2019 Annual Groundwater Monitoring and Corrective Action Report

Ottumwa Generating Station – Ash Pond
Ottumwa, Iowa

Prepared for:

Alliant Energy

SCS ENGINEERS

25219072.00 | January 31, 2020

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

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1.0 INTRODUCTION

This 2019 Annual Groundwater Monitoring and Corrective Action Report was prepared to support compliance with the groundwater monitoring requirements of the Coal Combustion Residuals (CCR) Rule [40 CFR 257.50-107]. Specifically, this report was prepared to fulfill the requirements of 40 CFR 257.90(e). The applicable sections of the Rule are provided below in *italics*, followed by applicable information relative to the 2019 Annual Groundwater Monitoring and Corrective Action Report for the CCR Units.

This report covers the period of groundwater monitoring from January 1, 2019, through December 31, 2019.

The groundwater monitoring system is designed to detect monitored constituents at the waste boundary of the Ottumwa Generating Station (OGS) Ash Pond (existing CCR surface impoundment), as required by 40 CFR 257.91(d). The groundwater monitoring system currently consists of 1 upgradient monitoring well, 5 downgradient monitoring wells at the waste boundaries, and 2 additional downgradient monitoring wells.

2.0 § 257.90(E) ANNUAL REPORT REQUIREMENTS

Annual groundwater monitoring and corrective action report. *For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than January 31 of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by § 257.105(h)(1). At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:*

2.1 §257.90(E)(1) SITE MAP

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

A map of the site location is provided on **Figure 1**. A map with an aerial image showing the CCR unit and all background (or upgradient) and downgradient monitoring wells with identification numbers for the groundwater monitoring program is provided as **Figure 2**. The OGS Zero Liquid Discharge Pond CCR unit is also shown on **Figure 2**.

2.2 §257.90(E)(2) MONITORING SYSTEM CHANGES

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

Two new monitoring wells, MW-310 and MW-311, were installed on August 27, 2019, to characterize site conditions in accordance with § 257.95(g)(1). The monitoring well logs and well construction forms were completed for the operating record on November 12, 2019.

2.3 §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;

Two groundwater sampling events were completed in 2019. The first round of semiannual assessment monitoring was completed in April 2019, and the second round was completed in October 2019. The two new wells were added to the monitoring program beginning with the October 2019 event.

Groundwater samples collected in the April and October 2019 events were analyzed for Appendix III and Appendix IV constituents. 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 is included in Table 1. The results of the analytical laboratory analyses are provided in the laboratory reports in Appendix A.

2.4 § 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);

An Assessment of Corrective Measures (ACM) was initiated for the OGS Ash Pond in April 2019 and completed in September 2019. The selection of remedy is in progress. The ACM was initiated in response to the detection of cobalt at a statistically significant level exceeding the Groundwater Protection Standards (GPS) in monitoring wells MW-305 and MW-306. Assessment monitoring continued during the ACM and will continue during the selection of remedy.

2.5 § 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 2019 Annual Groundwater Monitoring and Corrective Action Report.

2.5.1 § 257.90(e) General Requirements

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

Status of Groundwater Monitoring and Corrective Action Program. The groundwater monitoring and corrective action program is currently in the selection of remedy process, with assessment monitoring continuing.

Summary of Key Actions Completed.

- Statistical evaluation for the initial Assessment Monitoring samples collected in April, August, and October 2018, completed January 14, 2019.
- Statistical evaluation for the April 2019 monitoring event, completed July 15, 2019.
- Initiation of the ACM on April 15, 2019.
- Two semiannual assessment monitoring events (April and October 2019).
- Installation of two additional compliance groundwater monitoring wells (August 2019) to characterize the site conditions in accordance with §257.95(g)(1).
- Preparation of the ACM report, completed September 12, 2019.

Description of Any Problems Encountered.

- There were no problems encountered during 2019.

Discussion of Actions to Resolve the Problems.

- Not applicable.

Projection of Key Activities for the Upcoming Year (2020):

- Statistical evaluation and determination of any statistically significant levels exceeding the GPS for the October 2019 monitoring event (January 2020).
- Statistical evaluation and determination of any statistically significant levels exceeding the GPS for the April 2020 monitoring event (July 2020).
- Continued work on the selection of remedy in accordance with § 257.97.
- Installation of three additional monitoring wells to characterize site conditions for the selection of remedy (first quarter of 2020).
- Semiannual progress reports for the Selection of Remedy process (March and September 2020).
- Two semiannual assessment monitoring events (April and October 2020).

2.5.2 § 257.94(d) Alternative Detection Monitoring Frequency

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

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

2.5.3 § 257.94(e)(2) Alternative Source Demonstration for Detection Monitoring

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

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

2.5.4 § 257.95(c) Alternative Assessment Monitoring Frequency

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

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

2.5.5 § 257.95(d)(3) Assessment Monitoring Results and Standards

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

The recorded concentrations for the assessment monitoring events are in the laboratory reports in Appendix A. The background concentrations established under §257.94(b) were provided in Appendix A of the 2017 Annual Groundwater Monitoring and Corrective Action Report for OGS. The groundwater protection standards established for OGS are provided in Table 2.

2.5.6 § 257.95(g)(3)(ii) Alternative Source Demonstration for Assessment Monitoring

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

Not applicable. No alternative source demonstration evaluation for assessment monitoring was completed in 2019.

2.5.7 § 257.96(a) Extension of Time for Corrective Measures Assessment

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

The ACM was initiated on April 15, 2019. The July 10, 2019 certification demonstrating the need for a 90-day deadline extension is included in **Appendix B**. The ACM was completed on September 12, 2019.

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Tables

Table 1. CCR Rule Groundwater Samples Summary
Ottumwa Generating Station / SCS Engineers Project #25216072

Sample Dates	Downgradient Wells							Background Well
	MW-302	MW-303	MW-304	MW-305	MW-306	MW-310	MW-311	MW-301
4/8/2019	A	A	A	A	A	NI	NI	A
10/23-24/2019	A	A	A	A	A	A	A	A
Total Samples	2	2	2	2	2	1	1	2

Abbreviations:
A = Required by Assessment Monitoring Program
NI= Well not installed

Created by: NDK Date: 1/4/2019
Last revision by: LWJ Date: 12/24/2019
Checked by: NDK Date: 12/24/2019

I:\25219072.00\Deliverables\2019 Annual OGS AP\Tables\[Table 1_GW_Samples_Summary_Table_OGS.xlsx]GW Summary

Table 2. Groundwater Protection Standards - CCR Program - Assessment Monitoring
Ottumwa Generating Station Ash Pond / SCS Engineers Project #25219072.00

Parameter Name	GPS	Source
Antimony, ug/L	6	MCL
Arsenic, ug/L	10	MCL
Barium, ug/L	2000	MCL
Beryllium, ug/L	4	MCL
Cadmium, ug/L	5	MCL
Chromium, ug/L	100	MCL
Cobalt, ug/L	6	40 CFR 257.95(h)(2)
Fluoride, mg/L	4	MCL
Lead, ug/L	15	40 CFR 257.95(h)(2)
Lithium, ug/L	40	40 CFR 257.95(h)(2)
Mercury, ug/L	2	MCL
Molybdenum, ug/L	100	40 CFR 257.95(h)(2)
Selenium, ug/L	50	MCL
Thallium, ug/L	2	MCL
Radium 226/228 Combined, pCi/L	5	MCL

Abbreviations:
GPS = Groundwater Protection Standard
MCL = Maximum Contaminant Level established under 40 CFR 141.62 and 141.66

Created by: NDK, 1/8/2019
Checked by: MDB, 1/8/2019

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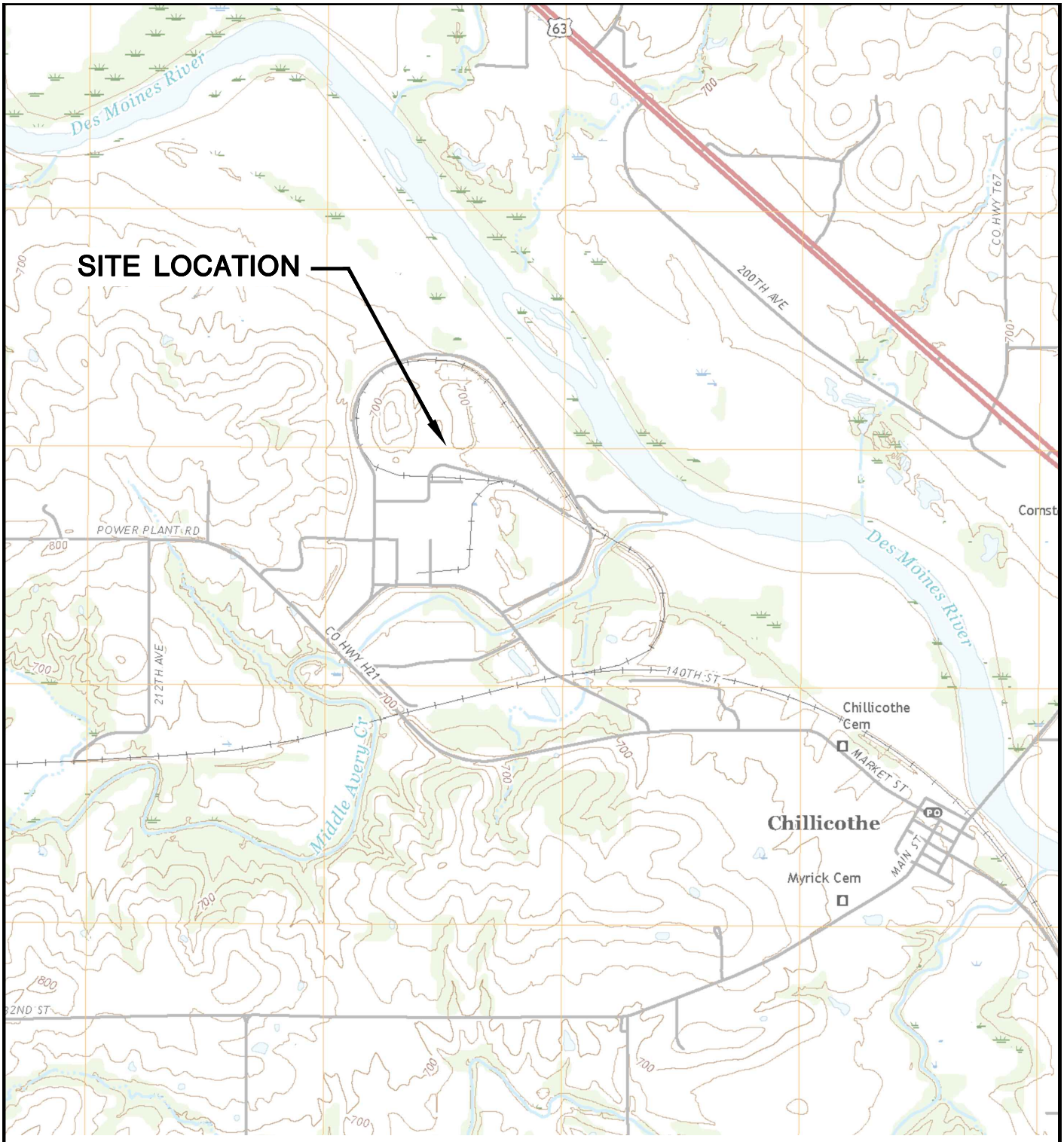
Figures



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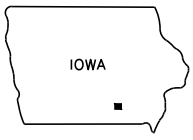
CHILLICOTHE QUADRANGLE
IOWA–WAPELLO CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
2018
SCALE: 1" = 2,000'



CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE	ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA

SITE LOCATION MAP

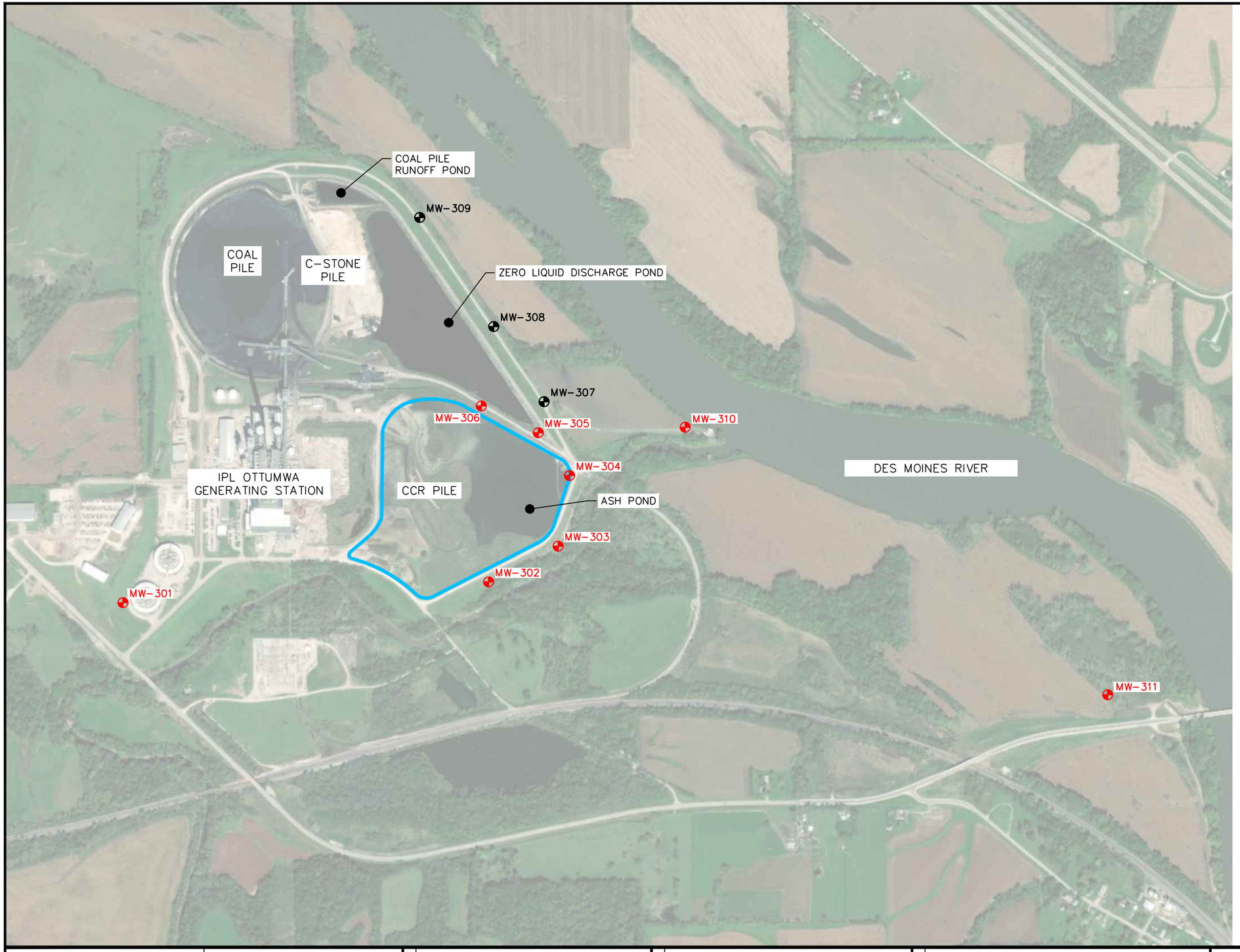
PROJECT NO.	25219072.00	DRAWN BY:	BSS
DRAWN:	11/15/2019	CHECKED BY:	MDB
REVISED:	01/10/2020	APPROVED BY:	TK 01/30/2020

ENGINEER

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

FIGURE
1

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



LEGEND

- CCR UNIT
- CCR MONITORING WELL
- ADDITIONAL MONITORING WELL

NOTES:

1. 2014 AERIAL PHOTOGRAPH SOURCES: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA FSA, USGS, AEX, GETMAPPING, AEROGRID, 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.

N

800 0 800

SCALE: 1" = 800'

PROJECT NO.	25219072.00	DRAWN BY:	BSS
DRAWN:	11/15/2019	CHECKED BY:	MDB
REVISED:	01/13/2020	APPROVED BY:	TK 01/30/2020

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

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

SITE: ALLIANT ENERGY
OTTUMWA GENERATING STATION
OTTUMWA, IOWA

SITE PLAN AND MONITORING WELL LOCATIONS-ASH POND

FIGURE 2

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Appendix A

Analytical Laboratory Reports

A1 Assessment Monitoring Sampling, April 2019

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

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

Laboratory Job ID: 310-152915-1
Laboratory Sample Delivery Group: 25219072
Client Project/Site: IPL Ottumwa Generating Station 25219072
Revision: 1

For:
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett

Sandie Fredrick

Authorized for release by:
7/11/2019 9:21:34 AM

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

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Case Narrative

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

Job ID: 310-152915-1
SDG: 25219072

Job ID: 310-152915-1

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative
310-152915-1

Comments
REVISION: Client requested split reports

Receipt
The samples were received on 4/9/2019 5:15 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 0.1° C and 0.8° C.

HPLC/IC
Method(s) 300.0, 9056A: The following samples were diluted due to the nature of the sample matrix: MW 301 (310-152915-1), MW 302 (310-152915-2), MW 303 (310-152915-3) and MW 306 (310-152915-6). 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: IPL Ottumwa Generating Station 25219072

Job ID: 310-152915-1
SDG: 25219072

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-152915-1	MW 301	Ground Water	04/08/19 09:32	04/09/19 17:15	
310-152915-2	MW 302	Ground Water	04/08/19 10:36	04/09/19 17:15	
310-152915-3	MW 303	Ground Water	04/08/19 11:41	04/09/19 17:15	
310-152915-4	MW 304	Ground Water	04/08/19 12:53	04/09/19 17:15	
310-152915-5	MW 305	Ground Water	04/08/19 13:39	04/09/19 17:15	
310-152915-6	MW 306	Ground Water	04/08/19 14:25	04/09/19 17:15	
310-152915-7	Field Blank	Ground Water	04/08/19 14:30	04/09/19 17:15	

Detection Summary

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

Job ID: 310-152915-1
SDG: 25219072

Client Sample ID: MW 301 — Lab Sample ID: 310-152915-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	50		5.0	1.5	mg/L	5		9056A	Total/NA
Fluoride	0.44	J	0.50	0.23	mg/L	5		9056A	Total/NA
Sulfate	81		5.0	1.8	mg/L	5		9056A	Total/NA
Barium	25		2.0	0.84	ug/L	1		6020A	Total/NA
Boron	380		200	110	ug/L	1		6020A	Total/NA
Calcium	43		0.50	0.10	mg/L	1		6020A	Total/NA
Cobalt	0.44	J	0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	15		10	2.7	ug/L	1		6020A	Total/NA
Selenium	3.1	J	5.0	1.0	ug/L	1		6020A	Total/NA
Total Dissolved Solids	340		30	24	mg/L	1		SM 2540C	Total/NA
pH	7.1	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Field Conductivity	501				umhos/cm	1		Field Sampling	Total/NA
Field Dissolved Oxygen	8.32				mg/L	1		Field Sampling	Total/NA
Field pH	6.61				SU	1		Field Sampling	Total/NA
Field Temperature	7.27				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	1.87				NTU	1		Field Sampling	Total/NA
Groundwater Elevation (ft MSL)	682.69				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	37.6				millivolts	1		Field Sampling	Total/NA

Client Sample ID: MW 302 — Lab Sample ID: 310-152915-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	240		5.0	1.5	mg/L	5		9056A	Total/NA
Sulfate	840		50	18	mg/L	50		9056A	Total/NA
Barium	19		2.0	0.84	ug/L	1		6020A	Total/NA
Boron	1300		200	110	ug/L	1		6020A	Total/NA
Cadmium	0.21	J	0.50	0.077	ug/L	1		6020A	Total/NA
Calcium	200		0.50	0.10	mg/L	1		6020A	Total/NA
Cobalt	1.2		0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	10		10	2.7	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1600		30	24	mg/L	1		SM 2540C	Total/NA
pH	6.9	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Field Conductivity	2159				umhos/cm	1		Field Sampling	Total/NA
Field Dissolved Oxygen	0.86				mg/L	1		Field Sampling	Total/NA
Field pH	6.61				SU	1		Field Sampling	Total/NA
Field Temperature	12.27				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	26.9				NTU	1		Field Sampling	Total/NA
Groundwater Elevation (ft MSL)	657.23				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	68.3				millivolts	1		Field Sampling	Total/NA

Client Sample ID: MW 303 — Lab Sample ID: 310-152915-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	22		5.0	1.5	mg/L	5		9056A	Total/NA
Sulfate	260		20	7.0	mg/L	20		9056A	Total/NA
Barium	54		2.0	0.84	ug/L	1		6020A	Total/NA
Boron	290		200	110	ug/L	1		6020A	Total/NA
Cadmium	0.092	J	0.50	0.077	ug/L	1		6020A	Total/NA
Calcium	170		0.50	0.10	mg/L	1		6020A	Total/NA
Cobalt	0.42	J	0.50	0.091	ug/L	1		6020A	Total/NA
Molybdenum	7.5		2.0	1.1	ug/L	1		6020A	Total/NA
Selenium	2.1	J	5.0	1.0	ug/L	1		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW 303 (Continued) — Lab Sample ID: 310-152915-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	890		30	24	mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Field Conductivity	1181				umhos/cm	1		Field Sampling	Total/NA
Field Dissolved Oxygen	2.29				mg/L	1		Field Sampling	Total/NA
Field pH	7.00				SU	1		Field Sampling	Total/NA
Field Temperature	8.51				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	3.49				NTU	1		Field Sampling	Total/NA
Groundwater Elevation (ft MSL)	655.55				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	51.7				millivolts	1		Field Sampling	Total/NA

Client Sample ID: MW 304 — Lab Sample ID: 310-152915-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	320		20	5.8	mg/L	20		9056A	Total/NA
Fluoride	1.3		0.50	0.23	mg/L	5		9056A	Total/NA
Sulfate	180		5.0	1.8	mg/L	5		9056A	Total/NA
Barium	80		2.0	0.84	ug/L	1		6020A	Total/NA
Boron	1100		200	110	ug/L	1		6020A	Total/NA
Calcium	130		0.50	0.10	mg/L	1		6020A	Total/NA
Chromium	1.6	J	5.0	0.98	ug/L	1		6020A	Total/NA
Cobalt	0.40	J	0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	3.3	J	10	2.7	ug/L	1		6020A	Total/NA
Molybdenum	1.5	J	2.0	1.1	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1100		30	24	mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Field Conductivity	1876				umhos/cm	1		Field Sampling	Total/NA
Field Dissolved Oxygen	0.41				mg/L	1		Field Sampling	Total/NA
Field pH	7.17				SU	1		Field Sampling	Total/NA
Field Temperature	13.75				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	57.9				NTU	1		Field Sampling	Total/NA
Groundwater Elevation (ft MSL)	659.33				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-58.3				millivolts	1		Field Sampling	Total/NA

Client Sample ID: MW 305 — Lab Sample ID: 310-152915-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	250		5.0	1.5	mg/L	5		9056A	Total/NA
Fluoride	0.75		0.50	0.23	mg/L	5		9056A	Total/NA
Sulfate	110		5.0	1.8	mg/L	5		9056A	Total/NA
Barium	120		2.0	0.84	ug/L	1		6020A	Total/NA
Boron	1000		200	110	ug/L	1		6020A	Total/NA
Calcium	110		0.50	0.10	mg/L	1		6020A	Total/NA
Cobalt	17		0.50	0.091	ug/L	1		6020A	Total/NA
Molybdenum	7.2		2.0	1.1	ug/L	1		6020A	Total/NA
Thallium	0.33	J	1.0	0.27	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1000		30	24	mg/L	1		SM 2540C	Total/NA
pH	7.0	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Field Conductivity	1728				umhos/cm	1		Field Sampling	Total/NA
Field Dissolved Oxygen	0.59				mg/L	1		Field Sampling	Total/NA
Field pH	7.06				SU	1		Field Sampling	Total/NA
Field Temperature	13.8				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	21.7				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW 305 (Continued) — Lab Sample ID: 310-152915-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Groundwater Elevation (ft MSL)	664.01				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	32.6				millivolts	1		Field Sampling	Total/NA

Client Sample ID: MW 306 — Lab Sample ID: 310-152915-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	98		5.0	1.5	mg/L	5		9056A	Total/NA
Fluoride	0.27	J	0.50	0.23	mg/L	5		9056A	Total/NA
Sulfate	270		10	3.5	mg/L	10		9056A	Total/NA
Barium	58		2.0	0.84	ug/L	1		6020A	Total/NA
Boron	1100		200	110	ug/L	1		6020A	Total/NA
Cadmium	1.1		0.50	0.077	ug/L	1		6020A	Total/NA
Calcium	95		0.50	0.10	mg/L	1		6020A	Total/NA
Cobalt	6.9		0.50	0.091	ug/L	1		6020A	Total/NA
Molybdenum	4.3		2.0	1.1	ug/L	1		6020A	Total/NA
Total Dissolved Solids	930		30	24	mg/L	1		SM 2540C	Total/NA
pH	6.6	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Field Conductivity	1350				umhos/cm	1		Field Sampling	Total/NA
Field Dissolved Oxygen	0.92				mg/L	1		Field Sampling	Total/NA
Field pH	6.66				SU	1		Field Sampling	Total/NA
Field Temperature	13.63				Degrees C	1		Field Sampling	Total/NA
Field Turbidity	28.5				NTU	1		Field Sampling	Total/NA
Groundwater Elevation (ft MSL)	670.96				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	49.1				millivolts	1		Field Sampling	Total/NA

