204547-1	MW-307	Total/NA	Water	6020A	313149
310-204547-2	MW-308	Total/NA	Water	6020A	313149
310-204547-3	MW-309	Total/NA	Water	6020A	313149
MB 310-313149/1-A	Method Blank	Total/NA	Water	6020A	313149
LCS 310-313149/2-A	Lab Control Sample	Total/NA	Water	6020A	313149

### Analysis Batch: 313546

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204547-1	MW-307	Total/NA	Water	6020A	313149
310-204547-2	MW-308	Total/NA	Water	6020A	313149
310-204547-3	MW-309	Total/NA	Water	6020A	313149

### Analysis Batch: 314022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204547-1	MW-307	Dissolved	Water	6020A	313144
310-204547-2	MW-308	Dissolved	Water	6020A	313144
310-204547-3	MW-309	Dissolved	Water	6020A	313144
MB 310-313144/1-A	Method Blank	Total/NA	Water	6020A	313144
LCS 310-313144/2-A	Lab Control Sample	Total/NA	Water	6020A	313144

## General Chemistry

### Analysis Batch: 313906

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-204547-1	MW-307	Total/NA	Water	SM 2320B	
310-204547-2	MW-308	Total/NA	Water	SM 2320B	
310-204547-3	MW-309	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: 310-204547-3

**Client Sample ID: MW-307**

**Lab Sample ID: 310-204547-1**

Date Collected: 04/14/21 12:30

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 19:32	SAD	TAL CF
Total/NA	Prep	3010A			313149	04/19/21 08:26	JNR	TAL CF
Total/NA	Analysis	6020A		1	313453	04/20/21 19:43	SAD	TAL CF
Total/NA	Prep	3010A			313149	04/19/21 08:26	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 15:36	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	313906	04/26/21 10:52	DFS	TAL CF

**Client Sample ID: MW-308**

**Lab Sample ID: 310-204547-2**

Date Collected: 04/14/21 13:55

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 19:35	SAD	TAL CF
Total/NA	Prep	3010A			313149	04/19/21 08:26	JNR	TAL CF
Total/NA	Analysis	6020A		1	313453	04/20/21 19:46	SAD	TAL CF
Total/NA	Prep	3010A			313149	04/19/21 08:26	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 15:38	SAD	TAL CF
Total/NA	Analysis	SM 2320B		1	313906	04/26/21 10:52	DFS	TAL CF

**Client Sample ID: MW-309**

**Lab Sample ID: 310-204547-3**

Date Collected: 04/14/21 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 19:37	SAD	TAL CF
Total/NA	Prep	3010A			313149	04/19/21 08:26	JNR	TAL CF
Total/NA	Analysis	6020A		1	313453	04/20/21 19:48	SAD	TAL CF
Total/NA	Prep	3010A			313149	04/19/21 08:26	JNR	TAL CF
Total/NA	Analysis	6020A		1	313546	04/21/21 15:41	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

Job ID: 310-204547-3

Project/Site: Ottumwa Generating Station - 25221072

## 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: 310-204547-3

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.

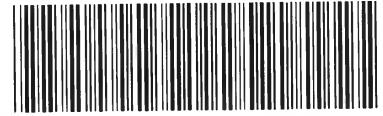
**Laboratory References:**

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





Environment Testing  
TestAmerica



310-204547 Chain of Custody

Cooler/Sample Receipt and Temperature Log

Client Information		
Client: <u>SOS Engineers</u>		
City/State: <u>Madison WI</u>	Project: <u>Ottumwa ben. Station</u>	
Receipt Information		
Date/Time Received: <u>9-16-21</u> <u>1100</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: _____		
Condition of Cooler/Containers		
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes: Cooler ID: <u>AB-79</u>
Multiple Coolers?	<u>Sit #10/21</u> <input checked="" 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 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-307, MW-308, MW 309</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>2.6</u>	
Corrected Temp (°C):	<u>2.6</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		

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

Eurofins TestAmerica, Cedar Falls

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

**Chain of Custody Record**

**TestAmerica Des Moines SC**

<b>Client Information</b> Client Contact: <u>Meghan Blodgett</u> Company: <u>SCS Engineers</u> Address: <u>2830 Dairy Drive</u> City: <u>Madison</u> State, Zip: <u>WI, 53718</u> Phone: <u>269-943-0855</u> Email: <u>mblodgett@scsengineers.com</u> Project Name: <u>Cittumwa Generating Station - 25221072</u> Site: <u>065</u>		Lab P#: <u>Frederick, Sandle</u> E-Mail: <u>sandra.fredrick@eurofins.com</u> Carrier Tracking No(s): <u>214</u> State of Origin:		COC No: <u>310-59845-17490.1</u> Page: <u>Page 1 of 1</u> Job #:	
Due Date Requested: TAT Requested (days): Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No PO #: <u>25221072</u> WC #:		Analysis Requested			
Sample Identification Sample Date Sample Time Sample Type (C=Comp, G=grab) Matrix (W=water, S=solid, O=wastewat, B=soil, A=air) Preservation Code:		Perform MS/MSD (Yes or No) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 2320B - Alkalinity/Carb/Bicarb <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 6020A - Metals (5) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No 6020A - D. Metals (4) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Total Number of Containers: <u>3</u> Special Instructions/Note:			
MW-307 MW-308 MW-309		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:			
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, IV, Other (specify)		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months			
Empty Kit Relinquished by Relinquished by: <u>Tantun Buszka</u> Relinquished by: Relinquished by:		Method of Shipment: Date/Time: <u>4-16-21 14:00</u> Date/Time: <u>4-16-21 17:00</u> Date/Time:			
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:			



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

	Parameter	COC Set #1 (Background)		COC Set #2 (Ash Pond)										COC Set #3 (ZLDP)			TOTAL
		MW-301	Field Blank	MW-302	MW-303	MW-304	MW-305	MW-305A	MW-306	MW-310	MW-310A	MW-311	MW-311A	MW-307	MW-308	MW-309	
Appendix III Parameters	Boron	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	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: 310-204547-3

**Login Number: 204547**

**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  
(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.*



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# 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	

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

1

2

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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



**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: 310-204548-1

**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 <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: 310-204548-2

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

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

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

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# Case Narrative

Client: SCS Engineers  
Project/Site: Ottumwa Generating Station - 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		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB 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 %Yield	MB Qualifier	Limits				Prepared		Analyzed	Dil Fac
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 %Yield	LCS Qualifier	Limits						
Ba Carrier	69.7		40 - 110						

**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
				Uncert. (2σ+/-)							Limit
Radium-226	11.3	10.75		1.15	1.00	0.136	pCi/L	95	75 - 125	0.23	1
Carrier	LCSD %Yield	LCSD Qualifier	Limits								
Ba Carrier	71.2		40 - 110								

## 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		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	MB 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 %Yield	MB Qualifier	Limits				Prepared		Analyzed	Dil Fac
Ba Carrier	71.5		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

# 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	
									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: 310-204548-2

## 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**

1  
2  
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<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>		Sampler: <u>Tantra Buszka</u>		Lab PM: <u>Fredrick, Sandie</u>		Carrier Tracking No(s): <u>310-59839-17485-1</u>	
Client Contact: <u>Meaghan Blodgett</u>		Phone: <u>269-443-0855</u>		E-Mail: <u>sandra.fredrick@eurofinset.com</u>		State of Origin:	
Company: <u>SCS Engineers</u>		Address: <u>2850 Dairy Drive</u>		City: <u>Madison</u>		State: <u>WI</u>	
Address: <u>2850 Dairy Drive</u>		City: <u>Madison</u>		State: <u>WI</u>		Zip: <u>53718</u>	
Phone: <u>269-443-0855</u>		Compliance Project: <u>Yes</u> <input type="checkbox"/> <u>No</u> <input type="checkbox"/>		Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/>		Perform MS/MSD (Yes or No) <input checked="" type="checkbox"/>	
Email: <u>mblodgett@scsengineers.com</u>		Project #: <u>31011020</u>		Sample Date: <u>4-14-21</u>		Sample Time: <u>10:10</u>	
Project Name: <u>Ottumwa Generating Station - 25221072</u>		Site: <u>065</u>		Sample Type (C=Comp, G=grab)		Matrix (W=water, S=solid, D=dew/ice, B=soil, R=tissue, A=air)	
Sample Identification		Sample Date		Sample Time		Sample Type	
MW-301		4-14-21		10:10		G Water	
Field Blank		4-14-21		9:40		G Water	
Analysis Requested		503 - Radium-226 (GFC)		504 - Radium-228 (GFC)		505A - ORGM_28D - Chloride, Fluoride & Sulfate	
Total Number of containers		502A, 7470A		2540C_Catcd, SM4500_H+		Special Instructions/Note:	
Possible Hazard Identification		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 <input type="checkbox"/>		Deliverable Requested: I, II, III, IV, Other (specify)		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	
Empty Kit Relinquished by		Date: <u>4-16-21 14:00</u>		Received by: <u>SES</u>		Company: <u>SES</u>	
Relinquished by: <u>Tantra Buszka</u>		Date: <u>4-16-21 14:00</u>		Received by: <u>SB</u>		Company: <u>Company</u>	
Relinquished by:		Date/Time:		Received by:		Date/Time:	
Custody Seal No.:		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		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: 310-204548-2

**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 <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: 310-204548-2

**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 </= 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: 310-204548-2

## 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  
**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.*

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# 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.

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# 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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# 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**  
 Date Collected: 04/14/21 10:10  
 Date Received: 04/16/21 17:00

**Lab Sample ID: 310-204548-1**  
 Matrix: Water

**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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# 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 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
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: 310-204548-3

## 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**

**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
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**

**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
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



# 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.

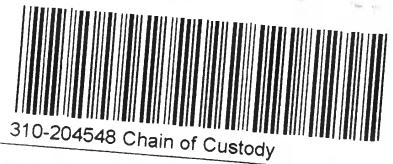
#### Laboratory References:

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



<b>Client Information</b>		Sampler: <b>Tamara Buszka</b>	Lab PM: <b>Fredrick, Sandie</b>	COC No: <b>310-59840-17486.1</b>					
Meghan Bloodgett Company: SCS Engineers		Phone: <b>269-943-0855</b>	E-Mail: <b>sandra.fredrick@eurofinset.com</b>	Page: <b>Page 1 of 1</b>					
Address: <b>2830 Dairy Drive</b>		Carrier Tracking Note(s):							
City: <b>Madison</b>		State of Origin:							
State, Zip: <b>WI, 53718</b>		Job #:							
Phone: <b>269-943-0855</b>		Analysis Requested:							
Email: <b>mbloodgett@scsengineers.com</b>		Total Number of Containers: <input checked="" type="checkbox"/>							
Project Name: <b>Ottumwa Generating Station - 25221072</b>		Special Instructions/Note:							
Site: <b>065</b>		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 - MCA K - EDTA W - pH 4-5 L - EDA Z - other (specify) Other:							
<b>Sample Identification</b>	<b>Sample Date</b>	<b>Sample Time</b>	<b>Sample Type (C=Comp, G=grab)</b>	<b>Matrix (W=water, S=soil, D=waste/dirt, BT=tissue/BV=air)</b>	<b>Field Filtered Sample (Yes or No)</b>	<b>Perform MS/MSD (Yes or No)</b>	<b>3320B - Alkalinity/Carb/Bicarb</b>	<b>6020A - Metals (5)</b>	<b>6020A - D. Metals (4)</b>
MW-3C1	4-14-21	10:10	G	Water	W	N	X	X	X
Field Blank	4-14-21	9:40	G	Water	W	N	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									
<b>Special Instructions/QC Requirements:</b> Empty Kit Relinquished by: _____ Date: _____ Time: _____ Relinquished by: <b>Tamara Buszka</b> Date/Time: <b>4.16.21 14:00</b> Company: <b>SCS</b> Relinquished by: _____ Date/Time: _____ Company: _____ Relinquished by: _____ Date/Time: _____ 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	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 <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	

## D3 July 2021 Assessment Monitoring

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-210533-2

Client Project/Site: Ottumwa Generating Station - 25221072

For:

SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



*Authorized for release by:  
7/21/2021 11:02:56 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.*



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# Case Narrative

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

Job ID: 310-210533-2

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## Job ID: 310-210533-2

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Laboratory: Eurofins TestAmerica, Cedar Falls

### Narrative

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Job Narrative  
310-210533-2

### Comments

Client requested split report

### 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.

### 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: 310-210533-2

---

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-210533-2	MW-307	Water	07/06/21 20:45	07/09/21 09:25	

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# Detection Summary

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

Job ID: 310-210533-2

**Client Sample ID: MW-307**

**Lab Sample ID: 310-210533-2**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cobalt	60		0.50	0.091	ug/L	1		6020A	Total/NA
Ground Water Elevation	647.03				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	14.7				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.21				mg/L	1		Field Sampling	Total/NA
pH, Field	7.05				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1705				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.2				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	17.91				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: 310-210533-2

**Client Sample ID: MW-307**  
 Date Collected: 07/06/21 20:45  
 Date Received: 07/09/21 09:25

**Lab Sample ID: 310-210533-2**  
 Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	60		0.50	0.091	ug/L		07/13/21 09:00	07/14/21 23:11	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	647.03				ft			07/06/21 20:45	1
Oxidation Reduction Potential	14.7				millivolts			07/06/21 20:45	1
Oxygen, Dissolved, Client Supplied	0.21				mg/L			07/06/21 20:45	1
pH, Field	7.05				SU			07/06/21 20:45	1
Specific Conductance, Field	1705				umhos/cm			07/06/21 20:45	1
Temperature, Field	13.2				Degrees C			07/06/21 20:45	1
Turbidity, Field	17.91				NTU			07/06/21 20:45	1

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# Definitions/Glossary

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

Job ID: 310-210533-2

## Glossary

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

# QC Association Summary

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

Job ID: 310-210533-2

## Metals

### Prep Batch: 322135

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-210533-2	MW-307	Total/NA	Water	3010A	

### Analysis Batch: 322457

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-210533-2	MW-307	Total/NA	Water	6020A	322135

## Field Service / Mobile Lab

### Analysis Batch: 323036

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-210533-2	MW-307	Total/NA	Water	Field Sampling	

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# Lab Chronicle

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

Job ID: 310-210533-2

**Client Sample ID: MW-307**

**Lab Sample ID: 310-210533-2**

**Date Collected: 07/06/21 20:45**

**Matrix: Water**

**Date Received: 07/09/21 09:25**

<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	Prep	3010A			322135	07/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	322457	07/14/21 23:11	SAP	TAL CF
Total/NA	Analysis	Field Sampling		1	323036	07/06/21 20:45	SJF	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: 310-210533-2

## Laboratory: Eurofins TestAmerica, Cedar Falls

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

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

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# Method Summary

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

Job ID: 310-210533-2

Method	Method Description	Protocol	Laboratory
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/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> 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 P#M: 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 WAC #:		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		Field Filtered Sample (Yes or No) Sample Date Sample Time Sample Type (C=Comp, G=grab) Matrix (W=water, S=solid, O=waste/oil, B=bi-tissue, A=air)		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 Date: 6/8/2021 1500		Received by: SCS Eng. Date/Time: 6/8/2021 1500		Received by: AW Date/Time: 7/01/21 925		Company: SCS Eng. Company:	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		Ver 11/01/2020	



# GROUNDWATER SAMPLING REQUEST

List wells in sampling order	Collect DTW	Slug Test	Install Pump	Measure TOC difference	Will well bail dry?	Discharge Water to: (see codes below)	Analytical Parameters													
							GRO	DRO	VOC	PVOC	Diss. Pb.	Nat. Aten. (see below)	WDATEP Pest.	8151 NO <sub>3</sub> +NO <sub>2</sub> & NH <sub>3</sub>	Other Parameters					
Field Blank																				Cobalt, lithium, & fluoride
Rinsate Blank																				
Field Dup.																				
MW-301																				
MW-302																				
MW-303																				
MW-304																				
MW-305																				
MW-306	X																			Cobalt only (total)
MW-307	X																			Cobalt only (total)
MW-308																				
MW-309																				
MW-310	X																			Lithium only (total)
MW-311																				
MW-305A																				
MW-310A																				
MW-311A	X																			Fluoride only (total)

Abbreviations:  
 SS = on-site sanitary sewer (prior approval required)  
 OS = on site (clean water)  
 BW = barrel water and leave on site

WWTP = transport to WWTP (prior approval required)  
 NA parameters include; NO<sub>2</sub> & NO<sub>3</sub>-N, SO<sub>4</sub>, Dissolved Fe, D.O., and pH

I:\25221072.00\Data and Calculations\Field Work  
 Requests\OGS\_Field\_Work\_Request\_2107.docx

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# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-210533-2

**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 </= 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**  
**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

## D4 October 2021 Assessment Monitoring

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-217093-1

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 5:27:55 PM*

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

### LINKS

Review your project  
results through  
**Total Access**

Have a Question?



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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.*



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# Case Narrative

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

Job ID: 310-217093-1

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## Job ID: 310-217093-1

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### Laboratory: Eurofins TestAmerica, Cedar Falls

#### Narrative

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#### Job Narrative 310-217093-1

#### 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 2.5° C.

#### HPLC/IC

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

#### Metals

Method 7470A: The following samples were improperly preserved in the field: MW-307 (310-217093-1), MW-308 (310-217093-2) and MW-309 (310-217093-3). The preservative used is not compatible with the analytes requested.

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 Statio - 25221072

Job ID: 310-217093-1

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-217093-1	MW-307	Water	10/07/21 15:47	10/11/21 17:42
310-217093-2	MW-308	Water	10/07/21 15:05	10/11/21 17:42
310-217093-3	MW-309	Water	10/07/21 18:02	10/11/21 17:42

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# Detection Summary

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

Job ID: 310-217093-1

## Client Sample ID: MW-307

## Lab Sample ID: 310-217093-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	240		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	110		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	140		2.0	0.37	ug/L	1		6020A	Total/NA
Boron	230		100	58	ug/L	1		6020A	Total/NA
Calcium	240		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	48		0.50	0.19	ug/L	1		6020A	Total/NA
Lithium	14		10	2.5	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1000		50	26	mg/L	1		SM 2540C	Total/NA
pH	6.8	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Dissolved Oxygen	0.19				mg/L	1		Field Sampling	Total/NA
Field Turbidity	10.0				NTU	1		Field Sampling	Total/NA
Ground Water Elevation	644.49				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-23.8				millivolts	1		Field Sampling	Total/NA
pH, Field	6.71				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1552				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	14.4				Degrees C	1		Field Sampling	Total/NA

## Client Sample ID: MW-308

## Lab Sample ID: 310-217093-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	170		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	290		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	130		2.0	0.37	ug/L	1		6020A	Total/NA
Boron	200		100	58	ug/L	1		6020A	Total/NA
Calcium	230		0.50	0.19	mg/L	1		6020A	Total/NA
Cobalt	0.22	J	0.50	0.19	ug/L	1		6020A	Total/NA
Lithium	16		10	2.5	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1000		50	26	mg/L	1		SM 2540C	Total/NA
pH	6.9	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Dissolved Oxygen	0.17				mg/L	1		Field Sampling	Total/NA
Field Turbidity	12.8				NTU	1		Field Sampling	Total/NA
Ground Water Elevation	641.81				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-26.1				millivolts	1		Field Sampling	Total/NA
pH, Field	6.83				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1453				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.0				Degrees C	1		Field Sampling	Total/NA

## Client Sample ID: MW-309

## Lab Sample ID: 310-217093-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	67		5.0	2.2	mg/L	5		9056A	Total/NA
Sulfate	400		5.0	2.5	mg/L	5		9056A	Total/NA
Barium	47		2.0	0.37	ug/L	1		6020A	Total/NA
Boron	1300		100	58	ug/L	1		6020A	Total/NA
Calcium	120		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	2.0		0.50	0.19	ug/L	1		6020A	Total/NA
Lithium	7.5	J	10	2.5	ug/L	1		6020A	Total/NA
Total Dissolved Solids	950		50	26	mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Dissolved Oxygen	0.21				mg/L	1		Field Sampling	Total/NA
Field Turbidity	19.6				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: Ottumwa Generating Statio - 25221072

Job ID: 310-217093-1

**Client Sample ID: MW-309 (Continued)**

**Lab Sample ID: 310-217093-3**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ground Water Elevation	640.71				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-8.1				millivolts	1		Field Sampling	Total/NA
pH, Field	7.18				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1297				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.1				Degrees C	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 Statio - 25221072

Job ID: 310-217093-1

**Client Sample ID: MW-307**

**Lab Sample ID: 310-217093-1**

Date Collected: 10/07/21 15:47

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	240		5.0	2.2	mg/L			10/14/21 16:20	5
Fluoride	<0.28		0.50	0.28	mg/L			10/14/21 16:20	5
Sulfate	110		5.0	2.5	mg/L			10/14/21 16:20	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 15:34	1
Arsenic	<0.75		2.0	0.75	ug/L		10/13/21 09:00	10/25/21 15:34	1
Barium	140		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 15:34	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 15:34	1
Boron	230		100	58	ug/L		10/13/21 09:00	10/25/21 15:34	1
Cadmium	<0.051		0.10	0.051	ug/L		10/13/21 09:00	10/25/21 15:34	1
Calcium	240		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 15:34	1
Chromium	<1.1		5.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:34	1
Cobalt	48		0.50	0.19	ug/L		10/13/21 09:00	10/25/21 15:34	1
Lead	<0.21		0.50	0.21	ug/L		10/13/21 09:00	10/25/21 15:34	1
Lithium	14		10	2.5	ug/L		10/13/21 09:00	10/25/21 15:34	1
Molybdenum	<1.3		2.0	1.3	ug/L		10/13/21 09:00	10/25/21 15:34	1
Selenium	<0.96		5.0	0.96	ug/L		10/13/21 09:00	10/25/21 15:34	1
Thallium	<0.26		1.0	0.26	ug/L		10/13/21 09:00	10/25/21 15:34	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 08:56	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	1000		50	26	mg/L			10/13/21 12:25	1
pH	6.8	HF	0.1	0.1	SU			10/12/21 17:02	1

## Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Oxygen	0.19				mg/L			10/07/21 15:47	1
Field Turbidity	10.0				NTU			10/07/21 15:47	1
Ground Water Elevation	644.49				ft			10/07/21 15:47	1
Oxidation Reduction Potential	-23.8				millivolts			10/07/21 15:47	1
pH, Field	6.71				SU			10/07/21 15:47	1
Specific Conductance, Field	1552				umhos/cm			10/07/21 15:47	1
Temperature, Field	14.4				Degrees C			10/07/21 15:47	1

# Client Sample Results

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

Job ID: 310-217093-1

**Client Sample ID: MW-308**

**Lab Sample ID: 310-217093-2**

Date Collected: 10/07/21 15:05

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>170</b>		5.0	2.2	mg/L			10/14/21 17:07	5
Fluoride	<0.28		0.50	0.28	mg/L			10/14/21 17:07	5
<b>Sulfate</b>	<b>290</b>		5.0	2.5	mg/L			10/14/21 17:07	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 15:37	1
Arsenic	<0.75		2.0	0.75	ug/L		10/13/21 09:00	10/25/21 15:37	1
<b>Barium</b>	<b>130</b>		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 15:37	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 15:37	1
<b>Boron</b>	<b>200</b>		100	58	ug/L		10/13/21 09:00	10/25/21 15:37	1
Cadmium	<0.051		0.10	0.051	ug/L		10/13/21 09:00	10/25/21 15:37	1
<b>Calcium</b>	<b>230</b>		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 15:37	1
Chromium	<1.1		5.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:37	1
<b>Cobalt</b>	<b>0.22</b>	<b>J</b>	0.50	0.19	ug/L		10/13/21 09:00	10/25/21 15:37	1
Lead	<0.21		0.50	0.21	ug/L		10/13/21 09:00	10/25/21 15:37	1
<b>Lithium</b>	<b>16</b>		10	2.5	ug/L		10/13/21 09:00	10/25/21 15:37	1
Molybdenum	<1.3		2.0	1.3	ug/L		10/13/21 09:00	10/25/21 15:37	1
Selenium	<0.96		5.0	0.96	ug/L		10/13/21 09:00	10/25/21 15:37	1
Thallium	<0.26		1.0	0.26	ug/L		10/13/21 09:00	10/25/21 15:37	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 08:58	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Dissolved Solids</b>	<b>1000</b>		50	26	mg/L			10/13/21 12:25	1
<b>pH</b>	<b>6.9</b>	<b>HF</b>	0.1	0.1	SU			10/12/21 16:38	1

## Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Dissolved Oxygen</b>	<b>0.17</b>				mg/L			10/07/21 15:05	1
<b>Field Turbidity</b>	<b>12.8</b>				NTU			10/07/21 15:05	1
<b>Ground Water Elevation</b>	<b>641.81</b>				ft			10/07/21 15:05	1
<b>Oxidation Reduction Potential</b>	<b>-26.1</b>				millivolts			10/07/21 15:05	1
<b>pH, Field</b>	<b>6.83</b>				SU			10/07/21 15:05	1
<b>Specific Conductance, Field</b>	<b>1453</b>				umhos/cm			10/07/21 15:05	1
<b>Temperature, Field</b>	<b>13.0</b>				Degrees C			10/07/21 15:05	1

# Client Sample Results

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

Job ID: 310-217093-1

**Client Sample ID: MW-309**

**Lab Sample ID: 310-217093-3**

Date Collected: 10/07/21 18:02

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	67		5.0	2.2	mg/L			10/14/21 17:23	5
Fluoride	<0.28		0.50	0.28	mg/L			10/14/21 17:23	5
Sulfate	400		5.0	2.5	mg/L			10/14/21 17:23	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 15:54	1
Arsenic	<0.75		2.0	0.75	ug/L		10/13/21 09:00	10/25/21 15:54	1
Barium	47		2.0	0.37	ug/L		10/13/21 09:00	10/25/21 15:54	1
Beryllium	<0.27		1.0	0.27	ug/L		10/13/21 09:00	10/25/21 15:54	1
Boron	1300		100	58	ug/L		10/13/21 09:00	10/25/21 15:54	1
Cadmium	<0.051		0.10	0.051	ug/L		10/13/21 09:00	10/25/21 15:54	1
Calcium	120		0.50	0.19	mg/L		10/13/21 09:00	10/25/21 15:54	1
Chromium	1.3	J	5.0	1.1	ug/L		10/13/21 09:00	10/25/21 15:54	1
Cobalt	2.0		0.50	0.19	ug/L		10/13/21 09:00	10/25/21 15:54	1
Lead	<0.21		0.50	0.21	ug/L		10/13/21 09:00	10/25/21 15:54	1
Lithium	7.5	J	10	2.5	ug/L		10/13/21 09:00	10/25/21 15:54	1
Molybdenum	<1.3		2.0	1.3	ug/L		10/13/21 09:00	10/25/21 15:54	1
Selenium	<0.96		5.0	0.96	ug/L		10/13/21 09:00	10/25/21 15:54	1
Thallium	<0.26		1.0	0.26	ug/L		10/13/21 09:00	10/25/21 15:54	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 09:09	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	950		50	26	mg/L			10/13/21 12:25	1
pH	7.3	HF	0.1	0.1	SU			10/12/21 16:34	1

## Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dissolved Oxygen	0.21				mg/L			10/07/21 18:02	1
Field Turbidity	19.6				NTU			10/07/21 18:02	1
Ground Water Elevation	640.71				ft			10/07/21 18:02	1
Oxidation Reduction Potential	-8.1				millivolts			10/07/21 18:02	1
pH, Field	7.18				SU			10/07/21 18:02	1
Specific Conductance, Field	1297				umhos/cm			10/07/21 18:02	1
Temperature, Field	13.1				Degrees C			10/07/21 18:02	1

# Definitions/Glossary

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

Job ID: 310-217093-1

## Qualifiers

### HPLC/IC

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

### Metals

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

### General Chemistry

Qualifier	Qualifier Description
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: 310-217093-1

## 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

**Lab Sample ID: 310-217093-1 MS**  
**Matrix: Water**  
**Analysis Batch: 332306**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	240		25.0	256	4	mg/L		69	80 - 120
Fluoride	<0.28		5.00	4.93		mg/L		99	80 - 120
Sulfate	110		25.0	129	4	mg/L		74	80 - 120

**Lab Sample ID: 310-217093-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 332306**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	240		25.0	258	4	mg/L		79	80 - 120	1	15
Fluoride	<0.28		5.00	5.05		mg/L		101	80 - 120	2	15
Sulfate	110		25.0	130	4	mg/L		78	80 - 120	1	15

## 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

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# QC Sample Results

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

Job ID: 310-217093-1

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

**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
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
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: 310-217093-2 DU**  
**Matrix: Water**  
**Analysis Batch: 332861**

**Client Sample ID: MW-308**  
**Prep Type: Total/NA**  
**Prep Batch: 331427**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	<1.1		<1.1		ug/L		NC	20
Arsenic	<0.75		<0.75		ug/L		NC	20
Barium	130		141		ug/L		5	20
Beryllium	<0.27		<0.27		ug/L		NC	20
Boron	200		206		ug/L		1	20
Cadmium	<0.051		<0.051		ug/L		NC	20
Calcium	230		239		mg/L		4	20
Chromium	<1.1		<1.1		ug/L		NC	20
Cobalt	0.22	J	0.220	J	ug/L		0.5	20
Lead	<0.21		<0.21		ug/L		NC	20
Lithium	16		17.0		ug/L		4	20
Molybdenum	<1.3		<1.3		ug/L		NC	20
Selenium	<0.96		<0.96		ug/L		NC	20
Thallium	<0.26		<0.26		ug/L		NC	20

# QC Sample Results

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

Job ID: 310-217093-1

## 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

## 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

## 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

Lab Sample ID: 310-217093-3 DU  
 Matrix: Water  
 Analysis Batch: 331376

Client Sample ID: MW-309  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	7.3	HF	7.2		SU		2	20

# QC Association Summary

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

Job ID: 310-217093-1

## HPLC/IC

### Analysis Batch: 332306

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217093-1	MW-307	Total/NA	Water	9056A	
310-217093-2	MW-308	Total/NA	Water	9056A	
310-217093-3	MW-309	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	
310-217093-1 MS	MW-307	Total/NA	Water	9056A	
310-217093-1 MSD	MW-307	Total/NA	Water	9056A	

## Metals

### Prep Batch: 331427

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217093-1	MW-307	Total/NA	Water	3010A	
310-217093-2	MW-308	Total/NA	Water	3010A	
310-217093-3	MW-309	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	
310-217093-2 DU	MW-308	Total/NA	Water	3010A	

### Prep Batch: 332319

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217093-1	MW-307	Total/NA	Water	7470A	
310-217093-2	MW-308	Total/NA	Water	7470A	
310-217093-3	MW-309	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
310-217093-1	MW-307	Total/NA	Water	7470A	332319
310-217093-2	MW-308	Total/NA	Water	7470A	332319
310-217093-3	MW-309	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
310-217093-1	MW-307	Total/NA	Water	6020A	331427
310-217093-2	MW-308	Total/NA	Water	6020A	331427
310-217093-3	MW-309	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
310-217093-2 DU	MW-308	Total/NA	Water	6020A	331427

## General Chemistry

### Analysis Batch: 331376

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217093-1	MW-307	Total/NA	Water	SM 4500 H+ B	
310-217093-2	MW-308	Total/NA	Water	SM 4500 H+ B	
310-217093-3	MW-309	Total/NA	Water	SM 4500 H+ B	
LCS 310-331376/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

Eurofins TestAmerica, Cedar Falls

# QC Association Summary

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

Job ID: 310-217093-1

## General Chemistry (Continued)

### Analysis Batch: 331376 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217093-3 DU	MW-309	Total/NA	Water	SM 4500 H+ B	

### Analysis Batch: 331505

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217093-1	MW-307	Total/NA	Water	SM 2540C	
310-217093-2	MW-308	Total/NA	Water	SM 2540C	
310-217093-3	MW-309	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	

## Field Service / Mobile Lab

### Analysis Batch: 331984

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217093-1	MW-307	Total/NA	Water	Field Sampling	
310-217093-2	MW-308	Total/NA	Water	Field Sampling	
310-217093-3	MW-309	Total/NA	Water	Field Sampling	

# Lab Chronicle

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

Job ID: 310-217093-1

**Client Sample ID: MW-307**

**Lab Sample ID: 310-217093-1**

**Date Collected: 10/07/21 15:47**

**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 16:20	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 15:34	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 08:56	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 17:02	ARG	TAL CF
Total/NA	Analysis	Field Sampling		1	331984	10/07/21 15:47	SLD	TAL CF

**Client Sample ID: MW-308**

**Lab Sample ID: 310-217093-2**

**Date Collected: 10/07/21 15:05**

**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 17:07	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 15:37	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 08:58	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 16:38	ARG	TAL CF
Total/NA	Analysis	Field Sampling		1	331984	10/07/21 15:05	SLD	TAL CF

**Client Sample ID: MW-309**

**Lab Sample ID: 310-217093-3**

**Date Collected: 10/07/21 18:02**

**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 17:23	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 15:54	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 09:09	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 16:34	ARG	TAL CF
Total/NA	Analysis	Field Sampling		1	331984	10/07/21 18:02	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 Statio - 25221072

Job ID: 310-217093-1

## Laboratory: Eurofins TestAmerica, Cedar Falls

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

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

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

# Method Summary

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

Job ID: 310-217093-1

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



### 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: AC26	
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): 2.5	Corrected Temp (°C): 2.5		
• Sample Container Temperature			
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>			
MW-308 Dis container empty			



**Chain of Custody Record**

<b>Client Information</b> Client Contact: Meghan Bloodgett Company: SCS Engineers Address: 2830 Dairy Drive City: Madison State, Zip: WI, 53718 Phone: 25221072 Email: mbloodgett@sceengineers.com Project Name: Ctruma Generating Station - 25221072 Site: App 11/4/13 (3)		Lab PI: Fredrick, Sandie E-Mail: sandra.frederick@eurofinset.com PWSID:		Sampler: Rosa Cruz Phone: 609-809-8245		Carrier Tracking No(s): 310-64467-17489.1 State of Origin: Page 1 of 1 Job #:		COC No: 310-64467-17489.1			
Due Date Requested: TAT Requested (days): Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No PO #: 25221072 WC #:			Analysis Requested			Preservation Codes: A - HCl B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water V - MCAA W - pH 4.5 L - EDTA Z - other (specify) Other:			Special Instructions/Note: Total Number of containers		
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=soil, O=water/soil, B=BI, T=tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0 - Radium-226 (GFC)	904.0 - Radium-228 (GFC)	9056A - ORGFM-28D - Chloride, Fluoride & Sulfate	6020A, 7470A	2640C - Caled, SM4500_H+
MW-307	10-7-21	15:47	G	Water			X	X	X	X	
MW-308	10-7-21	15:05	G	Water			X	X	X	X	
MW-309	10-7-21	18:02	G	Water							

<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):		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 <input type="checkbox"/> Months	
Special Instructions/OC Requirements:		Method of Shipment:	
Relinquished by: Rosa Cruz		Date/Time: 10-11-21 6:00	
Relinquished by:		Date/Time:	
Relinquished by:		Date/Time:	
Custody Seals Intact:		Date/Time: 10-11-21 1742 Company:	
A. Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Cooler Temperature(s) °C and Other Remarks:	

## Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-217093-1

SDG Number:

**Login Number: 217093**

**List Number: 1**

**Creator: Homolar, Dana J**

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

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



**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: 310-217093-2

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 6:41:20 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?



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

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



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# Case Narrative

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

Job ID: 310-217093-2

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## Job ID: 310-217093-2

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### Laboratory: Eurofins TestAmerica, Cedar Falls

#### Narrative

#### Job Narrative 310-217093-2

#### 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 2.5° 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-307 (310-217093-1), MW-308 (310-217093-2), MW-309 (310-217093-3), (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-307 (310-217093-1), MW-308 (310-217093-2), MW-309 (310-217093-3), (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-307 (310-217093-1), MW-308 (310-217093-2) and MW-309 (310-217093-3). 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 The following samples were prepared at a reduced aliquot due to Matrix: MW-307 (310-217093-1), MW-308 (310-217093-2) and MW-309 (310-217093-3). 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: 310-217093-2

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-217093-1	MW-307	Water	10/07/21 15:47	10/11/21 17:42
310-217093-2	MW-308	Water	10/07/21 15:05	10/11/21 17:42
310-217093-3	MW-309	Water	10/07/21 18:02	10/11/21 17:42

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

# Detection Summary

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

Job ID: 310-217093-2

**Client Sample ID: MW-307**

**Lab Sample ID: 310-217093-1**

No Detections.

**Client Sample ID: MW-308**

**Lab Sample ID: 310-217093-2**

No Detections.

**Client Sample ID: MW-309**

**Lab Sample ID: 310-217093-3**

No Detections.

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

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Cedar Falls



# Client Sample Results

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

Job ID: 310-217093-2

**Client Sample ID: MW-307**

**Lab Sample ID: 310-217093-1**

Date Collected: 10/07/21 15:47

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	2.52		0.607	0.648	1.00	0.531	pCi/L	10/15/21 10:26	11/08/21 17:37	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	97.4		40 - 110					10/15/21 10:26	11/08/21 17:37	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	1.38		0.400	0.419	1.00	0.516	pCi/L	10/15/21 11:06	11/08/21 12:51	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	97.4		40 - 110					10/15/21 11:06	11/08/21 12:51	1
Y Carrier	84.9		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
Radium 226 and 228	3.90		0.727	0.772	5.00	0.531	pCi/L		11/12/21 20:04	1

# Client Sample Results

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

Job ID: 310-217093-2

**Client Sample ID: MW-308**

**Lab Sample ID: 310-217093-2**

Date Collected: 10/07/21 15:05

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	1.78		0.532	0.555	1.00	0.549	pCi/L	10/15/21 10:26	11/08/21 17:37	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	99.5		40 - 110					10/15/21 10:26	11/08/21 17:37	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	1.43		0.400	0.421	1.00	0.510	pCi/L	10/15/21 11:06	11/08/21 12:51	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	99.5		40 - 110					10/15/21 11:06	11/08/21 12:51	1
Y Carrier	85.6		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
Radium 226 and 228	3.22		0.666	0.697	5.00	0.549	pCi/L		11/12/21 20:04	1

# Client Sample Results

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

Job ID: 310-217093-2

**Client Sample ID: MW-309**  
 Date Collected: 10/07/21 18:02  
 Date Received: 10/11/21 17:42

**Lab Sample ID: 310-217093-3**  
 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	1.14		0.460	0.472	1.00	0.555	pCi/L	10/15/21 10:26	11/08/21 17:38	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	99.2		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	0.458	U	0.334	0.337	1.00	0.525	pCi/L	10/15/21 11:06	11/08/21 12:51	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba	99.2		40 - 110					10/15/21 11:06	11/08/21 12:51	1
Y Carrier	84.1		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
Radium 226 and 228	1.60		0.568	0.580	5.00	0.555	pCi/L		11/12/21 20:04	1

# Definitions/Glossary

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

Job ID: 310-217093-2

## 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: 310-217093-2

## 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: 310-217093-2

## 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: 310-217093-2

## Rad

### Prep Batch: 531985

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217093-1	MW-307	Total/NA	Water	PrecSep-21	
310-217093-2	MW-308	Total/NA	Water	PrecSep-21	
310-217093-3	MW-309	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
310-217093-1	MW-307	Total/NA	Water	PrecSep_0	
310-217093-2	MW-308	Total/NA	Water	PrecSep_0	
310-217093-3	MW-309	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: 310-217093-2

**Client Sample ID: MW-307**

**Lab Sample ID: 310-217093-1**

Date Collected: 10/07/21 15:47

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 17:37	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: MW-308**

**Lab Sample ID: 310-217093-2**

Date Collected: 10/07/21 15:05

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 17:37	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: MW-309**

**Lab Sample ID: 310-217093-3**

Date Collected: 10/07/21 18:02

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 17:38	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

Job ID: 310-217093-2

## 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: 310-217093-2

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

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Environment Testing  
TestAmerica



### 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: AC26	
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): 2.5	Corrected Temp (°C): 2.5		
• Sample Container Temperature			
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>			
MW-308 Dis container empty			

**Chain of Custody Record**

<b>Client Information</b>		Sampler: <i>Rosa Cruz</i>	Lab PI#: Fredrick, Sandie	Carrier Tracking No(s):	COC No: 310-64467-17489.1
Client Contact: Meghan Bloodgett		Phone: <i>609-809-8245</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:			
City: Madison		TAT Requested (days):			
State, Zip: WI, 53718		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Phone:		PO #: 25221072	Matrix		
Email: mbloodgett@scsengineers.com		WC #: 31011020	Sample Type (C=Comp, G=grab) B1= Tissue, A=Air		
Project Name: Ottumwa Generating Station - 25221072 <i>App 11/10/19 (3)</i>		Project #:	Preservation Code:		
Site: <i>App 11/10/19 (3)</i>		Site #:	Field Filtered Sample (Yes or No)		
			Perform MS/MSD (Yes or No)		
			903 0 - Radium-226 (GFC)		
			904 0 - Radium-228 (GFC)		
			9056A_ORGFM_28D - Chondite, Fluoride & Sulfate		
			5020A_7470A		
			2640C_Calcid, SM4500_H+		
			Total Number of containers		
			Special Instructions/Note:		
Sample Identification		Sample Date	Sample Time	Sample Type	Matrix
MW-307		10-7-21	15:47	G	Water
MW-308		10-7-21	15:05	G	Water
MW-309		10-7-21	18:02	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:					
Relinquished by: <i>Rosa Cruz</i>		Date/Time: 10-11-21 6:00	Date/Time: 6:00	Company: Company	Received by:
Relinquished by:		Date/Time:	Date/Time:	Company: Company	Received by:
Relinquished by:		Date/Time:	Date/Time:	Company: Company	Received by: <i>M. S. D.</i>
Custody Seals Intact: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Custody Seal No.:		10-11-21	1742
Cooler Temperature(s) °C and Other Remarks:					
Special Instructions/GC 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 <input type="checkbox"/> Months					
Method of Shipment:					



## Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-217093-2

SDG Number:

**Login Number: 217093**

**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: 310-217093-2

SDG Number:

**Login Number: 217093**

**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 <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: 310-217093-2

## 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)
310-217093-1	MW-307	97.4
310-217093-2	MW-308	99.5
310-217093-3	MW-309	99.2
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

#### 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)
310-217093-1	MW-307	97.4	84.9
310-217093-2	MW-308	99.5	85.6
310-217093-3	MW-309	99.2	84.1
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

#### 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: 310-217094-1

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 2:55:07 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**

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.*



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# Case Narrative

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

Job ID: 310-217094-1

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**Job ID: 310-217094-1**

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**Laboratory: Eurofins TestAmerica, Cedar Falls**

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**Narrative**

**Job Narrative**  
**310-217094-1**

**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 2.5° C.

**Metals**

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

**General Chemistry**

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

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# Sample Summary

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

Job ID: 310-217094-1

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-217094-1	MW-307	Water	10/07/21 15:47	10/11/21 17:42
310-217094-2	MW-308	Water	10/07/21 15:05	10/11/21 17:42
310-217094-3	MW-309	Water	10/07/21 18:02	10/11/21 17:42

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# Detection Summary

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

Job ID: 310-217094-1

## Client Sample ID: MW-307

## Lab Sample ID: 310-217094-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	3900		100	36	ug/L	1		6020A	Total/NA
Magnesium	28000		500	100	ug/L	1		6020A	Total/NA
Manganese	440		10	4.4	ug/L	1		6020A	Total/NA
Potassium	2000		500	150	ug/L	1		6020A	Total/NA
Sodium	100000		1000	610	ug/L	1		6020A	Total/NA
Cobalt	59		0.50	0.19	ug/L	1		6020A	Dissolved
Iron	3400		100	36	ug/L	1		6020A	Dissolved
Manganese	410		10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	550		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	550		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-308

## Lab Sample ID: 310-217094-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	4700		100	36	ug/L	1		6020A	Total/NA
Magnesium	24000		500	100	ug/L	1		6020A	Total/NA
Manganese	1100		10	4.4	ug/L	1		6020A	Total/NA
Potassium	4300		500	150	ug/L	1		6020A	Total/NA
Sodium	110000		1000	610	ug/L	1		6020A	Total/NA
Iron	300		100	36	ug/L	1		6020A	Dissolved
Manganese	950		10	4.4	ug/L	1		6020A	Dissolved
Bicarbonate Alkalinity as CaCO3	410		10	4.6	mg/L	1		SM 2320B	Total/NA
Total Alkalinity as CaCO3	410		10	4.6	mg/L	1		SM 2320B	Total/NA

## Client Sample ID: MW-309

## Lab Sample ID: 310-217094-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	950		100	36	ug/L	1		6020A	Total/NA
Magnesium	18000		500	100	ug/L	1		6020A	Total/NA
Manganese	650		10	4.4	ug/L	1		6020A	Total/NA
Potassium	740		500	150	ug/L	1		6020A	Total/NA
Sodium	180000		1000	610	ug/L	1		6020A	Total/NA
Iron	680		100	36	ug/L	1		6020A	Dissolved
Manganese	600		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

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: 310-217094-1

**Client Sample ID: MW-307**

**Lab Sample ID: 310-217094-1**

Date Collected: 10/07/21 15:47

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	3900		100	36	ug/L		10/13/21 09:00	10/25/21 15:58	1
Magnesium	28000		500	100	ug/L		10/13/21 09:00	10/25/21 15:58	1
Manganese	440		10	4.4	ug/L		10/13/21 09:00	10/25/21 15:58	1
Potassium	2000		500	150	ug/L		10/13/21 09:00	10/25/21 15:58	1
Sodium	100000		1000	610	ug/L		10/13/21 09:00	10/25/21 15:58	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	59		0.50	0.19	ug/L		10/13/21 09:00	10/22/21 22:46	1
Iron	3400		100	36	ug/L		10/13/21 09:00	10/22/21 22:46	1
Manganese	410		10	4.4	ug/L		10/13/21 09:00	10/23/21 12:52	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	550		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	550		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: 310-217094-1

**Client Sample ID: MW-308**

**Lab Sample ID: 310-217094-2**

Date Collected: 10/07/21 15:05

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	4700		100	36	ug/L		10/13/21 09:00	10/25/21 16:01	1
Magnesium	24000		500	100	ug/L		10/13/21 09:00	10/25/21 16:01	1
Manganese	1100		10	4.4	ug/L		10/13/21 09:00	10/25/21 16:01	1
Potassium	4300		500	150	ug/L		10/13/21 09:00	10/25/21 16:01	1
Sodium	110000		1000	610	ug/L		10/13/21 09:00	10/25/21 16:01	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	300		100	36	ug/L		10/14/21 09:00	10/23/21 15:05	1
Manganese	950		10	4.4	ug/L		10/14/21 09:00	10/23/21 15:05	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	410		10	4.6	mg/L			10/18/21 11:28	1
Carbonate Alkalinity as CaCO3	<4.6		10	4.6	mg/L			10/18/21 11:28	1
Total Alkalinity as CaCO3	410		10	4.6	mg/L			10/18/21 11:28	1