Client Sample ID: Field Blank — Lab Sample ID: 310-152915-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	26	J	30	24	mg/L	1		SM 2540C	Total/NA
pH	7.3	HF	0.1		SU	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

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

Job ID: 310-152915-1
SDG: 25219072

Client Sample ID: MW 301

Date Collected: 04/08/19 09:32
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-1

Matrix: Ground Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**50**		5.0	1.5	mg/L			04/10/19 19:13	5
Fluoride	**0.44**	**J**	0.50	0.23	mg/L			04/10/19 19:13	5
Sulfate	**81**		5.0	1.8	mg/L			04/10/19 19:13	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		04/10/19 08:11	04/22/19 21:44	1
Arsenic	<0.75		2.0	0.75	ug/L		04/10/19 08:11	04/22/19 21:44	1
Barium	**25**		2.0	0.84	ug/L		04/10/19 08:11	04/22/19 21:44	1
Beryllium	<0.27		1.0	0.27	ug/L		04/10/19 08:11	04/22/19 21:44	1
Boron	**380**		200	110	ug/L		04/10/19 08:11	04/22/19 21:44	1
Cadmium	<0.077		0.50	0.077	ug/L		04/10/19 08:11	04/22/19 21:44	1
Calcium	**43**		0.50	0.10	mg/L		04/10/19 08:11	04/22/19 21:44	1
Chromium	<0.98		5.0	0.98	ug/L		04/10/19 08:11	04/22/19 21:44	1
Cobalt	**0.44**	**J**	0.50	0.091	ug/L		04/10/19 08:11	04/22/19 21:44	1
Lead	<0.27		0.50	0.27	ug/L		04/10/19 08:11	04/22/19 21:44	1
Lithium	**15**		10	2.7	ug/L		04/10/19 08:11	04/22/19 21:44	1
Molybdenum	<1.1		2.0	1.1	ug/L		04/10/19 08:11	04/22/19 21:44	1
Selenium	**3.1**	**J**	5.0	1.0	ug/L		04/10/19 08:11	04/22/19 21:44	1
Thallium	<0.27		1.0	0.27	ug/L		04/10/19 08:11	04/22/19 21:44	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/09/19 10:07	04/10/19 14:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**340**		30	24	mg/L			04/10/19 14:38	1
pH	**7.1**	**HF**	0.1	0.1	SU			04/09/19 23:56	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Field Conductivity	**501**				umhos/cm			04/08/19 09:32	1
Field Dissolved Oxygen	**8.32**				mg/L			04/08/19 09:32	1
Field pH	**6.61**				SU			04/08/19 09:32	1
Field Temperature	**7.27**				Degrees C			04/08/19 09:32	1
Field Turbidity	**1.87**				NTU			04/08/19 09:32	1
Groundwater Elevation (ft MSL)	**682.69**				ft			04/08/19 09:32	1
Oxidation Reduction Potential	**37.6**				millivolts			04/08/19 09:32	1

Client Sample Results

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

Job ID: 310-152915-1
SDG: 25219072

Client Sample ID: MW 302

Date Collected: 04/08/19 10:36
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-2

Matrix: Ground Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**240**		5.0	1.5	mg/L			04/10/19 19:28	5
Fluoride	<0.23		0.50	0.23	mg/L			04/10/19 19:28	5
Sulfate	**840**		50	18	mg/L			04/11/19 10:13	50

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		04/10/19 08:11	04/22/19 22:11	1
Arsenic	<0.75		2.0	0.75	ug/L		04/10/19 08:11	04/22/19 22:11	1
Barium	**19**		2.0	0.84	ug/L		04/10/19 08:11	04/22/19 22:11	1
Beryllium	<0.27		1.0	0.27	ug/L		04/10/19 08:11	04/22/19 22:11	1
Boron	**1300**		200	110	ug/L		04/10/19 08:11	04/22/19 22:11	1
Cadmium	**0.21**	**J**	0.50	0.077	ug/L		04/10/19 08:11	04/22/19 22:11	1
Calcium	**200**		0.50	0.10	mg/L		04/10/19 08:11	04/22/19 22:11	1
Chromium	<0.98		5.0	0.98	ug/L		04/10/19 08:11	04/22/19 22:11	1
Cobalt	**1.2**		0.50	0.091	ug/L		04/10/19 08:11	04/22/19 22:11	1
Lead	<0.27		0.50	0.27	ug/L		04/10/19 08:11	04/22/19 22:11	1
Lithium	**10**		10	2.7	ug/L		04/10/19 08:11	04/22/19 22:11	1
Molybdenum	<1.1		2.0	1.1	ug/L		04/10/19 08:11	04/22/19 22:11	1
Selenium	<1.0		5.0	1.0	ug/L		04/10/19 08:11	04/22/19 22:11	1
Thallium	<0.27		1.0	0.27	ug/L		04/10/19 08:11	04/22/19 22:11	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/09/19 10:07	04/10/19 14:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**1600**		30	24	mg/L			04/10/19 14:38	1
pH	**6.9**	**HF**	0.1	0.1	SU			04/09/19 23:59	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Field Conductivity	**2159**				umhos/cm			04/08/19 10:36	1
Field Dissolved Oxygen	**0.86**				mg/L			04/08/19 10:36	1
Field pH	**6.61**				SU			04/08/19 10:36	1
Field Temperature	**12.27**				Degrees C			04/08/19 10:36	1
Field Turbidity	**26.9**				NTU			04/08/19 10:36	1
Groundwater Elevation (ft MSL)	**657.23**				ft			04/08/19 10:36	1
Oxidation Reduction Potential	**68.3**				millivolts			04/08/19 10:36	1

Client Sample ID: MW 303

Date Collected: 04/08/19 11:41
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-3

Matrix: Ground Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**22**		5.0	1.5	mg/L			04/10/19 19:44	5
Fluoride	<0.23		0.50	0.23	mg/L			04/10/19 19:44	5
Sulfate	**260**		20	7.0	mg/L			04/11/19 10:30	20

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		04/10/19 08:11	04/22/19 22:15	1
Arsenic	<0.75		2.0	0.75	ug/L		04/10/19 08:11	04/22/19 22:15	1
Barium	**54**		2.0	0.84	ug/L		04/10/19 08:11	04/22/19 22:15	1
Beryllium	<0.27		1.0	0.27	ug/L		04/10/19 08:11	04/22/19 22:15	1
Boron	**290**		200	110	ug/L		04/10/19 08:11	04/22/19 22:15	1
Cadmium	**0.092**	**J**	0.50	0.077	ug/L		04/10/19 08:11	04/22/19 22:15	1
Calcium	**170**		0.50	0.10	mg/L		04/10/19 08:11	04/22/19 22:15	1
Chromium	<0.98		5.0	0.98	ug/L		04/10/19 08:11	04/22/19 22:15	1
Cobalt	**0.42**	**J**	0.50	0.091	ug/L		04/10/19 08:11	04/22/19 22:15	1
Lead	<0.27		0.50	0.27	ug/L		04/10/19 08:11	04/22/19 22:15	1
Lithium	<2.7		10	2.7	ug/L		04/10/19 08:11	04/22/19 22:15	1
Molybdenum	**7.5**		2.0	1.1	ug/L		04/10/19 08:11	04/22/19 22:15	1
Selenium	**2.1**	**J**	5.0	1.0	ug/L		04/10/19 08:11	04/22/19 22:15	1
Thallium	<0.27		1.0	0.27	ug/L		04/10/19 08:11	04/22/19 22:15	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/09/19 13:18	04/10/19 14:37	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**890**		30	24	mg/L			04/10/19 14:38	1
pH	**7.5**	**HF**	0.1	0.1	SU			04/10/19 00:04	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Field Conductivity	**1181**				umhos/cm			04/08/19 11:41	1
Field Dissolved Oxygen	**2.29**				mg/L			04/08/19 11:41	1
Field pH	**7.00**				SU			04/08/19 11:41	1
Field Temperature	**8.51**				Degrees C			04/08/19 11:41	1
Field Turbidity	**3.49**				NTU			04/08/19 11:41	1
Groundwater Elevation (ft MSL)	**655.55**				ft			04/08/19 11:41	1
Oxidation Reduction Potential	**51.7**				millivolts			04/08/19 11:41	1

Client Sample ID: MW 304

Date Collected: 04/08/19 12:53
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-4

Matrix: Ground Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**320**		20	5.8	mg/L			04/11/19 10:49	20
Fluoride	**1.3**		0.50	0.23	mg/L			04/10/19 20:00	5
Sulfate	**180**		5.0	1.8	mg/L			04/10/19 20:00	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		04/10/19 08:11	04/22/19 22:18	1
Arsenic	<0.75		2.0	0.75	ug/L		04/10/19 08:11	04/22/19 22:18	1
Barium	**80**		2.0	0.84	ug/L		04/10/19 08:11	04/22/19 22:18	1
Beryllium	<0.27		1.0	0.27	ug/L		04/10/19 08:11	04/22/19 22:18	1
Boron	**1100**		200	110	ug/L		04/10/19 08:11	04/22/19 22:18	1
Cadmium	<0.077		0.50	0.077	ug/L		04/10/19 08:11	04/22/19 22:18	1
Calcium	**130**		0.50	0.10	mg/L		04/10/19 08:11	04/22/19 22:18	1
Chromium	**1.6**	**J**	5.0	0.98	ug/L		04/10/19 08:11	04/22/19 22:18	1
Cobalt	**0.40**	**J**	0.50	0.091	ug/L		04/10/19 08:11	04/22/19 22:18	1
Lead	<0.27		0.50	0.27	ug/L		04/10/19 08:11	04/22/19 22:18	1
Lithium	**3.3**	**J**	10	2.7	ug/L		04/10/19 08:11	04/22/19 22:18	1
Molybdenum	**1.5**	**J**	2.0	1.1	ug/L		04/10/19 08:11	04/22/19 22:18	1
Selenium	<1.0		5.0	1.0	ug/L		04/10/19 08:11	04/22/19 22:18	1
Thallium	<0.27		1.0	0.27	ug/L		04/10/19 08:11	04/22/19 22:18	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/09/19 13:18	04/10/19 14:39	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**1100**		30	24	mg/L			04/10/19 14:38	1
pH	**7.5**	**HF**	0.1	0.1	SU			04/10/19 00:06	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Field Conductivity	**1876**				umhos/cm			04/08/19 12:53	1
Field Dissolved Oxygen	**0.41**				mg/L			04/08/19 12:53	1
Field pH	**7.17**				SU			04/08/19 12:53	1
Field Temperature	**13.75**				Degrees C			04/08/19 12:53	1
Field Turbidity	**57.9**				NTU			04/08/19 12:53	1
Groundwater Elevation (ft MSL)	**659.33**				ft			04/08/19 12:53	1
Oxidation Reduction Potential	**-58.3**				millivolts			04/08/19 12:53	1

Client Sample Results

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

Job ID: 310-152915-1
SDG: 25219072

Client Sample ID: MW 305

Date Collected: 04/08/19 13:39
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-5

Matrix: Ground Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**250**		5.0	1.5	mg/L			04/10/19 20:15	5
Fluoride	**0.75**		0.50	0.23	mg/L			04/10/19 20:15	5
Sulfate	**110**		5.0	1.8	mg/L			04/10/19 20:15	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		04/10/19 08:11	04/22/19 22:21	1
Arsenic	<0.75		2.0	0.75	ug/L		04/10/19 08:11	04/22/19 22:21	1
Barium	**120**		2.0	0.84	ug/L		04/10/19 08:11	04/22/19 22:21	1
Beryllium	<0.27		1.0	0.27	ug/L		04/10/19 08:11	04/22/19 22:21	1
Boron	**1000**		200	110	ug/L		04/10/19 08:11	04/22/19 22:21	1
Cadmium	<0.077		0.50	0.077	ug/L		04/10/19 08:11	04/22/19 22:21	1
Calcium	**110**		0.50	0.10	mg/L		04/10/19 08:11	04/22/19 22:21	1
Chromium	<0.98		5.0	0.98	ug/L		04/10/19 08:11	04/22/19 22:21	1
Cobalt	**17**		0.50	0.091	ug/L		04/10/19 08:11	04/22/19 22:21	1
Lead	<0.27		0.50	0.27	ug/L		04/10/19 08:11	04/22/19 22:21	1
Lithium	<2.7		10	2.7	ug/L		04/10/19 08:11	04/22/19 22:21	1
Molybdenum	**7.2**		2.0	1.1	ug/L		04/10/19 08:11	04/22/19 22:21	1
Selenium	<1.0		5.0	1.0	ug/L		04/10/19 08:11	04/22/19 22:21	1
Thallium	**0.33**	**J**	1.0	0.27	ug/L		04/10/19 08:11	04/22/19 22:21	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/09/19 13:18	04/10/19 14:41	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**1000**		30	24	mg/L			04/10/19 14:38	1
pH	**7.0**	**HF**	0.1		SU			04/10/19 00:14	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Field Conductivity	**1728**				umhos/cm			04/08/19 13:39	1
Field Dissolved Oxygen	**0.59**				mg/L			04/08/19 13:39	1
Field pH	**7.06**				SU			04/08/19 13:39	1
Field Temperature	**13.8**				Degrees C			04/08/19 13:39	1
Field Turbidity	**21.7**				NTU			04/08/19 13:39	1
Groundwater Elevation (ft MSL)	**664.01**				ft			04/08/19 13:39	1
Oxidation Reduction Potential	**32.6**				millivolts			04/08/19 13:39	1

Client Sample Results

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

Job ID: 310-152915-1
SDG: 25219072

Client Sample ID: MW 306

Date Collected: 04/08/19 14:25
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-6

Matrix: Ground Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**98**		5.0	1.5	mg/L			04/10/19 20:31	5
Fluoride	**0.27**	**J**	0.50	0.23	mg/L			04/10/19 20:31	5
Sulfate	**270**		10	3.5	mg/L			04/11/19 11:04	10

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		04/10/19 08:11	04/22/19 22:25	1
Arsenic	<0.75		2.0	0.75	ug/L		04/10/19 08:11	04/22/19 22:25	1
Barium	**58**		2.0	0.84	ug/L		04/10/19 08:11	04/22/19 22:25	1
Beryllium	<0.27		1.0	0.27	ug/L		04/10/19 08:11	04/22/19 22:25	1
Boron	**1100**		200	110	ug/L		04/10/19 08:11	04/22/19 22:25	1
Cadmium	**1.1**		0.50	0.077	ug/L		04/10/19 08:11	04/22/19 22:25	1
Calcium	**95**		0.50	0.10	mg/L		04/10/19 08:11	04/22/19 22:25	1
Chromium	<0.98		5.0	0.98	ug/L		04/10/19 08:11	04/22/19 22:25	1
Cobalt	**6.9**		0.50	0.091	ug/L		04/10/19 08:11	04/22/19 22:25	1
Lead	<0.27		0.50	0.27	ug/L		04/10/19 08:11	04/22/19 22:25	1
Lithium	<2.7		10	2.7	ug/L		04/10/19 08:11	04/22/19 22:25	1
Molybdenum	**4.3**		2.0	1.1	ug/L		04/10/19 08:11	04/22/19 22:25	1
Selenium	<1.0		5.0	1.0	ug/L		04/10/19 08:11	04/22/19 22:25	1
Thallium	<0.27		1.0	0.27	ug/L		04/10/19 08:11	04/22/19 22:25	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/09/19 13:18	04/10/19 14:43	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**930**		30	24	mg/L			04/10/19 14:38	1
pH	**6.6**	**HF**	0.1		SU			04/10/19 00:18	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Field Conductivity	**1350**				umhos/cm			04/08/19 14:25	1
Field Dissolved Oxygen	**0.92**				mg/L			04/08/19 14:25	1
Field pH	**6.66**				SU			04/08/19 14:25	1
Field Temperature	**13.63**				Degrees C			04/08/19 14:25	1
Field Turbidity	**28.5**				NTU			04/08/19 14:25	1
Groundwater Elevation (ft MSL)	**670.96**				ft			04/08/19 14:25	1
Oxidation Reduction Potential	**49.1**				millivolts			04/08/19 14:25	1

Client Sample ID: Field Blank

Date Collected: 04/08/19 14:30
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-7

Matrix: Ground Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.29		1.0	0.29	mg/L			04/10/19 20:46	1
Fluoride	<0.045		0.10	0.045	mg/L			04/10/19 20:46	1
Sulfate	<0.35		1.0	0.35	mg/L			04/10/19 20:46	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		04/10/19 08:11	04/22/19 22:28	1
Arsenic	<0.75		2.0	0.75	ug/L		04/10/19 08:11	04/22/19 22:28	1
Barium	<0.84		2.0	0.84	ug/L		04/10/19 08:11	04/22/19 22:28	1
Beryllium	<0.27		1.0	0.27	ug/L		04/10/19 08:11	04/22/19 22:28	1
Boron	<110		200	110	ug/L		04/10/19 08:11	04/22/19 22:28	1
Cadmium	<0.077		0.50	0.077	ug/L		04/10/19 08:11	04/22/19 22:28	1
Calcium	<0.10		0.50	0.10	mg/L		04/10/19 08:11	04/22/19 22:28	1
Chromium	<0.98		5.0	0.98	ug/L		04/10/19 08:11	04/22/19 22:28	1
Cobalt	<0.091		0.50	0.091	ug/L		04/10/19 08:11	04/22/19 22:28	1
Lead	<0.27		0.50	0.27	ug/L		04/10/19 08:11	04/22/19 22:28	1
Lithium	<2.7		10	2.7	ug/L		04/10/19 08:11	04/22/19 22:28	1
Molybdenum	<1.1		2.0	1.1	ug/L		04/10/19 08:11	04/22/19 22:28	1
Selenium	<1.0		5.0	1.0	ug/L		04/10/19 08:11	04/22/19 22:28	1
Thallium	<0.27		1.0	0.27	ug/L		04/10/19 08:11	04/22/19 22:28	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/09/19 13:18	04/10/19 14:45	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**26**	**J**	30	24	mg/L			04/10/19 14:38	1
pH	**7.3**	**HF**	0.1		SU			04/10/19 00:21	1

Definitions/Glossary

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

Job ID: 310-152915-1
SDG: 25219072

Qualifiers

HPLC/IC

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

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

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

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-235649/3
Matrix: Water
Analysis Batch: 235649

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.29		1.0	0.29	mg/L			04/10/19 15:44	1
Fluoride	<0.045		0.10	0.045	mg/L			04/10/19 15:44	1
Sulfate	<0.35		1.0	0.35	mg/L			04/10/19 15:44	1

Lab Sample ID: LCS 310-235649/4
Matrix: Water
Analysis Batch: 235649

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	7.50	7.26		mg/L		97	90 - 110
Fluoride	1.50	1.47		mg/L		98	90 - 110
Sulfate	7.50	7.49		mg/L		100	90 - 110

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-235260/1-A
Matrix: Water
Analysis Batch: 236802

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 235260

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		04/10/19 08:11	04/22/19 21:37	1
Arsenic	<0.75		2.0	0.75	ug/L		04/10/19 08:11	04/22/19 21:37	1
Barium	<0.84		2.0	0.84	ug/L		04/10/19 08:11	04/22/19 21:37	1
Beryllium	<0.27		1.0	0.27	ug/L		04/10/19 08:11	04/22/19 21:37	1
Boron	<110		200	110	ug/L		04/10/19 08:11	04/22/19 21:37	1
Cadmium	<0.077		0.50	0.077	ug/L		04/10/19 08:11	04/22/19 21:37	1
Calcium	<0.10		0.50	0.10	mg/L		04/10/19 08:11	04/22/19 21:37	1
Chromium	<0.98		5.0	0.98	ug/L		04/10/19 08:11	04/22/19 21:37	1
Cobalt	<0.091		0.50	0.091	ug/L		04/10/19 08:11	04/22/19 21:37	1
Lead	<0.27		0.50	0.27	ug/L		04/10/19 08:11	04/22/19 21:37	1
Lithium	<2.7		10	2.7	ug/L		04/10/19 08:11	04/22/19 21:37	1
Molybdenum	<1.1		2.0	1.1	ug/L		04/10/19 08:11	04/22/19 21:37	1
Selenium	<1.0		5.0	1.0	ug/L		04/10/19 08:11	04/22/19 21:37	1
Thallium	<0.27		1.0	0.27	ug/L		04/10/19 08:11	04/22/19 21:37	1

Lab Sample ID: LCS 310-235260/2-A
Matrix: Water
Analysis Batch: 236802

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 235260

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	20.0	19.6		ug/L		98	80 - 120
Arsenic	40.0	43.4		ug/L		109	80 - 120
Barium	40.0	41.6		ug/L		104	80 - 120
Beryllium	20.0	20.0		ug/L		100	80 - 120
Boron	880	920		ug/L		105	80 - 120
Cadmium	20.0	20.4		ug/L		102	80 - 120
Calcium	2.00	1.97		mg/L		99	80 - 120
Chromium	40.0	40.2		ug/L		101	80 - 120
Cobalt	20.0	19.1		ug/L		96	80 - 120

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

Lab Sample ID: LCS 310-235260/2-A
Matrix: Water
Analysis Batch: 236802

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 235260

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	20.0	20.7		ug/L		104	80 - 120
Lithium	100	110		ug/L		110	80 - 120
Molybdenum	40.0	40.0		ug/L		100	80 - 120
Selenium	40.0	39.3		ug/L		98	80 - 120
Thallium	16.0	15.9		ug/L		100	80 - 120

Lab Sample ID: 310-152915-1 MS
Matrix: Ground Water
Analysis Batch: 236802

Client Sample ID: MW 301
Prep Type: Total/NA
Prep Batch: 235260

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	<0.53		20.0	20.7		ug/L		103	75 - 125
Arsenic	<0.75		40.0	44.0		ug/L		110	75 - 125
Barium	25		40.0	67.7		ug/L		106	75 - 125
Beryllium	<0.27		20.0	20.0		ug/L		100	75 - 125
Boron	380		880	1370		ug/L		113	75 - 125
Cadmium	<0.077		20.0	21.1		ug/L		105	75 - 125
Calcium	43		2.00	49.0	4	mg/L		275	75 - 125
Chromium	<0.98		40.0	39.8		ug/L		99	75 - 125
Cobalt	0.44	J	20.0	19.9		ug/L		97	75 - 125
Lead	<0.27		20.0	20.8		ug/L		104	75 - 125
Lithium	15		100	121		ug/L		105	75 - 125
Molybdenum	<1.1		40.0	42.7		ug/L		107	75 - 125
Selenium	3.1	J	40.0	44.9		ug/L		105	75 - 125
Thallium	<0.27		16.0	16.0		ug/L		100	75 - 125

Lab Sample ID: 310-152915-1 MSD
Matrix: Ground Water
Analysis Batch: 236802

Client Sample ID: MW 301
Prep Type: Total/NA
Prep Batch: 235260

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	<0.53		20.0	19.8		ug/L		99	75 - 125	5	20
Arsenic	<0.75		40.0	41.8		ug/L		105	75 - 125	5	20
Barium	25		40.0	65.8		ug/L		101	75 - 125	3	20
Beryllium	<0.27		20.0	20.0		ug/L		100	75 - 125	0	20
Boron	380		880	1320		ug/L		108	75 - 125	3	20
Cadmium	<0.077		20.0	20.2		ug/L		101	75 - 125	4	20
Calcium	43		2.00	47.7	4	mg/L		211	75 - 125	3	20
Chromium	<0.98		40.0	38.0		ug/L		95	75 - 125	5	20
Cobalt	0.44	J	20.0	18.9		ug/L		92	75 - 125	5	20
Lead	<0.27		20.0	19.9		ug/L		100	75 - 125	4	20
Lithium	15		100	117		ug/L		101	75 - 125	3	20
Molybdenum	<1.1		40.0	40.6		ug/L		101	75 - 125	5	20
Selenium	3.1	J	40.0	42.6		ug/L		99	75 - 125	5	20
Thallium	<0.27		16.0	15.4		ug/L		96	75 - 125	4	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-235150/1-A
Matrix: Water
Analysis Batch: 235380

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 235150

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		04/09/19 10:07	04/10/19 13:59	1

Lab Sample ID: LCS 310-235150/2-A
Matrix: Water
Analysis Batch: 235380

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 235150

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			1.67	1.85		ug/L		111	80 - 120		

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

Lab Sample ID: MB 310-235365/1
Matrix: Water
Analysis Batch: 235365

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	<30.0		30.0		mg/L			04/10/19 14:38	1

Lab Sample ID: LCS 310-235365/2
Matrix: Water
Analysis Batch: 235365

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	998.0		mg/L		100	90 - 110		

Lab Sample ID: 310-152915-6 DU
Matrix: Ground Water
Analysis Batch: 235365

Client Sample ID: MW 306
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Dissolved Solids	930			960.0		mg/L				3	24

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-235230/1
Matrix: Water
Analysis Batch: 235230

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

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

Lab Sample ID: 310-152915-5 DU
Matrix: Ground Water
Analysis Batch: 235230

Client Sample ID: MW 305
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH	7.0	HF		7.1		SU				0.4	20

HPLC/IC

Analysis Batch: 235649

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-152915-1	MW 301	Total/NA	Ground Water	9056A	
310-152915-2	MW 302	Total/NA	Ground Water	9056A	
310-152915-2	MW 302	Total/NA	Ground Water	9056A	
310-152915-3	MW 303	Total/NA	Ground Water	9056A	
310-152915-3	MW 303	Total/NA	Ground Water	9056A	
310-152915-4	MW 304	Total/NA	Ground Water	9056A	
310-152915-4	MW 304	Total/NA	Ground Water	9056A	
310-152915-5	MW 305	Total/NA	Ground Water	9056A	
310-152915-6	MW 306	Total/NA	Ground Water	9056A	
310-152915-6	MW 306	Total/NA	Ground Water	9056A	
310-152915-7	Field Blank	Total/NA	Ground Water	9056A	
MB 310-235649/3	Method Blank	Total/NA	Water	9056A	
LCS 310-235649/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 235150

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-152915-1	MW 301	Total/NA	Ground Water	7470A	
310-152915-2	MW 302	Total/NA	Ground Water	7470A	
310-152915-3	MW 303	Total/NA	Ground Water	7470A	
310-152915-4	MW 304	Total/NA	Ground Water	7470A	
310-152915-5	MW 305	Total/NA	Ground Water	7470A	
310-152915-6	MW 306	Total/NA	Ground Water	7470A	
310-152915-7	Field Blank	Total/NA	Ground Water	7470A	
MB 310-235150/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-235150/2-A	Lab Control Sample	Total/NA	Water	7470A	

Prep Batch: 235260

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-152915-1	MW 301	Total/NA	Ground Water	3010A	
310-152915-2	MW 302	Total/NA	Ground Water	3010A	
310-152915-3	MW 303	Total/NA	Ground Water	3010A	
310-152915-4	MW 304	Total/NA	Ground Water	3010A	
310-152915-5	MW 305	Total/NA	Ground Water	3010A	
310-152915-6	MW 306	Total/NA	Ground Water	3010A	
310-152915-7	Field Blank	Total/NA	Ground Water	3010A	
MB 310-235260/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-235260/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-152915-1 MS	MW 301	Total/NA	Ground Water	3010A	
310-152915-1 MSD	MW 301	Total/NA	Ground Water	3010A	

Analysis Batch: 235380

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-152915-1	MW 301	Total/NA	Ground Water	7470A	235150
310-152915-2	MW 302	Total/NA	Ground Water	7470A	235150
310-152915-3	MW 303	Total/NA	Ground Water	7470A	235150
310-152915-4	MW 304	Total/NA	Ground Water	7470A	235150
310-152915-5	MW 305	Total/NA	Ground Water	7470A	235150
310-152915-6	MW 306	Total/NA	Ground Water	7470A	235150
310-152915-7	Field Blank	Total/NA	Ground Water	7470A	235150

Metals (Continued)

Analysis Batch: 235380 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-235150/1-A	Method Blank	Total/NA	Water	7470A	235150
LCS 310-235150/2-A	Lab Control Sample	Total/NA	Water	7470A	235150

Analysis Batch: 236802

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-152915-1	MW 301	Total/NA	Ground Water	6020A	235260
310-152915-2	MW 302	Total/NA	Ground Water	6020A	235260
310-152915-3	MW 303	Total/NA	Ground Water	6020A	235260
310-152915-4	MW 304	Total/NA	Ground Water	6020A	235260
310-152915-5	MW 305	Total/NA	Ground Water	6020A	235260
310-152915-6	MW 306	Total/NA	Ground Water	6020A	235260
310-152915-7	Field Blank	Total/NA	Ground Water	6020A	235260
MB 310-235260/1-A	Method Blank	Total/NA	Water	6020A	235260
LCS 310-235260/2-A	Lab Control Sample	Total/NA	Water	6020A	235260
310-152915-1 MS	MW 301	Total/NA	Ground Water	6020A	235260
310-152915-1 MSD	MW 301	Total/NA	Ground Water	6020A	235260

General Chemistry

Analysis Batch: 235230

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-152915-1	MW 301	Total/NA	Ground Water	SM 4500 H+ B	
310-152915-2	MW 302	Total/NA	Ground Water	SM 4500 H+ B	
310-152915-3	MW 303	Total/NA	Ground Water	SM 4500 H+ B	
310-152915-4	MW 304	Total/NA	Ground Water	SM 4500 H+ B	
310-152915-5	MW 305	Total/NA	Ground Water	SM 4500 H+ B	
310-152915-6	MW 306	Total/NA	Ground Water	SM 4500 H+ B	
310-152915-7	Field Blank	Total/NA	Ground Water	SM 4500 H+ B	
LCS 310-235230/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-152915-5 DU	MW 305	Total/NA	Ground Water	SM 4500 H+ B	

Analysis Batch: 235365

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-152915-1	MW 301	Total/NA	Ground Water	SM 2540C	
310-152915-2	MW 302	Total/NA	Ground Water	SM 2540C	
310-152915-3	MW 303	Total/NA	Ground Water	SM 2540C	
310-152915-4	MW 304	Total/NA	Ground Water	SM 2540C	
310-152915-5	MW 305	Total/NA	Ground Water	SM 2540C	
310-152915-6	MW 306	Total/NA	Ground Water	SM 2540C	
310-152915-7	Field Blank	Total/NA	Ground Water	SM 2540C	
MB 310-235365/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-235365/2	Lab Control Sample	Total/NA	Water	SM 2540C	
310-152915-6 DU	MW 306	Total/NA	Ground Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 236698

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-152915-1	MW 301	Total/NA	Ground Water	Field Sampling	
310-152915-2	MW 302	Total/NA	Ground Water	Field Sampling	
310-152915-3	MW 303	Total/NA	Ground Water	Field Sampling	
310-152915-4	MW 304	Total/NA	Ground Water	Field Sampling	

Field Service / Mobile Lab (Continued)

Analysis Batch: 236698 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-152915-5	MW 305	Total/NA	Ground Water	Field Sampling	
310-152915-6	MW 306	Total/NA	Ground Water	Field Sampling	

Lab Chronicle

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

Job ID: 310-152915-1
SDG: 25219072

Client Sample ID: MW 301
Date Collected: 04/08/19 09:32
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-1
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	235649	04/10/19 19:13	MLU	TAL CF
Total/NA	Prep	3010A			235260	04/10/19 08:11	HED	TAL CF
Total/NA	Analysis	6020A		1	236802	04/22/19 21:44	SAD	TAL CF
Total/NA	Prep	7470A			235150	04/09/19 10:07	JNR	TAL CF
Total/NA	Analysis	7470A		1	235380	04/10/19 14:28	JNR	TAL CF
Total/NA	Analysis	SM 2540C		1	235365	04/10/19 14:38	MDK	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	235230	04/09/19 23:56	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	236698	04/08/19 09:32	ANO	TAL CF

Client Sample ID: MW 302
Date Collected: 04/08/19 10:36
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-2
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	235649	04/10/19 19:28	MLU	TAL CF
Total/NA	Analysis	9056A		50	235649	04/11/19 10:13	MLU	TAL CF
Total/NA	Prep	3010A			235260	04/10/19 08:11	HED	TAL CF
Total/NA	Analysis	6020A		1	236802	04/22/19 22:11	SAD	TAL CF
Total/NA	Prep	7470A			235150	04/09/19 10:07	JNR	TAL CF
Total/NA	Analysis	7470A		1	235380	04/10/19 14:30	JNR	TAL CF
Total/NA	Analysis	SM 2540C		1	235365	04/10/19 14:38	MDK	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	235230	04/09/19 23:59	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	236698	04/08/19 10:36	ANO	TAL CF

Client Sample ID: MW 303
Date Collected: 04/08/19 11:41
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-3
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	235649	04/10/19 19:44	MLU	TAL CF
Total/NA	Analysis	9056A		20	235649	04/11/19 10:30	MLU	TAL CF
Total/NA	Prep	3010A			235260	04/10/19 08:11	HED	TAL CF
Total/NA	Analysis	6020A		1	236802	04/22/19 22:15	SAD	TAL CF
Total/NA	Prep	7470A			235150	04/09/19 13:18	JNR	TAL CF
Total/NA	Analysis	7470A		1	235380	04/10/19 14:37	JNR	TAL CF
Total/NA	Analysis	SM 2540C		1	235365	04/10/19 14:38	MDK	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	235230	04/10/19 00:04	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	236698	04/08/19 11:41	ANO	TAL CF

Lab Chronicle

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

Job ID: 310-152915-1
SDG: 25219072

Client Sample ID: MW 304

Date Collected: 04/08/19 12:53
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-4

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	235649	04/10/19 20:00	MLU	TAL CF
Total/NA	Analysis	9056A		20	235649	04/11/19 10:49	MLU	TAL CF
Total/NA	Prep	3010A			235260	04/10/19 08:11	HED	TAL CF
Total/NA	Analysis	6020A		1	236802	04/22/19 22:18	SAD	TAL CF
Total/NA	Prep	7470A			235150	04/09/19 13:18	JNR	TAL CF
Total/NA	Analysis	7470A		1	235380	04/10/19 14:39	JNR	TAL CF
Total/NA	Analysis	SM 2540C		1	235365	04/10/19 14:38	MDK	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	235230	04/10/19 00:06	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	236698	04/08/19 12:53	ANO	TAL CF

Client Sample ID: MW 305

Date Collected: 04/08/19 13:39
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-5

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	235649	04/10/19 20:15	MLU	TAL CF
Total/NA	Prep	3010A			235260	04/10/19 08:11	HED	TAL CF
Total/NA	Analysis	6020A		1	236802	04/22/19 22:21	SAD	TAL CF
Total/NA	Prep	7470A			235150	04/09/19 13:18	JNR	TAL CF
Total/NA	Analysis	7470A		1	235380	04/10/19 14:41	JNR	TAL CF
Total/NA	Analysis	SM 2540C		1	235365	04/10/19 14:38	MDK	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	235230	04/10/19 00:14	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	236698	04/08/19 13:39	ANO	TAL CF

Client Sample ID: MW 306

Date Collected: 04/08/19 14:25
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-6

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	235649	04/10/19 20:31	MLU	TAL CF
Total/NA	Analysis	9056A		10	235649	04/11/19 11:04	MLU	TAL CF
Total/NA	Prep	3010A			235260	04/10/19 08:11	HED	TAL CF
Total/NA	Analysis	6020A		1	236802	04/22/19 22:25	SAD	TAL CF
Total/NA	Prep	7470A			235150	04/09/19 13:18	JNR	TAL CF
Total/NA	Analysis	7470A		1	235380	04/10/19 14:43	JNR	TAL CF
Total/NA	Analysis	SM 2540C		1	235365	04/10/19 14:38	MDK	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	235230	04/10/19 00:18	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	236698	04/08/19 14:25	ANO	TAL CF

Lab Chronicle

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

Job ID: 310-152915-1
SDG: 25219072

Client Sample ID: Field Blank

Date Collected: 04/08/19 14:30
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-7

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1	235649	04/10/19 20:46	MLU	TAL CF
Total/NA	Prep	3010A			235260	04/10/19 08:11	HED	TAL CF
Total/NA	Analysis	6020A		1	236802	04/22/19 22:28	SAD	TAL CF
Total/NA	Prep	7470A			235150	04/09/19 13:18	JNR	TAL CF
Total/NA	Analysis	7470A		1	235380	04/10/19 14:45	JNR	TAL CF
Total/NA	Analysis	SM 2540C		1	235365	04/10/19 14:38	MDK	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	235230	04/10/19 00:21	JMH	TAL CF

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Job ID: 310-152915-1
Project/Site: IPL Ottumwa Generating Station 25219072
SDG: 25219072

Laboratory: Eurofins TestAmerica, Cedar Falls

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Iowa	State Program	7	007	12-01-19

Method Summary

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

Job ID: 310-152915-1
SDG: 25219072

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

Fredrick, Sandie

From: Blodgett, Meghan <mblodgett@scsengineers.com>
Sent: Wednesday, April 10, 2019 9:01 AM
To: Fredrick, Sandie
Cc: Schemmel, Nick; Karwoski, Thomas; Kron, Nicole
Subject: RE: TestAmerica Sample Login Confirmation files from 310-152915 IPL Ottumwa Generating Station 25219072

-External Email-

Sandie,

A couple changes on this one:

-For reporting, please split MW-301 through MW-306 plus the field blank onto one report, and MW-307 through MW-309 on a second report.
-We do not need all the listed metals for MW-307 through MW-309. The only metals needed for those three wells are boron and calcium (full parameter list for these three is boron, calcium, chloride, fluoride, sulfate, TDS, and pH).

-Meg

Meghan Blodgett
608.216.7362 (o)
608.345.9221 (m)

From: Sandie Fredrick <sandie.fredrick@testamericainc.com>
Sent: Tuesday, April 9, 2019 9:21 PM
To: Blodgett, Meghan <mblodgett@scsengineers.com>; Schemmel, Nick <NSchemmel@scsengineers.com>; Karwoski, Thomas <TKarwoski@scsengineers.com>
Subject: TestAmerica Sample Login Confirmation files from 310-152915 IPL Ottumwa Generating Station 25219072

Hello Everyone,

Please send over field data when you can.
Thanks,
Sandie

Attached, please find the Sample Confirmation files for job 310-152915; IPL Ottumwa Generating Station 25219072

Please feel free to contact me if you have any questions.

Thank you.

Sandie Fredrick
Project Manager

TestAmerica Laboratories, Inc.
Phone: 920-261-1660

E-mail: sandie.fredrick@testamericainc.com
www.eurofinsus.com | www.testamericainc.com

Reference: [310-351154]
Attachments: 5

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

310-152915 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS Engineers

City/State: CITY Clive | STATE IA | Project: IPL - Ottumwa Generating Station

Receipt Information

Date/Time Received: DATE 4-9-19 | TIME ~~15~~ 1715 4-9 LAB | Received By: LAB

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

Condition of Cooler/Containers

Sample(s) received in Cooler?	☒ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☒ Yes	☐ No	*If yes:* Cooler # 1 of 2
Cooler Custody Seals Present?	☒ Yes	☐ No	*If yes:* Cooler custody seals intact? ☒ Yes ☐ No
Sample Custody Seals Present?	☐ Yes	☒ No	*If yes:* Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?	☐ Yes	☒ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record

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

Thermometer ID: N | Correction Factor (°C): +0.0

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

Uncorrected Temp (°C): 0.1 | Corrected Temp (°C): 0.1

• **Sample Container Temperature**

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

Exceptions Noted

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

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

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

Additional Comments

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Place COC scanning label here
214

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS Engineers

City/State: CITY Clive STATE IA

Project: IPL - Ottumwa Generating Station

Receipt Information

Date/Time Received: DATE 4-9-19 TIME ~~15~~ 1715 4-9 LAB

Received By: LAB

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

Condition of Cooler/Containers

Sample(s) received in Cooler?	☒ Yes ☐ No	*If yes:* Cooler ID:	
Multiple Coolers?	☒ Yes ☐ No	*If yes:* Cooler # 2 of 2	
Cooler Custody Seals Present?	☒ Yes ☐ No	*If yes:* Cooler custody seals intact?	☒ Yes ☐ No
Sample Custody Seals Present?	☐ Yes ☒ No	*If yes:* Sample custody seals intact?	☐ Yes ☐ No
Trip Blank Present?	☐ Yes ☒ No	*If yes:* Which VOA samples are in cooler? ↓	

Temperature Record

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

Thermometer ID: N

Correction Factor (°C): +0.0

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

Uncorrected Temp (°C): 0.8

Corrected Temp (°C): 0.8

• **Sample Container Temperature**

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

Exceptions Noted

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

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

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

Additional Comments

38727

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Cedar Falls Division
704 Enterprise Drive
Cedar Falls, IA 50613

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

TestAmerica Des Moines SC
214

To assist us in using the proper analytical methods, is this work being conducted for regulatory purposes?
Compliance Monitoring ____

Client Name: SCS Engineers
Client #: ____
Address: 8450 Hedman Rd Suite 20
City/State/Zip Code: Clive IA 50325
Project Manager: Tom Karwoski
Email Address: ____
Telephone Number: 608-509-~~582~~ 8245
Fax: ____
Sampler Name: (Print Name) Nick Schemmel
Sampler Signature: [signature]

Project Name: IPL - Ottumwa Generating Station
Project #: 7521907Z
Site/Location ID: Ottumwa
State: IA
Report To: ____
Invoice To: ____
Quote #: ____
PO#: ____

TAT
___ Standard
___ Rush (surcharges may apply)
Date Needed: ____
Fax Results: Y N
Email Results: Y N

QC Deliverables
___ None
___ Level 2 (Batch QC)
___ Level 3
___ Level 4
Other: ____

SAMPLE ID	Date Sampled	Time Sampled	G = Grab, C = Composite	Field Filtered	Matrix: SL - Sludge, DW - Drinking Water, GW - Groundwater, S - Soil/Solid, WW - Wastewater, Specify, Other	Preservation & # of Containers: HNO_3	HCl	NaOH	H_2SO_4	Methanol	None	Other (Specify)	Analyze For: Metals	pH	TDS	Chloride/Fluoride/SO4	Radium 226 + 228	REMARKS
MW 301	4.8.19	0932	G		GW	3					1		x	x	x	x	x	
MW 302		1036				3					1		x	x	x	x	x	
MW 303		1141				3					1		x	x	x	x	x	
MW 304		1253				3					1		x	x	x	x	x	
MW 305		1339				3					1		x	x	x	x	x	
MW 306		1425				3					1		x	x	x	x	x	
Field Blank		1430				3					1		x	x	x	x	x	

Special Instructions:

LABORATORY COMMENTS:

Relinquished By: Nick Schemmel	Date: 4-9-19	Time: 1000	Received By: Lindsay Binder	Date: 4-9-19	Time: 1715
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAL-0033 (0708)

Page ____ of ____

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
MW 301	310-152915-A-1	Plastic 250ml - with Nitric Acid	<2		
MW 301	310-152915-C-1	Plastic 1 liter - Nitric Acid	<2		
MW 301	310-152915-D-1	Plastic 1 liter - Nitric Acid	<2		
MW 302	310-152915-A-2	Plastic 250ml - with Nitric Acid	<2		
MW 302	310-152915-C-2	Plastic 1 liter - Nitric Acid	<2		
MW 302	310-152915-D-2	Plastic 1 liter - Nitric Acid	<2		
MW 303	310-152915-A-3	Plastic 250ml - with Nitric Acid	<2		
MW 303	310-152915-C-3	Plastic 1 liter - Nitric Acid	<2		
MW 303	310-152915-D-3	Plastic 1 liter - Nitric Acid	<2		
MW 304	310-152915-A-4	Plastic 250ml - with Nitric Acid	<2		
MW 304	310-152915-C-4	Plastic 1 liter - Nitric Acid	<2		
MW 304	310-152915-D-4	Plastic 1 liter - Nitric Acid	<2		
MW 305	310-152915-A-5	Plastic 250ml - with Nitric Acid	<2		
MW 305	310-152915-C-5	Plastic 1 liter - Nitric Acid	<2		
MW 305	310-152915-D-5	Plastic 1 liter - Nitric Acid	<2		
MW 306	310-152915-A-6	Plastic 250ml - with Nitric Acid	<2		
MW 306	310-152915-C-6	Plastic 1 liter - Nitric Acid	<2		
MW 306	310-152915-D-6	Plastic 1 liter - Nitric Acid	<2		
Field Blank	310-152915-A-7	Plastic 250ml - with Nitric Acid	<2		
Field Blank	310-152915-C-7	Plastic 1 liter - Nitric Acid	<2		
Field Blank	310-152915-D-7	Plastic 1 liter - Nitric Acid	<2		
MW 307	310-152915-A-8	Plastic 250ml - with Nitric Acid	<2		
MW 308	310-152915-A-9	Plastic 250ml - with Nitric Acid	<2		
MW 309	310-152915-A-10	Plastic 250ml - with Nitric Acid	<2		

Table 2. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station / SCS Engineers Project No. 25219072
April 2019

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	4-8-2019/0932	682.69	7.27	6.61	8.32	501	37.6	1.87
MW-302	4-8-2019/1036	657.23	12.27	6.61	0.86	2159	68.3	26.9
MW-303	4-8-2019/1141	655.55	8.51	7.00	2.29	1181	51.7	3.49
MW-304	4-8-2019/1253	659.33	13.75	7.17	0.41	1876	-58.3	57.9
MW-305	4-8-2019/1339	664.01	13.8	7.06	0.59	1728	32.6	21.7
MW-306	4-8-2019/1425	670.96	13.63	6.66	0.92	1350	49.1	28.5

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

Notes:
none

Created by: KAK Date: 5/1/2017
Last revision by: JR Date: 4/12/2019
Checked by: MDB Date: 4/12/2019

\\Mad-fs01\data\Projects\25219072.00\Data and Calculations\Tables\[OGS_CCR_Field_2019_April.xlsx]GW Field Parameters

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-152915-1
SDG Number: 25219072

Login Number: 152915
List Number: 1
Creator: Bindert, Lindsay A

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.	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	

Tracer/Carrier Summary

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

Job ID: 310-152915-1
SDG: 25219072

Method: 903.0 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)
310-152915-1	MW 301	93.5
310-152915-2	MW 302	95.8
310-152915-3	MW 303	87.9
310-152915-4	MW 304	87.3
310-152915-5	MW 305	91.0
310-152915-6	MW 306	87.9
310-152915-7	Field Blank	99.4

Tracer/Carrier Legend

Ba Carrier = Ba Carrier

Method: 903.0 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)
LCS 160-425538/1-A	Lab Control Sample	99.7
LCSD 160-425538/2-A	Lab Control Sample Dup	98.9
MB 160-425538/23-A	Method Blank	96.0

Tracer/Carrier Legend

Ba Carrier = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Y Carrier (40-110)
310-152915-1	MW 301	93.5	93.1
310-152915-2	MW 302	95.8	86.4
310-152915-3	MW 303	87.9	89.7
310-152915-4	MW 304	87.3	94.2
310-152915-5	MW 305	91.0	95.3
310-152915-6	MW 306	87.9	96.1
310-152915-7	Field Blank	99.4	95.3

Tracer/Carrier Legend

Ba Carrier = Ba Carrier
Y Carrier = Y Carrier

Method: 904.0 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Y Carrier (40-110)
LCS 160-425541/1-A	Lab Control Sample	99.7	95.3
LCSD 160-425541/2-A	Lab Control Sample Dup	98.9	83.7
MB 160-425541/23-A	Method Blank	96.0	93.5

Tracer/Carrier Legend

Tracer/Carrier Summary

Client: SCS Engineers
Job ID: 310-152915-1
Project/Site: IPL Ottumwa Generating Station 25219072
SDG: 25219072

Ba Carrier = Ba Carrier

Y Carrier = Y Carrier

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

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

Laboratory Job ID: 310-152915-2
Laboratory Sample Delivery Group: 25219072
Client Project/Site: IPL Ottumwa Generating Station 25219072

For:
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett

Sandie Fredrick

Authorized for release by:
7/11/2019 9:30:07 AM

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

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

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

Table of Contents

Job ID: 310-152915-2

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative
310-152915-2

Comments
No additional comments.

Receipt
The samples were received on 4/9/2019 5:15 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 0.1° C and 0.8° C.

RAD
Method(s) 903.0, 9315: Ra-226 Prep Batch 160-425538
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 (310-152915-1), MW 302 (310-152915-2), MW 303 (310-152915-3), MW 304 (310-152915-4), MW 305 (310-152915-5), MW 306 (310-152915-6), Field Blank (310-152915-7), (LCS 160-425538/1-A), (LCSD 160-425538/2-A) and (MB 160-425538/23-A)

Method(s) 904.0, 9320: Ra-228 Prep Batch 160-425541
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 (310-152915-1), MW 302 (310-152915-2), MW 303 (310-152915-3), MW 304 (310-152915-4), MW 305 (310-152915-5), MW 306 (310-152915-6), Field Blank (310-152915-7), (LCS 160-425541/1-A), (LCSD 160-425541/2-A) and (MB 160-425541/23-A)

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

Sample Summary

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

Job ID: 310-152915-2
SDG: 25219072

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-152915-1	MW 301	Ground Water	04/08/19 09:32	04/09/19 17:15	
310-152915-2	MW 302	Ground Water	04/08/19 10:36	04/09/19 17:15	
310-152915-3	MW 303	Ground Water	04/08/19 11:41	04/09/19 17:15	
310-152915-4	MW 304	Ground Water	04/08/19 12:53	04/09/19 17:15	
310-152915-5	MW 305	Ground Water	04/08/19 13:39	04/09/19 17:15	
310-152915-6	MW 306	Ground Water	04/08/19 14:25	04/09/19 17:15	
310-152915-7	Field Blank	Ground Water	04/08/19 14:30	04/09/19 17:15	

Detection Summary

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

Job ID: 310-152915-2
SDG: 25219072

Client Sample ID: MW 301 — Lab Sample ID: 310-152915-1

No Detections.

Client Sample ID: MW 302 — Lab Sample ID: 310-152915-2

No Detections.

Client Sample ID: MW 303 — Lab Sample ID: 310-152915-3

No Detections.

Client Sample ID: MW 304 — Lab Sample ID: 310-152915-4

No Detections.

Client Sample ID: MW 305 — Lab Sample ID: 310-152915-5

No Detections.

Client Sample ID: MW 306 — Lab Sample ID: 310-152915-6

No Detections.