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# Client Sample Results

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

Job ID: 310-217094-1

**Client Sample ID: MW-309**

**Lab Sample ID: 310-217094-3**

Date Collected: 10/07/21 18:02

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	950		100	36	ug/L		10/13/21 09:00	10/25/21 16:05	1
Magnesium	18000		500	100	ug/L		10/13/21 09:00	10/25/21 16:05	1
Manganese	650		10	4.4	ug/L		10/13/21 09:00	10/25/21 16:05	1
Potassium	740		500	150	ug/L		10/13/21 09:00	10/25/21 16:05	1
Sodium	180000		1000	610	ug/L		10/13/21 09:00	10/25/21 16:05	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	680		100	36	ug/L		10/13/21 09:00	10/22/21 22:49	1
Manganese	600		10	4.4	ug/L		10/13/21 09:00	10/23/21 13:05	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Bicarbonate Alkalinity as CaCO3	300		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	300		10	4.6	mg/L			10/15/21 08:54	1

# Definitions/Glossary

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

Job ID: 310-217094-1

## 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  
 Additional

Job ID: 310-217094-1

## 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
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
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
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
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

Eurofins TestAmerica, Cedar Falls

# QC Sample Results

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

Job ID: 310-217094-1

## 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**  
**%Rec.**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Manganese	100	103		ug/L		103	80 - 120
Potassium	2000	2070		ug/L		103	80 - 120
Sodium	2000	1980		ug/L		99	80 - 120

## 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

**Lab Sample ID: MB 310-331994/1**  
**Matrix: Water**  
**Analysis Batch: 331994**

**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 11:28	1
Carbonate Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/18/21 11:28	1
Total Alkalinity as CaCO3	<2.3		5.0	2.3	mg/L			10/18/21 11:28	1

# QC Sample Results

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

Job ID: 310-217094-1

## Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCS 310-331994/2  
Matrix: Water  
Analysis Batch: 331994

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

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# QC Association Summary

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

Job ID: 310-217094-1

## Metals

### Filtration Batch: 331371

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217094-2	MW-308	Dissolved	Water	Filtration	

### Prep Batch: 331373

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217094-1	MW-307	Dissolved	Water	3010A	
310-217094-3	MW-309	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
310-217094-1	MW-307	Total/NA	Water	3010A	
310-217094-2	MW-308	Total/NA	Water	3010A	
310-217094-3	MW-309	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: 331609

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217094-2	MW-308	Dissolved	Water	3005A	331371

### 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
310-217094-1	MW-307	Dissolved	Water	6020A	331373
310-217094-3	MW-309	Dissolved	Water	6020A	331373

### Analysis Batch: 332758

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217094-1	MW-307	Dissolved	Water	6020A	331373
310-217094-2	MW-308	Dissolved	Water	6020A	331609
310-217094-3	MW-309	Dissolved	Water	6020A	331373

### Analysis Batch: 332861

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217094-1	MW-307	Total/NA	Water	6020A	331427
310-217094-2	MW-308	Total/NA	Water	6020A	331427
310-217094-3	MW-309	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

# QC Association Summary

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

Job ID: 310-217094-1

## General Chemistry

### Analysis Batch: 331761

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217094-3	MW-309	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
310-217094-1	MW-307	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	

### Analysis Batch: 331994

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-217094-2	MW-308	Total/NA	Water	SM 2320B	
MB 310-331994/1	Method Blank	Total/NA	Water	SM 2320B	
LCS 310-331994/2	Lab Control Sample	Total/NA	Water	SM 2320B	

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# Lab Chronicle

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

Job ID: 310-217094-1

**Client Sample ID: MW-307**

**Lab Sample ID: 310-217094-1**

**Date Collected: 10/07/21 15:47**

**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 22:46	SAP	TAL CF
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332758	10/23/21 12:52	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 15:58	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	331940	10/18/21 08:37	WJF	TAL CF

**Client Sample ID: MW-308**

**Lab Sample ID: 310-217094-2**

**Date Collected: 10/07/21 15:05**

**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	Filtration	Filtration			331371	10/12/21 15:35	ACM2	TAL CF
Dissolved	Prep	3005A			331609	10/14/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332758	10/23/21 15:05	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 16:01	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	331994	10/18/21 11:28	WJF	TAL CF

**Client Sample ID: MW-309**

**Lab Sample ID: 310-217094-3**

**Date Collected: 10/07/21 18:02**

**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 22:49	SAP	TAL CF
Dissolved	Prep	3010A			331373	10/13/21 09:00	ACM2	TAL CF
Dissolved	Analysis	6020A		1	332758	10/23/21 13:05	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 16:05	SAP	TAL CF
Total/NA	Analysis	SM 2320B		1	331761	10/15/21 08:54	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: 310-217094-1

## 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  
Additional

Job ID: 310-217094-1

Method	Method Description	Protocol	Laboratory
6020A	Metals (ICP/MS)	SW846	TAL CF
SM 2320B	Alkalinity	SM	TAL CF
3005A	Preparation, Total Metals	SW846	TAL CF
3010A	Preparation, Total Metals	SW846	TAL CF
Filtration	Sample Filtration	None	TAL CF

#### Protocol References:

None = None

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

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

#### Laboratory References:

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





Environment Testing  
TestAmerica



310-217094 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 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:	
<b>Condition of Cooler/Containers</b>			
Sample(s) received in Cooler?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	If yes: Cooler ID: AC26
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): 2.5	Corrected Temp (°C): 2.5		
<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>			
MW-308 Dis container empty			

<b>Client Information</b>		Sampler: <i>Rosa Cruz</i>		Lab PM: Fredrick, Sandie	Carrier Tracking No(s):	COC No: 310-64468-17490.1						
Client Contact: Meghan Blodgett		Phone: <i>608-569-8245</i>		E-Mail: samora.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):		Preservation Codes:								
State, Zip: WI, 53718		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHCO3 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)								
Phone: <i>25221072</i>		PC #:		Other:								
Email: <i>mblodgett@scsengineers.com</i>		WC #:		Total Number of containers								
Project Name: <i>Ottumwa Generating Station - 25221072 Add. (3)</i>		Project #:		Special Instructions/Note:								
Site: <i>31011020</i>		SSOW#:										
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (w-water, Solid, On-water)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	2320B - Alkalinity/Carb/Carb	6020A - Metals (5)	6020A - D. Metals (2-3)	N	D	D
MW-307	10-07-21	15:47	G	Water	X	X	X	X	X			
MW-308	10-7-21	15:05	G	Water	X	X	X	X	X			
MW-309	10-7-21	18:02	G	Water	X	X	X	X	X			
<p><b>Possible Hazard Identification</b></p> <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) <p>Empty Kit Relinquished by: <i>Rosa Cruz</i> Date: <i>10-11-21</i> Time: <i>6:00</i></p> <p>Relinquished by: <i>Rosa Cruz</i> Date/Time: <i>10-11-21 6:00</i> Company: <i>Company</i></p> <p>Relinquished by: <i>Rosa Cruz</i> Date/Time: <i>10-11-21 1742</i> Company: <i>Company</i></p> <p>Custody Seals Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Cooler Temperature(s) °C and Other Remarks:</p>												

## Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-217094-1

SDG Number:

**Login Number: 217094**

**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.	False	Refer to Job Narrative for details.
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: 310-217096-1

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?



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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.*

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# 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

Eurofins TestAmerica, Cedar Falls

# 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

Eurofins TestAmerica, Cedar Falls

# 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	

Eurofins TestAmerica, Cedar Falls

# 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:	CITY <u>Madison</u>	STATE <u>WI</u>	Project: <u>Ottumwa Generating Station - Additional</u>
<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>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:	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>		
<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>			



# 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

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

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



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# Case Narrative

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

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#### 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.

- 1
- 2
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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/I

Job ID: 310-217096-2

**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: 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	
<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
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 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	

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# 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

<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>		



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

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

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# Case Narrative

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

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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

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# 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

# 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

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# 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	

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# 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	

- 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 -  
 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
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14



# Method Summary

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

Job ID: 310-217097-1

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**

<b>Client Information</b>			
Client: <u>SCS Engineers</u>			
City/State:	CITY <u>Madison</u>	STATE <u>WI</u>	Project: <u>Ottumwa Generating Station - Additional</u>
<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>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>		Sampler: <u>Rosa CVUZ</u>		Lab PM: Fredrick, Sandie		COC No: 310-64464-17486.1	
Client Contact: Meghan Blodgett		Phone: <u>608-509-8245</u>		E-Mail: sandra.fredrick@eurofinsct.com		Page: Page 1 of 1	
Company: SCS Engineers		PWSID:		Carner Tracking No(s):		Job #:	
Address: 2830 Dairy Drive		Due Date Requested:		State of Origin:		Preservation Codes:	
City: Madison		TAT Requested (days):		Perform MS/MSD (Yes or No)		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
State, Zip: WI, 53718		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		Field Filtered Sample (Yes or No)		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)	
Phone: 2522-1072		PO #: 2522-1072		232B - Alkalinity/Carb/Bicarb		Total Number of containers	
WC #: 31011020		Project #: 31011020		602A - Metals (5)		Special Instructions/Note:	
Site: <u>Additional</u>		330W4		602A - D. Metals (2)			
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Preservation Code	Matrix (w-water, Sealed, On-wastefiel, etc-tissue, A, etc)		
MW-301	10-07-21	8:25	6	Water	Water	<input checked="" type="checkbox"/>	
Field Blank	10-07-21	9:00	6	Water	Water	<input checked="" type="checkbox"/>	
<p><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</p> <p>Deliverable Requested: I, II, III, IV, Other (specify) <u>6:00</u></p>							
<p>Empty Kit Relinquished by: _____ Date: _____ Time: _____</p> <p>Relinquished by: <u>Rosa CVUZ</u> Date/Time: <u>10-08-21 10:00</u> Company: <u>Company</u></p> <p>Relinquished by: _____ Date/Time: _____ Company: <u>Company</u></p> <p>Relinquished by: _____ Date/Time: _____ Company: <u>Company</u></p> <p>Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Custody Seal No.: _____</p>							
<p>Special Instructions/QC Requirements: _____</p> <p>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</p> <p>Method of Shipment: _____</p> <p>Received by: _____ Date/Time: _____ Company: _____</p> <p>Received by: _____ Date/Time: _____ Company: _____</p> <p>Received by: <u>M. S. D.</u> Date/Time: <u>10-11-21 17:42</u> Company: <u>Company</u></p> <p>Cooler Temperature(s) °C and Other Remarks: _____</p>							



# 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 <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	





Appendix E  
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	
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	78000	88000	
Cobalt, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.32	0.44	--	--	--
Iron, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<50	<50	<50	<36	<36
Manganese, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16	19	14	14	18
Lithium, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22	--	--	--	--

# Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-307																					
Number of Sampling Dates: 20																					
Parameter Name	Units	1/19/2017	4/20/2017	6/21/2017	8/21/2017	11/8/2017	4/16/2018	5/30/2018	6/28/2018	7/18/2018	10/16/2018	4/8/2019	10/23/2019	12/11/2019	2/5/2020	4/14/2020	10/7/2020	2/23/2021	4/14/2021	7/6/2021	10/7/2021
Boron	ug/L	207	205	197	197	214	200	--	210	--	195	240	200	190	200	240	260	--	200	--	230
Calcium	mg/L	230	241	229	221	227	220	--	239	--	222	240	230	230	210	240	240	--	250	--	240
Chloride	mg/L	210	201	213	219	217	224	--	--	223	293	220	220	200	220	230	230	--	210	--	240
Fluoride	mg/L	0.12	0.13	0.16	0.2	0.12	0.11	--	--	0.13	<0.19	0.28	<0.23	<0.23	--	<0.23	<0.23	--	<0.28	--	<0.28
Field pH	Std. Units	6.7	6.51	6.82	6.4	6.61	7.04	6.44	6.87	6.62	6.54	6.76	6.68	6.37	6.67	6.76	6.97	6.5	6.59	7.05	6.71
Sulfate	mg/L	105	105	110	102	102	103	--	--	105	104	100	95	92	100	99	100	--	92	--	110
Total Dissolved Solids	mg/L	1050	1100	1070	1050	1030	--	1100	--	1070	1070	1000	1000	1000	970	980	1000	--	1000	--	1000
Antimony	ug/L	0.1	<0.026	<0.026	<0.026	<0.026	<0.026	--	<0.15	--	<0.078	--	--	<0.53	--	<0.58	--	--	<1.1	--	<1.1
Arsenic	ug/L	1.1	0.96	0.62	0.52	0.54	0.41	--	0.86	--	0.66	--	--	<0.75	<0.88	<0.88	<0.88	--	<0.75	--	<0.75
Barium	ug/L	127	139	132	128	131	126	--	147	--	145	--	--	140	130	140	140	--	160	--	140
Beryllium	ug/L	<0.08	0.029	0.016	<0.012	<0.012	<0.012	--	<0.12	--	<0.089	--	--	<0.27	--	<0.27	--	--	<0.27	--	<0.27
Cadmium	ug/L	<0.029	0.025	<0.018	<0.018	0.018	<0.018	--	<0.07	--	<0.033	--	--	<0.039	<0.039	<0.039	--	--	<0.051	--	<0.051
Chromium	ug/L	0.59	1.6	1	0.38	0.38	0.28	--	1.4	--	0.59	--	--	<0.98	<1.1	<1.1	<1.1	--	<1.1	--	<1.1
Cobalt	ug/L	0.62	1.6	1.1	1.1	1.3	1.3	--	2.9	--	4.8	--	--	11	13	20	18	64	46	60	48
Lead	ug/L	<0.19	0.49	0.26	0.085	0.075	0.13	--	0.48	--	0.13	--	--	0.71	<0.27	0.31	<0.11	--	<0.21	--	<0.21
Lithium	ug/L	10	9.4	11.2	15.2	12.9	9.3	--	13.2	--	11.6	--	--	12	9.1	13	11	--	14	--	14
Mercury	ug/L	<0.039	<0.046	<0.046	<0.046	<0.046	<0.09	--	<0.037	--	<0.09	--	--	<0.1	--	<0.1	--	--	<0.15	--	<0.15
Molybdenum	ug/L	0.5	0.56	0.31	0.31	0.37	0.3	--	0.39	--	<0.57	--	--	<1.1	--	<1.1	<1.1	--	<1.3	--	<1.3
Selenium	ug/L	<0.18	0.12	0.11	0.11	0.13	<0.086	--	0.25	--	0.13	--	--	<1	--	<1	<1	--	<0.96	--	<0.96
Thallium	ug/L	<0.5	<0.036	<0.036	<0.036	0.065	<0.036	--	<0.14	--	<0.099	--	--	<0.27	--	<0.26	--	--	<0.26	--	<0.26
Total Radium	pCi/L	2.66	2.77	2.83	3.07	2.88	2.96	--	2.47	--	3.1	--	--	2.46	2.23	2.06	2.36	--	3.08	--	3.9
Radium-226	pCi/L	1.55	1.72	1.87	1.69	1.76	1.31	--	1.84	--	2.11	--	--	1.65	1.51	1.5	1.47	--	1.99	--	2.52
Radium-228	pCi/L	1.11	1.05	0.96	1.38	1.12	1.65	--	0.629	--	0.991	--	--	0.81	0.718	0.562	0.885	--	1.09	--	1.38
Field Specific Conductance	umhos/cm	1640	1648	1557	2193	1656	1674	1710	1686	1718	1697	1599	1684	1576	1681	1554	1637	1632	1675	1705	1552
Field Temperature	deg C	12.9	12	12.7	13	13.2	11.6	12.7	13.4	12.9	14.3	12.47	13.38	11.5	11.65	10.6	13.2	12.2	11.5	13.2	14.4
Groundwater Elevation	feet	648.81	653.62	649.85	645.78	647.37	649.66	652.45	652.87	652.27	654.13	654.9	651.89 ft	649.59	649.88	650.66	646.18	646.8	649.53	647.03	644.49
Oxygen, Dissolved	mg/L	0.16	0.2	0.08	0.08	0.17	0.29	0.18	0.21	0.21	0.08	0.51	0.25	0.18	0.9	0.69	0.08	0.2	0.41	0.21	0.19
Turbidity	NTU	9.01	66.67	34.94	4.89	11.16	11.93	18.58	53.34	14.94	14.08	26	12.5	43.13	9.74	28.9	4.56	2.41	21.2	17.91	10
pH at 25 Degrees C	Std. Units	7	6.9	6.8	6.9	7	7.1	--	--	6.7	6.8	6.7	7.5	6.7	6.7	6.8	6.9	--	6.8	--	6.8
Field Oxidation Potential	millivolts	-42	-16	-23.1	23.7	176.7	-105.9	-45.8	-43.4	-416.3	-65.7	-3.7	-24.8	-45.8	-15.6	-52.9	-62.2	0.8	-39.9	14.7	-23.8
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	520	480	--	490	--	550
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1.9	<3.8	--	<4.6	--	<4.6
Total Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	520	480	--	490	--	550
Iron, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3800	3500	--	3700	--	3900
Magnesium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	28000	27000	--	30000	--	28000
Manganese, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	350	--	360	--	410
Potassium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1900	1900	--	2000	--	2000
Sodium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	97000	100000	--	98000	--	100000
Cobalt, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19	19	--	49	--	59
Iron, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3100	3600	--	3400	--	3400
Manganese, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	310	290	--	330	--	440

# Single Location

Name: IPL - Ottumwa Generating Station


Location ID: MW-308		Number of Sampling Dates: 18																	
Parameter Name	Units	1/19/2017	4/20/2017	6/21/2017	8/21/2017	11/8/2017	4/16/2018	5/30/2018	6/28/2018	7/18/2018	10/16/2018	4/8/2019	10/23/2019	12/11/2019	2/5/2020	4/14/2020	10/7/2020	4/14/2021	10/7/2021
Boron	ug/L	218	146	182	214	240	210	--	153	--	162	190	220	160	220	210	270	220	200
Calcium	mg/L	212	222	209	218	212	229	--	215	--	209	240	240	220	210	240	220	230	230
Chloride	mg/L	151	149	146	151	156	153	--	--	158	158	160	160	150	160	170	160	150	170
Fluoride	mg/L	0.11	0.12	0.12	0.23	0.12	0.1	--	--	0.12	<0.19	<0.23	<0.23	<0.23	--	<0.23	<0.23	<0.28	<0.28
Field pH	Std. Units	6.85	6.7	6.93	6.52	6.76	7.14	6.61	7.08	6.73	6.68	6.9	6.78	6.55	6.78	6.9	7.24	6.7	6.83
Sulfate	mg/L	296	283	303	294	297	305	--	--	310	311	300	300	280	300	290	290	270	290
Total Dissolved Solids	mg/L	1060	1100	1050	1020	1120	--	1090	--	1080	1110	1200	1100	1100	1100	1000	1000	1100	1000
Antimony	ug/L	0.11	<0.026	0.039	<0.026	<0.026	<0.026	--	<0.15	--	<0.078	--	--	<0.53	--	<0.58	--	<1.1	<1.1
Arsenic	ug/L	0.44	0.34	0.14	0.32	0.32	0.29	--	0.39	--	0.44	--	--	<0.75	<0.88	<0.88	<0.88	<0.75	<0.75
Barium	ug/L	118	118	125	132	133	123	--	134	--	143	--	--	130	130	140	130	140	130
Beryllium	ug/L	<0.08	<0.012	<0.012	<0.012	<0.012	<0.012	--	<0.12	--	<0.089	--	--	<0.27	--	<0.27	--	<0.27	<0.27
Cadmium	ug/L	<0.029	<0.018	<0.018	<0.018	<0.018	<0.018	--	<0.07	--	<0.033	--	--	<0.039	<0.039	<0.039	--	<0.051	<0.051
Chromium	ug/L	0.57	0.44	0.34	0.49	0.45	0.17	--	0.42	--	0.27	--	--	5.9	<1.1	<1.1	<1.1	<1.1	<1.1
Cobalt	ug/L	0.52	0.43	0.25	0.26	0.23	0.18	--	0.19	--	0.15	--	--	0.26	0.14	0.14	0.14	0.16	0.22
Lead	ug/L	<0.19	0.066	<0.033	<0.033	<0.033	0.043	--	<0.12	--	<0.13	--	--	0.52	<0.27	<0.27	<0.11	<0.21	<0.21
Lithium	ug/L	10.3	13.3	12.7	19.1	12.6	12.3	--	17.6	--	13.7	--	--	16	12	17	14	16	16
Mercury	ug/L	<0.039	<0.046	<0.046	<0.046	<0.046	<0.09	--	<0.037	--	<0.09	--	--	<0.1	--	<0.1	--	<0.15	<0.15
Molybdenum	ug/L	0.95	0.53	0.5	0.61	0.75	0.6	--	0.46	--	<0.57	--	--	<1.1	--	<1.1	<1.1	<1.3	<1.3
Selenium	ug/L	<0.18	<0.086	<0.086	<0.086	<0.086	<0.086	--	<0.16	--	<0.085	--	--	<1	--	<1	<1	<0.96	<0.96
Thallium	ug/L	<0.5	<0.036	<0.036	<0.036	<0.036	<0.036	--	<0.14	--	<0.099	--	--	<0.27	--	<0.26	--	<0.26	<0.26
Total Radium	pCi/L	1.45	0.496	3.3	2.17	1.47	1.63	--	1.88	--	2.85	--	--	2.73	2.13	1.69	2.67	2.87	3.22
Radium-226	pCi/L	0.282	-0.173	2	1.42	1.18	0.532	--	1.5	--	1.44	--	--	1.54	1.42	1.24	1.53	1.36	1.78
Radium-228	pCi/L	1.17	0.496	1.3	0.745	0.286	1.1	--	0.379	--	1.41	--	--	1.19	0.705	0.454	1.14	1.51	1.43
Field Specific Conductance	umhos/cm	1559	1509	1467	2042	1577	1577	1611	1584	1628	1594	1539	1637	1532	1630	1502	1575	1598	1453
Field Temperature	deg C	12.6	11.9	12.2	12.6	13	11.8	12.1	13.1	12.6	13.1	12.54	13.16	10.5	11.35	10.9	13.2	11.5	13
Groundwater Elevation	feet	647.42	651.09	648.26	643.12	644.99	647.91	651.05	651.43	650.67	--	653.7	651.31	647.39	650.12	650.09	642.85	647.66	641.81
Oxygen, Dissolved	mg/L	0.15	0.21	0.03	0.12	0.12	0.35	0.14	0.19	0.13	0.08	0.66	4.42	0.43	1.48	0.28	0.11	0.44	0.17
Turbidity	NTU	1.65	4.6	0.84	1.15	0.73	0.93	3.34	5.87	1.54	5.49	6.87	7.42	15.72	3.49	5.12	1.15	4.47	12.8
pH at 25 Degrees C	Std. Units	7.2	7.2	7	6.9	7	7.1	--	--	6.8	7	6.8	7.9	6.8	6.8	6.9	7.1	7.1	6.9
Field Oxidation Potential	millivolts	-44.4	1.7	-29.1	24.4	169.7	-47.2	-48.2	-60.3	-415.4	-80.8	-23	-38.7	-56.6	-35.9	-69.1	-56.5	-49.3	-26.1
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	380	390	370	410
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1.9	<3.8	<4.6	<4.6
Total Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	380	390	370	410
Iron, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5100	3800	3900	4700
Magnesium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	25000	23000	26000	24000
Manganese, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	770	1400	1300	950
Potassium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3900	4000	4400	4300
Sodium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	110000	100000	100000	110000
Cobalt, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.11	--	--	--
Iron, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4400	4000	3900	300
Manganese, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	800	1200	1300	1100