Client Sample ID: Field Blank — Lab Sample ID: 310-152915-7

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample Results

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

Job ID: 310-152915-2
SDG: 25219072

Client Sample ID: MW 301
Date Collected: 04/08/19 09:32
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-1
Matrix: Ground Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0726	U	0.0694	0.0697	1.00	0.104	pCi/L	04/25/19 15:16	05/20/19 10:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*93.5*		*40 - 110*	*04/25/19 15:16*	*05/20/19 10:45*	*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	0.0230	U	0.243	0.243	1.00	0.435	pCi/L	04/25/19 15:58	05/13/19 11:49	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*93.5*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:49*	*1*
Y Carrier	*93.1*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:49*	*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	0.0956	U	0.253	0.253	5.00	0.435	pCi/L		05/30/19 09:15	1

Client Sample Results

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

Job ID: 310-152915-2
SDG: 25219072

Client Sample ID: MW 302
Date Collected: 04/08/19 10:36
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-2
Matrix: Ground Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.116		0.0759	0.0766	1.00	0.0952	pCi/L	04/25/19 15:16	05/20/19 10:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*95.8*		*40 - 110*	*04/25/19 15:16*	*05/20/19 10:45*	*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	-0.0591	U	0.321	0.321	1.00	0.576	pCi/L	04/25/19 15:58	05/13/19 11:49	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*95.8*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:49*	*1*
Y Carrier	*86.4*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:49*	*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	0.116	U	0.330	0.330	5.00	0.576	pCi/L		05/30/19 09:15	1

Client Sample Results

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

Job ID: 310-152915-2
SDG: 25219072

Client Sample ID: MW 303

Date Collected: 04/08/19 11:41
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-3

Matrix: Ground Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.172		0.0857	0.0871	1.00	0.0897	pCi/L	04/25/19 15:16	05/20/19 10:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*87.9*		*40 - 110*	*04/25/19 15:16*	*05/20/19 10:45*	*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	0.220	U	0.312	0.313	1.00	0.522	pCi/L	04/25/19 15:58	05/13/19 11:49	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*87.9*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:49*	*1*
Y Carrier	*89.7*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:49*	*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	0.391	U	0.324	0.325	5.00	0.522	pCi/L		05/30/19 09:15	1

Client Sample Results

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

Job ID: 310-152915-2
SDG: 25219072

Client Sample ID: MW 304

Date Collected: 04/08/19 12:53
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-4

Matrix: Ground Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.23		0.209	0.237	1.00	0.0952	pCi/L	04/25/19 15:16	05/20/19 10:45	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*87.3*		*40 - 110*	*04/25/19 15:16*	*05/20/19 10:45*	*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	1.19		0.376	0.391	1.00	0.494	pCi/L	04/25/19 15:58	05/13/19 11:49	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*87.3*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:49*	*1*
Y Carrier	*94.2*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:49*	*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	2.42		0.430	0.457	5.00	0.494	pCi/L		05/30/19 09:15	1

Client Sample Results

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

Job ID: 310-152915-2
SDG: 25219072

Client Sample ID: MW 305

Date Collected: 04/08/19 13:39
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-5

Matrix: Ground Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**0.339**		0.114	0.118	1.00	0.103	pCi/L	04/25/19 15:16	05/20/19 18:37	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*91.0*		*40 - 110*	*04/25/19 15:16*	*05/20/19 18:37*	*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	0.347	U	0.266	0.268	1.00	0.417	pCi/L	04/25/19 15:58	05/13/19 11:50	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*91.0*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:50*	*1*
Y Carrier	*95.3*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:50*	*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	**0.685**		0.289	0.293	5.00	0.417	pCi/L		05/30/19 09:15	1

Client Sample Results

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

Job ID: 310-152915-2
SDG: 25219072

Client Sample ID: MW 306

Date Collected: 04/08/19 14:25
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-6

Matrix: Ground Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0529	U	0.0713	0.0714	1.00	0.120	pCi/L	04/25/19 15:16	05/20/19 18:37	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*87.9*		*40 - 110*	*04/25/19 15:16*	*05/20/19 18:37*	*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	0.102	U	0.301	0.302	1.00	0.520	pCi/L	04/25/19 15:58	05/13/19 11:50	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*87.9*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:50*	*1*
Y Carrier	*96.1*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:50*	*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	0.155	U	0.309	0.310	5.00	0.520	pCi/L		05/30/19 09:15	1

Client Sample Results

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

Job ID: 310-152915-2
SDG: 25219072

Client Sample ID: Field Blank

Date Collected: 04/08/19 14:30
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-7

Matrix: Ground Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.0169	U	0.0506	0.0507	1.00	0.0968	pCi/L	04/25/19 15:16	05/20/19 18:37	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*99.4*		*40 - 110*	*04/25/19 15:16*	*05/20/19 18:37*	*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	0.0163	U	0.226	0.226	1.00	0.404	pCi/L	04/25/19 15:58	05/13/19 11:50	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*99.4*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:50*	*1*
Y Carrier	*95.3*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:50*	*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	0.0332	U	0.232	0.232	5.00	0.404	pCi/L		05/30/19 09:15	1

Definitions/Glossary

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

Job ID: 310-152915-2
SDG: 25219072

Qualifiers

Rad

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

Glossary

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

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-425538/23-A
Matrix: Water
Analysis Batch: 429093

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 425538

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.07851	U	0.0617	0.0621	1.00	0.0866	pCi/L	04/25/19 15:16	05/20/19 20:01	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*96.0*		*40 - 110*	*04/25/19 15:16*	*05/20/19 20:01*	*1*

Lab Sample ID: LCS 160-425538/1-A
Matrix: Water
Analysis Batch: 429839

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 425538

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-226			11.4	8.599		0.903	1.00	0.0811	pCi/L	76	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*99.7*		*40 - 110*

Lab Sample ID: LCSD 160-425538/2-A
Matrix: Water
Analysis Batch: 429095

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 425538

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-226			11.4	8.867		0.947	1.00	0.0808	pCi/L	78	75 - 125	0.14	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*98.9*		*40 - 110*

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-425541/23-A
Matrix: Water
Analysis Batch: 428064

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 425541

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.08722	U	0.244	0.244	1.00	0.424	pCi/L	04/25/19 15:58	05/13/19 11:51	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*96.0*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:51*	*1*
Y Carrier	*93.5*		*40 - 110*	*04/25/19 15:58*	*05/13/19 11:51*	*1*

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

Lab Sample ID: LCS 160-425541/1-A
Matrix: Water
Analysis Batch: 428064

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 425541

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-228			9.21	8.180		0.997	1.00	0.405	pCi/L	89	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*99.7*		*40 - 110*
Y Carrier	*95.3*		*40 - 110*

Lab Sample ID: LCSD 160-425541/2-A
Matrix: Water
Analysis Batch: 428064

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 425541

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228			9.21	9.446		1.15	1.00	0.473	pCi/L	103	75 - 125	0.59	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*98.9*		*40 - 110*
Y Carrier	*83.7*		*40 - 110*

QC Association Summary

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

Job ID: 310-152915-2
SDG: 25219072

Rad

Prep Batch: 425538

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-152915-1	MW 301	Total/NA	Ground Water	PrecSep-21	
310-152915-2	MW 302	Total/NA	Ground Water	PrecSep-21	
310-152915-3	MW 303	Total/NA	Ground Water	PrecSep-21	
310-152915-4	MW 304	Total/NA	Ground Water	PrecSep-21	
310-152915-5	MW 305	Total/NA	Ground Water	PrecSep-21	
310-152915-6	MW 306	Total/NA	Ground Water	PrecSep-21	
310-152915-7	Field Blank	Total/NA	Ground Water	PrecSep-21	
MB 160-425538/23-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-425538/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-425538/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 425541

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-152915-1	MW 301	Total/NA	Ground Water	PrecSep_0	
310-152915-2	MW 302	Total/NA	Ground Water	PrecSep_0	
310-152915-3	MW 303	Total/NA	Ground Water	PrecSep_0	
310-152915-4	MW 304	Total/NA	Ground Water	PrecSep_0	
310-152915-5	MW 305	Total/NA	Ground Water	PrecSep_0	
310-152915-6	MW 306	Total/NA	Ground Water	PrecSep_0	
310-152915-7	Field Blank	Total/NA	Ground Water	PrecSep_0	
MB 160-425541/23-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-425541/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-425541/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

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

Job ID: 310-152915-2
SDG: 25219072

Client Sample ID: MW 301
Date Collected: 04/08/19 09:32
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-1
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			425538	04/25/19 15:16		TAL SL
Total/NA	Analysis	903.0		1	429095	05/20/19 10:45	CDR	TAL SL
Total/NA	Prep	PrecSep_0			425541	04/25/19 15:58		TAL SL
Total/NA	Analysis	904.0		1	428064	05/13/19 11:49	BLH	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	430224	05/30/19 09:15	SMP	TAL SL

Client Sample ID: MW 302
Date Collected: 04/08/19 10:36
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-2
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			425538	04/25/19 15:16		TAL SL
Total/NA	Analysis	903.0		1	429095	05/20/19 10:45	CDR	TAL SL
Total/NA	Prep	PrecSep_0			425541	04/25/19 15:58		TAL SL
Total/NA	Analysis	904.0		1	428064	05/13/19 11:49	BLH	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	430224	05/30/19 09:15	SMP	TAL SL

Client Sample ID: MW 303
Date Collected: 04/08/19 11:41
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-3
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			425538	04/25/19 15:16		TAL SL
Total/NA	Analysis	903.0		1	429095	05/20/19 10:45	CDR	TAL SL
Total/NA	Prep	PrecSep_0			425541	04/25/19 15:58		TAL SL
Total/NA	Analysis	904.0		1	428064	05/13/19 11:49	BLH	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	430224	05/30/19 09:15	SMP	TAL SL

Client Sample ID: MW 304
Date Collected: 04/08/19 12:53
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-4
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			425538	04/25/19 15:16		TAL SL
Total/NA	Analysis	903.0		1	429095	05/20/19 10:45	CDR	TAL SL
Total/NA	Prep	PrecSep_0			425541	04/25/19 15:58		TAL SL
Total/NA	Analysis	904.0		1	428064	05/13/19 11:49	BLH	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	430224	05/30/19 09:15	SMP	TAL SL

Lab Chronicle

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

Job ID: 310-152915-2
SDG: 25219072

Client Sample ID: MW 305

Date Collected: 04/08/19 13:39
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-5

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			425538	04/25/19 15:16		TAL SL
Total/NA	Analysis	903.0		1	429092	05/20/19 18:37	CDR	TAL SL
Total/NA	Prep	PrecSep_0			425541	04/25/19 15:58		TAL SL
Total/NA	Analysis	904.0		1	428064	05/13/19 11:50	BLH	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	430224	05/30/19 09:15	SMP	TAL SL

Client Sample ID: MW 306

Date Collected: 04/08/19 14:25
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-6

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			425538	04/25/19 15:16		TAL SL
Total/NA	Analysis	903.0		1	429092	05/20/19 18:37	CDR	TAL SL
Total/NA	Prep	PrecSep_0			425541	04/25/19 15:58		TAL SL
Total/NA	Analysis	904.0		1	428064	05/13/19 11:50	BLH	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	430224	05/30/19 09:15	SMP	TAL SL

Client Sample ID: Field Blank

Date Collected: 04/08/19 14:30
Date Received: 04/09/19 17:15

Lab Sample ID: 310-152915-7

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			425538	04/25/19 15:16		TAL SL
Total/NA	Analysis	903.0		1	429092	05/20/19 18:37	CDR	TAL SL
Total/NA	Prep	PrecSep_0			425541	04/25/19 15:58		TAL SL
Total/NA	Analysis	904.0		1	428064	05/13/19 11:50	BLH	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	430224	05/30/19 09:15	SMP	TAL SL

Laboratory References:

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

Accreditation/Certification Summary

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

Job ID: 310-152915-2
SDG: 25219072

Laboratory: Eurofins TestAmerica, Cedar Falls

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Iowa	State Program	7	007	12-01-19

Laboratory: Eurofins TestAmerica, St. Louis

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Iowa	State Program	7	373	12-01-20

Method Summary

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

Job ID: 310-152915-2
SDG: 25219072

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

Fredrick, Sandie

From: Blodgett, Meghan <mblodgett@scsengineers.com>
Sent: Wednesday, April 10, 2019 9:01 AM
To: Fredrick, Sandie
Cc: Schemmel, Nick; Karwoski, Thomas; Kron, Nicole
Subject: RE: TestAmerica Sample Login Confirmation files from 310-152915 IPL Ottumwa Generating Station 25219072

-External Email-

Sandie,

A couple changes on this one:

-For reporting, please split MW-301 through MW-306 plus the field blank onto one report, and MW-307 through MW-309 on a second report.
-We do not need all the listed metals for MW-307 through MW-309. The only metals needed for those three wells are boron and calcium (full parameter list for these three is boron, calcium, chloride, fluoride, sulfate, TDS, and pH).

-Meg

Meghan Blodgett
608.216.7362 (o)
608.345.9221 (m)

From: Sandie Fredrick <sandie.fredrick@testamericainc.com>
Sent: Tuesday, April 9, 2019 9:21 PM
To: Blodgett, Meghan <mblodgett@scsengineers.com>; Schemmel, Nick <NSchemmel@scsengineers.com>; Karwoski, Thomas <TKarwoski@scsengineers.com>
Subject: TestAmerica Sample Login Confirmation files from 310-152915 IPL Ottumwa Generating Station 25219072

Hello Everyone,

Please send over field data when you can.
Thanks,
Sandie

Attached, please find the Sample Confirmation files for job 310-152915; IPL Ottumwa Generating Station 25219072

Please feel free to contact me if you have any questions.

Thank you.

Sandie Fredrick
Project Manager

TestAmerica Laboratories, Inc.
Phone: 920-261-1660

E-mail: sandie.fredrick@testamericainc.com
www.eurofinsus.com | www.testamericainc.com

Reference: [310-351154]
Attachments: 5

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

310-152915 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS Engineers

City/State: CITY Clive STATE IA | Project: IPL - Ottumwa Generating Station

Receipt Information

Date/Time Received: DATE 4-9-19 TIME ~~15~~ 1715 4-9 LAB | Received By: LAB

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

Condition of Cooler/Containers

Sample(s) received in Cooler?	☒ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☒ Yes	☐ No	*If yes:* Cooler # 1 of 2
Cooler Custody Seals Present?	☒ Yes	☐ No	*If yes:* Cooler custody seals intact? ☒ Yes ☐ No
Sample Custody Seals Present?	☐ Yes	☒ No	*If yes:* Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?	☐ Yes	☒ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record

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

Thermometer ID: N | Correction Factor (°C): +0.0

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

Uncorrected Temp (°C): 0.1 | Corrected Temp (°C): 0.1

• **Sample Container Temperature**

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

Exceptions Noted

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

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

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

Additional Comments

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Place COC scanning label here
214

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS Engineers

City/State: CITY Clive STATE IA

Project: IPL - Ottumwa Generating Station

Receipt Information

Date/Time Received: DATE 4-9-19 TIME ~~15~~ 1715 4-9 LAB

Received By: LAB

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

Condition of Cooler/Containers

Sample(s) received in Cooler?	☒ Yes ☐ No	*If yes:* Cooler ID:	
Multiple Coolers?	☒ Yes ☐ No	*If yes:* Cooler # 2 of 2	
Cooler Custody Seals Present?	☒ Yes ☐ No	*If yes:* Cooler custody seals intact?	☒ Yes ☐ No
Sample Custody Seals Present?	☐ Yes ☒ No	*If yes:* Sample custody seals intact?	☐ Yes ☐ No
Trip Blank Present?	☐ Yes ☒ No	*If yes:* Which VOA samples are in cooler? ↓	

Temperature Record

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

Thermometer ID: N

Correction Factor (°C): +0.0

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

Uncorrected Temp (°C): 0.8

Corrected Temp (°C): 0.8

• **Sample Container Temperature**

Container type(s) used: CONTAINER 1 | CONTAINER 2

Uncorrected Temp (°C):	TEMP 1	TEMP 2	Corrected Temp (°C):	TEMP 1	TEMP 2

Exceptions Noted

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

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

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

Additional Comments

38727

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Cedar Falls Division
704 Enterprise Drive
Cedar Falls, IA 50613

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

TestAmerica Des Moines SC
214

To assist us in using the proper analytical methods, is this work being conducted for regulatory purposes?
Compliance Monitoring ____

Client Name: SCS Engineers
Client #: ____
Address: 8450 Hedman Rd Suite 20
City/State/Zip Code: Clive IA 50325
Project Manager: Tom Karwoski
Email Address: ____
Telephone Number: 608-509-~~5[illegible]~~ 8745
Fax: ____
Sampler Name: (Print Name) Nick Schemmel
Sampler Signature: [signature]

Project Name: IPL - Ottumwa Generating Station
Project #: 7521907Z
Site/Location ID: Ottumwa
State: IA
Report To: ____
Invoice To: ____
Quote #: ____
PO#: ____

TAT
___ Standard
___ Rush (surcharges may apply)
Date Needed: ____
Fax Results: Y N
Email Results: Y N

SAMPLE ID	Date Sampled	Time Sampled	G = Grab, C = Composite	Field Filtered	Matrix: SL - Sludge, DW - Drinking Water, GW - Groundwater, S - Soil/Solid, WW - Wastewater, Specify, Other	Preservation & # of Containers: HNO_3	HCl	NaOH	H_2SO_4	Methanol	None	Other (Specify)	Analyze For: Metals	pH	TDS	Chloride/Fluoride/SO4	Radium 226 + 228	QC Deliverables	REMARKS
MW 301	4.8.19	0932	G		GW	3					1		x	x	x	x	x	None	
MW 302		1036				3					1		x	x	x	x	x	Level 2 (Batch QC)	
MW 303		1141				3					1		x	x	x	x	x	Level 3	
MW 304		1253				3					1		x	x	x	x	x	Level 4	
MW 305		1339				3					1		x	x	x	x	x	Other: ____	
MW 306		1425				3					1		x	x	x	x	x		
Field Blank		1430				3					1		x	x	x	x	x		

Special Instructions:

LABORATORY COMMENTS:

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Nick Schemmel	4-9-19	1000	Lindsay Binder	4-9-19	1715
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAL-0033 (0708)

Page ____ of ____

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
MW 301	310-152915-A-1	Plastic 250ml - with Nitric Acid	<2		
MW 301	310-152915-C-1	Plastic 1 liter - Nitric Acid	<2		
MW 301	310-152915-D-1	Plastic 1 liter - Nitric Acid	<2		
MW 302	310-152915-A-2	Plastic 250ml - with Nitric Acid	<2		
MW 302	310-152915-C-2	Plastic 1 liter - Nitric Acid	<2		
MW 302	310-152915-D-2	Plastic 1 liter - Nitric Acid	<2		
MW 303	310-152915-A-3	Plastic 250ml - with Nitric Acid	<2		
MW 303	310-152915-C-3	Plastic 1 liter - Nitric Acid	<2		
MW 303	310-152915-D-3	Plastic 1 liter - Nitric Acid	<2		
MW 304	310-152915-A-4	Plastic 250ml - with Nitric Acid	<2		
MW 304	310-152915-C-4	Plastic 1 liter - Nitric Acid	<2		
MW 304	310-152915-D-4	Plastic 1 liter - Nitric Acid	<2		
MW 305	310-152915-A-5	Plastic 250ml - with Nitric Acid	<2		
MW 305	310-152915-C-5	Plastic 1 liter - Nitric Acid	<2		
MW 305	310-152915-D-5	Plastic 1 liter - Nitric Acid	<2		
MW 306	310-152915-A-6	Plastic 250ml - with Nitric Acid	<2		
MW 306	310-152915-C-6	Plastic 1 liter - Nitric Acid	<2		
MW 306	310-152915-D-6	Plastic 1 liter - Nitric Acid	<2		
Field Blank	310-152915-A-7	Plastic 250ml - with Nitric Acid	<2		
Field Blank	310-152915-C-7	Plastic 1 liter - Nitric Acid	<2		
Field Blank	310-152915-D-7	Plastic 1 liter - Nitric Acid	<2		
MW 307	310-152915-A-8	Plastic 250ml - with Nitric Acid	<2		
MW 308	310-152915-A-9	Plastic 250ml - with Nitric Acid	<2		
MW 309	310-152915-A-10	Plastic 250ml - with Nitric Acid	<2		

Table 2. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station / SCS Engineers Project No. 25219072
April 2019

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	4-8-2019/0932	682.69	7.27	6.61	8.32	501	37.6	1.87
MW-302	4-8-2019/1036	657.23	12.27	6.61	0.86	2159	68.3	26.9
MW-303	4-8-2019/1141	655.55	8.51	7.00	2.29	1181	51.7	3.49
MW-304	4-8-2019/1253	659.33	13.75	7.17	0.41	1876	-58.3	57.9
MW-305	4-8-2019/1339	664.01	13.8	7.06	0.59	1728	32.6	21.7
MW-306	4-8-2019/1425	670.96	13.63	6.66	0.92	1350	49.1	28.5

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

Notes:
none

Created by: KAK Date: 5/1/2017
Last revision by: JR Date: 4/12/2019
Checked by: MDB Date: 4/12/2019

\\Mad-fs01\data\Projects\25219072.00\Data and Calculations\Tables\[OGS_CCR_Field_2019_April.xlsx]GW Field Parameters

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-152915-2
SDG Number: 25219072

Login Number: 152915
List Number: 1
Creator: Bindert, Lindsay A

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.	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: 310-152915-2
SDG Number: 25219072

Login Number: 152915
List Number: 2
Creator: Hellm, Michael

List Source: Eurofins TestAmerica, St. Louis
List Creation: 04/11/19 06:01 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	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.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	18.0
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Tracer/Carrier Summary

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

Job ID: 310-152915-2
SDG: 25219072

Method: 903.0 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)
310-152915-1	MW 301	93.5
310-152915-2	MW 302	95.8
310-152915-3	MW 303	87.9
310-152915-4	MW 304	87.3
310-152915-5	MW 305	91.0
310-152915-6	MW 306	87.9
310-152915-7	Field Blank	99.4

Tracer/Carrier Legend

Ba Carrier = Ba Carrier

Method: 903.0 - Radium-226 (GFPC)

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

		Percent Yield (Acceptance Limits)
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)
LCS 160-425538/1-A	Lab Control Sample	99.7
LCSD 160-425538/2-A	Lab Control Sample Dup	98.9
MB 160-425538/23-A	Method Blank	96.0

Tracer/Carrier Legend

Ba Carrier = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Y Carrier (40-110)
310-152915-1	MW 301	93.5	93.1
310-152915-2	MW 302	95.8	86.4
310-152915-3	MW 303	87.9	89.7
310-152915-4	MW 304	87.3	94.2
310-152915-5	MW 305	91.0	95.3
310-152915-6	MW 306	87.9	96.1
310-152915-7	Field Blank	99.4	95.3

Tracer/Carrier Legend

Ba Carrier = Ba Carrier
Y Carrier = Y Carrier

Method: 904.0 - Radium-228 (GFPC)

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

		Percent Yield (Acceptance Limits)	
Lab Sample ID	Client Sample ID	Ba Carrier (40-110)	Y Carrier (40-110)
LCS 160-425541/1-A	Lab Control Sample	99.7	95.3
LCSD 160-425541/2-A	Lab Control Sample Dup	98.9	83.7
MB 160-425541/23-A	Method Blank	96.0	93.5

Tracer/Carrier Legend

Tracer/Carrier Summary

Client: SCS Engineers
Job ID: 310-152915-2
Project/Site: IPL Ottumwa Generating Station 25219072
SDG: 25219072

Ba Carrier = Ba Carrier
Y Carrier = Y Carrier

A2 Assessment Monitoring Sampling, October 2019

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

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

Laboratory Job ID: 310-168508-1
Client Project/Site: Ottumwa Generating Station 25219072
Revision: 1

For:
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett

Authorized for release by:
1/6/2020 3:25:33 PM

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

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

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

Table of Contents

Case Narrative

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

Job ID: 310-168508-1

Job ID: 310-168508-1

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative
310-168508-1

Comments
REVISION: Client requested split report

Receipt
The samples were received on 10/25/2019 6:30 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.2º C and 4.3º C.