# Single Location

Name: IPL - Ottumwa Generating Station

Location ID: MW-309		Number of Sampling Dates: 18																	
Parameter Name	Units	1/19/2017	4/20/2017	6/21/2017	8/21/2017	11/8/2017	4/16/2018	5/30/2018	6/28/2018	7/18/2018	10/16/2018	4/8/2019	10/23/2019	12/11/2019	2/5/2020	4/14/2020	10/7/2020	4/14/2021	10/7/2021
Boron	ug/L	1300	1280	1250	1320	1360	1340	--	1360	--	1280	1500	1300	1100	1300	1400	1200	1400	1300
Calcium	mg/L	134	152	136	135	135	150	--	181	--	139	160	150	150	130	150	120	130	120
Chloride	mg/L	73.1	73.7	75.5	78.4	78.1	78.9	--	--	76.4	80.6	72	74	66	68	69	68	57	67
Fluoride	mg/L	0.12	0.13	0.16	0.19	0.14	0.094	--	--	0.13	<0.19	0.27	<0.23	<0.23	--	0.36	<0.23	<0.28	<0.28
Field pH	Std. Units	7.18	7.01	7.17	6.9	7.11	7.52	6.92	7.36	7.02	6.95	7.18	6.98	6.67	7.09	7.21	7.57	7	7.18
Sulfate	mg/L	406	393	415	395	402	373	--	--	417	453	410	400	370	370	390	380	360	400
Total Dissolved Solids	mg/L	1030	1030	1020	1010	1010	--	1050	--	1030	1040	1100	1100	980	990	1000	930	940	950
Antimony	ug/L	0.095	<0.026	0.041	0.029	<0.026	0.079	--	<0.15	--	<0.078	--	--	<0.53	--	<0.58	--	<1.1	<1.1
Arsenic	ug/L	0.66	1.1	0.52	0.44	0.45	0.62	--	2	--	0.74	--	--	1.1	<0.88	0.88	<0.88	<0.75	<0.75
Barium	ug/L	48.7	62.4	48.7	46.1	46	53.7	--	82.1	--	54.5	--	--	54	46	50	42	52	47
Beryllium	ug/L	<0.08	0.073	0.025	<0.012	0.016	0.056	--	0.28	--	<0.089	--	--	<0.27	--	<0.27	--	<0.27	<0.27
Cadmium	ug/L	<0.029	0.042	0.033	0.018	<0.018	0.052	--	0.15	--	<0.033	--	--	0.09	<0.039	<0.039	--	<0.051	<0.051
Chromium	ug/L	1.4	3.2	1.8	1.2	1.2	2.7	--	5.4	--	1.6	--	--	1.7	<1.1	1.3	<1.1	<1.1	1.3
Cobalt	ug/L	2	3.1	2.4	2.1	2	2.4	--	4.7	--	2.7	--	--	3.7	2.3	3.2	2	2.3	2
Lead	ug/L	<0.19	1	0.5	0.096	0.057	0.95	--	3.1	--	0.46	--	--	2.8	0.63	1.6	<0.11	<0.21	<0.21
Lithium	ug/L	5.8	9.3	7.3	9.4	6.9	8	--	16.2	--	8.8	--	--	8.2	6.3	9.6	6.9	8.9	7.5
Mercury	ug/L	<0.039	<0.046	<0.046	<0.046	<0.046	<0.09	--	<0.037	--	<0.09	--	--	<0.1	--	<0.1	--	<0.15	<0.15
Molybdenum	ug/L	0.57	0.32	0.28	0.28	0.37	0.29	--	0.33	--	<0.57	--	--	<1.1	--	<1.1	<1.1	<1.3	<1.3
Selenium	ug/L	<0.18	0.22	<0.086	<0.086	<0.086	<0.086	--	1	--	0.24	--	--	<1	--	<1	<1	<0.96	<0.96
Thallium	ug/L	<0.5	<0.036	<0.036	<0.036	<0.036	<0.036	--	<0.14	--	<0.099	--	--	<0.27	--	<0.26	--	<0.26	<0.26
Total Radium	pCi/L	0.606	2.23	1.63	1.65	1.11	1.59	--	2.36	--	2.2	--	--	1.77	1.02	0.957	1.77	1.05	1.6
Radium-226	pCi/L	0.143	0.968	1.37	0.783	0.284	0.974	--	1.83	--	1.09	--	--	1.08	0.771	0.868	0.863	0.604	1.14
Radium-228	pCi/L	0.463	1.26	0.259	0.866	0.825	0.614	--	0.534	--	1.11	--	--	0.683	0.251	0.0894	0.906	0.448	<0.525
Field Specific Conductance	umhos/cm	1426	1430	1363	1821	1431	1445	1484	1477	1501	1464	1396	1461	1350	1433	1322	1371	1411	1297
Field Temperature	deg C	12.7	12.1	12.4	12.6	13.1	11.2	12.4	13.8	12.6	13.5	12.4	12.83	11.5	11.42	11.2	13.3	11.7	13.1
Groundwater Elevation	feet	646.66	650.16	647.6	641.82	644.2	647.65	650.98	651.47	650.69	651.61	653.55	651.28	647.24	648.34	649.19	641.5	646.46	640.71
Oxygen, Dissolved	mg/L	0.09	0.16	0.06	0.08	0.13	0.37	0.12	0.17	0.11	0.03	0.66	0.36	0.26	1.07	0.16	0.09	0.36	0.21
Turbidity	NTU	8.56	77.74	20.33	2.34	3.71	36.7	40.55	241.4	40.38	28.27	72.1	42.6	413.6	18.1	100.1	7.7	9.32	19.6
pH at 25 Degrees C	Std. Units	7.4	7.4	7.2	7.2	7.4	7.3	--	--	7.3	7.2	7.2	7.2	7.1	7.2	7.1	7.4	7.3	7.3
Field Oxidation Potential	millivolts	-42.1	0.2	-34.8	-5	149.7	-58.5	-38	-45.5	-432.6	-81.6	-3.3	-27.5	-37.8	-7.8	-51.5	-71.1	-40.6	-8.1
Bicarbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	290	280	300
Carbonate Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<1.9	<1.9	<4.6	<4.6
Total Alkalinity as CaCO3	mg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	290	290	280	300
Iron, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1900	890	900	950
Magnesium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19000	18000	19000	18000
Manganese, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	660	660	640	600
Potassium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	670	670	750	740
Sodium, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	170000	180000	180000	180000
Cobalt, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.2	--	--	--
Iron, dissolved	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	590	690	660	680
Manganese, total	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	740	620	630	650



Appendix F  
Statistical Evaluation

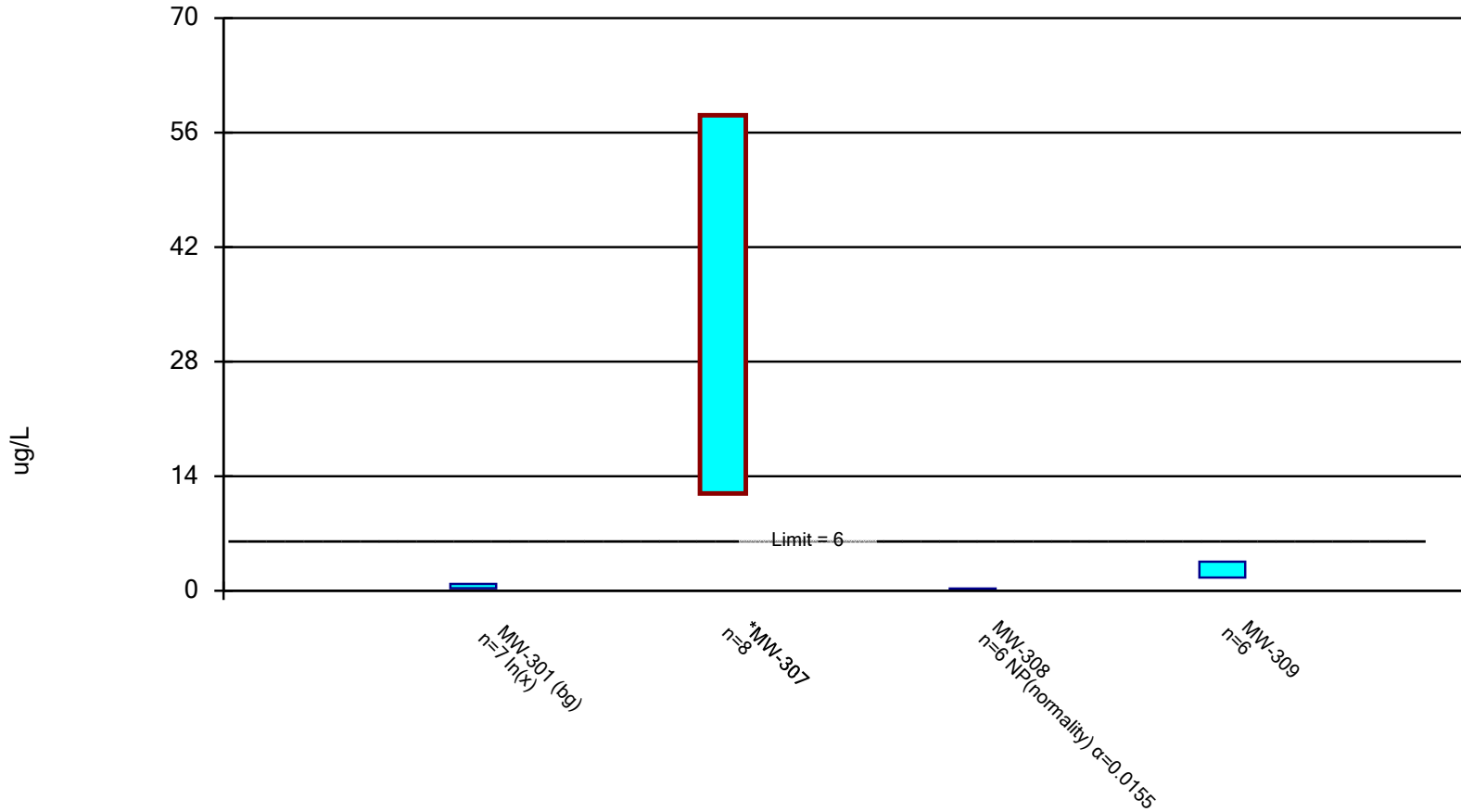
# Confidence Interval

Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122 Printed 12/13/2021, 11:01 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)	0.824	0.31	6	No	7	0	None	ln(x)	0.01	Param.
<b>Cobalt (ug/L)</b>	<b>MW-307</b>	<b>58.12</b>	<b>11.88</b>	<b>6</b>	<b>Yes</b>	<b>8</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.01</b>	<b>Param.</b>
Cobalt (ug/L)	MW-308	0.26	0.14	6	No	6	0	None	No	0.0155	NP (normality)
Cobalt (ug/L)	MW-309	3.549	1.618	6	No	6	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 11:01 PM View: OGS - ZLDP

Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

# Confidence Interval

Constituent: Cobalt (ug/L) Analysis Run 12/13/2021 11:01 PM View: OGS - ZLDP  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

	MW-301 (bg)	MW-307	MW-308	MW-309
10/24/2019	0.6			
12/11/2019		11	0.26 (J)	3.7
2/5/2020	1.1	13	0.14 (J)	2.3
3/12/2020	0.43 (J)			
4/14/2020	0.52	20	0.14 (J)	3.2
10/7/2020		18	0.14 (J)	2
10/8/2020	0.41 (J)			
2/23/2021		64		
4/14/2021	0.29 (J)	46	0.16 (J)	2.3
7/6/2021		60		
10/7/2021	0.48 (J)	48	0.22 (J)	2
<b>Mean</b>	0.5471	35	0.1767	2.583
<b>Std. Dev.</b>	0.2622	21.81	0.05125	0.7026
<b>Upper Lim.</b>	0.824	58.12	0.26	3.549
<b>Lower Lim.</b>	0.31	11.88	0.14	1.618



Appendix G  
Alternative Source Demonstration Report

# Alternative Source Demonstration February, April, and July 2021 Assessment Monitoring

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

Prepared for:



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

**SCS ENGINEERS**

25221072.00 | August 30, 2021

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

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## Tables

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Table 2.	Historical Analytical Results for Cobalt
Table 3.	Groundwater Elevations - CCR Rule Monitoring Well Networks



## Figures


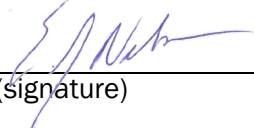
- Figure 1. Site Location Map
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## Appendices

- Appendix A July 2021 Laboratory Report
- Appendix B CCR Well Trend Plot
- Appendix C Regional Geologic and Hydrogeologic Background Information
- Appendix D Boring Logs
- Appendix E Cobalt Lower Confidence Limit Evaluation
- Appendix F Ash Pond CCR Unit Cobalt Data

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# PE CERTIFICATION

	<p>I, Eric J. Nelson, hereby certify that that the information in this alternative source demonstration is accurate and meets the requirements of 40 CFR 257.95(g)(3)(ii). This certification is based on my review of the groundwater data and related site information available for the Ottumwa Generating Station. I 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>	
		<p>8/30/2021</p>
	<p>(signature)</p>	<p>(date)</p>
	<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, February, April, and July, 2021</p>		
<p>Assessment Monitoring, Zero Liquid Discharge Pond, Ottumwa Generating Station, Ottumwa, Iowa</p>		

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## 1.0 INTRODUCTION

This Alternative Source Demonstration (ASD) was prepared to support compliance with the groundwater monitoring requirements of the “Coal Combustion Residuals (CCR) Final Rule” published by the U.S. Environmental Protection Agency (USEPA) in the Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, dated April 17, 2015 (USEPA, 2015), and subsequent amendments. Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.95(g)(3)(ii). The applicable sections of the Rule are provided below in *italics*.

This report was prepared to also fulfill the requirements of 40 CFR 257.100 for inactive CCR surface impoundments.

### 1.1 §257.95(G)(3) ALTERNATIVE SOURCE DEMONSTRATION REQUIREMENTS

*(3) Within 90 days of finding that any of the constituents listed in appendix IV to this part have been detected at a statistically significant level exceeding the groundwater protection standards the owner or operator must either:*

*(i) Initiate an assessment of corrective measures as required by § 257.96; or*

*(ii) Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Any such demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified to be accurate by a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority. If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to this section, and may return to detection monitoring if the constituents in Appendix III and Appendix IV of this part are at or below background as specified in paragraph (e) of this section. The owner or operator must also include the demonstration in the annual groundwater monitoring and corrective action report required by § 257.90(e), in addition to the certification by a qualified professional engineer or the approval from the Participating State Director or the approval from EPA where EPA is the permitting authority.*

An ASD is completed when there are exceedances of one or more benchmarks established within the groundwater monitoring program. The ASD is completed to determine if any other sources are likely causes of the identified exceedance(s) of established benchmark(s) at the site. This ASD was performed in response to results showing cobalt at concentrations exceeding the groundwater protection standard (GPS) during assessment monitoring under the CCR Rule. Cobalt was determined to be present at an SSL above the GPS in the statistical evaluation of the February results, which was completed on June 1, 2021.

Cobalt was detected above the GPS in samples collected from monitoring well MW-307 in February, April, and July 2021. The February and July 2021 sampling event were supplemental to provide more details on site conditions; while, the April 2021 sampling event was part of the semiannual assessment monitoring for the Zero Liquid Discharge Pond (ZLDP).

Cobalt was previously determined to be at an SSL above the GPS at MW-307 in the initial evaluation of assessment monitoring results dated July 13, 2020. An ASD was completed on October 12, 2020, concluding that the most likely source of the GPS exceedance for cobalt at MW-307 was the adjacent OGS Ash Pond, and not the OGS ZLDP. Following the October 2020 monitoring event, the statistical evaluation completed on January 15, 2021, indicated that the cobalt concentration at MW-307 was not at an SSL above the GPS; therefore, no ASD was required for that event.

## 1.2 SITE INFORMATION AND MAP

Ottumwa Generating Station (OGS) is located at 20775 Power Plant Road in Ottumwa, Wapello County, Iowa (**Figure 1**). OGS is an active, coal-powered generating station. In addition to the ZLDP, which is an inactive CCR surface impoundment, there is one active existing CCR surface impoundment at OGS (OGS Ash Pond). There are no existing or closed CCR landfills or closed CCR surface impoundments at the site.

The ZLDP is currently in the process of closing. The pond has been dewatered (started in May 2021) and CCR material is actively being removed and relocated to the OGS Ash Pond. The ZLDP will be transitioned to a low volume wastewater treatment pond after CCR removal is complete. The OGS Ash Pond is currently scheduled to be closed in 2022, with dewatering activities starting in the fall of 2021.

The CCR surface impoundments at OGS are monitored using single-unit groundwater monitoring systems. The single-unit system for the ZLDP is designed to detect monitored constituents at the waste boundary of the facility as required by 40 CFR 257.91(d). The groundwater monitoring system consists of one upgradient and three downgradient monitoring wells. A separate single-unit groundwater monitoring system is used to monitor the OGS Ash Pond CCR Unit, consisting of one upgradient well (shared with the ZLDP monitoring system) and five downgradient wells at the Ash Pond compliance boundary. Five additional downgradient monitoring wells have been installed as part of an Assessment of Corrective Measures (ACM) and Selection of Remedy (SOR) process for the Ash Pond CCR Unit.

A map showing the CCR Units and all background (or upgradient) and downgradient monitoring wells with identification numbers for the CCR groundwater monitoring program is provided as **Figure 2**.

## 1.3 SAMPLE COLLECTION AND ANALYSIS

In addition to the semiannual assessment monitoring event in April 2021, two supplemental sampling events were completed in February and July 2021. Both supplemental monitoring events were performed to collect additional samples from monitoring well MW-307 to support the evaluation of whether cobalt was present at the well at an SSL above the GPS. The results are summarized in **Table 1**.

The field parameters results were compiled by SCS Engineers (SCS) and provided to the laboratory for inclusion in the laboratory reports. The results are also summarized in **Table 1** and the July 2021 laboratory report is included in **Appendix A**. The February and April laboratory reports were previously provided to Interstate Power & Light (IPL) under separate cover.

## 1.4 STATISTICALLY SIGNIFICANT LEVELS ABOVE GPS IDENTIFIED

The Appendix IV parameter monitoring results were compared to the GPS values established under 40 CFR 257.95(h) in **Table 1**. The only assessment monitoring parameter for which a monitoring

result exceeded the GPS was cobalt in the samples from MW-307. Cobalt exceeded the GPS in the samples from MW-307 from sampling events in February, April, and July 2021. The cobalt levels also exceeded the upper prediction limit (UPL) established based on background monitoring at the upgradient well. Cobalt was first determined to be present at an SSL above the GPS in the statistical evaluation of the February results, which was completed on June 1, 2021.

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

A lower confidence limit (LCL) evaluation was completed for cobalt and the LCLs were calculated with Sanitas™ using historical concentrations measured since assessment monitoring was initiated for the ZLDP in October 2019. The LCL for the mean for cobalt exceeded the GPS at compliance well MW-307; therefore, cobalt is present at a statistically significant level (SSL) above the GPS at this well, See **Section 3.3**. for more details on the statistical evaluation.

## 1.5 OVERVIEW OF ALTERNATIVE SOURCE DEMONSTRATION APPROACH

This ASD report includes:

- Background information (**Section 2.0**)
- Evaluation of potential that GPS exceedances are due to methodology or analysis (**Section 3.0**)
- Evaluation of potential that GPS exceedances are due to natural sources or man-made sources other than the ZLDP CCR Unit (**Section 4.0**)
- ASD conclusions (**Section 5.0**)
- Monitoring recommendations (**Section 6.0**)

Historical cobalt concentration samples from background and compliance sampling for cobalt in the ZLDP monitoring wells are provided in **Table 2**. Historical concentration trends are shown in **Appendix B**. Laboratory reports for the eight background monitoring events were included in the 2018 Annual Groundwater Monitoring and Corrective Action Report submitted in August 2019 (SCS, 2019). The laboratory reports for the February, April, and July 2021 assessment monitoring events will be included in the 2021 Annual Groundwater Monitoring and Corrective Action Report which is due in August 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 C**.

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

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 C**. 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 C**.

### 2.1.2 Site Information

Site boring logs indicate that the unconsolidated material at the site is fairly thin (approximately 20 to 30 feet or less) and consists of a clay layer overlying clay and sand. Monitoring wells MW-301 through MW-309 were installed to intersect the bedrock aquifer or unconsolidated material in contact with the bedrock aquifer at the site. The unconsolidated material at these well locations is generally clay, silt, and sand, and the uppermost bedrock appears to be weathered. The total boring depths were between 14.5 and 52 feet and weathered bedrock was encountered at depths between 7 and 44 feet below ground surface. Boring logs for the monitoring wells used to evaluate the ZLDP (MW-301, MW-307, MW-308, and MW-309) are included in **Appendix D**.

## 2.2 CCR RULE MONITORING SYSTEM

The groundwater monitoring system established in accordance with the CCR Rule consists of one upgradient (background) monitoring well and three downgradient monitoring wells for the ZLDP. The background well is MW-301, and the three downgradient wells include MW-307, MW-308, and MW-309. The CCR Rule wells are installed in the Mississippian aquifer and/or hydraulically connected overlying unconsolidated deposits, which comprise the uppermost aquifer unit at the site. Well depths range from approximately 28 to 30 feet, measured from the top of the well casing.

The background well (MW-301) is located to the west of the site. The downgradient wells (MW-307, MW-308, and MW-309) are located along the eastern edge of the ZLDP. The downgradient wells were installed as close as practicable to the pond boundaries considering the site layout (**Figure 2**).

## 2.3 OTHER MONITORING WELLS

Additional groundwater monitoring wells currently exist at OGS as part of the single-unit monitoring system developed for the OGS Ash Pond CCR Unit.

The additional monitoring wells include five compliance wells at the Ash Pond boundary (MW-302 through MW-306), two downgradient well nests (MW-310/MW-310A and MW-311/MW-311A), and a piezometer added in a nest with one of the existing compliance wells (MW-305A). The wells added to the OGS Ash Pond monitoring system beyond the original background and compliance wells have been installed as part of an ACM and SOR process for the Ash Pond CCR Unit.

Boring depths of existing monitoring well are between 14.5 and 82 feet. Weathered bedrock was encountered at depths between 7 and 44 feet below ground surface. The existing Ash Pond and the inactive ZLDP share the same upgradient (background) monitoring well, MW-301.

## 2.4 GROUNDWATER FLOW DIRECTION

Groundwater flow in the area of the ZLDP is generally to the east, following the same flow patterns observed in regional flow maps of the area. The shallow and deep potentiometric surface maps for April 2021 are shown on **Figure 3** and **Figure 4**. The shallow and deep potentiometric surface maps show groundwater flow moving generally to the east toward the Des Moines River. The groundwater elevation data for the CCR monitoring wells are provided in **Table 3**.

## 3.0 METHODOLOGY AND ANALYSIS REVIEW

To evaluate the potential that the cobalt GPS exceedance is due to a source other than the ZLDP, SCS used a two-step evaluation process. First, the sample collection, field and laboratory analysis, and statistical evaluation were reviewed to identify any potential error or analysis that led to an exceedance of the benchmark. Second, potential alternative sources, including natural variation and man-made sources other than the CCR Unit, were evaluated. This section of the report provides the findings of the methodology and analysis review. **Section 4.0** of the report addresses the potential alternative sources.

## 3.1 SAMPLING AND FIELD ANALYSIS REVIEW

Field notes and sampling results were reviewed to determine if any sampling error may have caused or contributed to the observed GPS exceedances. Potential field sampling errors or issues could include mislabeling of samples, improper sample handling, missed holding times, cross contamination during sampling, or other field error. Field blank sample results were also reviewed for



an indication of potential contamination from sampling equipment or containers. Based on the review of the field notes and results, SCS did not identify any indication that the concentrations exceeding the GPS were due to a sampling error.

Because cobalt is a laboratory parameter, there is little potential for a field analysis error to contribute to a GPS exceedance for this parameter.

### **3.2 LABORATORY ANALYSIS REVIEW**

The laboratory reports for the February, April, and July 2021 assessment monitoring events were reviewed to determine if any laboratory analysis error or issue may have caused or contributed to the observed cobalt concentrations above the GPS. The laboratory report review included reviewing the laboratory quality control flags and narrative, verifying that correct methods were used and desired detection limits were achieved, and checking the field and laboratory blank sample results.

Based on the review of the laboratory reports, SCS did not identify any indication that the GPS exceedances were due to a laboratory analysis error. There were no laboratory quality control flags or issues identified in the laboratory reports that affect the usability of the data for assessment monitoring.

A time series plot of the cobalt analytical data was also reviewed for anomalous results that might indicate a possible sampling or laboratory error (e.g., dilution error or incorrect sample labeling). The time series plot is provided in **Appendix B**. Cobalt at MW-307 has followed a generally increasing trend since the start of assessment monitoring with the December 2019 sampling event. Although there is some variability in the results, the time series plot does not appear to show any anomalous results indicating a sampling or laboratory error.

### **3.3 STATISTICAL EVALUATION REVIEW**

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

An LCL evaluation was completed for cobalt and the LCLs were calculated with Sanitas™ using historical concentrations measured since assessment monitoring began in October 2019. The LCL for the mean for cobalt exceeded the GPS at monitoring well MW-307; therefore, cobalt is at a SSL above the GPS at this well. The evaluation is provided in **Appendix E**.

The cobalt concentrations at MW-307 have shown an increasing shift or trend since the beginning of assessment monitoring. In this scenario, the Unified Guidance recommends consideration of a "moving window" approach for confidence limits or a confidence band around a trend line, because a standard LCL calculation may result in an overly wide confidence interval that would not identify an SSL (false negative). However, since the SSL for cobalt was identified without consideration of the shift/trend, there is no need for further analysis to narrow the interval (raise the LCL).

## **3.4 SUMMARY OF THE METHODOLOGY AND ANALYSIS REVIEW FINDINGS**

In summary, there were no changes to the determination that cobalt concentrations exceeded the GPS at MW-307 based on the methodology and analysis review, and no errors or issues causing or contributing to the reported GPS exceedance were identified.

## **4.0 ALTERNATIVE SOURCES**

This section of the report discusses the potential alternative sources for the cobalt GPS exceedance at MW-307, identifies the mostly alternative source(s), and presents lines of evidences indicating that an alternative source is most likely the cause of the observed GPS exceedance for cobalt.

### **4.1 POTENTIAL CAUSES OF STATISTICALLY SIGNIFICANT INCREASE**

#### **4.1.1 Natural Variation**

If concentrations of a constituent that is naturally present in the aquifer vary spatially, then the potential exists that the downgradient concentrations may be higher than upgradient concentrations due to natural variation. Although natural variation is likely present in the aquifer, SCS has not identified evidence that natural variation is the likely primary source causing the cobalt GPS exceedance at MW-307.

#### **4.1.2 Man-Made Alternative Sources**

Man-made alternative sources that could potentially contribute to the cobalt GPS exceedances could include the active Ash Pond CCR Unit, hydrated fly ash pile, coal pile runoff pond, and coal storage area, impacts associated with roads or rail lines, or other on-site or off-site sources

Based on the groundwater flow directions and on previous investigations at the site, the Ash Pond CCR Unit appears to be the most likely cause of the cobalt GPS exceedances for well MW-307.

## **4.2 LINES OF EVIDENCE**

The lines of evidence indicating that the GPS exceedances for cobalt in compliance well MW-307 are due to the Ash Pond include:

1. Monitoring well MW-307 is downgradient of the OGS Ash Pond CCR Unit and is downgradient from the Ash Pond monitoring wells with GPS exceedances for cobalt (MW-305 and MW-306).
2. The distribution of cobalt in groundwater based on the site monitoring wells is consistent with the Ash Pond as a source and is not consistent with the ZLDP as a source.
3. Based on historical use and the quantity and types of materials discharged to ponds, the Ash Pond is a more likely source of cobalt in groundwater than the ZLDP.

### **4.2.1 Groundwater Flow Direction**

As shown on **Figure 3**, groundwater flow in the area of the Ash Pond and ZLDP is generally to the east, following the same flow patterns observed in regional flow maps of the area. MW-307 is located downgradient from a small portion of the ZLDP and is also downgradient from a larger

portion of the Ash Pond. MW-307 is also downgradient from the area of the Ash Pond monitoring system where cobalt impacts attributed to the Ash Pond have been identified, including monitoring wells MW-305 and MW-306.

Water level data from the Ash Pond and ZLDP indicate that the water level in the Ash Pond is higher than the water level in the ZLDP (Hard Hat Services, 2016); therefore, shallow groundwater flow within the berm separating the two ponds is also to the east.

#### **4.2.2 Cobalt Distribution in Groundwater**

The distribution of cobalt in groundwater is consistent with an Ash Pond source and is not consistent with the ZLDP as a source. The three wells with cobalt concentrations exceeding the GPS are all downgradient from the northeast boundary of the Ash Pond. Cobalt concentrations for the ZLDP monitoring wells are shown in **Table 2**, and cobalt results for all monitoring wells at OGS are summarized in **Appendix F**.

The other downgradient monitoring wells for the ZLDP, MW-308 and MW-309, have consistently lower cobalt concentrations. All cobalt concentrations at MW-308 are J flagged values below the laboratory's limit of quantitation. All cobalt concentrations for samples from MW-308 and MW-309, including background and compliance monitoring events, have been below the cobalt GPS (6 micrograms per liter [ $\mu\text{g}/\text{L}$ ]) (**Table 2**).

The OGS Ash Pond is currently in the corrective action process in response to the cobalt concentrations observed at the Ash Pond downgradient wells.

#### **4.2.3 Historical Impoundment Use**

As described in the History of Construction report for the OGS surface impoundments (Hard Hat Services, 2016), the Ash Pond has been the primary receiver of bottom ash and economizer ash sluiced from the generating plant. The bottom ash and economizer ash were originally discharged in the northwest corner of the ash pond. In addition to the sluiced CCR, the OGS Ash Pond was also a primary receiver of process water flows from the plant, including flows from an oil separation basin (inclusive of miscellaneous plant floor drains, flash evaporator blowdown, sodium softener regeneration waste, condensate polisher regeneration waste), an ash water pit (inclusive of steam cycle blowdown), cooling tower blowdown, boiler blowdown, sluiced pyrites from the pyrites hopper, as well as other miscellaneous flows. Cobalt in coal is commonly associated with sulfide minerals such as pyrite; therefore, the sluiced pyrites are a potential source of cobalt in groundwater downgradient from the Ash Pond.

The historical use of the ZLDP was to collect storm water runoff from dry fly ash stored on the west side of the ZLDP, north of the plant, as well as storm water from the surrounding embankments. Based on the location of the former fly ash storage along the northern portion of the ZLDP, impacts from the fly ash storage or runoff would be expected to be similar or greater in the northern ZLDP wells (MW-308 and MW-309) rather than the southern well (MW-307), which is located furthest from the source and downgradient from the narrowest width of the ZLDP.

### **5.0 ALTERNATIVE SOURCE DEMONSTRATION CONCLUSIONS**

Based on the available data, the most likely source of the GPS exceedance for cobalt at MW-307 is the adjacent OGS Ash Pond, and not the OGS ZLDP.

## **6.0 SITE GROUNDWATER MONITORING RECOMMENDATIONS**

In accordance with section 257.95(g)(3)(ii.) of the CCR Rule, the OGS ZLDP CCR Unit may continue with assessment monitoring based on this ASD. The ASD report will be included in the 2021 Annual Report due in August 2022.

## **7.0 REFERENCES**

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

Hard Hat Services, 2016, History of Construction, CCR Surface Impoundment, Alliant Energy, Interstate Power and Light Company, Ottumwa Generating Station, issued September 29, 2016.

Kentucky Geological Survey, University of Kentucky website, Coal, Major, Minor, and Trace Elements, <https://www.uky.edu/KGS/coal/coal-major-minor-trace-elements.php>, downloaded October 1, 2020.

SCS Engineers, 2019, 2018 Annual Groundwater Monitoring and Corrective Action Report, Ottumwa Generating Station, Ottumwa, IA, 2019.

U.S. Environmental Protection Agency, 2015, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, April 2015.

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## Tables

- 1 Groundwater Analytical Results Summary
- 2 Historical Analytical Results for Cobalt
- 3 Groundwater Elevations – CCR Monitoring Well Networks

**Table 1. Groundwater Analytical Results Summary  
Ottumwa Generating Station - Zero Liquid Discharge Pond (ZLDP)  
SCS Engineers Project #25221072.00**

Parameter Name	UPL Method	UPL	GPS	Background Well	Compliance Wells				
				MW-301	MW-307		MW-308	MW-309	
				4/14/2021	2/23/2021	4/14/2021	7/6/2021	4/14/2021	4/14/2021
<b>Appendix III</b>									
Boron, ug/L	P	820		690	--	200	--	220	1400
Calcium, mg/L	P	78.7		96	--	250	--	230	130
Chloride, mg/L	P	86.8		150	--	210	--	150	57
Fluoride, mg/L	P	0.484		<0.28	--	<0.28	--	<0.28	<0.28
Field pH, Std. Units	P	6.87		6.26	6.50	6.59	7.05	6.70	7.00
Sulfate, mg/L	P	199		140	--	92 F1	--	270	360
Total Dissolved Solids, mg/L	P	628		620	--	1,000	--	1,100	940
<b>Appendix IV</b>									
Antimony, ug/L	P*	0.22	6	<1.1	--	<1.1	--	<1.1	<1.1
Arsenic, ug/L	P*	0.53	10	<0.75	--	<0.75	--	<0.75	<0.75
Barium, ug/L	P	68.8	2,000	52	--	160	--	140	52
Beryllium, ug/L	DQ	DQ	4	<0.27	--	<0.27	--	<0.27	<0.27
Cadmium, ug/L	NP*	0.12	5	<0.051	--	<0.051	--	<0.051	<0.051
Chromium, ug/L	P	1.07	100	<1.1	--	<1.1	--	<1.1	<1.1
Cobalt, ug/L	NP	4.10	6	0.29 J	64	46	60	0.16 J	2.3
Fluoride, mg/L	P*	0.484	4	<0.28	--	<0.28	--	<0.28	<0.28
Lead, ug/L	NP*	0.10	15	<0.21	--	<0.21	--	<0.21	<0.21
Lithium, ug/L	P	34.2	40	23	--	14	--	16	8.9 J
Mercury, ug/L	DQ	DQ	2	<0.15	--	<0.15	--	<0.15	<0.15
Molybdenum, ug/L	P	1.74	100	<1.3	--	<1.3	--	<1.3	<1.3
Selenium, ug/L	P	8.55	50	6.5	--	<0.96	--	<0.96	<0.96
Thallium, ug/L	NP*	0.14	2	<0.26	--	<0.26	--	<0.26	<0.26
Radium 226/228 Combined, pCi/L	P	2.15	5	0.598	--	3.08	--	2.87	1.05
<b>Additional Parameters Collected for Ash Pond Selection of Remedy</b>									
Cobalt - dissolved, # ug/L	UPL and GPS not applicable			--	--	49	--	--	--
Lithium - dissolved, # ug/L	UPL and GPS not applicable			--	--	--	--	--	--
Iron, dissolved, # ug/L	UPL and GPS not applicable			<36	--	3,400	--	3,900	660
Iron, ug/L	UPL and GPS not applicable			49 J	--	3,700	--	3,900	900
Magnesium ug/L	UPL and GPS not applicable			34,000	--	30,000	--	26,000	19,000
Manganese, dissolved, # ug/L	UPL and GPS not applicable			10	--	360	--	1,300	640
Manganese, ug/L	UPL and GPS not applicable			14	--	330	--	1,300	630
Potassium, ug/L	UPL and GPS not applicable			1,200	--	2,000	--	4,400	750
Sodium, ug/L	UPL and GPS not applicable			78,000	--	98,000	--	100,000	180,000
Bicarbonate Alkalinity, mg/L	UPL and GPS not applicable			170	--	490	--	370	280
Carbonate Alkalinity, mg/L	UPL and GPS not applicable			<4.6	--	<4.6	--	<4.6	<4.6
Total Alkalinity, mg/L	UPL and GPS not applicable			170	--	490	--	370	280

4.4
30.8
17

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

**Table 1. Groundwater Analytical Results Summary**  
**Ottumwa Generating Station - Zero Liquid Discharge Pond (ZLDP)**  
**SCS Engineers Project #25221072.00**

**Abbreviations:**

UPL = Upper Prediction Limit

-- = Not Analyzed

P = Parametric UPL with 1-of-2 retesting

NP = Non Parametric UPL

mg/L = milligrams per liter

ug/L = micrograms per liter

LOD = Limit of Detection

LOQ = Limit of Quantitation

DQ = Double Quantification Rule (not detected in background)

MNA = Monitored Natural Attenuation

mg/L = milligrams per liter

ug/L = micrograms per liter

GPS = Groundwater Protection Standard

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

F1 = MS and/or MSD recovery exceeds control limits

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

**Notes:**

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

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Date: 3/9/2021

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Date: 8/9/2021

Proj Mgr QA/QC: TK

Date: 8/17/2021



**Table 2. Historical Analytical Results for Cobalt  
Ottumwa Generating Station, Zero Liquid Discharge Pond**

Well Group	Well	Collection Date	Cobalt (µg/L)
Background	MW-301	4/26/2016	4.10
		6/23/2016	3.10
		8/10/2016	1.80
		10/26/2016	1.80
		1/18/2017	1.30
		4/19/2017	0.97 J
		6/20/2017	1.00 J
		8/23/2017	0.96 J
		4/18/2018	0.46 J
		8/14/2018	1.40
		10/16/2018	0.36 J
		4/8/2019	0.44 J
		10/24/2019	0.60
		2/5/2020	1.10
		3/12/2020	0.43 J
		4/14/2020	0.52
		10/8/2020	0.41 J
4/14/2021	0.29 J		
Compliance	MW-307	1/19/2017	0.62 J
		4/20/2017	1.60
		6/21/2017	1.10
		8/21/2017	1.10
		11/8/2017	1.30
		4/16/2018	1.30
		6/28/2018	2.90
		10/16/2018	4.80
		12/11/2019	11.0
		2/5/2020	13.0
		4/14/2020	20.0
		10/7/2020	18
		2/23/2021	64
		4/14/2021	46
	7/6/2021	60	
	MW-308	1/19/2017	0.52 J
		4/20/2017	0.43 J
		6/21/2017	0.25 J
		8/21/2017	0.26 J
		11/8/2017	0.23 J
		4/16/2018	0.18 J
		6/28/2018	0.19 J
		10/16/2018	0.15 J
		12/11/2019	0.26 J
		2/5/2020	0.14 J
4/14/2020		0.14 J	
10/7/2020	0.14 J		
4/14/2021	0.16 J		

**Table 2. Historical Analytical Results for Cobalt  
Ottumwa Generating Station, Zero Liquid Discharge Pond**

Well Group	Well	Collection Date	Cobalt (µg/L)
Compliance (cont.)	MW-309	1/19/2017	2.00
		4/20/2017	3.10
		6/21/2017	2.40
		8/21/2017	2.10
		11/8/2017	2.00
		4/16/2018	2.40
		6/28/2018	4.70
		10/16/2018	2.70
		12/11/2019	3.70
		2/5/2020	2.30
		4/14/2020	3.20
		10/7/2020	2.00
		4/14/2021	2.30

Abbreviations:

µg/L = micrograms per liter or parts per billion (ppb)

Notes:

(1) Complete laboratory reports included in the Annual Groundwater Monitoring and Corrective Action Reports.

J = Estimated concentrations at or above the limit of detection and the limit of quantitation.

Created by: RM  
 Last revision by: RM  
 Scientist check by: NDK

Date: 8/10/2021  
 Date: 8/10/2021  
 Date: 8/11/2021

**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	--

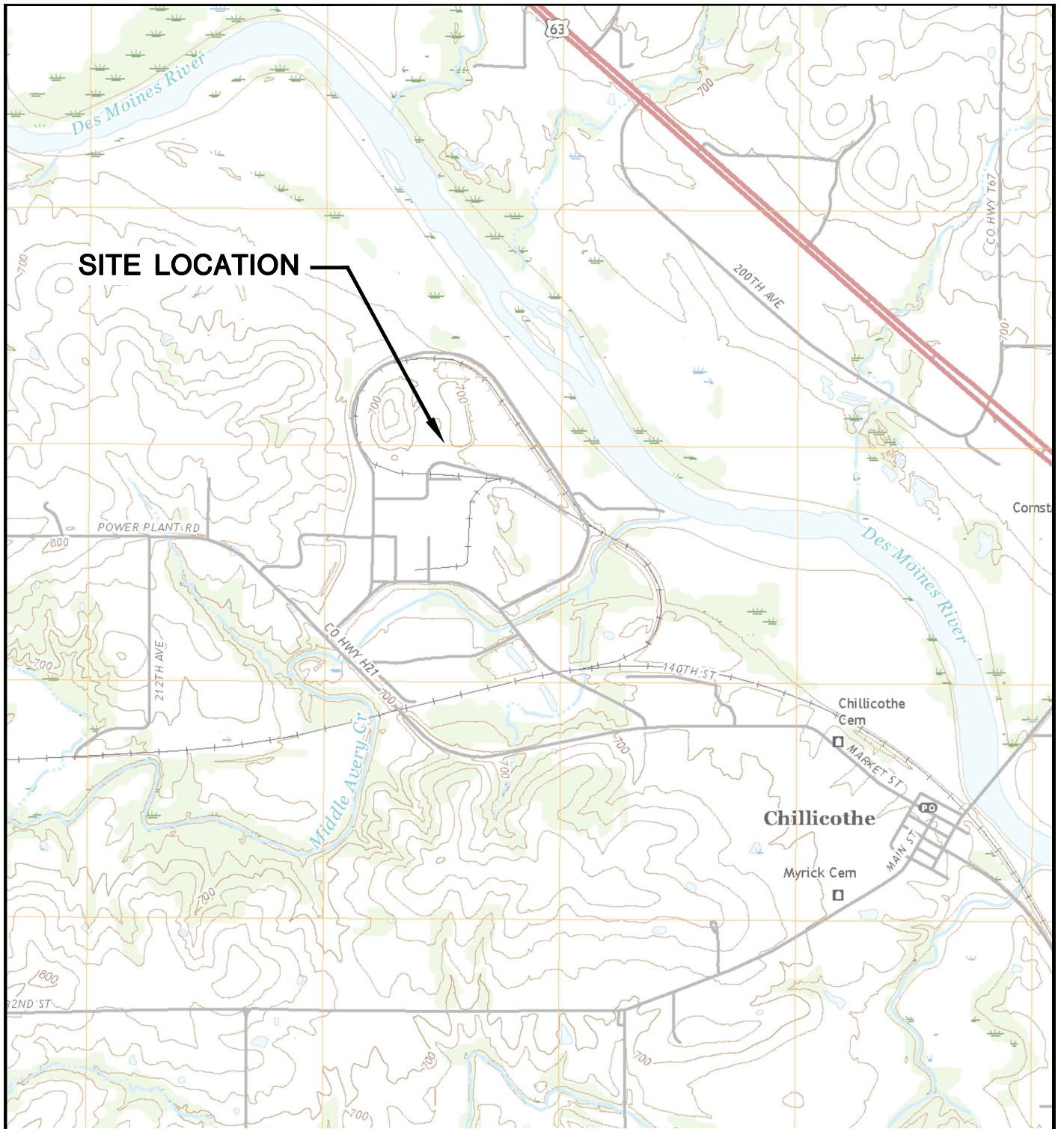
Notes:  
 NM = not measured  
 NI = not installed

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

## Figures

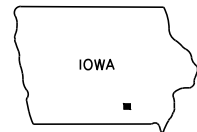
- 1 Site Location Map
- 2 Site Plan and Monitoring Well Locations
- 3 Shallow Potentiometric Surface – April 2021
- 4 Deep Potentiometric Surface – April 2021



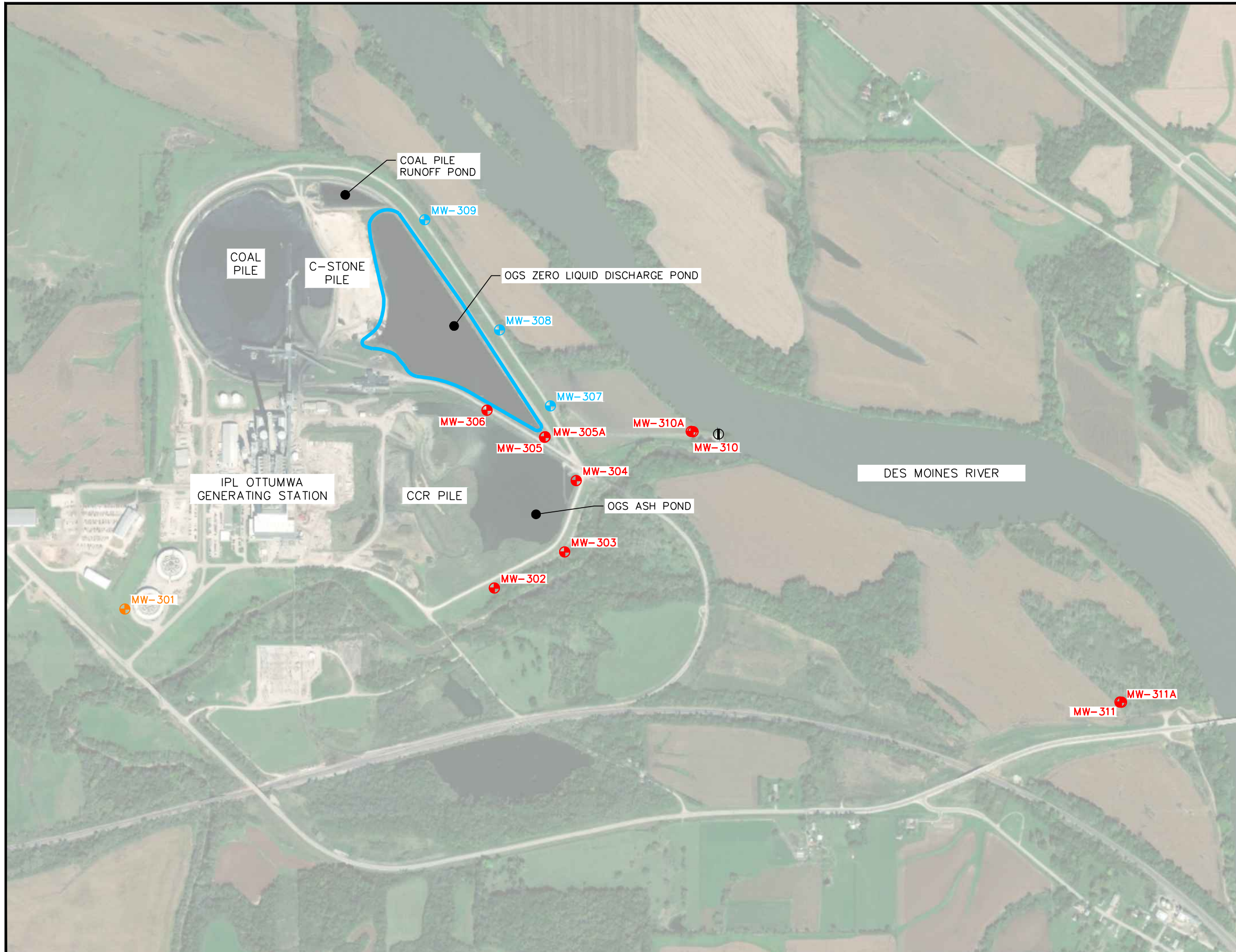
**SITE LOCATION**



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							

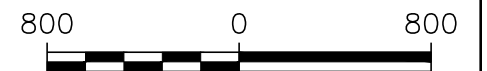


LEGEND

- CCR UNIT
- CCR ZLDP MONITORING WELL
- CCR ASH POND MONITORING WELL
- CCR BACKGROUND MONITORING WELL
- ⊕ RIVER ELEVATION MEASUREMENT LOCATION