HPLC/IC
Method 9056A: The following samples were diluted due to the nature of the sample matrix: MW-301 (310-168508-1), MW-302 (310-168508-2), MW-303 (310-168508-3), MW-305 (310-168508-5), MW-306 (310-168508-6), MW-310 (310-168508-11) and MW-311 (310-168508-12). 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
Job ID: 310-168508-1
Project/Site: Ottumwa Generating Station 25219072

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-168508-1	MW-301	Water	10/24/19 09:00	10/25/19 18:30	
310-168508-2	MW-302	Water	10/24/19 10:20	10/25/19 18:30	
310-168508-3	MW-303	Water	10/24/19 12:00	10/25/19 18:30	
310-168508-4	MW-304	Water	10/23/19 14:27	10/25/19 18:30	
310-168508-5	MW-305	Water	10/23/19 16:15	10/25/19 18:30	
310-168508-6	MW-306	Water	10/23/19 17:00	10/25/19 18:30	
310-168508-7	FIELD BLANK	Water	10/23/19 23:59	10/25/19 18:30	
310-168508-11	MW-310	Water	10/24/19 12:50	10/25/19 18:30	
310-168508-12	MW-311	Water	10/24/19 13:45	10/25/19 18:30	

Detection Summary

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

Job ID: 310-168508-1

Client Sample ID: MW-301 — Lab Sample ID: 310-168508-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	110		5.0	1.5	mg/L	5		9056A	Total/NA
Sulfate	130		5.0	1.8	mg/L	5		9056A	Total/NA
Barium	56		2.0	0.84	ug/L	1		6020A	Total/NA
Boron	680		200	110	ug/L	1		6020A	Total/NA
Cadmium	0.040	J	0.10	0.039	ug/L	1		6020A	Total/NA
Calcium	78		0.50	0.10	mg/L	1		6020A	Total/NA
Cobalt	0.60		0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	24		10	2.7	ug/L	1		6020A	Total/NA
Molybdenum	1.1	J	2.0	1.1	ug/L	1		6020A	Total/NA
Selenium	6.2		5.0	1.0	ug/L	1		6020A	Total/NA
Total Dissolved Solids	510		30	24	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	683.07				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	9.9				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	4.94				mg/L	1		Field Sampling	Total/NA
pH, Field	6.33				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	902				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.71				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	1.6				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-302 — Lab Sample ID: 310-168508-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	220		5.0	1.5	mg/L	5		9056A	Total/NA
Sulfate	810		20	7.0	mg/L	20		9056A	Total/NA
Barium	21		2.0	0.84	ug/L	1		6020A	Total/NA
Boron	1200		200	110	ug/L	1		6020A	Total/NA
Cadmium	0.20		0.10	0.039	ug/L	1		6020A	Total/NA
Calcium	180		0.50	0.10	mg/L	1		6020A	Total/NA
Cobalt	2.7		0.50	0.091	ug/L	1		6020A	Total/NA
Lead	0.29	J	0.50	0.27	ug/L	1		6020A	Total/NA
Lithium	10		10	2.7	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1600		150	120	mg/L	1		SM 2540C	Total/NA
pH	7.2	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	660.14				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-0.5				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.35				mg/L	1		Field Sampling	Total/NA
pH, Field	6.55				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	2184				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	12.91				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	11.9				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-303 — Lab Sample ID: 310-168508-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	35		5.0	1.5	mg/L	5		9056A	Total/NA
Sulfate	180		5.0	1.8	mg/L	5		9056A	Total/NA
Barium	77		2.0	0.84	ug/L	1		6020A	Total/NA
Boron	440		200	110	ug/L	1		6020A	Total/NA
Cadmium	0.21		0.10	0.039	ug/L	1		6020A	Total/NA
Calcium	170		0.50	0.10	mg/L	1		6020A	Total/NA
Cobalt	1.2		0.50	0.091	ug/L	1		6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-303 (Continued)

Lab Sample ID: 310-168508-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Molybdenum	5.2		2.0	1.1	ug/L	1		6020A	Total/NA
Total Dissolved Solids	810		30	24	mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	653.86				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-5.1				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.28				mg/L	1		Field Sampling	Total/NA
pH, Field	6.83				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1287				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	15.34				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	4.24				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-304

Lab Sample ID: 310-168508-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	280		10	2.9	mg/L	10		9056A	Total/NA
Fluoride	0.74		0.50	0.23	mg/L	5		9056A	Total/NA
Sulfate	190		5.0	1.8	mg/L	5		9056A	Total/NA
Arsenic	0.83	J	2.0	0.75	ug/L	1		6020A	Total/NA
Barium	80		2.0	0.84	ug/L	1		6020A	Total/NA
Boron	970		200	110	ug/L	1		6020A	Total/NA
Calcium	120		0.50	0.10	mg/L	1		6020A	Total/NA
Chromium	2.0	J	5.0	0.98	ug/L	1		6020A	Total/NA
Cobalt	0.50		0.50	0.091	ug/L	1		6020A	Total/NA
Lead	0.27	J	0.50	0.27	ug/L	1		6020A	Total/NA
Lithium	2.8	J	10	2.7	ug/L	1		6020A	Total/NA
Molybdenum	2.3		2.0	1.1	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1100		30	24	mg/L	1		SM 2540C	Total/NA
pH	7.7	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	657.71				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-57.5				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.44				mg/L	1		Field Sampling	Total/NA
pH, Field	7.05				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1871				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.64				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	18.9				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-305

Lab Sample ID: 310-168508-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	280		10	2.9	mg/L	10		9056A	Total/NA
Sulfate	76		5.0	1.8	mg/L	5		9056A	Total/NA
Barium	110		2.0	0.84	ug/L	1		6020A	Total/NA
Boron	880		200	110	ug/L	1		6020A	Total/NA
Cadmium	0.087	J	0.10	0.039	ug/L	1		6020A	Total/NA
Calcium	100		0.50	0.10	mg/L	1		6020A	Total/NA
Cobalt	17		0.50	0.091	ug/L	1		6020A	Total/NA
Molybdenum	7.2		2.0	1.1	ug/L	1		6020A	Total/NA
Thallium	0.38	J	1.0	0.27	ug/L	1		6020A	Total/NA
Total Dissolved Solids	1000		30	24	mg/L	1		SM 2540C	Total/NA
pH	7.5	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	663.21				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-6.7				millivolts	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

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

Job ID: 310-168508-1

Client Sample ID: MW-305 (Continued)

Lab Sample ID: 310-168508-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Oxygen, Dissolved, Client Supplied	0.42				mg/L	1		Field Sampling	Total/NA
pH, Field	6.91				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1794				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.2				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	6.21				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-306

Lab Sample ID: 310-168508-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	47		5.0	1.5	mg/L	5		9056A	Total/NA
Sulfate	280		20	7.0	mg/L	20		9056A	Total/NA
Arsenic	0.78	J	2.0	0.75	ug/L	1		6020A	Total/NA
Barium	51		2.0	0.84	ug/L	1		6020A	Total/NA
Boron	980		200	110	ug/L	1		6020A	Total/NA
Cadmium	0.89		0.10	0.039	ug/L	1		6020A	Total/NA
Calcium	77		0.50	0.10	mg/L	1		6020A	Total/NA
Chromium	1.0	J	5.0	0.98	ug/L	1		6020A	Total/NA
Cobalt	6.2		0.50	0.091	ug/L	1		6020A	Total/NA
Lead	0.34	J	0.50	0.27	ug/L	1		6020A	Total/NA
Molybdenum	4.9		2.0	1.1	ug/L	1		6020A	Total/NA
Total Dissolved Solids	870		30	24	mg/L	1		SM 2540C	Total/NA
pH	7.4	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	671.28				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-0.5				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.29				mg/L	1		Field Sampling	Total/NA
pH, Field	6.74				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1266				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.12				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	12.3				NTU	1		Field Sampling	Total/NA

Client Sample ID: FIELD BLANK

Lab Sample ID: 310-168508-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	74		30	24	mg/L	1		SM 2540C	Total/NA
pH	6.8	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-310

Lab Sample ID: 310-168508-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	150		5.0	1.5	mg/L	5		9056A	Total/NA
Fluoride	0.31	J	0.50	0.23	mg/L	5		9056A	Total/NA
Sulfate	610		20	7.0	mg/L	20		9056A	Total/NA
Arsenic	0.78	J	2.0	0.75	ug/L	1		6020A	Total/NA
Barium	76		2.0	0.84	ug/L	1		6020A	Total/NA
Boron	720		200	110	ug/L	1		6020A	Total/NA
Cadmium	0.22		0.10	0.039	ug/L	1		6020A	Total/NA
Calcium	230		0.50	0.10	mg/L	1		6020A	Total/NA
Cobalt	0.57		0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	35		10	2.7	ug/L	1		6020A	Total/NA
Molybdenum	26		2.0	1.1	ug/L	1		6020A	Total/NA
Selenium	5.0		5.0	1.0	ug/L	1		6020A	Total/NA
Total Dissolved Solids	260		30	24	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-310 (Continued)
Lab Sample ID: 310-168508-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
pH	7.2	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	649.31				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-9.3				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.41				mg/L	1		Field Sampling	Total/NA
pH, Field	7.15				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	1906				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.74				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	2.29				NTU	1		Field Sampling	Total/NA

Client Sample ID: MW-311
Lab Sample ID: 310-168508-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	13		5.0	1.5	mg/L	5		9056A	Total/NA
Sulfate	47		5.0	1.8	mg/L	5		9056A	Total/NA
Barium	200		2.0	0.84	ug/L	1		6020A	Total/NA
Cadmium	0.040	J	0.10	0.039	ug/L	1		6020A	Total/NA
Calcium	170		0.50	0.10	mg/L	1		6020A	Total/NA
Cobalt	0.78		0.50	0.091	ug/L	1		6020A	Total/NA
Lithium	4.7	J	10	2.7	ug/L	1		6020A	Total/NA
Total Dissolved Solids	530		30	24	mg/L	1		SM 2540C	Total/NA
pH	7.0	HF	0.1	0.1	SU	1		SM 4500 H+ B	Total/NA
Ground Water Elevation	647.80				ft	1		Field Sampling	Total/NA
Oxidation Reduction Potential	-24.7				millivolts	1		Field Sampling	Total/NA
Oxygen, Dissolved, Client Supplied	0.29				mg/L	1		Field Sampling	Total/NA
pH, Field	6.95				SU	1		Field Sampling	Total/NA
Specific Conductance, Field	926				umhos/cm	1		Field Sampling	Total/NA
Temperature, Field	13.88				Degrees C	1		Field Sampling	Total/NA
Turbidity, Field	3.88				NTU	1		Field Sampling	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-301
Lab Sample ID: 310-168508-1

Date Collected: 10/24/19 09:00
Matrix: Water
Date Received: 10/25/19 18:30

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**110**		5.0	1.5	mg/L			10/31/19 11:59	5
Fluoride	<0.23		0.50	0.23	mg/L			10/31/19 11:59	5
Sulfate	**130**		5.0	1.8	mg/L			10/31/19 11:59	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		10/29/19 08:00	10/29/19 21:22	1
Arsenic	<0.75		2.0	0.75	ug/L		10/29/19 08:00	10/29/19 21:22	1
Barium	**56**		2.0	0.84	ug/L		10/29/19 08:00	10/29/19 21:22	1
Beryllium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 21:22	1
Boron	**680**		200	110	ug/L		10/29/19 08:00	10/29/19 21:22	1
Cadmium	**0.040**	**J**	0.10	0.039	ug/L		10/29/19 08:00	10/29/19 21:22	1
Calcium	**78**		0.50	0.10	mg/L		10/29/19 08:00	10/29/19 21:22	1
Chromium	<0.98		5.0	0.98	ug/L		10/29/19 08:00	10/29/19 21:22	1
Cobalt	**0.60**		0.50	0.091	ug/L		10/29/19 08:00	10/29/19 21:22	1
Lead	<0.27		0.50	0.27	ug/L		10/29/19 08:00	10/29/19 21:22	1
Lithium	**24**		10	2.7	ug/L		10/29/19 08:00	10/29/19 21:22	1
Molybdenum	**1.1**	**J**	2.0	1.1	ug/L		10/29/19 08:00	10/29/19 21:22	1
Selenium	**6.2**		5.0	1.0	ug/L		10/29/19 08:00	10/29/19 21:22	1
Thallium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 21:22	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		10/30/19 12:40	10/31/19 13:13	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**510**		30	24	mg/L			10/31/19 14:13	1
pH	**7.1**	**HF**	0.1	0.1	SU			10/25/19 22:47	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	**683.07**				ft			10/24/19 09:00	1
Oxidation Reduction Potential	**9.9**				millivolts			10/24/19 09:00	1
Oxygen, Dissolved, Client Supplied	**4.94**				mg/L			10/24/19 09:00	1
pH, Field	**6.33**				SU			10/24/19 09:00	1
Specific Conductance, Field	**902**				umhos/cm			10/24/19 09:00	1
Temperature, Field	**13.71**				Degrees C			10/24/19 09:00	1
Turbidity, Field	**1.6**				NTU			10/24/19 09:00	1

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

Job ID: 310-168508-1

Client Sample ID: MW-302

Date Collected: 10/24/19 10:20
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-2

Matrix: Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**220**		5.0	1.5	mg/L			10/31/19 12:15	5
Fluoride	<0.23		0.50	0.23	mg/L			10/31/19 12:15	5
Sulfate	**810**		20	7.0	mg/L			11/01/19 11:35	20

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		10/29/19 08:00	10/29/19 21:36	1
Arsenic	<0.75		2.0	0.75	ug/L		10/29/19 08:00	10/29/19 21:36	1
Barium	**21**		2.0	0.84	ug/L		10/29/19 08:00	10/29/19 21:36	1
Beryllium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 21:36	1
Boron	**1200**		200	110	ug/L		10/29/19 08:00	10/29/19 21:36	1
Cadmium	**0.20**		0.10	0.039	ug/L		10/29/19 08:00	10/29/19 21:36	1
Calcium	**180**		0.50	0.10	mg/L		10/29/19 08:00	10/29/19 21:36	1
Chromium	<0.98		5.0	0.98	ug/L		10/29/19 08:00	10/29/19 21:36	1
Cobalt	**2.7**		0.50	0.091	ug/L		10/29/19 08:00	10/29/19 21:36	1
Lead	**0.29**	**J**	0.50	0.27	ug/L		10/29/19 08:00	10/29/19 21:36	1
Lithium	**10**		10	2.7	ug/L		10/29/19 08:00	10/29/19 21:36	1
Molybdenum	<1.1		2.0	1.1	ug/L		10/29/19 08:00	10/29/19 21:36	1
Selenium	<1.0		5.0	1.0	ug/L		10/29/19 08:00	10/29/19 21:36	1
Thallium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 21:36	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		10/30/19 12:40	10/31/19 13:15	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**1600**		150	120	mg/L			10/31/19 14:13	1
pH	**7.2**	**HF**	0.1	0.1	SU			10/25/19 22:50	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	**660.14**				ft			10/24/19 10:20	1
Oxidation Reduction Potential	**-0.5**				millivolts			10/24/19 10:20	1
Oxygen, Dissolved, Client Supplied	**0.35**				mg/L			10/24/19 10:20	1
pH, Field	**6.55**				SU			10/24/19 10:20	1
Specific Conductance, Field	**2184**				umhos/cm			10/24/19 10:20	1
Temperature, Field	**12.91**				Degrees C			10/24/19 10:20	1
Turbidity, Field	**11.9**				NTU			10/24/19 10:20	1

Client Sample Results

Client: SCS Engineers
Job ID: 310-168508-1
Project/Site: Ottumwa Generating Station 25219072

Client Sample ID: MW-303
Date Collected: 10/24/19 12:00
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-3
Matrix: Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**35**		5.0	1.5	mg/L			10/31/19 12:30	5
Fluoride	<0.23		0.50	0.23	mg/L			10/31/19 12:30	5
Sulfate	**180**		5.0	1.8	mg/L			10/31/19 12:30	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		10/29/19 08:00	10/29/19 21:39	1
Arsenic	<0.75		2.0	0.75	ug/L		10/29/19 08:00	10/29/19 21:39	1
Barium	**77**		2.0	0.84	ug/L		10/29/19 08:00	10/29/19 21:39	1
Beryllium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 21:39	1
Boron	**440**		200	110	ug/L		10/29/19 08:00	10/29/19 21:39	1
Cadmium	**0.21**		0.10	0.039	ug/L		10/29/19 08:00	10/29/19 21:39	1
Calcium	**170**		0.50	0.10	mg/L		10/29/19 08:00	10/29/19 21:39	1
Chromium	<0.98		5.0	0.98	ug/L		10/29/19 08:00	10/29/19 21:39	1
Cobalt	**1.2**		0.50	0.091	ug/L		10/29/19 08:00	10/29/19 21:39	1
Lead	<0.27		0.50	0.27	ug/L		10/29/19 08:00	10/29/19 21:39	1
Lithium	<2.7		10	2.7	ug/L		10/29/19 08:00	10/29/19 21:39	1
Molybdenum	**5.2**		2.0	1.1	ug/L		10/29/19 08:00	10/29/19 21:39	1
Selenium	<1.0		5.0	1.0	ug/L		10/29/19 08:00	10/29/19 21:39	1
Thallium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 21:39	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		10/30/19 12:40	10/31/19 13:21	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**810**		30	24	mg/L			10/31/19 14:13	1
pH	**7.5**	**HF**	0.1	0.1	SU			10/25/19 22:52	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	**653.86**				ft			10/24/19 12:00	1
Oxidation Reduction Potential	**-5.1**				millivolts			10/24/19 12:00	1
Oxygen, Dissolved, Client Supplied	**0.28**				mg/L			10/24/19 12:00	1
pH, Field	**6.83**				SU			10/24/19 12:00	1
Specific Conductance, Field	**1287**				umhos/cm			10/24/19 12:00	1
Temperature, Field	**15.34**				Degrees C			10/24/19 12:00	1
Turbidity, Field	**4.24**				NTU			10/24/19 12:00	1

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

Job ID: 310-168508-1

Client Sample ID: MW-304

Date Collected: 10/23/19 14:27
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-4

Matrix: Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**280**		10	2.9	mg/L			11/01/19 11:52	10
Fluoride	**0.74**		0.50	0.23	mg/L			10/31/19 12:46	5
Sulfate	**190**		5.0	1.8	mg/L			10/31/19 12:46	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		10/29/19 08:00	10/29/19 21:42	1
Arsenic	**0.83**	**J**	2.0	0.75	ug/L		10/29/19 08:00	10/29/19 21:42	1
Barium	**80**		2.0	0.84	ug/L		10/29/19 08:00	10/29/19 21:42	1
Beryllium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 21:42	1
Boron	**970**		200	110	ug/L		10/29/19 08:00	10/29/19 21:42	1
Cadmium	<0.039		0.10	0.039	ug/L		10/29/19 08:00	10/29/19 21:42	1
Calcium	**120**		0.50	0.10	mg/L		10/29/19 08:00	10/29/19 21:42	1
Chromium	**2.0**	**J**	5.0	0.98	ug/L		10/29/19 08:00	10/29/19 21:42	1
Cobalt	**0.50**		0.50	0.091	ug/L		10/29/19 08:00	10/29/19 21:42	1
Lead	**0.27**	**J**	0.50	0.27	ug/L		10/29/19 08:00	10/29/19 21:42	1
Lithium	**2.8**	**J**	10	2.7	ug/L		10/29/19 08:00	10/29/19 21:42	1
Molybdenum	**2.3**		2.0	1.1	ug/L		10/29/19 08:00	10/29/19 21:42	1
Selenium	<1.0		5.0	1.0	ug/L		10/29/19 08:00	10/29/19 21:42	1
Thallium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 21:42	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		10/30/19 12:40	10/31/19 13:36	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**1100**		30	24	mg/L			10/29/19 13:03	1
pH	**7.7**	**HF**	0.1	0.1	SU			10/25/19 22:53	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	**657.71**				ft			10/23/19 14:27	1
Oxidation Reduction Potential	**-57.5**				millivolts			10/23/19 14:27	1
Oxygen, Dissolved, Client Supplied	**0.44**				mg/L			10/23/19 14:27	1
pH, Field	**7.05**				SU			10/23/19 14:27	1
Specific Conductance, Field	**1871**				umhos/cm			10/23/19 14:27	1
Temperature, Field	**13.64**				Degrees C			10/23/19 14:27	1
Turbidity, Field	**18.9**				NTU			10/23/19 14:27	1

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

Job ID: 310-168508-1

Client Sample ID: MW-305

Date Collected: 10/23/19 16:15
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-5

Matrix: Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**280**		10	2.9	mg/L			11/01/19 12:08	10
Fluoride	<0.23		0.50	0.23	mg/L			10/31/19 13:01	5
Sulfate	**76**		5.0	1.8	mg/L			10/31/19 13:01	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		10/29/19 08:00	10/29/19 21:46	1
Arsenic	<0.75		2.0	0.75	ug/L		10/29/19 08:00	10/29/19 21:46	1
Barium	**110**		2.0	0.84	ug/L		10/29/19 08:00	10/29/19 21:46	1
Beryllium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 21:46	1
Boron	**880**		200	110	ug/L		10/29/19 08:00	10/29/19 21:46	1
Cadmium	**0.087**	**J**	0.10	0.039	ug/L		10/29/19 08:00	10/29/19 21:46	1
Calcium	**100**		0.50	0.10	mg/L		10/29/19 08:00	10/29/19 21:46	1
Chromium	<0.98		5.0	0.98	ug/L		10/29/19 08:00	10/29/19 21:46	1
Cobalt	**17**		0.50	0.091	ug/L		10/29/19 08:00	10/29/19 21:46	1
Lead	<0.27		0.50	0.27	ug/L		10/29/19 08:00	10/29/19 21:46	1
Lithium	<2.7		10	2.7	ug/L		10/29/19 08:00	10/29/19 21:46	1
Molybdenum	**7.2**		2.0	1.1	ug/L		10/29/19 08:00	10/29/19 21:46	1
Selenium	<1.0		5.0	1.0	ug/L		10/29/19 08:00	10/29/19 21:46	1
Thallium	**0.38**	**J**	1.0	0.27	ug/L		10/29/19 08:00	10/29/19 21:46	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		10/30/19 12:40	10/31/19 13:38	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**1000**		30	24	mg/L			10/29/19 13:03	1
pH	**7.5**	**HF**	0.1	0.1	SU			10/25/19 22:54	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	**663.21**				ft			10/23/19 16:15	1
Oxidation Reduction Potential	**-6.7**				millivolts			10/23/19 16:15	1
Oxygen, Dissolved, Client Supplied	**0.42**				mg/L			10/23/19 16:15	1
pH, Field	**6.91**				SU			10/23/19 16:15	1
Specific Conductance, Field	**1794**				umhos/cm			10/23/19 16:15	1
Temperature, Field	**13.2**				Degrees C			10/23/19 16:15	1
Turbidity, Field	**6.21**				NTU			10/23/19 16:15	1

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

Job ID: 310-168508-1

Client Sample ID: MW-306

Date Collected: 10/23/19 17:00
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-6

Matrix: Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**47**		5.0	1.5	mg/L			10/31/19 13:17	5
Fluoride	<0.23		0.50	0.23	mg/L			10/31/19 13:17	5
Sulfate	**280**		20	7.0	mg/L			10/31/19 13:33	20

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		10/29/19 08:00	10/29/19 21:49	1
Arsenic	**0.78**	**J**	2.0	0.75	ug/L		10/29/19 08:00	10/29/19 21:49	1
Barium	**51**		2.0	0.84	ug/L		10/29/19 08:00	10/29/19 21:49	1
Beryllium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 21:49	1
Boron	**980**		200	110	ug/L		10/29/19 08:00	10/29/19 21:49	1
Cadmium	**0.89**		0.10	0.039	ug/L		10/29/19 08:00	10/29/19 21:49	1
Calcium	**77**		0.50	0.10	mg/L		10/29/19 08:00	10/29/19 21:49	1
Chromium	**1.0**	**J**	5.0	0.98	ug/L		10/29/19 08:00	10/29/19 21:49	1
Cobalt	**6.2**		0.50	0.091	ug/L		10/29/19 08:00	10/29/19 21:49	1
Lead	**0.34**	**J**	0.50	0.27	ug/L		10/29/19 08:00	10/29/19 21:49	1
Lithium	<2.7		10	2.7	ug/L		10/29/19 08:00	10/29/19 21:49	1
Molybdenum	**4.9**		2.0	1.1	ug/L		10/29/19 08:00	10/29/19 21:49	1
Selenium	<1.0		5.0	1.0	ug/L		10/29/19 08:00	10/29/19 21:49	1
Thallium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 21:49	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		10/30/19 12:40	10/31/19 13:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**870**		30	24	mg/L			10/29/19 13:03	1
pH	**7.4**	**HF**	0.1	0.1	SU			10/25/19 22:55	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	**671.28**				ft			10/23/19 17:00	1
Oxidation Reduction Potential	**-0.5**				millivolts			10/23/19 17:00	1
Oxygen, Dissolved, Client Supplied	**0.29**				mg/L			10/23/19 17:00	1
pH, Field	**6.74**				SU			10/23/19 17:00	1
Specific Conductance, Field	**1266**				umhos/cm			10/23/19 17:00	1
Temperature, Field	**13.12**				Degrees C			10/23/19 17:00	1
Turbidity, Field	**12.3**				NTU			10/23/19 17:00	1

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

Job ID: 310-168508-1

Client Sample ID: FIELD BLANK

Date Collected: 10/23/19 23:59
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-7

Matrix: Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.29		1.0	0.29	mg/L			10/31/19 13:48	1
Fluoride	<0.045		0.10	0.045	mg/L			10/31/19 13:48	1
Sulfate	<0.35		1.0	0.35	mg/L			10/31/19 13:48	1

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		10/29/19 08:00	10/29/19 22:03	1
Arsenic	<0.75		2.0	0.75	ug/L		10/29/19 08:00	10/29/19 22:03	1
Barium	<0.84		2.0	0.84	ug/L		10/29/19 08:00	10/29/19 22:03	1
Beryllium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 22:03	1
Boron	<110		200	110	ug/L		10/29/19 08:00	10/29/19 22:03	1
Cadmium	<0.039		0.10	0.039	ug/L		10/29/19 08:00	10/29/19 22:03	1
Calcium	<0.10		0.50	0.10	mg/L		10/29/19 08:00	10/29/19 22:03	1
Chromium	<0.98		5.0	0.98	ug/L		10/29/19 08:00	10/29/19 22:03	1
Cobalt	<0.091		0.50	0.091	ug/L		10/29/19 08:00	10/29/19 22:03	1
Lead	<0.27		0.50	0.27	ug/L		10/29/19 08:00	10/29/19 22:03	1
Lithium	<2.7		10	2.7	ug/L		10/29/19 08:00	10/29/19 22:03	1
Molybdenum	<1.1		2.0	1.1	ug/L		10/29/19 08:00	10/29/19 22:03	1
Selenium	<1.0		5.0	1.0	ug/L		10/29/19 08:00	10/29/19 22:03	1
Thallium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 22:03	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10	F1	0.20	0.10	ug/L		10/31/19 12:56	11/01/19 12:06	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**74**		30	24	mg/L			10/29/19 13:03	1
pH	**6.8**	**HF**	0.1	0.1	SU			10/25/19 23:00	1