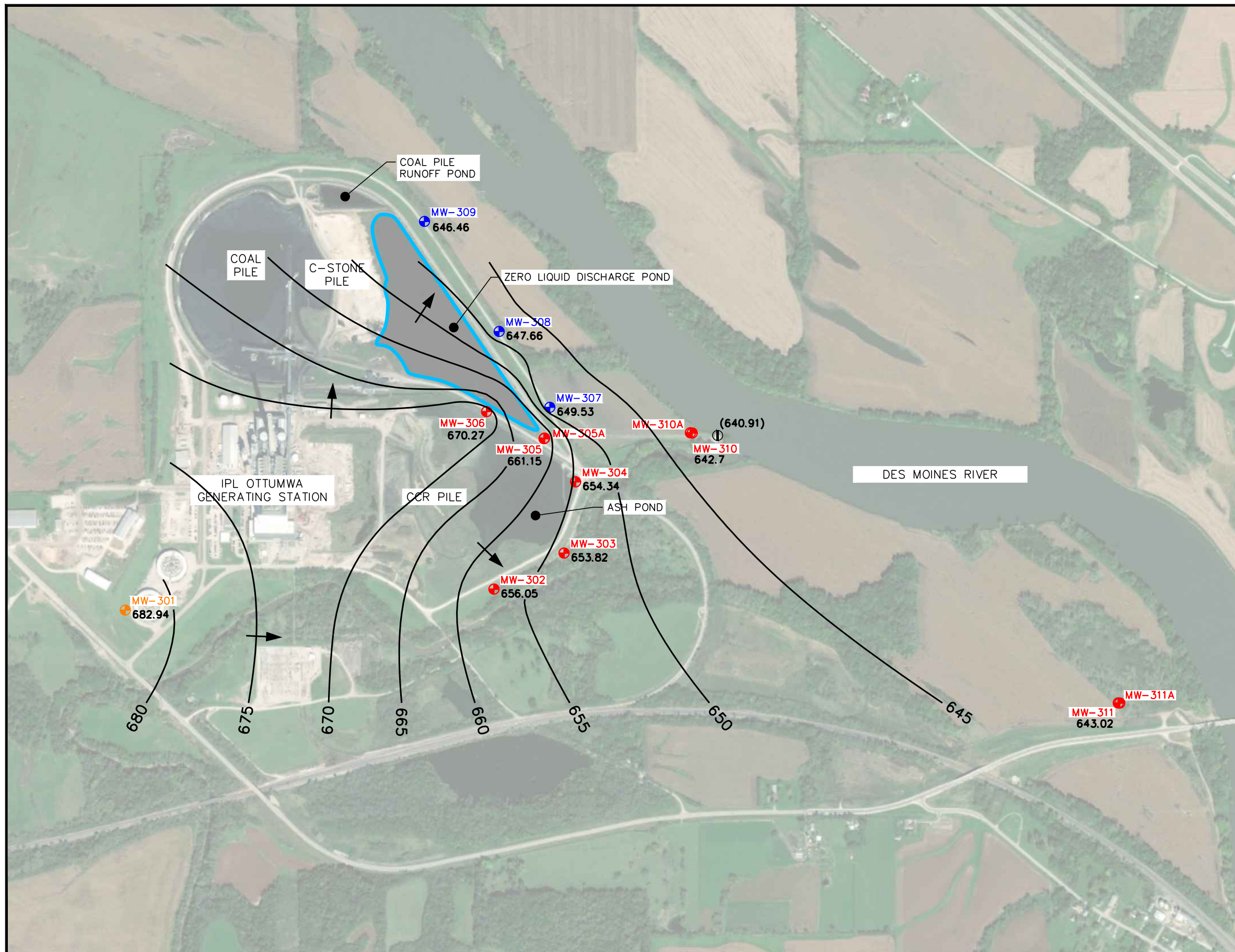
NOTES:

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



SCALE: 1" = 800'

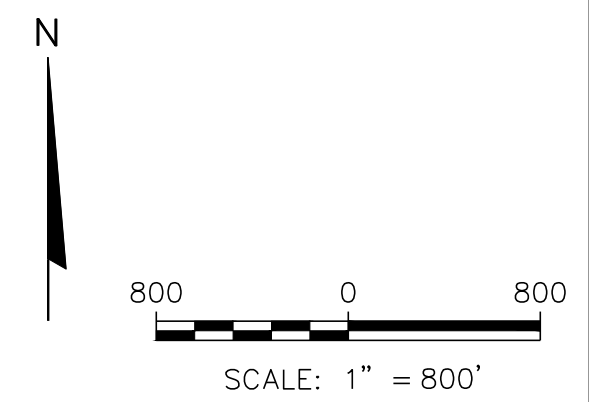
PROJECT NO. 25221072.00	DRAWN BY: BSS	<b>SCS ENGINEERS</b> 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA	FIGURE SITE PLAN AND MONITORING WELL LOCATIONS-ZERO LIQUID DISCHARGE POND 2
DRAWN: 11/15/2019	CHECKED BY: MDB				
REVISED: 08/11/2021	APPROVED BY: TK 8/17/2021				



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

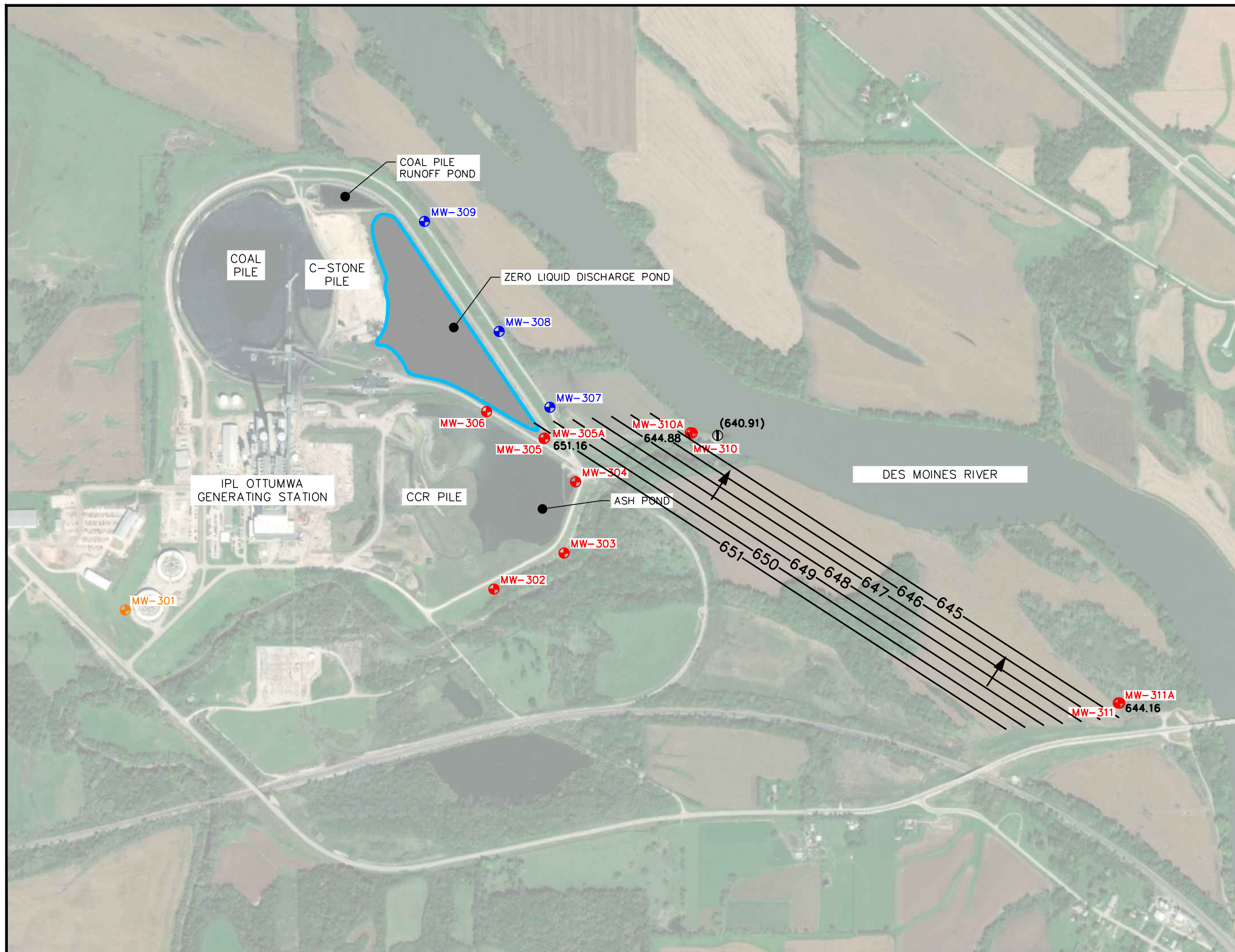
NOTE:

1. THE BACKGROUND MONITORING WELL FOR THE OGS ZLDP 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 8/17/2021					

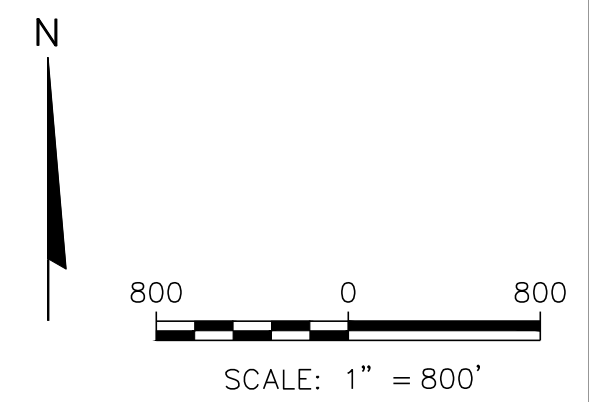
\\Mad\_s01\data\Projects\25221072.00\Drawings\Potentiometric Surface 2021 - LDP.dwg, 7/11/2021 10:54:37 AM



- 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:


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



PROJECT NO.	25221072.00	DRAWN BY:	KP	<b>SCS ENGINEERS</b>	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							PHONE: (608) 224-2830	SCALE: 1" = 800'
REVISED:	08/11/2021	APPROVED BY:	TK 8/17/2021								

\\Mad\_s01\data\Projects\25221072.00\Drawings\Potentiometric Surface 2021 - LDP.dwg, 7/11/2021 10:54:40 AM





Appendix A  
July 2021 Laboratory Report

## ANALYTICAL REPORT

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

Laboratory Job ID: 310-210533-2

Client Project/Site: Ottumwa Generating Station - 25221072

For:

SCS Engineers  
2830 Dairy Drive  
Madison, Wisconsin 53718

Attn: Meghan Blodgett



Authorized for release by:  
7/21/2021 11:02:56 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.*

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# Case Narrative

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

Job ID: 310-210533-2

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## Job ID: 310-210533-2

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Laboratory: Eurofins TestAmerica, Cedar Falls

### Narrative

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Job Narrative  
310-210533-2

### Comments

Client requested split report

### 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.

### 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: 310-210533-2

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-210533-2	MW-307	Water	07/06/21 20:45	07/09/21 09:25	

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# Detection Summary

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

Job ID: 310-210533-2

**Client Sample ID: MW-307**

**Lab Sample ID: 310-210533-2**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cobalt	60		0.50	0.091	ug/L	1		6020A	Total/NA
Ground Water Elevation	647.03				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	14.7				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.21				mg/L	1		Field Sampling	Total/NA
pH, Field	7.05				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1705				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.2				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	17.91				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: 310-210533-2

**Client Sample ID: MW-307**  
 Date Collected: 07/06/21 20:45  
 Date Received: 07/09/21 09:25

**Lab Sample ID: 310-210533-2**  
 Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	60		0.50	0.091	ug/L		07/13/21 09:00	07/14/21 23:11	1

**Method: Field Sampling - Field Sampling**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	647.03				ft			07/06/21 20:45	1
Oxidation Reduction Potential	14.7				millivolts			07/06/21 20:45	1
Oxygen, Dissolved, Client Supplied	0.21				mg/L			07/06/21 20:45	1
pH, Field	7.05				SU			07/06/21 20:45	1
Specific Conductance, Field	1705				umhos/cm			07/06/21 20:45	1
Temperature, Field	13.2				Degrees C			07/06/21 20:45	1
Turbidity, Field	17.91				NTU			07/06/21 20:45	1

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# Definitions/Glossary

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

Job ID: 310-210533-2

## Glossary

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



# QC Association Summary

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

Job ID: 310-210533-2

## Metals

### Prep Batch: 322135

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-210533-2	MW-307	Total/NA	Water	3010A	

### Analysis Batch: 322457

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-210533-2	MW-307	Total/NA	Water	6020A	322135

## Field Service / Mobile Lab

### Analysis Batch: 323036

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-210533-2	MW-307	Total/NA	Water	Field Sampling	

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# Lab Chronicle

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

Job ID: 310-210533-2

**Client Sample ID: MW-307**

**Lab Sample ID: 310-210533-2**

**Date Collected: 07/06/21 20:45**

**Matrix: Water**

**Date Received: 07/09/21 09:25**

<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	Prep	3010A			322135	07/13/21 09:00	ACM2	TAL CF
Total/NA	Analysis	6020A		1	322457	07/14/21 23:11	SAP	TAL CF
Total/NA	Analysis	Field Sampling		1	323036	07/06/21 20:45	SJF	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: 310-210533-2

## Laboratory: Eurofins TestAmerica, Cedar Falls

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

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

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# Method Summary

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

Job ID: 310-210533-2

Method	Method Description	Protocol	Laboratory
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/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> Client Contact: Meghan Blodgett Company: SCS Engineers Address: 2830 Dairy Drive City: Madison State: IA Zip: 52715 Phone: 608-224-2834 Email: mblodgett@scsengineers.com Project Name: Ottumwa Generating Station - 25221072 Site:		Lab P#M: Fredrick, Sandie E-Mail: sandra.fredrick@eurofinset.com PWSID:		Sampler: Adam Watson Phone: 608-250-9985		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 WAC #:		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)		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	
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) Water Water Water Water Water		Field Filtered Sample (Yes or No)		Special Instructions/OC 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	
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)		Empty Kit Requisitioned by:		Date:		Method of Shipment:		Date/Time:		Company:	
Requisitioned by: Adam Watson		Date/Time: 6/8/2021 1500		Company: SCS Eng.		Received by: AW		Date/Time: 7/01/21 925		Company:	
Requisitioned by:		Date/Time:		Company:		Received by:		Date/Time:		Company:	
Requisitioned by:		Date/Time:		Company:		Received by:		Date/Time:		Company:	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		Cooler Temperature(s) °C and Other Remarks:		Cooler Temperature(s) °C and Other Remarks:		Cooler Temperature(s) °C and Other Remarks:	



# GROUNDWATER SAMPLING REQUEST

List wells in sampling order	Collect DTW	Slug Test	Install Pump	Measure TOC difference	Will well bail dry?	Discharge Water to: (see codes below)	Analytical Parameters													
							GRO	DRO	VOC	PVOC	Diss. Pb.	Nat. Aten. (see below)	WDATCP Pesti.	8151 NO <sub>3</sub> +NO <sub>2</sub> & NH <sub>3</sub> Pesti.	Other Parameters					
Field Blank																			Cobalt, lithium, & fluoride	
Rinsate Blank																				
Field Dup.																				
MW-301																				
MW-302																				
MW-303																				
MW-304																				
MW-305																				
MW-306	X																			Cobalt only (total)
MW-307	X																			Cobalt only (total)
MW-308																				
MW-309																				
MW-310	X																			Lithium only (total)
MW-311																				
MW-305A																				
MW-310A																				
MW-311A	X																			Fluoride only (total)

**Abbreviations:**

SS = on-site sanitary sewer (prior approval required)  
 OS = on site (clean water)  
 BW = barrel water and leave on site

WWTP = transport to WWTP (prior approval required)  
 NA parameters include: NO<sub>2</sub> & NO<sub>3</sub>-N, SO<sub>4</sub>, Dissolved Fe, D.O., and pH

I:\25221072.00\Data and Calculations\Field Work Requests\OGS\_Field\_Work\_Request\_2107.docx



# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-210533-2

**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 </= 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**  
**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

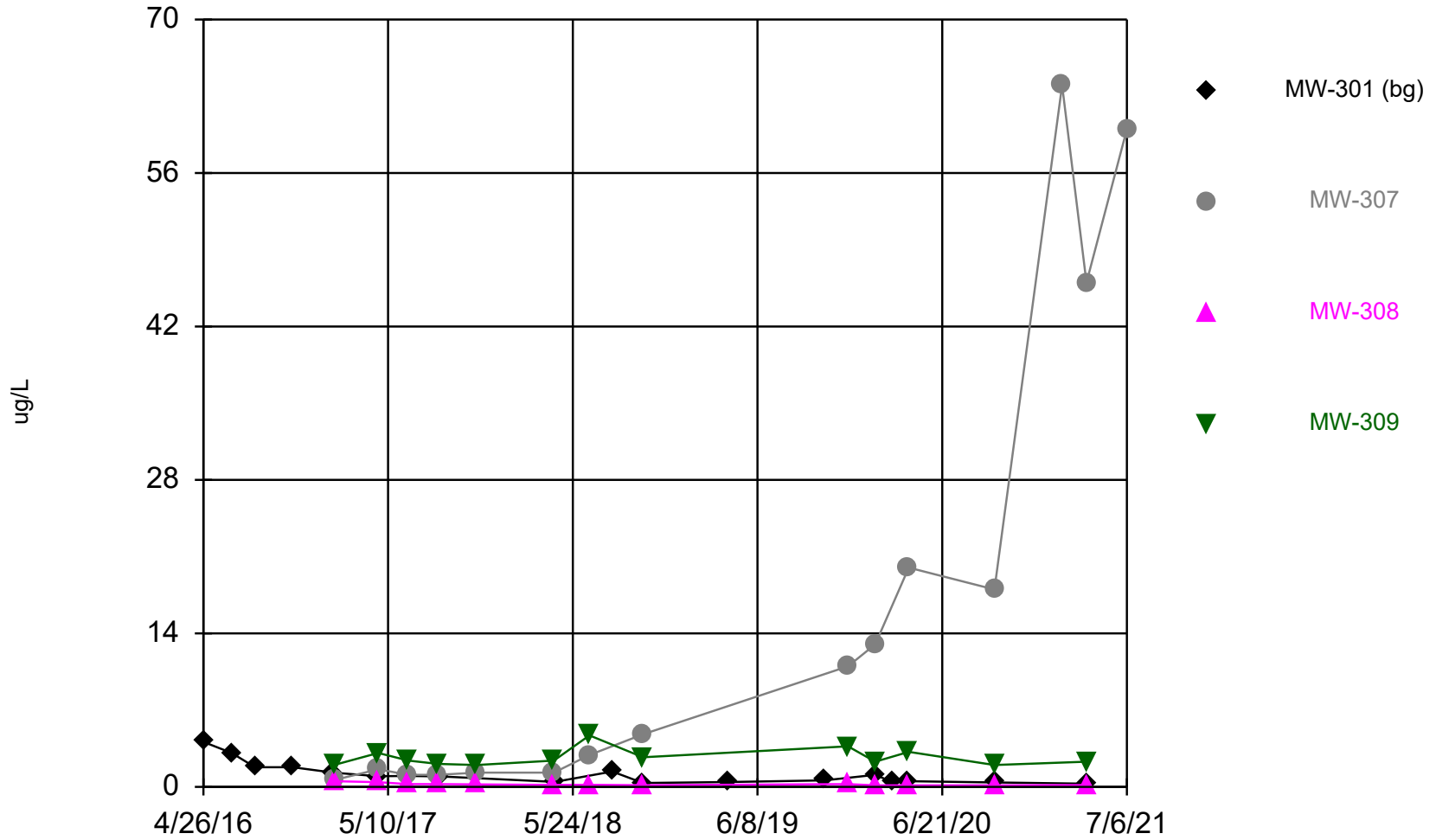
Notes:  
 none

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

Appendix B  
CCR Well Trend Plot

# Cobalt




Time Series Analysis Run 8/10/2021 9:18 AM View: OGS - ZLDP

Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

# Time Series

Constituent: Cobalt (ug/L) Analysis Run 8/10/2021 9:19 AM View: OGS - ZLDP  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

	MW-301 (bg)	MW-307	MW-308	MW-309
4/26/2016	4.1			
6/23/2016	3.1			
8/10/2016	1.8			
10/26/2016	1.8			
1/18/2017	1.3			
1/19/2017		0.62 (J)	0.52 (J)	2
4/19/2017	0.97 (J)			
4/20/2017		1.6	0.43 (J)	3.1
6/20/2017	1 (J)			
6/21/2017		1.1	0.25 (J)	2.4
8/21/2017		1.1	0.26 (J)	2.1
8/23/2017	0.96 (J)			
11/8/2017		1.3	0.23 (J)	2
4/16/2018		1.3	0.18 (J)	2.4
4/18/2018	0.46 (J)			
6/28/2018		2.9	0.19 (J)	4.7
8/14/2018	1.4			
10/16/2018	0.36 (J)	4.8	0.15 (J)	2.7
4/8/2019	0.44 (J)			
10/24/2019	0.6			
12/11/2019		11	0.26 (J)	3.7
2/5/2020	1.1	13	0.14 (J)	2.3
3/12/2020	0.43 (J)			
4/14/2020	0.52	20	0.14 (J)	3.2
10/7/2020		18	0.14 (J)	2
10/8/2020	0.41 (J)			
2/23/2021		64		
4/14/2021	0.29 (J)	46	0.16 (J)	2.3
7/6/2021		60		



## Appendix C

### Regional Geologic and Hydrogeologic Background Information

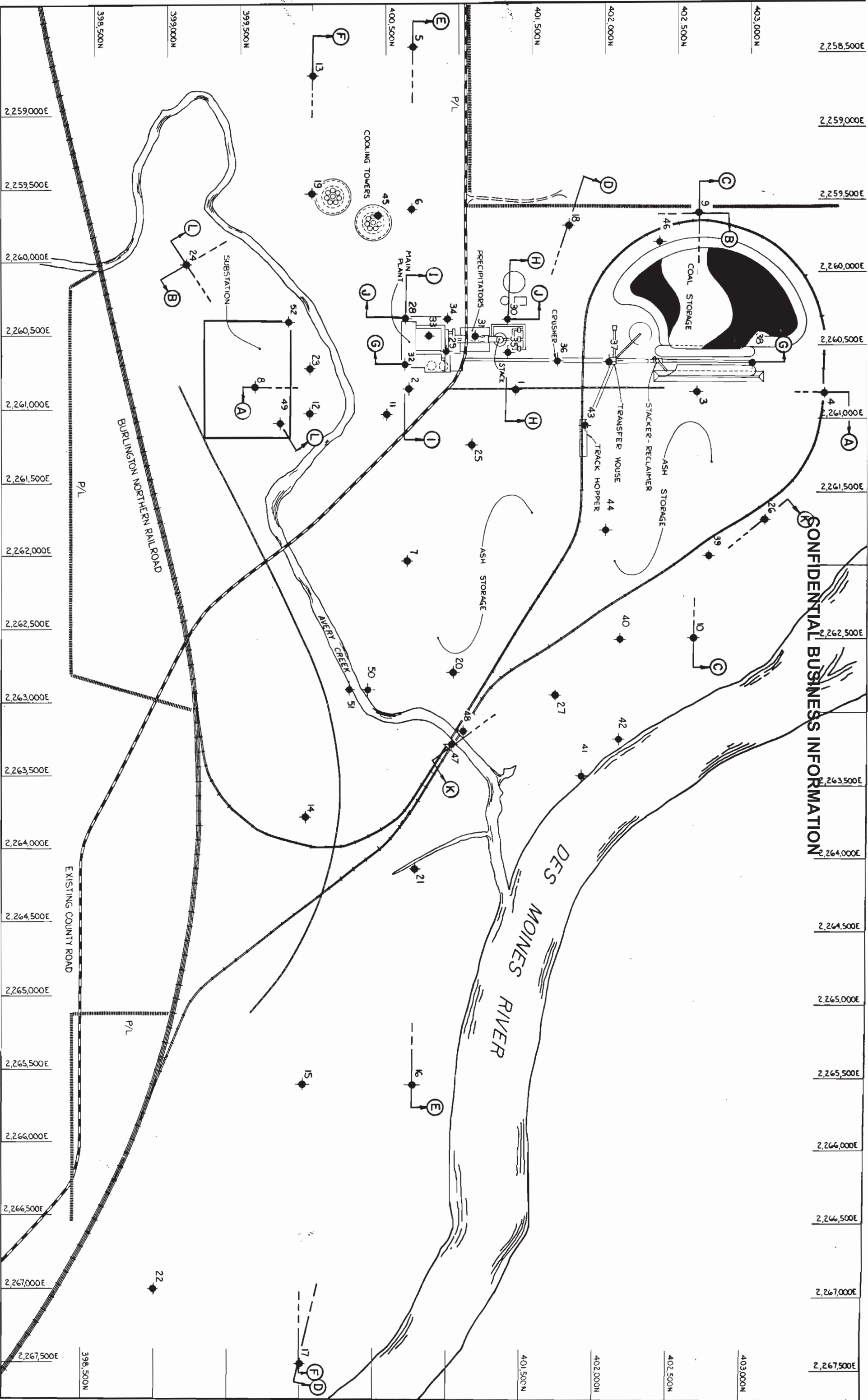
**Table OGS-2. Regional Hydrogeologic Stratigraphy  
Ottumwa Midland Landfill / SCS Engineers Project #25215053.01**

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>

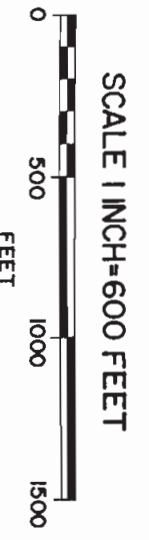
\*This nomenclature and classification of rock units in this report are those of the Iowa Geological Survey and do not necessarily coincide with those accepted by the U.S. Geological Survey.

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

CONFIDENTIAL BUSINESS INFORMATION



ATEC ASSOCIATES



PLAN OF BORINGS  
 OTTUMWA GENERATING STATION-UNIT 1  
 CHILLICOTHE, IOWA FIGURE 2

# LOG OF BORING NO. 7 CONFIDENTIAL BUSINESS INFORMATION

Ottumwa Generating Station-Unit 1  
Chillicothe, Iowa

N 400,675

BORING METHOD: HSA

DATE: 5-30-75

LOCATION: E 2,262,000

DEPTH SCALE, FT.	SURFACE ELEVATION-- 676	STRATUM DEPTH FT.	STANDARD PENETRATION		☒ Unconfined Compressive Strength, TSF					SHELBY TUBE										
			SAMPLE DEPTH	RECOVERY, %	○ Natural Dry Density, PCF															
					□ Water Content, %    □ Plast. Lim., %    □ Liq. Lim., %															
					● Standard Penetration, Blows/Ft.															
					1	2	3	4	5											
					90	100	110	120	130											
					10	20	30	40	50											
					10	20	30	40	50											
			4	25																
		2.5	6/7	25																
5			6	25																
			7/9	25																
			3	100																
			5/7	90																
10			3	90																
			3/5	100																
			3	100																
			5/8	90																
15			7	90																
			11/12	100																
			6	100																
		18.0	9/18	100																
			3	100																
20		19.0	2/50	100																
		20.3																		
			RC 1																	
			RQD	96																
			18																	
25			RC 2																	
			RQD	66																
		28.7	21																	
30		30.3	RC 3																	
			RQD	76																
			42																	
35		34.5	RC 4																	
			RQD	100																
			38																	
40			RC 5																	
			RQD	92																
			20																	
45																				
		48.5																		

COMPLETION DEPTH: (cont'd on next page)

ROCK CORE DIAMETER: 2 1/8"

GROUND WATER: NOTED ON RODS AT COMPLETION AFTER HRS. FT. FT.



# CONFIDENTIAL BUSINESS INFORMATION

Ottumwa Generating Station-Unit 1  
Chillicothe, Iowa

N 400,675

BORING METHOD: HSA

DATE: 5-30-75

LOCATION: E 2,262,000

DEPTH SCALE, FT.	SURFACE ELEVATION—	STRATUM DEPTH FT.	STANDARD PENETRATION		<input checked="" type="checkbox"/> Unconfined Compressive Strength, TSF					SHELBY TUBE		
			SAMPLE DEPTH	BLAWS/6 in. 3-6 in. INCREMENTS	RECOVERY, %	<input type="checkbox"/> Natural Dry Density, PCF						
						1	2	3	4		5	
							90	100	110	120	130	
							<input type="checkbox"/> Water Content, % <input checked="" type="checkbox"/> Plast. Lim., % <input checked="" type="checkbox"/> Liq. Lim., %					
							10	20	30	40	50	
							<input checked="" type="checkbox"/> Standard Penetration, Blows/Ft.					
							10	20	30	40	50	
55	Gray fine grained LIMESTONE with Stylolites -irregular clay fillings 48.5 to 49.5' -chert nodules at 52.0, 52.3 and 59.5' -lenses of shale at 55.0 and 55.9'		RC 6									
			RQD 56	97								
60		60.3										
65	Note: Piezometer installed at 20.0'											

COMPLETION DEPTH: 60.3'

ROCK CORE DIAMETER: 2 1/8"

GROUND WATER: NOTED ON RODS AT COMPLETION AFTER HRS. FT. FT.

**CONFIDENTIAL BUSINESS INFORMATION**

Ottumwa Generating Station-Unit 1  
Chillicothe, Iowa

N 401,000

BORING METHOD: HSA

DATE: 6-13-75

LOCATION: E 2,262,750

DEPTH SCALE, FT.	SURFACE ELEVATION— 658	STRATUM DEPTH FT.	STANDARD PENETRATION		⊗ Unconfined Compressive Strength, TSF					SHELBY TUBE	
			SAMPLE DEPTH	BLOWS/6 in. 3-6 in. INCREMENTS	RECOVERY, %	1	2	3	4		5
						○ Natural Dry Density, PCF 90    100    110    120    130					
						□ Water Content, %    ▣ Plast. Lim., %    ▤ Liq. Lim., % 10    20    30    40    50					
						⊕ Standard Penetration, Blows/Ft. 10    20    30    40    50					
				6	50						
				7/9							
5		5.5		5	10						
				5/4							
				2	100						
				2/3							
10		10.5		2							
				1/1							
				50/.2							
		14.3		50/.3							
15		17.2		RC 1							
				RQD	82						
				36							
20				RC 2							
				RQD	77						
				17							
25											
30											
		31.8		RC 3							
		32.8		RQD	99						
				95							
35											
		38.5									
40		40.0		RC 4							
				RQD	100						

COMPLETION DEPTH: 40.0'

ROCK CORE DIAMETER: 1 7/8"

GROUND WATER: NOTED ON RODS 8.0 FT.  
AT COMPLETION FT.  
AFTER HRS. FT.

**CONFIDENTIAL BUSINESS INFORMATION**

Ottumwa Generating Station-Unit 1  
Chillicothe, Iowa

N 402,725

BORING METHOD: HSA

DATE: 10-3-75

LOCATION: E 2,261,050

DEPTH SCALE, FT.	SURFACE ELEVATION-- 654	STRATUM DEPTH FT.	STANDARD PENETRATION		⊗ Unconfined Compressive Strength, TSF					SHELBY TUBE	
			SAMPLE DEPTH	BLOWS/6 in. 3-6 in. INCREMENTS	RECOVERY, %	○ Natural Dry Density, PCF					
						1	2	3	4		5
						90	100	110	120		130
					□ Water Content, %    ▣ Plast. Lim., %    ▤ Liq. Lim., %						
					⊕ Standard Penetration, Blows/ft.						
					10	20	30	40	50		
	Dark Gray medium stiff CLAY(CH) w/trace organic material		3 3/5	100							
5			3 4/4	100							
			2 3/4	100							
10		10.5	3 3/5	100							
	Dark Gray soft to very soft SILTY CLAY(CL) with trace Sand and fine Gravel		2 2/3	75							
15		15.5	1 1/2	75							
	Dark Gray wet loose to medium dense SILTY SAND(SM)w/some f-m Gravel	17.0	3/21	100							
	Light Gray very moist very dense SILTY SAND(SM-ML) w/soft Rock frag. (calcareous)	18.0	100/.3	100							
20											
	Note: Auger refusal at 18.0 ft										

COMPLETION DEPTH: 18.0'

ROCK CORE DIAMETER:

GROUND WATER: NOTED ON RODS 15.0 FT.  
AT COMPLETION FT.  
AFTER HRS. FT.

# CONFIDENTIAL BUSINESS INFORMATION

Ottumwa Generating Station-Unit 1  
Chillicothe, Iowa

N 402,130

BORING METHOD: HSA

DATE: 10-3-75

LOCATION: E 2,260,530

DEPTH SCALE, FT.	SURFACE ELEVATION-- 652	STRATUM DEPTH FT.	STANDARD PENETRATION		⊗ Unconfined Compressive Strength, TSF					SHELBY TUBE	
			SAMPLE DEPTH	BLOWS/6 in. 3-6 in. INCREMENTS	RECOVERY, %						
						○ Natural Dry Density, PCF					
						□ Water Content, %    ⊠ Plast. Lim., %    ⊡ Liq. Lim., %					
						1	2	3	4	5	
						90	100	110	120	130	
						10	20	30	40	50	
						⊗ Standard Penetration, Blows/Ft.					
						10	20	30	40	50	
5	Dark Gray moist stiff CLAY(CH) w/ trace organic material -medium stiff	9.0	2 4/7	75	75						
10	Dark Gray very moist loose SANDY SILT (ML) w/trace Clay	11.0	3 4/6	75	75						
15	Brown wet loose to medium dense fine to medium SAND (SP) with trace Silt -trace coarse sand	18.8	5 8/11	100	100						
20	Note: Piezometer installed at 18.5 ft		3 3/4	100	100						
			4 4/5	100	100						
			4 9/8	100	100						
			6 6/7	75	75						
			50 50/3	0	0						

COMPLETION DEPTH: 18.8'

ROCK CORE DIAMETER:

GROUND WATER: NOTED ON RODS 12.0 FT.  
AT COMPLETION FT.  
AFTER HRS. FT.

# CONFIDENTIAL BUSINESS INFORMATION

Ottumwa Generating Station-Unit 1  
Chillicothe, Iowa

N 402,020

BORING METHOD: HSA

DATE: 10-7-75

LOCATION: E 2,261,780

DEPTH SCALE, FT.	STRATUM DEPTH FT.	STANDARD PENETRATION		Unconfined Compressive Strength, TSF					SHELBY TUBE	
		SAMPLE DEPTH	BLOWS/6 in. 3-6 in. INCREMENTS	RECOVERY, %	Natural Dry Density, PCF					
					Water Content, %					
					Standard Penetration, Blows/Ft.					
SURFACE ELEVATION-- 662										
	Dark Gray slightly moist very stiff SILTY CLAY (CL)	10	11/12							
5	Brown moist stiff SANDY CLAY (CL-SC)	5.0	8/10							
	Brown moist med. dense fine SAND (SP)	6.5	5							
		8.2	9/6							
10	Brown wet loose fine to medium SAND (SP) w/trace Silt -very loose	13.0	3/3							
	Brown wet very loose CLAYEY SAND (SW-SC) w/little fine to med. Gvl	15.5	1/2							
15	Brown very moist med. stiff CLAYEY SILT (ML) w/tr. Sand & fine Gvl	18.0	2/2							
	Brown wet very loose SANDY SILT (ML)	20.5	2/2							
20	Dark Gray very wet soft CLAY (CL-CH) with trace coarse Gravel	24.0	34							
			25/16							
25	Brown wet dense fine to coarse SAND (SW) w/trace Silt & Gravel	26.2	50/.2							
	Gray very moist very dense fine SAND (SP) w/trace Silt	26.3								
30	Note: SPT from 23.5 to 25.0' driven on a boulder									
	* Caved to 11.8 ft at completion									

COMPLETION DEPTH: 26.3

ROCK CORE DIAMETER:

GROUND WATER: NOTED ON RODS 10.5 FT.  
AT COMPLETION 8.2 FT.\*  
AFTER HRS. FT.

LOG OF BORING NO. 48  
**CONFIDENTIAL BUSINESS INFORMATION**

Ottumwa Generating Station-Unit 1  
 Chillicothe, Iowa

N 401,070

BORING METHOD: HSA

DATE: 10-7-75

LOCATION: E 2,263,160

DEPTH SCALE, FT.	STRATUM DEPTH FT.	STANDARD PENETRATION		⊗ Unconfined Compressive Strength, TSF					SHELBY TUBE	
		SAMPLE DEPTH	BLOWS/6 in. 3-6 in. INCREMENTS	RECOVERY, %	○ Natural Dry Density, PCF					
					□ Water Content, %    □ Plast. Lim., %    □ Liq. Lim., %					
					⊙ Standard Penetration, Blows/Ft.					
					1	2	3	4	5	
					90	100	110	120	130	
					10	20	30	40	50	
					10	20	30	40	50	
SURFACE ELEVATION- 655										
5	Dark Gray to Brown moist stiff CLAY (CL-CH)	6 6/7	100	100	100	100	100	100	100	
10	Brown moist loose SILTY fine SAND (SM) -wet below 13.0'	4 7/10 5 8/7 2 4/8	100	75	50	50	50	50	50	
15	Dark Gray very moist soft CLAY (CH)	0 1/1	50	50	50	50	50	50	50	
20	Dark Gray wet very loose SILTY fine SAND (SP-SM)	2 1/3	50	50	50	50	50	50	50	
25	Gray very loosely cemented fine grained LIMEY QUARTZ SANDSTONE -friable below 27.9' -limestone fragments 30.3 to 31.1' -white fine grained limestone w/ irregular clay filled seams 31.1 to 31.8'	1 1/4 50/.2	50	50	50	50	50	50	50	
30		RC 1 RQD	33							
35		RC 2 RQD	100							
35	*Caved to 12.1 ft at completion	38	38							

COMPLETION DEPTH: 31.8'

ROCK CORE DIAMETER: 2 1/8"

NOTED ON RODS 13.0 FT.  
 GROUND WATER: AT COMPLETION 12.1 FT. \*  
 AFTER HRS. FT.

# LOG OF BORING NO. 50 CONFIDENTIAL BUSINESS INFORMATION

Ottumwa Generating Station-Unit 1  
Chillicothe, Iowa

N 400,410

BORING METHOD: HSA

DATE: 10-8-75

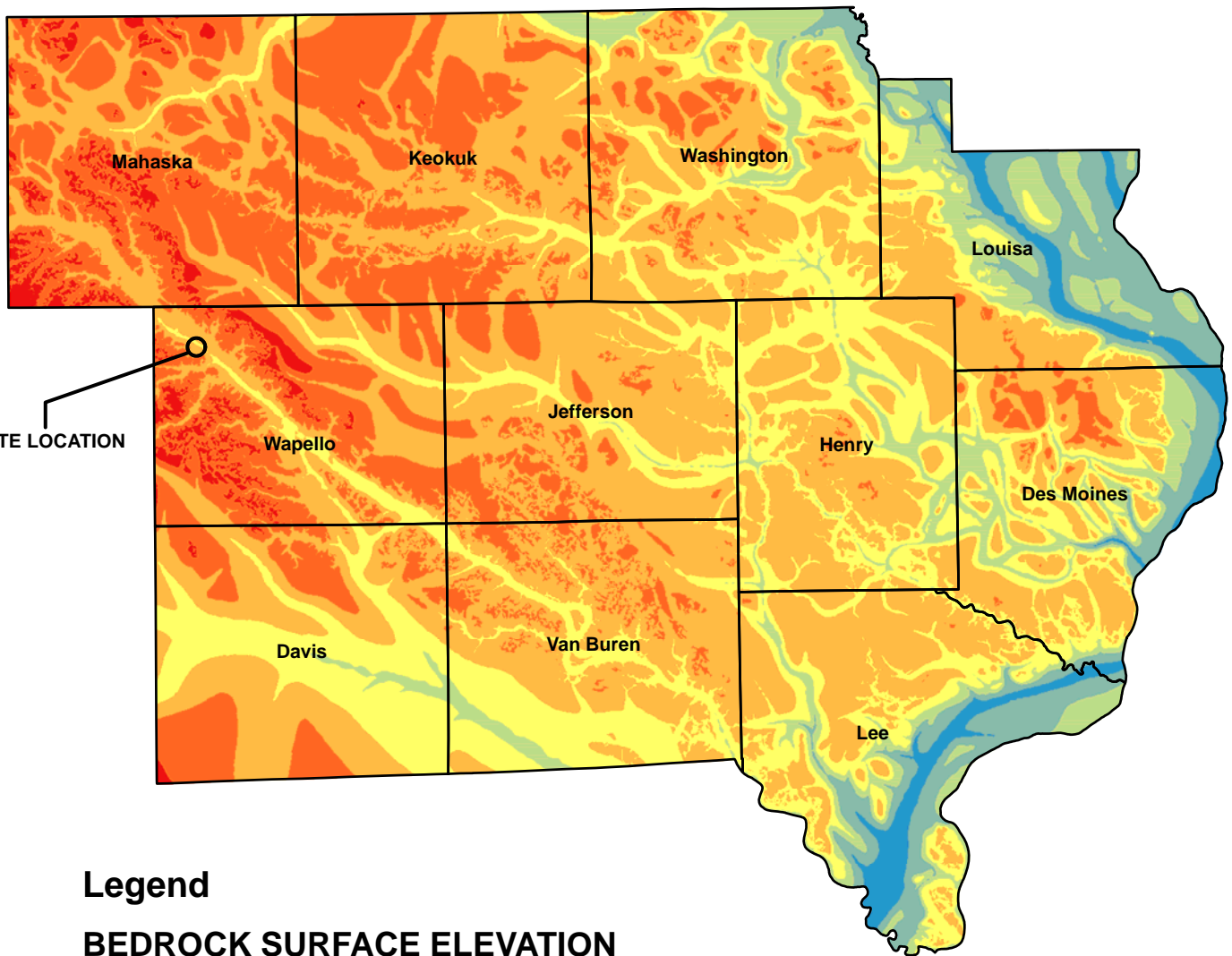
LOCATION: E 2,262,880

DEPTH SCALE, FT.	STRATUM DEPTH FT.	STANDARD PENETRATION		Unconfined Compressive Strength, TSF					SHELBY TUBE	
		SAMPLE DEPTH	BLOWS/6 in. 3-5 in. INCREMENTS	RECOVERY, %	Natural Dry Density, PCF					
					1	2	3	4		5
							<input type="checkbox"/> Water Content, % <input type="checkbox"/> Plast. Lim., % <input type="checkbox"/> Liq. Lim., %			
SURFACE ELEVATION-- 654										
5		9	10/13	100						
	6.0									
10		4	6/7	100						
	11.5									
15		2	3/3	75						
20		2	2/2	75						
	22.5									
25		18	50/.5	75						
	24.5									
30		RC 1	RQD	55						
	32.0									
35		RC 2	RQD	100						
	34.5									

COMPLETION DEPTH: 34.5

ROCK CORE DIAMETER: 2 1/8"

GROUND WATER: NOTED ON RODS 11.5 FT.  
AT COMPLETION 14.8 \* FT.  
AFTER HRS. FT.

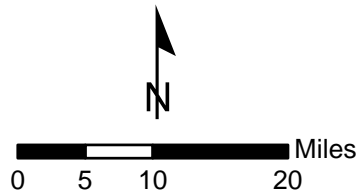


### Legend

### BEDROCK SURFACE ELEVATION

ELEVATION ABOVE MEAN SEA LEVEL IN FEET

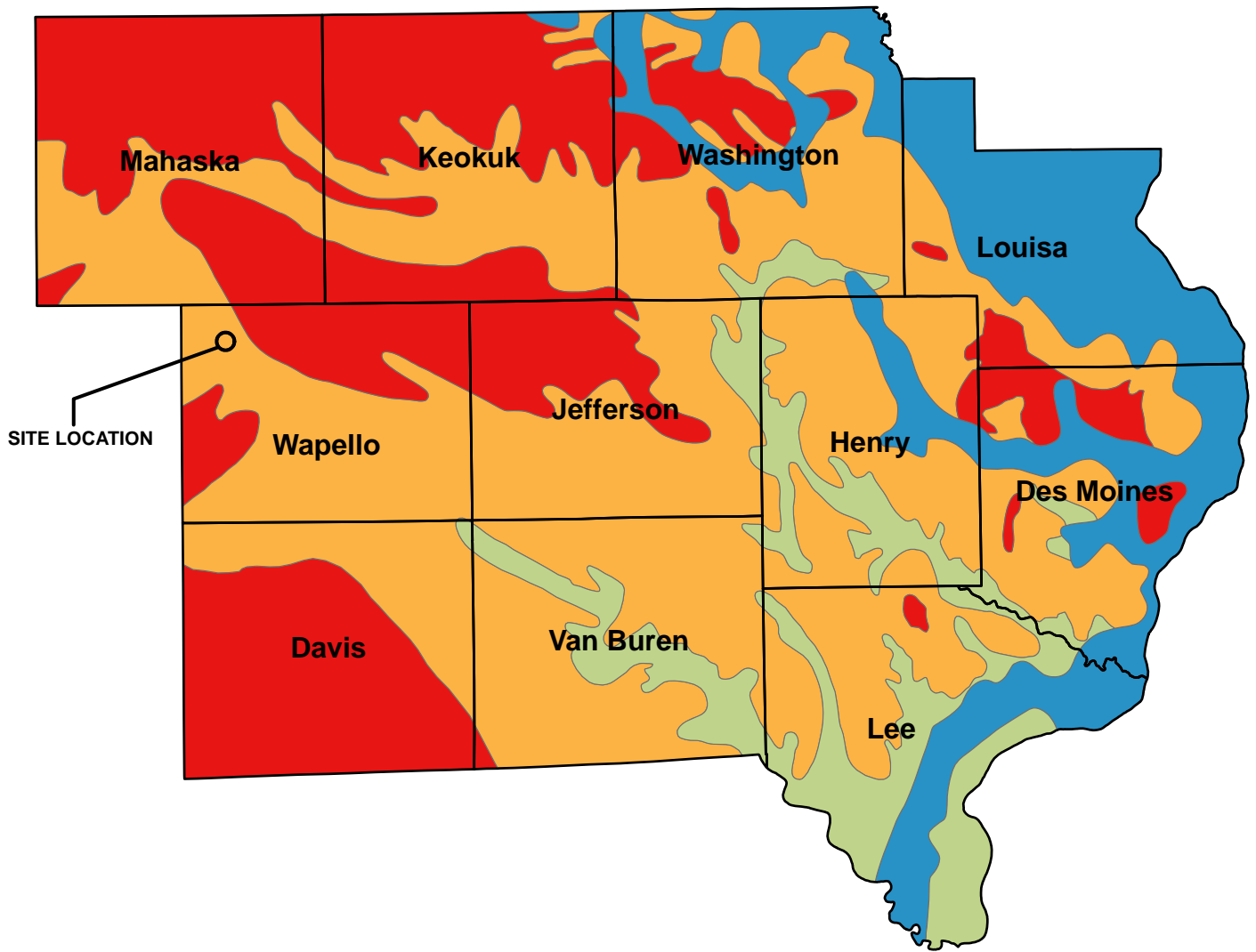
- BELOW 300
- 300 TO 400
- 400 TO 500
- 500 TO 600
- 600 TO 700
- 700 TO 800
- 800 TO 900



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

<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>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>ENGINEER</b>				<b>FIGURE</b>