Client Sample ID: MW-310

Date Collected: 10/24/19 12:50
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-11

Matrix: Water

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**150**		5.0	1.5	mg/L			10/31/19 15:22	5
Fluoride	**0.31**	**J**	0.50	0.23	mg/L			10/31/19 15:22	5
Sulfate	**610**		20	7.0	mg/L			11/01/19 12:57	20

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		10/29/19 08:00	10/29/19 22:16	1
Arsenic	**0.78**	**J**	2.0	0.75	ug/L		10/29/19 08:00	10/29/19 22:16	1
Barium	**76**		2.0	0.84	ug/L		10/29/19 08:00	10/29/19 22:16	1
Beryllium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 22:16	1
Boron	**720**		200	110	ug/L		10/29/19 08:00	10/29/19 22:16	1
Cadmium	**0.22**		0.10	0.039	ug/L		10/29/19 08:00	10/29/19 22:16	1
Calcium	**230**		0.50	0.10	mg/L		10/29/19 08:00	10/29/19 22:16	1
Chromium	<0.98		5.0	0.98	ug/L		10/29/19 08:00	10/29/19 22:16	1
Cobalt	**0.57**		0.50	0.091	ug/L		10/29/19 08:00	10/29/19 22:16	1
Lead	<0.27		0.50	0.27	ug/L		10/29/19 08:00	10/29/19 22:16	1
Lithium	**35**		10	2.7	ug/L		10/29/19 08:00	10/29/19 22:16	1
Molybdenum	**26**		2.0	1.1	ug/L		10/29/19 08:00	10/29/19 22:16	1
Selenium	**5.0**		5.0	1.0	ug/L		10/29/19 08:00	10/29/19 22:16	1
Thallium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 22:16	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		10/31/19 12:56	11/01/19 12:13	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**260**		30	24	mg/L			10/31/19 14:13	1
pH	**7.2**	**HF**	0.1	0.1	SU			10/25/19 23:39	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	**649.31**				ft			10/24/19 12:50	1
Oxidation Reduction Potential	**-9.3**				millivolts			10/24/19 12:50	1
Oxygen, Dissolved, Client Supplied	**0.41**				mg/L			10/24/19 12:50	1
pH, Field	**7.15**				SU			10/24/19 12:50	1
Specific Conductance, Field	**1906**				umhos/cm			10/24/19 12:50	1
Temperature, Field	**13.74**				Degrees C			10/24/19 12:50	1
Turbidity, Field	**2.29**				NTU			10/24/19 12:50	1

Client Sample Results

Client: SCS Engineers
Job ID: 310-168508-1
Project/Site: Ottumwa Generating Station 25219072

Client Sample ID: MW-311
Lab Sample ID: 310-168508-12
Date Collected: 10/24/19 13:45
Matrix: Water
Date Received: 10/25/19 18:30

Method: 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**13**		5.0	1.5	mg/L			10/31/19 15:37	5
Fluoride	<0.23		0.50	0.23	mg/L			10/31/19 15:37	5
Sulfate	**47**		5.0	1.8	mg/L			10/31/19 15:37	5

Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		10/29/19 08:00	10/29/19 22:23	1
Arsenic	<0.75		2.0	0.75	ug/L		10/29/19 08:00	10/29/19 22:23	1
Barium	**200**		2.0	0.84	ug/L		10/29/19 08:00	10/29/19 22:23	1
Beryllium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 22:23	1
Boron	<110		200	110	ug/L		10/29/19 08:00	10/29/19 22:23	1
Cadmium	**0.040**	**J**	0.10	0.039	ug/L		10/29/19 08:00	10/29/19 22:23	1
Calcium	**170**		0.50	0.10	mg/L		10/29/19 08:00	10/29/19 22:23	1
Chromium	<0.98		5.0	0.98	ug/L		10/29/19 08:00	10/29/19 22:23	1
Cobalt	**0.78**		0.50	0.091	ug/L		10/29/19 08:00	10/29/19 22:23	1
Lead	<0.27		0.50	0.27	ug/L		10/29/19 08:00	10/29/19 22:23	1
Lithium	**4.7**	**J**	10	2.7	ug/L		10/29/19 08:00	10/29/19 22:23	1
Molybdenum	<1.1		2.0	1.1	ug/L		10/29/19 08:00	10/29/19 22:23	1
Selenium	<1.0		5.0	1.0	ug/L		10/29/19 08:00	10/29/19 22:23	1
Thallium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 22:23	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10	F1	0.20	0.10	ug/L		10/31/19 13:00	11/01/19 13:17	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	**530**		30	24	mg/L			10/31/19 14:13	1
pH	**7.0**	**HF**	0.1	0.1	SU			10/25/19 23:40	1

Method: Field Sampling - Field Sampling

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ground Water Elevation	**647.80**				ft			10/24/19 13:45	1
Oxidation Reduction Potential	**-24.7**				millivolts			10/24/19 13:45	1
Oxygen, Dissolved, Client Supplied	**0.29**				mg/L			10/24/19 13:45	1
pH, Field	**6.95**				SU			10/24/19 13:45	1
Specific Conductance, Field	**926**				umhos/cm			10/24/19 13:45	1
Temperature, Field	**13.88**				Degrees C			10/24/19 13:45	1
Turbidity, Field	**3.88**				NTU			10/24/19 13:45	1

Definitions/Glossary

Client: SCS Engineers
Job ID: 310-168508-1
Project/Site: Ottumwa Generating Station 25219072

Qualifiers

HPLC/IC

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

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F1	MS and/or MSD Recovery is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

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

Glossary

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

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-259370/3
Matrix: Water
Analysis Batch: 259370

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.29		1.0	0.29	mg/L			10/31/19 08:19	1
Fluoride	<0.045		0.10	0.045	mg/L			10/31/19 08:19	1
Sulfate	<0.35		1.0	0.35	mg/L			10/31/19 08:19	1

Lab Sample ID: LCS 310-259370/4
Matrix: Water
Analysis Batch: 259370

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	2.07		mg/L		104	90 - 110
Sulfate	10.0	10.3		mg/L		103	90 - 110

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 310-258560/1-A
Matrix: Water
Analysis Batch: 258765

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 258560

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	<0.53		1.0	0.53	ug/L		10/29/19 08:00	10/29/19 21:05	1
Arsenic	<0.75		2.0	0.75	ug/L		10/29/19 08:00	10/29/19 21:05	1
Barium	<0.84		2.0	0.84	ug/L		10/29/19 08:00	10/29/19 21:05	1
Beryllium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 21:05	1
Boron	<110		200	110	ug/L		10/29/19 08:00	10/29/19 21:05	1
Cadmium	<0.039		0.10	0.039	ug/L		10/29/19 08:00	10/29/19 21:05	1
Calcium	<0.10		0.50	0.10	mg/L		10/29/19 08:00	10/29/19 21:05	1
Chromium	<0.98		5.0	0.98	ug/L		10/29/19 08:00	10/29/19 21:05	1
Cobalt	<0.091		0.50	0.091	ug/L		10/29/19 08:00	10/29/19 21:05	1
Lead	<0.27		0.50	0.27	ug/L		10/29/19 08:00	10/29/19 21:05	1
Lithium	<2.7		10	2.7	ug/L		10/29/19 08:00	10/29/19 21:05	1
Molybdenum	<1.1		2.0	1.1	ug/L		10/29/19 08:00	10/29/19 21:05	1
Selenium	<1.0		5.0	1.0	ug/L		10/29/19 08:00	10/29/19 21:05	1
Thallium	<0.27		1.0	0.27	ug/L		10/29/19 08:00	10/29/19 21:05	1

Lab Sample ID: LCS 310-258560/2-A
Matrix: Water
Analysis Batch: 258765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 258560

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	40.0	33.5		ug/L		84	80 - 120
Arsenic	80.0	75.4		ug/L		94	80 - 120
Barium	80.0	78.9		ug/L		99	80 - 120
Beryllium	40.0	37.8		ug/L		94	80 - 120
Boron	1760	1680		ug/L		95	80 - 120
Cadmium	40.0	40.2		ug/L		100	80 - 120
Calcium	4.00	4.04		mg/L		101	80 - 120
Chromium	80.0	78.0		ug/L		98	80 - 120
Cobalt	40.0	39.2		ug/L		98	80 - 120

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

Lab Sample ID: LCS 310-258560/2-A
Matrix: Water
Analysis Batch: 258765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 258560

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	40.0	39.3		ug/L		98	80 - 120
Lithium	200	174		ug/L		87	80 - 120
Molybdenum	80.0	68.8		ug/L		86	80 - 120
Selenium	80.0	75.6		ug/L		95	80 - 120
Thallium	32.0	30.8		ug/L		96	80 - 120

Lab Sample ID: 310-168508-1 MS
Matrix: Water
Analysis Batch: 258765

Client Sample ID: MW-301
Prep Type: Total/NA
Prep Batch: 258560

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	<0.53		40.0	40.3		ug/L		101	75 - 125
Arsenic	<0.75		80.0	85.7		ug/L		107	75 - 125
Barium	56		80.0	139		ug/L		104	75 - 125
Beryllium	<0.27		40.0	43.9		ug/L		110	75 - 125
Boron	680		1760	2480		ug/L		102	75 - 125
Cadmium	0.040	J	40.0	43.1		ug/L		108	75 - 125
Calcium	78		4.00	81.9	4	mg/L		98	75 - 125
Chromium	<0.98		80.0	86.8		ug/L		108	75 - 125
Cobalt	0.60		40.0	43.0		ug/L		106	75 - 125
Lead	<0.27		40.0	43.4		ug/L		108	75 - 125
Lithium	24		200	215		ug/L		96	75 - 125
Molybdenum	1.1	J	80.0	83.7		ug/L		105	75 - 125
Selenium	6.2		80.0	86.0		ug/L		100	75 - 125
Thallium	<0.27		32.0	34.5		ug/L		108	75 - 125

Lab Sample ID: 310-168508-1 MSD
Matrix: Water
Analysis Batch: 258765

Client Sample ID: MW-301
Prep Type: Total/NA
Prep Batch: 258560

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	<0.53		40.0	39.4		ug/L		99	75 - 125	2	20
Arsenic	<0.75		80.0	85.0		ug/L		106	75 - 125	1	20
Barium	56		80.0	139		ug/L		103	75 - 125	0	20
Beryllium	<0.27		40.0	43.4		ug/L		108	75 - 125	1	20
Boron	680		1760	2500		ug/L		104	75 - 125	1	20
Cadmium	0.040	J	40.0	42.9		ug/L		107	75 - 125	0	20
Calcium	78		4.00	82.4	4	mg/L		111	75 - 125	1	20
Chromium	<0.98		80.0	84.5		ug/L		106	75 - 125	3	20
Cobalt	0.60		40.0	42.2		ug/L		104	75 - 125	2	20
Lead	<0.27		40.0	42.5		ug/L		106	75 - 125	2	20
Lithium	24		200	209		ug/L		93	75 - 125	3	20
Molybdenum	1.1	J	80.0	82.5		ug/L		103	75 - 125	1	20
Selenium	6.2		80.0	87.1		ug/L		101	75 - 125	1	20
Thallium	<0.27		32.0	33.7		ug/L		105	75 - 125	2	20

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

Lab Sample ID: 310-168508-11 DU
Matrix: Water
Analysis Batch: 258765

Client Sample ID: MW-310
Prep Type: Total/NA
Prep Batch: 258560

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	<0.53		<0.53		ug/L		NC	20
Arsenic	0.78	J	0.797	J	ug/L		2	20
Barium	76		78.2		ug/L		2	20
Beryllium	<0.27		<0.27		ug/L		NC	20
Boron	720		739		ug/L		3	20
Cadmium	0.22		0.262		ug/L		17	20
Calcium	230		227		mg/L		0.4	20
Chromium	<0.98		<0.98		ug/L		NC	20
Cobalt	0.57		0.705		ug/L		20	20
Lead	<0.27		<0.27		ug/L		NC	20
Lithium	35		36.7		ug/L		4	20
Molybdenum	26		26.8		ug/L		1	20
Selenium	5.0		5.40		ug/L		7	20
Thallium	<0.27		<0.27		ug/L		NC	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 310-258836/1-A
Matrix: Water
Analysis Batch: 259013

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 258836

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		10/30/19 12:40	10/31/19 12:34	1

Lab Sample ID: LCS 310-258836/2-A
Matrix: Water
Analysis Batch: 259013

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 258836

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	1.67	1.55		ug/L		93	80 - 120

Lab Sample ID: MB 310-258991/1-A
Matrix: Water
Analysis Batch: 259222

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 258991

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		10/31/19 12:56	11/01/19 12:02	1

Lab Sample ID: LCS 310-258991/2-A
Matrix: Water
Analysis Batch: 259222

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 258991

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	1.67	1.52		ug/L		91	80 - 120

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

Lab Sample ID: 310-168508-7 MS
Matrix: Water
Analysis Batch: 259222
Client Sample ID: FIELD BLANK
Prep Type: Total/NA
Prep Batch: 258991

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	<0.10	F1	1.67	1.32	F1	ug/L		79	80 - 120

Lab Sample ID: 310-168508-7 MSD
Matrix: Water
Analysis Batch: 259222
Client Sample ID: FIELD BLANK
Prep Type: Total/NA
Prep Batch: 258991

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	<0.10	F1	1.67	1.42		ug/L		85	80 - 120	7	20

Lab Sample ID: MB 310-258993/1-A
Matrix: Water
Analysis Batch: 259222
Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 258993

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.10		0.20	0.10	ug/L		10/31/19 13:00	11/01/19 13:13	1

Lab Sample ID: LCS 310-258993/2-A
Matrix: Water
Analysis Batch: 259222
Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 258993

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	1.67	1.44		ug/L		86	80 - 120

Lab Sample ID: 310-168508-12 MS
Matrix: Water
Analysis Batch: 259222
Client Sample ID: MW-311
Prep Type: Total/NA
Prep Batch: 258993

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	<0.10	F1	1.67	1.37		ug/L		82	80 - 120

Lab Sample ID: 310-168508-12 MSD
Matrix: Water
Analysis Batch: 259222
Client Sample ID: MW-311
Prep Type: Total/NA
Prep Batch: 258993

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	<0.10	F1	1.67	1.28	F1	ug/L		77	80 - 120	6	20

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

Lab Sample ID: 310-168508-7 DU
Matrix: Water
Analysis Batch: 258685
Client Sample ID: FIELD BLANK
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	74		76.0		mg/L		3	24

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

Lab Sample ID: MB 310-259015/1
Matrix: Water
Analysis Batch: 259015

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	<24		30	24	mg/L			10/31/19 14:13	1

Lab Sample ID: LCS 310-259015/2
Matrix: Water
Analysis Batch: 259015

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Dissolved Solids			1000	966		mg/L		97	90 - 110		

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 310-258389/1
Matrix: Water
Analysis Batch: 258389

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

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

Lab Sample ID: 310-168508-1 DU
Matrix: Water
Analysis Batch: 258389

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

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH	7.1	HF		7.1		SU				0.3	20

HPLC/IC

Analysis Batch: 259370

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-1	MW-301	Total/NA	Water	9056A	
310-168508-2	MW-302	Total/NA	Water	9056A	
310-168508-2	MW-302	Total/NA	Water	9056A	
310-168508-3	MW-303	Total/NA	Water	9056A	
310-168508-4	MW-304	Total/NA	Water	9056A	
310-168508-4	MW-304	Total/NA	Water	9056A	
310-168508-5	MW-305	Total/NA	Water	9056A	
310-168508-5	MW-305	Total/NA	Water	9056A	
310-168508-6	MW-306	Total/NA	Water	9056A	
310-168508-6	MW-306	Total/NA	Water	9056A	
310-168508-7	FIELD BLANK	Total/NA	Water	9056A	
310-168508-11	MW-310	Total/NA	Water	9056A	
310-168508-11	MW-310	Total/NA	Water	9056A	
310-168508-12	MW-311	Total/NA	Water	9056A	
MB 310-259370/3	Method Blank	Total/NA	Water	9056A	
LCS 310-259370/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 258560

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-1	MW-301	Total/NA	Water	3010A	
310-168508-2	MW-302	Total/NA	Water	3010A	
310-168508-3	MW-303	Total/NA	Water	3010A	
310-168508-4	MW-304	Total/NA	Water	3010A	
310-168508-5	MW-305	Total/NA	Water	3010A	
310-168508-6	MW-306	Total/NA	Water	3010A	
310-168508-7	FIELD BLANK	Total/NA	Water	3010A	
310-168508-11	MW-310	Total/NA	Water	3010A	
310-168508-12	MW-311	Total/NA	Water	3010A	
MB 310-258560/1-A	Method Blank	Total/NA	Water	3010A	
LCS 310-258560/2-A	Lab Control Sample	Total/NA	Water	3010A	
310-168508-1 MS	MW-301	Total/NA	Water	3010A	
310-168508-1 MSD	MW-301	Total/NA	Water	3010A	
310-168508-11 DU	MW-310	Total/NA	Water	3010A	

Analysis Batch: 258765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-1	MW-301	Total/NA	Water	6020A	258560
310-168508-2	MW-302	Total/NA	Water	6020A	258560
310-168508-3	MW-303	Total/NA	Water	6020A	258560
310-168508-4	MW-304	Total/NA	Water	6020A	258560
310-168508-5	MW-305	Total/NA	Water	6020A	258560
310-168508-6	MW-306	Total/NA	Water	6020A	258560
310-168508-7	FIELD BLANK	Total/NA	Water	6020A	258560
310-168508-11	MW-310	Total/NA	Water	6020A	258560
310-168508-12	MW-311	Total/NA	Water	6020A	258560
MB 310-258560/1-A	Method Blank	Total/NA	Water	6020A	258560
LCS 310-258560/2-A	Lab Control Sample	Total/NA	Water	6020A	258560
310-168508-1 MS	MW-301	Total/NA	Water	6020A	258560
310-168508-1 MSD	MW-301	Total/NA	Water	6020A	258560

Metals (Continued)

Analysis Batch: 258765 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-11 DU	MW-310	Total/NA	Water	6020A	258560

Prep Batch: 258836

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-1	MW-301	Total/NA	Water	7470A	
310-168508-2	MW-302	Total/NA	Water	7470A	
310-168508-3	MW-303	Total/NA	Water	7470A	
310-168508-4	MW-304	Total/NA	Water	7470A	
310-168508-5	MW-305	Total/NA	Water	7470A	
310-168508-6	MW-306	Total/NA	Water	7470A	
MB 310-258836/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-258836/2-A	Lab Control Sample	Total/NA	Water	7470A	

Prep Batch: 258991

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-7	FIELD BLANK	Total/NA	Water	7470A	
310-168508-11	MW-310	Total/NA	Water	7470A	
MB 310-258991/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-258991/2-A	Lab Control Sample	Total/NA	Water	7470A	
310-168508-7 MS	FIELD BLANK	Total/NA	Water	7470A	
310-168508-7 MSD	FIELD BLANK	Total/NA	Water	7470A	

Prep Batch: 258993

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-12	MW-311	Total/NA	Water	7470A	
MB 310-258993/1-A	Method Blank	Total/NA	Water	7470A	
LCS 310-258993/2-A	Lab Control Sample	Total/NA	Water	7470A	
310-168508-12 MS	MW-311	Total/NA	Water	7470A	
310-168508-12 MSD	MW-311	Total/NA	Water	7470A	

Analysis Batch: 259013

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-1	MW-301	Total/NA	Water	7470A	258836
310-168508-2	MW-302	Total/NA	Water	7470A	258836
310-168508-3	MW-303	Total/NA	Water	7470A	258836
310-168508-4	MW-304	Total/NA	Water	7470A	258836
310-168508-5	MW-305	Total/NA	Water	7470A	258836
310-168508-6	MW-306	Total/NA	Water	7470A	258836
MB 310-258836/1-A	Method Blank	Total/NA	Water	7470A	258836
LCS 310-258836/2-A	Lab Control Sample	Total/NA	Water	7470A	258836

Analysis Batch: 259222

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-7	FIELD BLANK	Total/NA	Water	7470A	258991
310-168508-11	MW-310	Total/NA	Water	7470A	258991
310-168508-12	MW-311	Total/NA	Water	7470A	258993
MB 310-258991/1-A	Method Blank	Total/NA	Water	7470A	258991
MB 310-258993/1-A	Method Blank	Total/NA	Water	7470A	258993
LCS 310-258991/2-A	Lab Control Sample	Total/NA	Water	7470A	258991
LCS 310-258993/2-A	Lab Control Sample	Total/NA	Water	7470A	258993
310-168508-7 MS	FIELD BLANK	Total/NA	Water	7470A	258991

Metals (Continued)

Analysis Batch: 259222 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-7 MSD	FIELD BLANK	Total/NA	Water	7470A	258991
310-168508-12 MS	MW-311	Total/NA	Water	7470A	258993
310-168508-12 MSD	MW-311	Total/NA	Water	7470A	258993

General Chemistry

Analysis Batch: 258389

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-1	MW-301	Total/NA	Water	SM 4500 H+ B	
310-168508-2	MW-302	Total/NA	Water	SM 4500 H+ B	
310-168508-3	MW-303	Total/NA	Water	SM 4500 H+ B	
310-168508-4	MW-304	Total/NA	Water	SM 4500 H+ B	
310-168508-5	MW-305	Total/NA	Water	SM 4500 H+ B	
310-168508-6	MW-306	Total/NA	Water	SM 4500 H+ B	
310-168508-7	FIELD BLANK	Total/NA	Water	SM 4500 H+ B	
310-168508-11	MW-310	Total/NA	Water	SM 4500 H+ B	
310-168508-12	MW-311	Total/NA	Water	SM 4500 H+ B	
LCS 310-258389/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
310-168508-1 DU	MW-301	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 258685

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-4	MW-304	Total/NA	Water	SM 2540C	
310-168508-5	MW-305	Total/NA	Water	SM 2540C	
310-168508-6	MW-306	Total/NA	Water	SM 2540C	
310-168508-7	FIELD BLANK	Total/NA	Water	SM 2540C	
310-168508-7 DU	FIELD BLANK	Total/NA	Water	SM 2540C	

Analysis Batch: 259015

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-1	MW-301	Total/NA	Water	SM 2540C	
310-168508-2	MW-302	Total/NA	Water	SM 2540C	
310-168508-3	MW-303	Total/NA	Water	SM 2540C	
310-168508-11	MW-310	Total/NA	Water	SM 2540C	
310-168508-12	MW-311	Total/NA	Water	SM 2540C	
MB 310-259015/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 310-259015/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Field Service / Mobile Lab

Analysis Batch: 259232

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-1	MW-301	Total/NA	Water	Field Sampling	
310-168508-2	MW-302	Total/NA	Water	Field Sampling	
310-168508-3	MW-303	Total/NA	Water	Field Sampling	
310-168508-4	MW-304	Total/NA	Water	Field Sampling	
310-168508-5	MW-305	Total/NA	Water	Field Sampling	
310-168508-6	MW-306	Total/NA	Water	Field Sampling	
310-168508-11	MW-310	Total/NA	Water	Field Sampling	
310-168508-12	MW-311	Total/NA	Water	Field Sampling	

Lab Chronicle

Client: SCS Engineers
Job ID: 310-168508-1
Project/Site: Ottumwa Generating Station 25219072

Client Sample ID: MW-301
Lab Sample ID: 310-168508-1
Date Collected: 10/24/19 09:00
Matrix: Water
Date Received: 10/25/19 18:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	259370	10/31/19 11:59	CJT	TAL CF
Total/NA	Prep	3010A			258560	10/29/19 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	258765	10/29/19 21:22	SAD	TAL CF
Total/NA	Prep	7470A			258836	10/30/19 12:40	HIS	TAL CF
Total/NA	Analysis	7470A		1	259013	10/31/19 13:13	HIS	TAL CF
Total/NA	Analysis	SM 2540C		1	259015	10/31/19 14:13	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	258389	10/25/19 22:47	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	259232	10/24/19 09:00	EAR	TAL CF

Client Sample ID: MW-302
Lab Sample ID: 310-168508-2
Date Collected: 10/24/19 10:20
Matrix: Water
Date Received: 10/25/19 18:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	259370	10/31/19 12:15	CJT	TAL CF
Total/NA	Analysis	9056A		20	259370	11/01/19 11:35	CJT	TAL CF
Total/NA	Prep	3010A			258560	10/29/19 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	258765	10/29/19 21:36	SAD	TAL CF
Total/NA	Prep	7470A			258836	10/30/19 12:40	HIS	TAL CF
Total/NA	Analysis	7470A		1	259013	10/31/19 13:15	HIS	TAL CF
Total/NA	Analysis	SM 2540C		1	259015	10/31/19 14:13	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	258389	10/25/19 22:50	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	259232	10/24/19 10:20	EAR	TAL CF

Client Sample ID: MW-303
Lab Sample ID: 310-168508-3
Date Collected: 10/24/19 12:00
Matrix: Water
Date Received: 10/25/19 18:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	259370	10/31/19 12:30	CJT	TAL CF
Total/NA	Prep	3010A			258560	10/29/19 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	258765	10/29/19 21:39	SAD	TAL CF
Total/NA	Prep	7470A			258836	10/30/19 12:40	HIS	TAL CF
Total/NA	Analysis	7470A		1	259013	10/31/19 13:21	HIS	TAL CF
Total/NA	Analysis	SM 2540C		1	259015	10/31/19 14:13	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	258389	10/25/19 22:52	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	259232	10/24/19 12:00	EAR	TAL CF

Client Sample ID: MW-304
Lab Sample ID: 310-168508-4
Date Collected: 10/23/19 14:27
Matrix: Water
Date Received: 10/25/19 18:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	259370	10/31/19 12:46	CJT	TAL CF

Lab Chronicle

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

Job ID: 310-168508-1

Client Sample ID: MW-304

Date Collected: 10/23/19 14:27
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		10	259370	11/01/19 11:52	CJT	TAL CF
Total/NA	Prep	3010A			258560	10/29/19 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	258765	10/29/19 21:42	SAD	TAL CF
Total/NA	Prep	7470A			258836	10/30/19 12:40	HIS	TAL CF
Total/NA	Analysis	7470A		1	259013	10/31/19 13:36	HIS	TAL CF
Total/NA	Analysis	SM 2540C		1	258685	10/29/19 13:03	MDK	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	258389	10/25/19 22:53	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	259232	10/23/19 14:27	EAR	TAL CF

Client Sample ID: MW-305

Date Collected: 10/23/19 16:15
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	259370	10/31/19 13:01	CJT	TAL CF
Total/NA	Analysis	9056A		10	259370	11/01/19 12:08	CJT	TAL CF
Total/NA	Prep	3010A			258560	10/29/19 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	258765	10/29/19 21:46	SAD	TAL CF
Total/NA	Prep	7470A			258836	10/30/19 12:40	HIS	TAL CF
Total/NA	Analysis	7470A		1	259013	10/31/19 13:38	HIS	TAL CF
Total/NA	Analysis	SM 2540C		1	258685	10/29/19 13:03	MDK	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	258389	10/25/19 22:54	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	259232	10/23/19 16:15	EAR	TAL CF

Client Sample ID: MW-306

Date Collected: 10/23/19 17:00
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	259370	10/31/19 13:17	CJT	TAL CF
Total/NA	Analysis	9056A		20	259370	10/31/19 13:33	CJT	TAL CF
Total/NA	Prep	3010A			258560	10/29/19 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	258765	10/29/19 21:49	SAD	TAL CF
Total/NA	Prep	7470A			258836	10/30/19 12:40	HIS	TAL CF
Total/NA	Analysis	7470A		1	259013	10/31/19 13:29	HIS	TAL CF
Total/NA	Analysis	SM 2540C		1	258685	10/29/19 13:03	MDK	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	258389	10/25/19 22:55	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	259232	10/23/19 17:00	EAR	TAL CF

Lab Chronicle

Client: SCS Engineers
Job ID: 310-168508-1
Project/Site: Ottumwa Generating Station 25219072

Client Sample ID: FIELD BLANK
Lab Sample ID: 310-168508-7
Date Collected: 10/23/19 23:59
Matrix: Water
Date Received: 10/25/19 18:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		1	259370	10/31/19 13:48	CJT	TAL CF
Total/NA	Prep	3010A			258560	10/29/19 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	258765	10/29/19 22:03	SAD	TAL CF
Total/NA	Prep	7470A			258991	10/31/19 12:56	HIS	TAL CF
Total/NA	Analysis	7470A		1	259222	11/01/19 12:06	HIS	TAL CF
Total/NA	Analysis	SM 2540C		1	258685	10/29/19 13:03	MDK	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	258389	10/25/19 23:00	JMH	TAL CF

Client Sample ID: MW-310
Lab Sample ID: 310-168508-11
Date Collected: 10/24/19 12:50
Matrix: Water
Date Received: 10/25/19 18:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	259370	10/31/19 15:22	CJT	TAL CF
Total/NA	Analysis	9056A		20	259370	11/01/19 12:57	CJT	TAL CF
Total/NA	Prep	3010A			258560	10/29/19 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	258765	10/29/19 22:16	SAD	TAL CF
Total/NA	Prep	7470A			258991	10/31/19 12:56	HIS	TAL CF
Total/NA	Analysis	7470A		1	259222	11/01/19 12:13	HIS	TAL CF
Total/NA	Analysis	SM 2540C		1	259015	10/31/19 14:13	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	258389	10/25/19 23:39	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	259232	10/24/19 12:50	EAR	TAL CF

Client Sample ID: MW-311
Lab Sample ID: 310-168508-12
Date Collected: 10/24/19 13:45
Matrix: Water
Date Received: 10/25/19 18:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9056A		5	259370	10/31/19 15:37	CJT	TAL CF
Total/NA	Prep	3010A			258560	10/29/19 08:00	HED	TAL CF
Total/NA	Analysis	6020A		1	258765	10/29/19 22:23	SAD	TAL CF
Total/NA	Prep	7470A			258993	10/31/19 13:00	HIS	TAL CF
Total/NA	Analysis	7470A		1	259222	11/01/19 13:17	HIS	TAL CF
Total/NA	Analysis	SM 2540C		1	259015	10/31/19 14:13	SAS	TAL CF
Total/NA	Analysis	SM 4500 H+ B		1	258389	10/25/19 23:40	JMH	TAL CF
Total/NA	Analysis	Field Sampling		1	259232	10/24/19 13:45	EAR	TAL CF

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

Accreditation/Certification Summary

Client: SCS Engineers
Job ID: 310-168508-1
Project/Site: Ottumwa Generating Station 25219072

Laboratory: Eurofins TestAmerica, Cedar Falls

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

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

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

Method Summary

Client: SCS Engineers
Job ID: 310-168508-1
Project/Site: Ottumwa Generating Station 25219072

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

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310-168508 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS Engineers

City/State: CITY Clive STATE IA Project: Ottumwa Generating Station

Receipt Information

Date/Time Received: DATE 10-25-19 TIME 1830 Received By: LAB

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

Condition of Cooler/Containers

Sample(s) received in Cooler?	☒ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☒ Yes	☐ No	*If yes:* Cooler # 1 of 2
Cooler Custody Seals Present?	☐ Yes	☒ No	*If yes:* Cooler custody seals intact? ☐ Yes ☐ No
Sample Custody Seals Present?	☐ Yes	☒ No	*If yes:* Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?	☐ Yes	☒ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record

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

Thermometer ID: N Correction Factor (°C): +0.0

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

Uncorrected Temp (°C): 1.2 Corrected Temp (°C): 1.2

• Sample Container Temperature

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

Exceptions Noted

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

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

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

Additional Comments

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

Client Information

Client: SCS engineers

City/State: CITY Clive STATE IA

Project: Ottumwa Generating Station

Receipt Information

Date/Time Received: DATE 10-25-19 TIME 1830

Received By: LAB

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

Condition of Cooler/Containers

Sample(s) received in Cooler?	☒ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☒ Yes	☐ No	*If yes:* Cooler # 2 of 2
Cooler Custody Seals Present?	☐ Yes	☒ No	*If yes:* Cooler custody seals intact? ☐ Yes ☐ No
Sample Custody Seals Present?	☐ Yes	☒ No	*If yes:* Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?	☐ Yes	☒ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record

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

Thermometer ID: N

Correction Factor (°C): +0.0

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

Uncorrected Temp (°C): 4.3

Corrected Temp (°C): 4.3

• **Sample Container Temperature**

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

Exceptions Noted

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

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

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

Additional Comments

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

Chain of Custody Record

TestAmerica Des Moines SC
214

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Client Information	Sampler: Louise Jennings	Lab PM: Fredrick, Sandie	Carrier Tracking No(s):	COC No: 310-44167-12671.1
Client Contact: Louise Jennings	Phone: 608 509 8245	E-Mail: sandie.fredrick@testamericainc.com		Page: Page 1 of 2
Company: SCS Engineers				Job #:
Address: 8450 Hickman Road Suite 20	Due Date Requested:			
City: Clive	TAT Requested (days): Standard			
State, Zip: IA, 50325				
Phone:	PO #: 25219072			
Email: ljennings@scsengineers.com	WO #:			
Project Name: Ottumwa Generating Station 25219072	Project #: 31011020			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

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

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0, 904.0	6020A, 7470A	2540C_Calcd, 9056A_ORGFM_28D, SM4500_H+	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D	N		
MW-301	10.24.19	0900	G	Water			X	X	X		
MW-302	10.24.19	1020		Water							
MW-303	10.24.19	1200		Water							
MW-304	10.23.19	1427		Water							
MW-305	10.23.19	1615		Water							
MW-306	10.23.19	1700		Water							
FIELD BLANK	10.23.19	2359		Water							
MW-307	10.23.19	1315	G	Water							
MW-308	10.23.19	1156		Water							
MW-309	10.23.19	1032		Water							
FIELD BLANK				Water							

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

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

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

Special Instructions/QC Requirements:

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

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	10.24.19 1600	SCS	Lindsay Binder	10.25.19 1830	ETA
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

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

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

Chain of Custody Record

TestAmerica Des Moines SC
214

eurofins | Environment Testing TestAmerica

Client Information	Sampler: Louise Jennings	Lab PM: Fredrick, Sandie	Carrier Tracking No(s):	COC No: 310-44167-12671.2
Client Contact: Louise Jennings	Phone: 608 509 8245	E-Mail: sandie.fredrick@testamericainc.com		Page: Page 2 of 2
Company: SCS Engineers				Job #:
Address: 8450 Hickman Road Suite 20	Due Date Requested:			
City: Clive	TAT Requested (days): Standard			
State, Zip: IA, 50325				
Phone:	PO #: 25219072			
Email: ljennings@scsengineers.com	WO #:			
Project Name: Ottumwa Generating Station 25219072	Project #: 31011020			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

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

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0, 904.0	6020A, 7470A	2540C_Calcd, 9056A_ORGFM_28D, SM4500_H+	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D	N		
MW-310	10.24.19	1250	G	Water			X	X	X		
MW-311	10.24.19	1345	G	Water			X	X	X		

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

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

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

Special Instructions/QC Requirements:

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

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		10.24.19 1600	SCS	Lindsay Burden	10-25-19 1830	ETA
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

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

Ver: 01/16/2019

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
MW-301	310-168508-A-1	Plastic 250ml - with Nitric Acid	<2		
MW-301	310-168508-C-1	Plastic 1 liter - Nitric Acid	<2		
MW-301	310-168508-D-1	Plastic 1 liter - Nitric Acid	<2		
MW-302	310-168508-A-2	Plastic 250ml - with Nitric Acid	<2		
MW-302	310-168508-C-2	Plastic 1 liter - Nitric Acid	<2		
MW-302	310-168508-D-2	Plastic 1 liter - Nitric Acid	<2		
MW-303	310-168508-A-3	Plastic 250ml - with Nitric Acid	<2		
MW-303	310-168508-C-3	Plastic 1 liter - Nitric Acid	<2		
MW-303	310-168508-D-3	Plastic 1 liter - Nitric Acid	<2		
MW-304	310-168508-A-4	Plastic 250ml - with Nitric Acid	<2		
MW-304	310-168508-C-4	Plastic 1 liter - Nitric Acid	<2		
MW-304	310-168508-D-4	Plastic 1 liter - Nitric Acid	<2		
MW-305	310-168508-A-5	Plastic 250ml - with Nitric Acid	<2		
MW-305	310-168508-C-5	Plastic 1 liter - Nitric Acid	<2		
MW-305	310-168508-D-5	Plastic 1 liter - Nitric Acid	<2		
MW-306	310-168508-A-6	Plastic 250ml - with Nitric Acid	<2		
MW-306	310-168508-C-6	Plastic 1 liter - Nitric Acid	<2		
MW-306	310-168508-D-6	Plastic 1 liter - Nitric Acid	<2		
FIELD BLANK	310-168508-A-7	Plastic 250ml - with Nitric Acid	<2		
FIELD BLANK	310-168508-C-7	Plastic 1 liter - Nitric Acid	<2		
FIELD BLANK	310-168508-D-7	Plastic 1 liter - Nitric Acid	<2		
MW-307	310-168508-A-8	Plastic 250ml - with Nitric Acid	<2		
MW-308	310-168508-A-9	Plastic 250ml - with Nitric Acid	<2		
MW-309	310-168508-A-10	Plastic 250ml - with Nitric Acid	<2		
MW-310	310-168508-A-11	Plastic 250ml - with Nitric Acid	<2		
MW-310	310-168508-C-11	Plastic 1 liter - Nitric Acid	<2		
MW-310	310-168508-D-11	Plastic 1 liter - Nitric Acid	<2		
MW-311	310-168508-A-12	Plastic 250ml - with Nitric Acid	<2		
MW-311	310-168508-C-12	Plastic 1 liter - Nitric Acid	<2		
MW-311	310-168508-D-12	Plastic 1 liter - Nitric Acid	<2		

Table 1. Sampling Points and Parameters - CCR Rule Sampling Program
Groundwater Monitoring - Ottumwa Generating Station / SCS Engineers Project #25219072

		COC #1		COC #2							COC #3			
	Parameter	MW-301	Field Blank	MW-302	MW-303	MW-304	MW-305	MW-306	MW-310	MW-311	MW-307	MW-308	MW-309	TOTAL
Appendix III Parameters	Boron	x	x	x	x	x	x	x	x	x	x	x	x	12
	Calcium	x	x	x	x	x	x	x	x	x	x	x	x	12
	Chloride	x	x	x	x	x	x	x	x	x	x	x	x	12
	Fluoride	x	x	x	x	x	x	x	x	x	x	x	x	12
	pH	x	x	x	x	x	x	x	x	x	x	x	x	12
	Sulfate	x	x	x	x	x	x	x	x	x	x	x	x	12
	TDS	x	x	x	x	x	x	x	x	x	x	x	x	12
Appendix IV Parameters	Antimony	x	x	x	x	x	x	x	x	x				9
	Arsenic	x	x	x	x	x	x	x	x	x				9
	Barium	x	x	x	x	x	x	x	x	x				9
	Beryllium	x	x	x	x	x	x	x	x	x				9
	Cadmium	x	x	x	x	x	x	x	x	x				9
	Chromium	x	x	x	x	x	x	x	x	x				9
	Cobalt	x	x	x	x	x	x	x	x	x				9
	Fluoride	x	x	x	x	x	x	x	x	x				9
	Lead	x	x	x	x	x	x	x	x	x				9
	Lithium	x	x	x	x	x	x	x	x	x				9
	Mercury	x	x	x	x	x	x	x	x	x				9
	Molybdenum	x	x	x	x	x	x	x	x	x				9
	Selenium	x	x	x	x	x	x	x	x	x				9
	Thallium	x	x	x	x	x	x	x	x	x				9
	Radium	x	x	x	x	x	x	x	x	x				9
Field Parameters	Groundwater Elevation	x		x	x	x	x	x	x	x	x	x	x	11
	Well Depth	x		x	x	x	x	x	x	x	x	x	x	11
	pH (field)	x		x	x	x	x	x	x	x	x	x	x	11
	Specific Conductance	x		x	x	x	x	x	x	x	x	x	x	11
	Dissolved Oxygen	x		x	x	x	x	x	x	x	x	x	x	11
	ORP	x		x	x	x	x	x	x	x	x	x	x	11
	Temperature	x		x	x	x	x	x	x	x	x	x	x	11
	Turbidity	x		x	x	x	x	x	x	x	x	x	x	11
	Color	x		x	x	x	x	x	x	x	x	x	x	11
	Odor	x		x	x	x	x	x	x	x	x	x	x	11

Notes: All samples are unfiltered (total).

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Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-168508-1

Login Number: 168508
List Number: 1
Creator: Bovy, Lorrainna L

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.	True	

Table 2. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station - ZLDP / SCS Engineers Project No. 25219072
October 2019

Sample	Date/Sample Time	Groundwater Elevation (amsl)	Temperature (Deg. C)	pH (Std. Units)	Dissolved Oxygen (mg/L)	Specific Conductivity (µmhos/cm)	ORP (mV)	Turbidity
MW-307	10.23.19/1315	651.89	13.38	6.68	0.25	1684	-24.8	12.5
MW-308	10.23.19/1156	651.31	13.16	6.78	4.42	1637	-38.7	7.42
MW-309	10.23.19/1032	651.28	12.83	6.98	0.36	1461	-27.5	42.6

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

Notes:
none

Created by: KAK Date: 5/1/2017
Last revision by: NDK Date: 11/1/2019
Checked by: MDB Date: 11/1/2019

I:\25219072.00\Data and Calculations\Tables\Fleld Data\[OGS_CCR_Field_2019 Oct-ZLDP.xlsx]GW Field Parameters

Table 2. Groundwater Monitoring Results - Field Parameters
Ottumwa Generating Station - Primary Pond / SCS Engineers Project No. 25219072
October 2019

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	10.24.19/0900	683.07	13.71	6.33	4.94	902	9.9	1.6
MW-302	10.24.19/1020	660.14	12.91	6.55	0.35	2184	-0.5	11.9
MW-303	10.24.19/1200	653.86	15.34	6.83	0.28	1287	-5.1	4.24
MW-304	10.23.19/1427	657.71	13.64	7.05	0.44	1871	-57.5	18.9
MW-305	10.23.19/1615	663.21	13.2	6.91	0.42	1794	-6.7	6.21
MW-306	10.23.19/1700	671.28	13.12	6.74	0.29	1266	-0.5	12.3
MW-310	10.24.19/1250	649.31	13.74	7.15	0.41	1906	-9.3	2.29
MW-311	10.24.19/1345	647.80	13.88	6.95	0.29	926	-24.7	3.88

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

Notes:
none

Created by:	KAK	Date:	5/1/2017
Last revision by:	LWJ	Date:	10/31/2019
Checked by:	JSN	Date:	11/1/2019
Scientist QA/QC:	NDK	Date:	11/1/2019

I:\25219072.00\Data and Calculations\Tables\[OGS_CCR_Field_2019_October1.xlsx]GW Field Parameters

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ANALYTICAL REPORT

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

Laboratory Job ID: 310-168508-2
Client Project/Site: Ottumwa Generating Station 25219072

For:
SCS Engineers
2830 Dairy Drive
Madison, Wisconsin 53718

Attn: Meghan Blodgett

Therese Hargraves

Authorized for release by:
11/22/2019 9:53:08 AM
Therese Hargraves, Project Manager I
(708)793-3461
therese.hargraves@testamericainc.com

Designee for

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

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

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

Table of Contents

Job ID: 310-168508-2

Laboratory: Eurofins TestAmerica, Cedar Falls

Narrative

Job Narrative
310-168508-2

Comments
No additional comments.

Receipt
The samples were received on 10/25/2019 6:30 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.2º C and 4.3º C.

RAD
Methods 903.0, 9315: Radium-226 Prep Batch 160-448344

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 (310-168508-1), MW-302 (310-168508-2), MW-303 (310-168508-3), MW-304 (310-168508-4), MW-305 (310-168508-5), MW-306 (310-168508-6), FIELD BLANK (310-168508-7), MW-310 (310-168508-11), MW-311 (310-168508-12), (LCS 160-448344/1-A), (LCSD 160-448344/2-A) and (MB 160-448344/21-A)

Methods 904.0, 9320: Radium-228 Prep Batch 160-448411

The following batch has a LCS (139%) that is above the upper limit (75-125%). The LCSD was within limits and all samples met the client requested limit (RL). The data has been reported with this narrative.

MW-301 (310-168508-1), MW-302 (310-168508-2), MW-303 (310-168508-3), MW-304 (310-168508-4), MW-305 (310-168508-5), MW-306 (310-168508-6), FIELD BLANK (310-168508-7), MW-310 (310-168508-11), MW-311 (310-168508-12), (LCS 160-448411/1-A), (LCSD 160-448411/2-A) and (MB 160-448411/21-A)

Methods 904.0, 9320: Radium-228 Prep Batch 160-448411

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 (310-168508-1), MW-302 (310-168508-2), MW-303 (310-168508-3), MW-304 (310-168508-4), MW-305 (310-168508-5), MW-306 (310-168508-6), FIELD BLANK (310-168508-7), MW-310 (310-168508-11), MW-311 (310-168508-12), (LCS 160-448411/1-A), (LCSD 160-448411/2-A) and (MB 160-448411/21-A)

Method PrecSep_0: Radium 228 Prep Batch 160-448411:

Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-301 (310-168508-1), MW-302 (310-168508-2), MW-303 (310-168508-3), MW-304 (310-168508-4), MW-305 (310-168508-5), MW-306 (310-168508-6), FIELD BLANK (310-168508-7), MW-310 (310-168508-11) and MW-311 (310-168508-12). A laboratory control sample/ laboratory control sample duplicate (LCS/LCSD) were prepared instead to demonstrate batch precision.

Method PrecSep-21: Radium 226 Prep batch 160-448344:

Insufficient sample volume was available to perform a sample duplicate for the following samples: MW-301 (310-168508-1), MW-302 (310-168508-2), MW-303 (310-168508-3), MW-304 (310-168508-4), MW-305 (310-168508-5), MW-306 (310-168508-6), FIELD BLANK (310-168508-7), MW-310 (310-168508-11) and MW-311 (310-168508-12). 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
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
310-168508-1	MW-301	Water	10/24/19 09:00	10/25/19 18:30	
310-168508-2	MW-302	Water	10/24/19 10:20	10/25/19 18:30	
310-168508-3	MW-303	Water	10/24/19 12:00	10/25/19 18:30	
310-168508-4	MW-304	Water	10/23/19 14:27	10/25/19 18:30	
310-168508-5	MW-305	Water	10/23/19 16:15	10/25/19 18:30	
310-168508-6	MW-306	Water	10/23/19 17:00	10/25/19 18:30	
310-168508-7	FIELD BLANK	Water	10/23/19 23:59	10/25/19 18:30	
310-168508-11	MW-310	Water	10/24/19 12:50	10/25/19 18:30	
310-168508-12	MW-311	Water	10/24/19 13:45	10/25/19 18:30	

Client Sample Results

Client: SCS Engineers
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

Client Sample ID: MW-301
Date Collected: 10/24/19 09:00
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-1
Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.203		0.101	0.103	1.00	0.119	pCi/L	10/30/19 11:17	11/21/19 08:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*94.9*		*40 - 110*	*10/30/19 11:17*	*11/21/19 08:40*	*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	0.753	*	0.308	0.315	1.00	0.443	pCi/L	10/31/19 06:24	11/08/19 09:02	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*94.9*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:02*	*1*
Y Carrier	*86.7*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:02*	*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	0.956		0.324	0.331	5.00	0.443	pCi/L		11/22/19 07:47	1

Client Sample Results

Client: SCS Engineers
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

Client Sample ID: MW-302
Date Collected: 10/24/19 10:20
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-2
Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.171		0.112	0.113	1.00	0.156	pCi/L	10/30/19 11:17	11/21/19 08:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*82.6*		*40 - 110*	*10/30/19 11:17*	*11/21/19 08:40*	*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	0.619	*	0.295	0.301	1.00	0.427	pCi/L	10/31/19 06:24	11/08/19 09:06	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*82.6*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:06*	*1*
Y Carrier	*81.9*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:06*	*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	0.790		0.316	0.322	5.00	0.427	pCi/L		11/22/19 07:47	1

Client Sample Results

Client: SCS Engineers
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

Client Sample ID: MW-303
Date Collected: 10/24/19 12:00
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-3
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	0.0705	U	0.105	0.106	1.00	0.180	pCi/L	10/30/19 11:17	11/21/19 08:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*74.8*		*40 - 110*	*10/30/19 11:17*	*11/21/19 08:40*	*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	0.265	U *	0.279	0.280	1.00	0.455	pCi/L	10/31/19 06:24	11/08/19 09:06	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*74.8*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:06*	*1*
Y Carrier	*80.7*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:06*	*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	0.336	U	0.298	0.299	5.00	0.455	pCi/L		11/22/19 07:47	1

Client Sample Results

Client: SCS Engineers
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

Client Sample ID: MW-304
Date Collected: 10/23/19 14:27
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-4
Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	1.52		0.272	0.304	1.00	0.196	pCi/L	10/30/19 11:17	11/21/19 08:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*88.0*		*40 - 110*	*10/30/19 11:17*	*11/21/19 08:40*	*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	1.50	*	0.336	0.364	1.00	0.369	pCi/L	10/31/19 06:24	11/08/19 09:06	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*88.0*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:06*	*1*
Y Carrier	*81.9*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:06*	*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	3.03		0.432	0.474	5.00	0.369	pCi/L		11/22/19 07:47	1

Client Sample Results

Client: SCS Engineers
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

Client Sample ID: MW-305
Date Collected: 10/23/19 16:15
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-5
Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	**0.263**		0.137	0.139	1.00	0.183	pCi/L	10/30/19 11:17	11/21/19 08:40	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*88.9*		*40 - 110*	*10/30/19 11:17*	*11/21/19 08:40*	*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	0.197	U *	0.253	0.253	1.00	0.420	pCi/L	10/31/19 06:24	11/08/19 09:06	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*88.9*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:06*	*1*
Y Carrier	*86.4*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:06*	*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	**0.460**		0.288	0.289	5.00	0.420	pCi/L		11/22/19 07:47	1

Client Sample Results

Client: SCS Engineers
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

Client Sample ID: MW-306
Date Collected: 10/23/19 17:00
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-6
Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.00587	U	0.0963	0.0963	1.00	0.190	pCi/L	10/30/19 11:17	11/21/19 08:41	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*90.1*		*40 - 110*	*10/30/19 11:17*	*11/21/19 08:41*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	**0.624**	*	0.260	0.266	1.00	0.359	pCi/L	10/31/19 06:24	11/08/19 09:06	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*90.1*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:06*	*1*
Y Carrier	*83.7*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:06*	*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	**0.624**		0.277	0.283	5.00	0.359	pCi/L		11/22/19 07:47	1

Client Sample Results

Client: SCS Engineers
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

Client Sample ID: FIELD BLANK
Lab Sample ID: 310-168508-7
Date Collected: 10/23/19 23:59
Matrix: Water
Date Received: 10/25/19 18:30

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0866	U	0.0593	0.0598	1.00	0.164	pCi/L	10/30/19 11:17	11/21/19 08:41	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*94.9*		*40 - 110*	*10/30/19 11:17*	*11/21/19 08:41*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	**0.413**	*	0.232	0.235	1.00	0.344	pCi/L	10/31/19 06:24	11/08/19 09:06	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*94.9*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:06*	*1*
Y Carrier	*86.7*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:06*	*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	**0.413**		0.239	0.242	5.00	0.344	pCi/L		11/22/19 07:47	1

Client Sample Results

Client: SCS Engineers
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

Client Sample ID: MW-310
Date Collected: 10/24/19 12:50
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-11
Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	-0.0487	U	0.0720	0.0721	1.00	0.164	pCi/L	10/30/19 11:17	11/21/19 10:26	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*81.4*		*40 - 110*	*10/30/19 11:17*	*11/21/19 10:26*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	**0.411**	*	0.268	0.270	1.00	0.408	pCi/L	10/31/19 06:24	11/08/19 09:06	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*81.4*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:06*	*1*
Y Carrier	*82.6*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:06*	*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	**0.411**		0.278	0.279	5.00	0.408	pCi/L		11/22/19 07:47	1

Client Sample ID: MW-311
Date Collected: 10/24/19 13:45
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-12
Matrix: Water

Method: 903.0 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.108	U	0.0981	0.0986	1.00	0.153	pCi/L	10/30/19 11:17	11/21/19 10:26	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*103*		*40 - 110*	*10/30/19 11:17*	*11/21/19 10:26*	*1*

Method: 904.0 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.303	U *	0.240	0.242	1.00	0.382	pCi/L	10/31/19 06:24	11/08/19 09:07	1

Carrier	*%Yield*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*103*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:07*	*1*
Y Carrier	*85.2*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:07*	*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	**0.411**		0.259	0.261	5.00	0.382	pCi/L		11/22/19 07:47	1

Definitions/Glossary

Client: SCS Engineers
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

Qualifiers

Rad

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
U	Result is less than the sample detection limit.