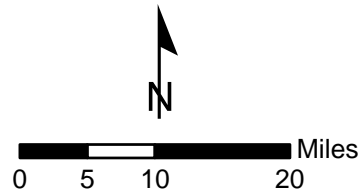
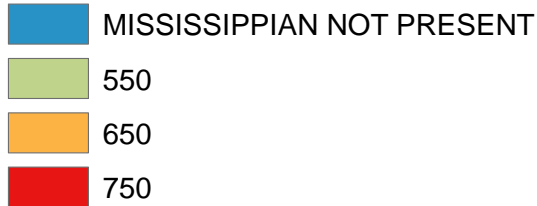




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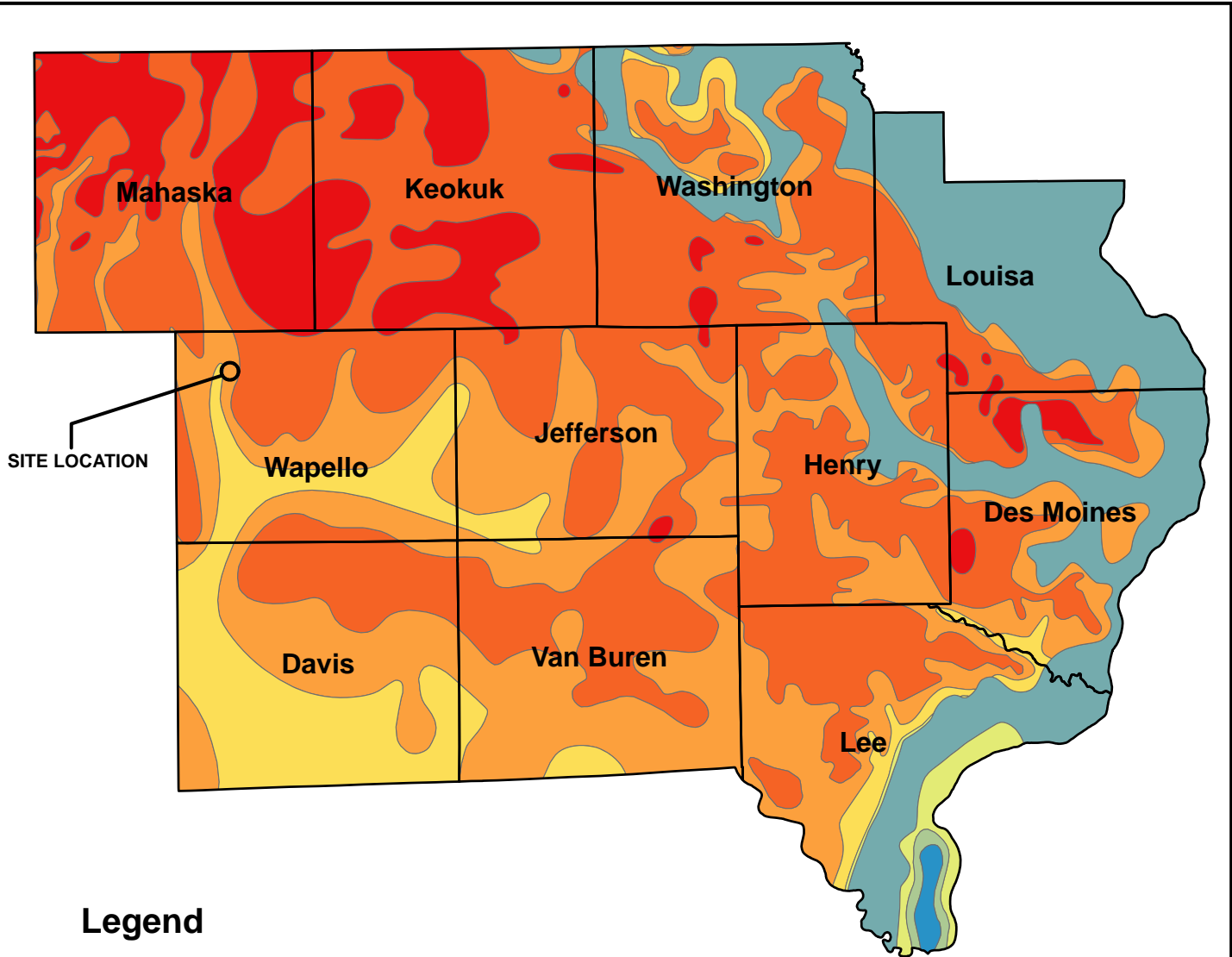
### MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE

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

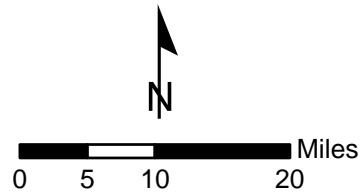
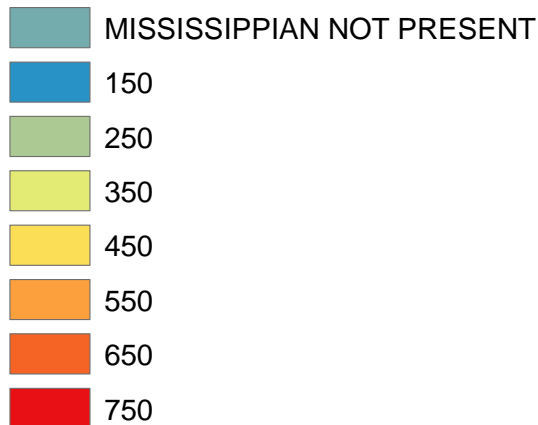
CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE	OTTUMWA GENERATING STATION OTTUMWA, IOWA	SE IOWA REGIONAL MISSISSIPPIAN AQUIFER POTENTIOMETRIC SURFACE ELEVATION	
	PROJECT NO. 25215053.03		DRAWN BY: JB	<b>SCS ENGINEERS</b>	FIGURE
DRAWN: 07/29/13	CHECKED BY: MDB				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

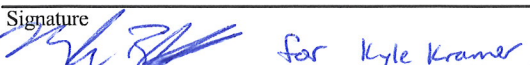
## Boring Logs

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>	Drilling Method <b>4-1/4 hollow stem auger</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 <b>° ' "</b>		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 <b>° ' "</b>		Feet <input type="checkbox"/> S Feet <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											
S1	10	woh 1 39	2-6	SANDY SILT WITH GRAVEL, gray (7.5YR 6/1), gravel is fine.	ML						W					
S2	13	24 50	8	WEATHERED SANDSTONE, very weak, light gray matrix (10YR 7/1), secondary color very dark gray 910YR 3/1), massive.							W					
S3	5	50	11		SANDSTONE						W					
S4	6	50	13								W					
S5	4	50	15	Endo of Boring at 15 feet bgs.							W					

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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**SCS ENGINEERS**

Environmental Consultants and Contractors

**SOIL BORING LOG INFORMATION**

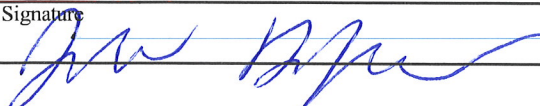
Route To:  Watershed/Wastewater  Waste Management   
 Remediation/Redevelopment  Other

Facility/Project Name <b>IPL-Ottumwa Generating Station</b> SCS#: 25216148.00		License/Permit/Monitoring Number		Boring Number <b>MW-307</b>	
Boring Drilled By: Name of crew chief (first, last) and Firm <b>Mike Mueller Cascade Drilling</b>		Date Drilling Started <b>10/25/2016</b>		Date Drilling Completed <b>10/25/2016</b>	
Unique Well No.		DNR Well ID No.		Common Well Name <b>MW-307</b>	
Final Static Water Level <b>Feet</b>		Surface Elevation <b>655.1 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>401,707 N, 1,903,070 E S/C/N</b>		Lat <input type="checkbox"/> ° <input type="checkbox"/> ' <input type="checkbox"/> "		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
NE 1/4 of SE 1/4 of Section 26, T 73 N, R 15 W		Long <input type="checkbox"/> ° <input type="checkbox"/> ' <input type="checkbox"/> "		Feet <input type="checkbox"/> S Feet <input type="checkbox"/> W	
Facility ID		County <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	
S1	24	22 32	1	POORLY GRADED SAND WITH GRAVEL, tan, fine to coarse sand and gravel, (construction fill sand to fill in hydrovac hole cleared to 8.5 ft bgs).	SP									
			2											
3														
4														
5														
6														
7														
8														
9														
10														
S2	14	41 44	11	LEAN CLAY, dark yellowish brown (10YR 4/4), slightly dense.	CL									
			12											
			13											
			14											
			15											

water level 6.5 ft bgs.

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

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



**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#: 25216148.00		License/Permit/Monitoring Number		Boring Number <b>MW-308</b>	
Boring Drilled By: Name of crew chief (first, last) and Firm <b>Mike Mueller Cascade Drilling</b>		Date Drilling Started <b>10/25/2016</b>		Date Drilling Completed <b>10/25/2016</b>	
Unique Well No.		DNR Well ID No.		Common Well Name <b>MW-308</b>	
Final Static Water Level <b>Feet</b>		Surface Elevation <b>652.9 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>402,312 N, 1,902,665 E S/C/N</b>		Lat <input type="checkbox"/> ° <input type="checkbox"/> ' <input type="checkbox"/> "		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W	
NE 1/4 of SE 1/4 of Section 26, T 73 N, R 15 W		Long <input type="checkbox"/> ° <input type="checkbox"/> ' <input type="checkbox"/> "		Feet <input type="checkbox"/> S Feet <input type="checkbox"/> W	
Facility ID		County <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	POORLY GRADED SAND WITH GRAVEL, tan, fine to coarse sand and gravel, (construction fill sand to fill in hydrovac hole cleared to 9.5 ft bgs).	SP										
			2												
			3												
			4												
			5												
			6												
			7												
			8												
			9												
			10	LEAN CLAY, brown (10YR 4/3), dense.	CL										
S1	24	19 4 22	11												
			12												
			13	SILT, brown (10YR 4/3), some clay.	ML										
S2	13	12 22	14												
			15												

water @ 6.5 ft bgs.

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

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






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

Facility/Project Name <b>IPL-Ottumwa Generating Station</b> SCS#: 25216148.00		License/Permit/Monitoring Number		Boring Number <b>MW-309</b>	
Boring Drilled By: Name of crew chief (first, last) and Firm <b>Mike Mueller Cascade Drilling</b>		Date Drilling Started <b>10/27/2016</b>		Date Drilling Completed <b>10/27/2016</b>	
Unique Well No.		DNR Well ID No.		Common Well Name <b>MW-309</b>	
Final Static Water Level <b>Feet</b>		Surface Elevation <b>652.5 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>403,189 N, 1,902,070 E S/C/N</b>		Local Grid Location	
NE 1/4 of SE 1/4 of Section 26, T 73 N, R 15 W		Lat _____ ° _____ ' _____ "		_____ ° _____ ' _____ "	
_____ Feet <input type="checkbox"/> N <input type="checkbox"/> E		_____ Feet <input type="checkbox"/> S <input type="checkbox"/> W		_____ Feet <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		
			1-9	Hydrovac borehole to 10 ft bgs.											
S1	33 67		10-11	LEAN CLAY, very dark grayish brown (10YR 3/2), trace sand.	CL						W				
S2	22 22		13-14								W				

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

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

Boring Number **MW-309**

Page **2** of **2**

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	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	1 1 1 1	16	17	SILTY SAND, very dark grayish brown (10YR 3/2), fine to medium grained.	SM						W			
S4	3 5 4 6	18	19	POORLY GRADED SAND, yellowish brown (10YR 5/4), coarse grained.	SP						W			
S5	2 3 7 50	20	21	WEATHERED SANDSTONE.							W			
S6		22	27	End of boring at 27.5 ft bgs.							W			

**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#: 25216148.00		License/Permit/Monitoring Number		Boring Number <b>B-309X</b>	
Boring Drilled By: Name of crew chief (first, last) and Firm <b>Mike Mueller Cascade Drilling</b>			Date Drilling Started <b>10/26/2016</b>	Date Drilling Completed <b>10/26/2016</b>	Drilling Method <b>HSA</b>
Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level Feet	Surface Elevation Feet	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>N, E S/C/N</b>			Lat <b>_____</b> ° <b>_____</b> ' <b>_____</b> "		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> E
NE 1/4 of SE 1/4 of Section <b>26, T 73 N, R 15 W</b>			Long <b>_____</b> ° <b>_____</b> ' <b>_____</b> "		Feet <input type="checkbox"/> S Feet <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	
S1	12	13 34	1	POORLY GRADED SAND WITH GRAVEL, tan, fine to coarse sand and gravel, (construction fill sand to fill in hydrovac hole cleared to 9 ft bgs).	SP									
			2											
			3											
S2	18	33 33	4	LEAN CLAY, dark brown (10YR 3/3), medium dense.	CL									
			5											
			6											
			7	SILT, dark brown (10YR 3/3), some clay.	ML									
			8											
			9											
			10											
			11											
			12											
			13											
			14											
			15											

Water at 6.5 ft bgs

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

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





Appendix E  
Cobalt Lower Confidence Limit Evaluation

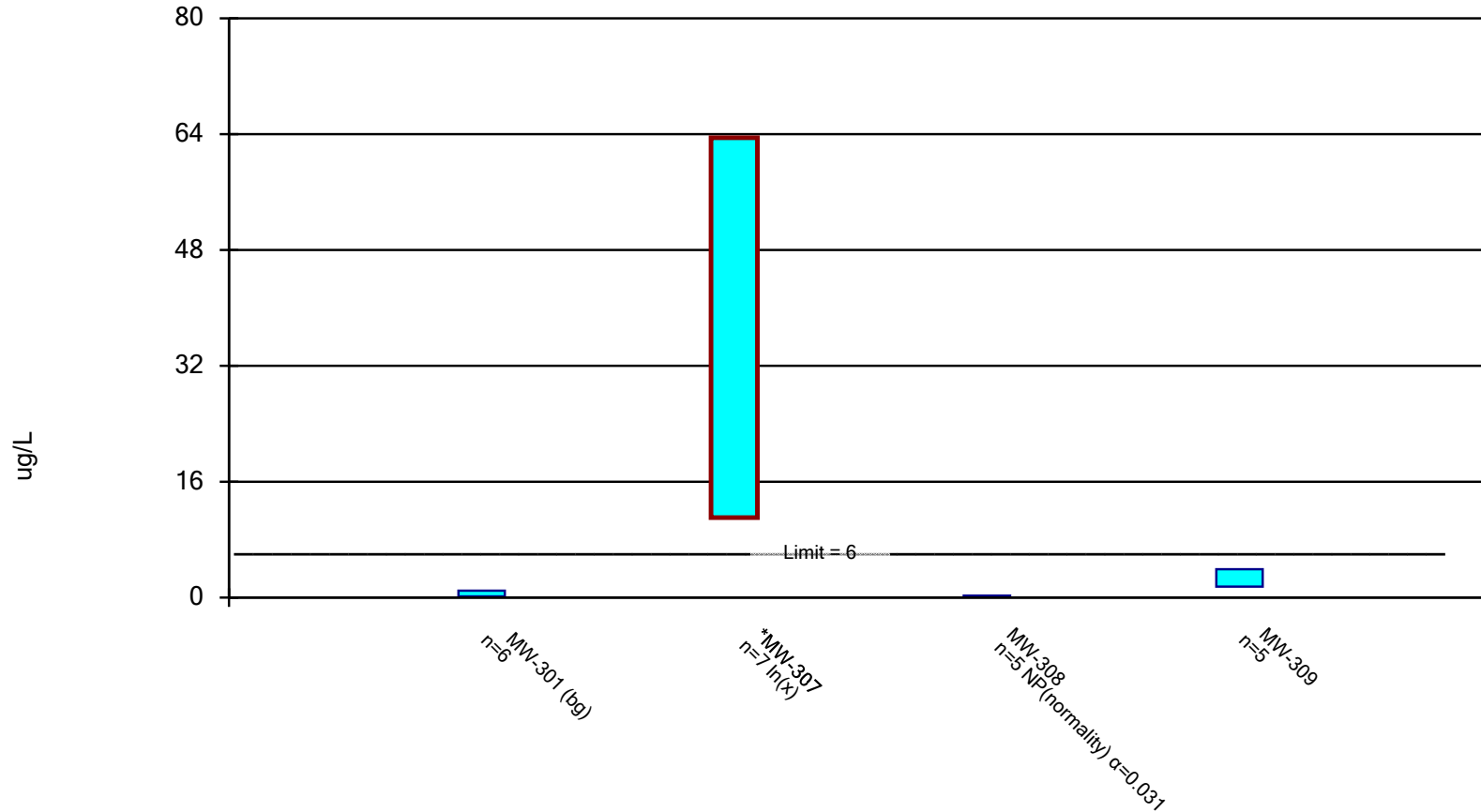
# Confidence Interval

Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122 Printed 8/10/2021, 12:24 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Cobalt (ug/L)	MW-301 (bg)	0.9503	0.1664	6	No	6	0	None	No	0.01	Param.
<b>Cobalt (ug/L)</b>	<b>MW-307</b>	<b>63.51</b>	<b>11.03</b>	<b>6</b>	<b>Yes</b>	<b>7</b>	<b>0</b>	<b>None</b>	<b>In(x)</b>	<b>0.01</b>	<b>Param.</b>
Cobalt (ug/L)	MW-308	0.26	0.14	6	No	5	0	None	No	0.031	NP (normality)
Cobalt (ug/L)	MW-309	3.903	1.497	6	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 8/10/2021 12:24 PM View: OGS - ZLDP


Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

# Confidence Interval

Constituent: Cobalt (ug/L) Analysis Run 8/10/2021 12:25 PM View: OGS - ZLDP  
Ottumwa Generating Station Client: SCS Engineers Data: OGS\_CP\_Export\_201122

	MW-301 (bg)	MW-307	MW-308	MW-309
10/24/2019	0.6			
12/11/2019		11	0.26 (J)	3.7
2/5/2020	1.1	13	0.14 (J)	2.3
3/12/2020	0.43 (J)			
4/14/2020	0.52	20	0.14 (J)	3.2
10/7/2020		18	0.14 (J)	2
10/8/2020	0.41 (J)			
2/23/2021		64		
4/14/2021	0.29 (J)	46	0.16 (J)	2.3
7/6/2021		60		
<b>Mean</b>	0.5583	33.14	0.168	2.7
<b>Std. Dev.</b>	0.2853	22.87	0.05215	0.7176
<b>Upper Lim.</b>	0.9503	63.51	0.26	3.903
<b>Lower Lim.</b>	0.1664	11.03	0.14	1.497





Appendix F  
Ash Pond CCR Unit Cobalt Data

## Cobalt Results for Ash Pond and ZLDP Wells IPL - Ottumwa Generating Station

Parameter: Cobalt  
 Number of Sampling Dates: 42  
 Units: ug/L

Location ID	Background	Compliance - Ash Pond					Compliance - ZLDP			Additional Wells for ACM/SOR - Ash Pond				
	MW-301	MW-302	MW-303	MW-304	MW-305	MW-306	MW-307	MW-308	MW-309	MW-310	MW-311	MW-305A	MW-310A	MW-311A
4/26/2016	4.1	2.6	2.2	0.89	14.8	8.3	--	--	--	--	--	--	--	--
6/23/2016	3.1	1.4	2.5	1.1	15.1	7.7	--	--	--	--	--	--	--	--
8/10/2016	1.8	1.1	2.6	--	--	--	--	--	--	--	--	--	--	--
8/11/2016	--	--	--	<0.5	13.7	6.4	--	--	--	--	--	--	--	--
10/26/2016	1.8	1	3.1	--	--	--	--	--	--	--	--	--	--	--
10/27/2016	--	--	--	<0.5	14.8	6.6	--	--	--	--	--	--	--	--
1/18/2017	1.3	0.94	2.6	<0.5	15.2	6	--	--	--	--	--	--	--	--
1/19/2017	--	--	--	--	--	--	0.62	0.52	2	--	--	--	--	--
4/19/2017	0.97	0.95	1.8	0.37	14.6	5.7	--	--	--	--	--	--	--	--
4/20/2017	--	--	--	--	--	--	1.6	0.43	3.1	--	--	--	--	--
6/20/2017	1	0.86	1.9	--	--	--	--	--	--	--	--	--	--	--
6/21/2017	--	--	--	0.36	14.4	5.2	1.1	0.25	2.4	--	--	--	--	--
8/21/2017	--	--	--	--	--	--	1.1	0.26	2.1	--	--	--	--	--
8/22/2017	--	0.88	2.8	0.3	--	--	--	--	--	--	--	--	--	--
8/23/2017	0.96	--	--	--	14.7	5	--	--	--	--	--	--	--	--
11/8/2017	--	--	--	--	--	--	1.3	0.23	2	--	--	--	--	--
4/16/2018	--	--	--	--	--	--	1.3	0.18	2.4	--	--	--	--	--
4/18/2018	0.46	0.9	2.1	0.39	14.5	4.8	--	--	--	--	--	--	--	--
6/28/2018	--	--	--	--	--	--	2.9	0.19	4.7	--	--	--	--	--
8/14/2018	1.4	1.5	2.2	--	--	--	--	--	--	--	--	--	--	--
8/15/2018	--	--	--	0.92	15.6	5.5	--	--	--	--	--	--	--	--
10/16/2018	0.36	4	1.7	0.45	17.2	6.4	4.8	0.15	2.7	--	--	--	--	--
1/8/2019	--	--	--	--	16.4	6.2	--	--	--	--	--	--	--	--
4/8/2019	0.44	1.2	0.42	0.4	17	6.9	--	--	--	--	--	--	--	--
10/23/2019	--	--	--	0.5	17	6.2	--	--	--	--	--	--	--	--
10/24/2019	0.6	2.7	1.2	--	--	--	--	--	--	0.57	0.78	--	--	--
12/11/2019	--	--	--	--	--	--	11	0.26	3.7	--	--	--	--	--

## Cobalt Results for Ash Pond and ZLDP Wells IPL - Ottumwa Generating Station

Parameter: Cobalt  
 Number of Sampling Dates: 42  
 Units: ug/L

Location ID	Background	Compliance - Ash Pond					Compliance - ZLDP			Additional Wells for ACM/SOR - Ash Pond				
	MW-301	MW-302	MW-303	MW-304	MW-305	MW-306	MW-307	MW-308	MW-309	MW-310	MW-311	MW-305A	MW-310A	MW-311A
2/5/2020	1.1	--	--	--	--	--	13	0.14	2.3	0.32	0.11	--	--	--
3/12/2020	0.43	--	--	--	--	--	--	--	--	0.32	--	--	--	--
3/13/2020	--	--	--	--	18	--	--	--	--	--	<0.091	2.4	0.63	0.19
4/13/2020	--	--	--	0.57	16	--	--	--	--	0.24	<0.091	--	--	0.13
4/14/2020	0.52	5.3	0.87	--	--	5.5	20	0.14	3.2	--	--	2.7	0.39	--
10/7/2020	--	--	--	--	--	--	18	0.14	2	--	--	--	--	--
10/8/2020	0.41	1.5	2.4	0.41	--	--	--	--	--	--	--	--	--	0.12
10/9/2020	--	--	--	--	17	5.9	--	--	--	--	--	1.5	--	--
10/12/2020	--	--	--	--	--	--	--	--	--	0.38	2.2	--	0.43	--
2/23/2021	--	--	--	--	--	5.6	64	--	--	--	--	--	--	--
4/13/2021	--	5.5	0.43	--	--	5.6	--	--	--	0.75	--	--	--	--
4/14/2021	0.29	--	--	0.43	--	--	46	0.16	2.3	--	<0.091	--	--	--
4/15/2021	--	--	--	--	--	--	--	--	--	--	--	0.5	0.48	--
4/16/2021	--	--	--	--	18	--	--	--	--	--	--	--	--	0.13
7/6/2021	--	--	--	--	--	5.8	60	--	--	--	--	--	--	--

Notes:

17 Grayscale indicates concentration is above the Cobalt GPS (6 ug/L)

Created by: RM  
 Last updated by: RM  
 Checked by: NDK

Date: 8/10/2021  
 Date: 8/10/2021  
 Date: 8/11/2021