Glossary

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

Method: 903.0 - Radium-226 (GFPC)

Lab Sample ID: MB 160-448344/21-A
Matrix: Water
Analysis Batch: 451498

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 448344

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.01229	U	0.0607	0.0607	1.00	0.120	pCi/L	10/30/19 11:17	11/21/19 10:26	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*93.1*		*40 - 110*	*10/30/19 11:17*	*11/21/19 10:26*	*1*

Lab Sample ID: LCS 160-448344/1-A
Matrix: Water
Analysis Batch: 451498

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 448344

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-226			11.4	12.16		1.29	1.00	0.175	pCi/L	107	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*74.8*		*40 - 110*

Lab Sample ID: LCSD 160-448344/2-A
Matrix: Water
Analysis Batch: 451498

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 448344

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-226			11.4	12.62		1.31	1.00	0.163	pCi/L	111	75 - 125	0.17	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*94.0*		*40 - 110*

Method: 904.0 - Radium-228 (GFPC)

Lab Sample ID: MB 160-448411/21-A
Matrix: Water
Analysis Batch: 449621

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 448411

Analyte	MB Result	MB Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.4561		0.249	0.252	1.00	0.369	pCi/L	10/31/19 06:24	11/08/19 09:07	1

Carrier	*MB %Yield*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Ba Carrier	*93.1*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:07*	*1*
Y Carrier	*83.7*		*40 - 110*	*10/31/19 06:24*	*11/08/19 09:07*	*1*

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

Lab Sample ID: LCS 160-448411/1-A
Matrix: Water
Analysis Batch: 449588

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 448411

Analyte			Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits		
Radium-228			9.42	13.06	*	1.51	1.00	0.513	pCi/L	139	75 - 125		

Carrier	*LCS %Yield*	*LCS Qualifier*	*Limits*
Ba Carrier	*74.8*		*40 - 110*
Y Carrier	*82.2*		*40 - 110*

Lab Sample ID: LCSD 160-448411/2-A
Matrix: Water
Analysis Batch: 449588

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 448411

Analyte			Spike Added	LCSD Result	LCSD Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits	RER	RER Limit
Radium-228			9.42	10.72		1.23	1.00	0.430	pCi/L	114	75 - 125	0.85	1

Carrier	*LCSD %Yield*	*LCSD Qualifier*	*Limits*
Ba Carrier	*94.0*		*40 - 110*
Y Carrier	*81.5*		*40 - 110*

QC Association Summary

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

Job ID: 310-168508-2

Rad

Prep Batch: 448344

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-1	MW-301	Total/NA	Water	PrecSep-21	
310-168508-2	MW-302	Total/NA	Water	PrecSep-21	
310-168508-3	MW-303	Total/NA	Water	PrecSep-21	
310-168508-4	MW-304	Total/NA	Water	PrecSep-21	
310-168508-5	MW-305	Total/NA	Water	PrecSep-21	
310-168508-6	MW-306	Total/NA	Water	PrecSep-21	
310-168508-7	FIELD BLANK	Total/NA	Water	PrecSep-21	
310-168508-11	MW-310	Total/NA	Water	PrecSep-21	
310-168508-12	MW-311	Total/NA	Water	PrecSep-21	
MB 160-448344/21-A	Method Blank	Total/NA	Water	PrecSep-21	
LCS 160-448344/1-A	Lab Control Sample	Total/NA	Water	PrecSep-21	
LCSD 160-448344/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep-21	

Prep Batch: 448411

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-168508-1	MW-301	Total/NA	Water	PrecSep_0	
310-168508-2	MW-302	Total/NA	Water	PrecSep_0	
310-168508-3	MW-303	Total/NA	Water	PrecSep_0	
310-168508-4	MW-304	Total/NA	Water	PrecSep_0	
310-168508-5	MW-305	Total/NA	Water	PrecSep_0	
310-168508-6	MW-306	Total/NA	Water	PrecSep_0	
310-168508-7	FIELD BLANK	Total/NA	Water	PrecSep_0	
310-168508-11	MW-310	Total/NA	Water	PrecSep_0	
310-168508-12	MW-311	Total/NA	Water	PrecSep_0	
MB 160-448411/21-A	Method Blank	Total/NA	Water	PrecSep_0	
LCS 160-448411/1-A	Lab Control Sample	Total/NA	Water	PrecSep_0	
LCSD 160-448411/2-A	Lab Control Sample Dup	Total/NA	Water	PrecSep_0	

Lab Chronicle

Client: SCS Engineers
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

Client Sample ID: MW-301
Lab Sample ID: 310-168508-1
Date Collected: 10/24/19 09:00
Matrix: Water
Date Received: 10/25/19 18:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			448344	10/30/19 11:17	MNH	TAL SL
Total/NA	Analysis	903.0		1	451498	11/21/19 08:40	CJQ	TAL SL
Total/NA	Prep	PrecSep_0			448411	10/31/19 06:24	MNH	TAL SL
Total/NA	Analysis	904.0		1	449588	11/08/19 09:02	AJD	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	451575	11/22/19 07:47	SMP	TAL SL

Client Sample ID: MW-302
Lab Sample ID: 310-168508-2
Date Collected: 10/24/19 10:20
Matrix: Water
Date Received: 10/25/19 18:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			448344	10/30/19 11:17	MNH	TAL SL
Total/NA	Analysis	903.0		1	451498	11/21/19 08:40	CJQ	TAL SL
Total/NA	Prep	PrecSep_0			448411	10/31/19 06:24	MNH	TAL SL
Total/NA	Analysis	904.0		1	449621	11/08/19 09:06	AJD	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	451575	11/22/19 07:47	SMP	TAL SL

Client Sample ID: MW-303
Lab Sample ID: 310-168508-3
Date Collected: 10/24/19 12:00
Matrix: Water
Date Received: 10/25/19 18:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			448344	10/30/19 11:17	MNH	TAL SL
Total/NA	Analysis	903.0		1	451498	11/21/19 08:40	CJQ	TAL SL
Total/NA	Prep	PrecSep_0			448411	10/31/19 06:24	MNH	TAL SL
Total/NA	Analysis	904.0		1	449621	11/08/19 09:06	AJD	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	451575	11/22/19 07:47	SMP	TAL SL

Client Sample ID: MW-304
Lab Sample ID: 310-168508-4
Date Collected: 10/23/19 14:27
Matrix: Water
Date Received: 10/25/19 18:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			448344	10/30/19 11:17	MNH	TAL SL
Total/NA	Analysis	903.0		1	451498	11/21/19 08:40	CJQ	TAL SL
Total/NA	Prep	PrecSep_0			448411	10/31/19 06:24	MNH	TAL SL
Total/NA	Analysis	904.0		1	449621	11/08/19 09:06	AJD	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	451575	11/22/19 07:47	SMP	TAL SL

Lab Chronicle

Client: SCS Engineers
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

Client Sample ID: MW-305
Lab Sample ID: 310-168508-5
Date Collected: 10/23/19 16:15
Matrix: Water
Date Received: 10/25/19 18:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			448344	10/30/19 11:17	MNH	TAL SL
Total/NA	Analysis	903.0		1	451498	11/21/19 08:40	CJQ	TAL SL
Total/NA	Prep	PrecSep_0			448411	10/31/19 06:24	MNH	TAL SL
Total/NA	Analysis	904.0		1	449621	11/08/19 09:06	AJD	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	451575	11/22/19 07:47	SMP	TAL SL

Client Sample ID: MW-306
Lab Sample ID: 310-168508-6
Date Collected: 10/23/19 17:00
Matrix: Water
Date Received: 10/25/19 18:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			448344	10/30/19 11:17	MNH	TAL SL
Total/NA	Analysis	903.0		1	451498	11/21/19 08:41	CJQ	TAL SL
Total/NA	Prep	PrecSep_0			448411	10/31/19 06:24	MNH	TAL SL
Total/NA	Analysis	904.0		1	449621	11/08/19 09:06	AJD	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	451575	11/22/19 07:47	SMP	TAL SL

Client Sample ID: FIELD BLANK
Lab Sample ID: 310-168508-7
Date Collected: 10/23/19 23:59
Matrix: Water
Date Received: 10/25/19 18:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			448344	10/30/19 11:17	MNH	TAL SL
Total/NA	Analysis	903.0		1	451498	11/21/19 08:41	CJQ	TAL SL
Total/NA	Prep	PrecSep_0			448411	10/31/19 06:24	MNH	TAL SL
Total/NA	Analysis	904.0		1	449621	11/08/19 09:06	AJD	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	451575	11/22/19 07:47	SMP	TAL SL

Client Sample ID: MW-310
Lab Sample ID: 310-168508-11
Date Collected: 10/24/19 12:50
Matrix: Water
Date Received: 10/25/19 18:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			448344	10/30/19 11:17	MNH	TAL SL
Total/NA	Analysis	903.0		1	451498	11/21/19 10:26	CJQ	TAL SL
Total/NA	Prep	PrecSep_0			448411	10/31/19 06:24	MNH	TAL SL
Total/NA	Analysis	904.0		1	449621	11/08/19 09:06	AJD	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	451575	11/22/19 07:47	SMP	TAL SL

Lab Chronicle

Client: SCS Engineers
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

Client Sample ID: MW-311
Date Collected: 10/24/19 13:45
Date Received: 10/25/19 18:30

Lab Sample ID: 310-168508-12
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PrecSep-21			448344	10/30/19 11:17	MNH	TAL SL
Total/NA	Analysis	903.0		1	451498	11/21/19 10:26	CJQ	TAL SL
Total/NA	Prep	PrecSep_0			448411	10/31/19 06:24	MNH	TAL SL
Total/NA	Analysis	904.0		1	449621	11/08/19 09:07	AJD	TAL SL
Total/NA	Analysis	Ra226_Ra228 Pos		1	451575	11/22/19 07:47	SMP	TAL SL

Laboratory References:

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

Accreditation/Certification Summary

Client: SCS Engineers
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

Laboratory: Eurofins TestAmerica, Cedar Falls

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

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

Laboratory: Eurofins TestAmerica, St. Louis

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

Authority	Program	Identification Number	Expiration Date
ANAB	Dept. of Defense ELAP	L2305	04-06-22
ANAB	Dept. of Energy	L2305.01	04-06-22
ANAB	ISO/IEC 17025	L2305	04-06-22
Arizona	State	AZ0813	12-08-19
California	Los Angeles County Sanitation Districts	10259	06-30-20
California	State	2886	06-30-20
Connecticut	State	PH-0241	03-31-21
Florida	NELAP	E87689	06-30-20
HI - RadChem Recognition	State	n/a	06-30-20
Illinois	NELAP	004553	11-30-19
Iowa	State	373	09-17-20
Kansas	NELAP	E-10236	10-31-20
Kentucky (DW)	State	KY90125	12-31-19
Louisiana	NELAP	04080	06-30-20
Louisiana (DW)	State	LA011	12-31-19
Maryland	State	310	09-30-20
MI - RadChem Recognition	State	9005	06-30-20
Missouri	State	780	06-30-22
Nevada	State	MO000542020-1	07-31-20
New Jersey	NELAP	MO002	06-30-20
New York	NELAP	11616	04-01-20
North Dakota	State	R-207	06-30-20
NRC	NRC	24-24817-01	12-31-22
Oklahoma	State	9997	08-31-20
Pennsylvania	NELAP	68-00540	02-28-20
South Carolina	State	85002001	06-30-20
Texas	NELAP	T104704193-19-13	07-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-17-00028	02-02-20
Utah	NELAP	MO000542019-11	07-31-20
Virginia	NELAP	10310	06-14-20
Washington	State	C592	08-30-20
West Virginia DEP	State	381	12-01-19

Method Summary

Client: SCS Engineers
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

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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310-168508 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS Engineers

City/State: CITY Clive STATE IA Project: Ottumwa Generating Station

Receipt Information

Date/Time Received: DATE 10-25-19 TIME 1830 Received By: LAB

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

Condition of Cooler/Containers

Sample(s) received in Cooler?	☒ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☒ Yes	☐ No	*If yes:* Cooler # 1 of 2
Cooler Custody Seals Present?	☐ Yes	☒ No	*If yes:* Cooler custody seals intact? ☐ Yes ☐ No
Sample Custody Seals Present?	☐ Yes	☒ No	*If yes:* Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?	☐ Yes	☒ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record

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

Thermometer ID: N Correction Factor (°C): +0.0

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

Uncorrected Temp (°C): 1.2 Corrected Temp (°C): 1.2

• Sample Container Temperature

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

Exceptions Noted

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

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

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

Additional Comments

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Place COC scanning label here
214

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SCS engineers

City/State: CITY Clive STATE IA Project: Ottumwa Generating Station

Receipt Information

Date/Time Received: DATE 10-25-19 TIME 1830 Received By: LAB

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

Condition of Cooler/Containers

Sample(s) received in Cooler?	☒ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☒ Yes	☐ No	*If yes:* Cooler # 2 of 2
Cooler Custody Seals Present?	☐ Yes	☒ No	*If yes:* Cooler custody seals intact? ☐ Yes ☐ No
Sample Custody Seals Present?	☐ Yes	☒ No	*If yes:* Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?	☐ Yes	☒ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record

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

Thermometer ID: N Correction Factor (°C): +0.0

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

Uncorrected Temp (°C): 4.3 Corrected Temp (°C): 4.3

• Sample Container Temperature

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

Exceptions Noted

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

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

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

Additional Comments

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

Chain of Custody Record

TestAmerica Des Moines SC
214

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Client Information	Sampler: Louise Jennings	Lab PM: Fredrick, Sandie	Carrier Tracking No(s):	COC No: 310-44167-12671.1
Client Contact: Louise Jennings	Phone: 608 509 8245	E-Mail: sandie.fredrick@testamericainc.com		Page: Page 1 of 2
Company: SCS Engineers				Job #:
Address: 8450 Hickman Road Suite 20	Due Date Requested:			
City: Clive	TAT Requested (days): Standard			
State, Zip: IA, 50325				
Phone:	PO #: 25219072			
Email: ljennings@scsengineers.com	WO #:			
Project Name: Ottumwa Generating Station 25219072	Project #: 31011020			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

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

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0, 904.0	6020A, 7470A	2540C_Calcd, 9056A_ORGFM_28D, SM4500_H+	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D	N		
MW-301	10.24.19	0900	G	Water			X	X	X		
MW-302	10.24.19	1020		Water							
MW-303	10.24.19	1200		Water							
MW-304	10.23.19	1427		Water							
MW-305	10.23.19	1615		Water							
MW-306	10.23.19	1700		Water							
FIELD BLANK	10.23.19	2359		Water							
MW-307	10.23.19	1315	G	Water							
MW-308	10.23.19	1156		Water							
MW-309	10.23.19	1032		Water							
FIELD BLANK				Water							

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

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

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

Special Instructions/QC Requirements:

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

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Louise Jennings	10.24.19 1600	SCS	Lindsay Binder	10.25.19 1830	ETA
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

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

Ver: 01/16/2019

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

Chain of Custody Record

TestAmerica Des Moines SC
214

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Client Information	Sampler: Louise Jennings	Lab PM: Fredrick, Sandie	Carrier Tracking No(s):	COC No: 310-44167-12671.2
Client Contact: Louise Jennings	Phone: 608 509 8245	E-Mail: sandie.fredrick@testamericainc.com		Page: Page 2 of 2
Company: SCS Engineers				Job #:

Address: 8450 Hickman Road Suite 20	Due Date Requested:	Analysis Requested
City: Clive	TAT Requested (days): Standard	
State, Zip: IA, 50325	PO #: 25219072	
Phone:	WO #:	
Email: ljennings@scsengineers.com	Project #: 31011020	
Project Name: Ottumwa Generating Station 25219072	SSOW#:	
Site:		

Preservation Codes:

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

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	903.0, 904.0	6020A, 7470A	2540C_Calcd, 9056A_ORGFM_28D, SM4500_H+	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	D	N		
MW-310	10.24.19	1250	G	Water			X	X	X		
MW-311	10.24.19	1345	G	Water			X	X	X		

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

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

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

Special Instructions/QC Requirements:

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

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	10.24.19 1600	SCS	Lindsay Bindler	10-25-19 830	ETA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

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

Ver: 01/16/2019

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
MW-301	310-168508-A-1	Plastic 250ml - with Nitric Acid	<2		
MW-301	310-168508-C-1	Plastic 1 liter - Nitric Acid	<2		
MW-301	310-168508-D-1	Plastic 1 liter - Nitric Acid	<2		
MW-302	310-168508-A-2	Plastic 250ml - with Nitric Acid	<2		
MW-302	310-168508-C-2	Plastic 1 liter - Nitric Acid	<2		
MW-302	310-168508-D-2	Plastic 1 liter - Nitric Acid	<2		
MW-303	310-168508-A-3	Plastic 250ml - with Nitric Acid	<2		
MW-303	310-168508-C-3	Plastic 1 liter - Nitric Acid	<2		
MW-303	310-168508-D-3	Plastic 1 liter - Nitric Acid	<2		
MW-304	310-168508-A-4	Plastic 250ml - with Nitric Acid	<2		
MW-304	310-168508-C-4	Plastic 1 liter - Nitric Acid	<2		
MW-304	310-168508-D-4	Plastic 1 liter - Nitric Acid	<2		
MW-305	310-168508-A-5	Plastic 250ml - with Nitric Acid	<2		
MW-305	310-168508-C-5	Plastic 1 liter - Nitric Acid	<2		
MW-305	310-168508-D-5	Plastic 1 liter - Nitric Acid	<2		
MW-306	310-168508-A-6	Plastic 250ml - with Nitric Acid	<2		
MW-306	310-168508-C-6	Plastic 1 liter - Nitric Acid	<2		
MW-306	310-168508-D-6	Plastic 1 liter - Nitric Acid	<2		
FIELD BLANK	310-168508-A-7	Plastic 250ml - with Nitric Acid	<2		
FIELD BLANK	310-168508-C-7	Plastic 1 liter - Nitric Acid	<2		
FIELD BLANK	310-168508-D-7	Plastic 1 liter - Nitric Acid	<2		
MW-307	310-168508-A-8	Plastic 250ml - with Nitric Acid	<2		
MW-308	310-168508-A-9	Plastic 250ml - with Nitric Acid	<2		
MW-309	310-168508-A-10	Plastic 250ml - with Nitric Acid	<2		
MW-310	310-168508-A-11	Plastic 250ml - with Nitric Acid	<2		
MW-310	310-168508-C-11	Plastic 1 liter - Nitric Acid	<2		
MW-310	310-168508-D-11	Plastic 1 liter - Nitric Acid	<2		
MW-311	310-168508-A-12	Plastic 250ml - with Nitric Acid	<2		
MW-311	310-168508-C-12	Plastic 1 liter - Nitric Acid	<2		
MW-311	310-168508-D-12	Plastic 1 liter - Nitric Acid	<2		

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-168508-2

Login Number: 168508
List Number: 1
Creator: Bovy, Lorrainna L

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.	True	

Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-168508-2

Login Number: 168508
List Number: 2
Creator: Hellm, Michael

List Source: Eurofins TestAmerica, St. Louis
List Creation: 10/29/19 01:05 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.	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.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	22.0
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Tracer/Carrier Summary

Client: SCS Engineers
Job ID: 310-168508-2
Project/Site: Ottumwa Generating Station 25219072

Method: 903.0 - Radium-226 (GFPC)

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

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits) Ba Carrier (40-110)
310-168508-1	MW-301	94.9
310-168508-2	MW-302	82.6
310-168508-3	MW-303	74.8
310-168508-4	MW-304	88.0
310-168508-5	MW-305	88.9
310-168508-6	MW-306	90.1
310-168508-7	FIELD BLANK	94.9
310-168508-11	MW-310	81.4
310-168508-12	MW-311	103
LCS 160-448344/1-A	Lab Control Sample	74.8
LCSD 160-448344/2-A	Lab Control Sample Dup	94.0
MB 160-448344/21-A	Method Blank	93.1

Tracer/Carrier Legend

Ba Carrier = Ba Carrier

Method: 904.0 - Radium-228 (GFPC)

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

Lab Sample ID	Client Sample ID	Percent Yield (Acceptance Limits) Ba Carrier (40-110)	Y Carrier (40-110)
310-168508-1	MW-301	94.9	86.7
310-168508-2	MW-302	82.6	81.9
310-168508-3	MW-303	74.8	80.7
310-168508-4	MW-304	88.0	81.9
310-168508-5	MW-305	88.9	86.4
310-168508-6	MW-306	90.1	83.7
310-168508-7	FIELD BLANK	94.9	86.7
310-168508-11	MW-310	81.4	82.6
310-168508-12	MW-311	103	85.2
LCS 160-448411/1-A	Lab Control Sample	74.8	82.2
LCSD 160-448411/2-A	Lab Control Sample Dup	94.0	81.5
MB 160-448411/21-A	Method Blank	93.1	83.7

Tracer/Carrier Legend

Ba Carrier = Ba Carrier
Y Carrier = Y Carrier

Appendix B

Demonstration of Need for ACM Deadline Extension

July 10, 2019
File No. 25218202.00

Mr. Rob Saunders
Alliant Energy
20775 Power Plant Rd
Ottumwa, IA 52501

Subject: Demonstration of Need for Deadline Extension
Assessment of Corrective Measures
Ottumwa Generating Station, Ottumwa, Iowa

Dear Mr. Saunders:

In accordance with 40 CFR 257.96(a), Interstate Power and Light Company (IPL) has initiated an Assessment of Corrective Measures (ACM) for the Ottumwa Generating Station. The ACM was initiated on April 15, 2019, in response to detections of constituents in Appendix IV to 40 CFR Part 257 at statistically significant levels above the groundwater protection standards (GPS) established under 40 CFR 257.95(h). As allowed under 40 CFR 257.96(a), this letter provides a demonstration that additional time beyond the 90-day deadline is needed to complete the ACM, and that the deadline may be extended by 60 days. Therefore, the ACM must be completed by September 13, 2019.

Demonstration of Need for Additional Time

Additional time is needed to complete the ACM in order to investigate the nature and extent of downgradient groundwater impacts and consider that information in preparing the ACM. The additional information obtained through further investigation of site conditions is important to the selection of suitable corrective measures and the evaluation of those corrective measures in meeting the requirements and objectives outlined in 40 CFR 257.96(c). Specifically, additional data about the nature and extent of groundwater impacts is needed to determine the current level of risk, evaluate the reduction of risk provided, and evaluate the implementation of potential corrective measures.

In January 2019, prior to initiating an ACM in April 2019, IPL began the process of designing, permitting, installing, and sampling additional groundwater monitoring wells to investigate the nature and extent of these constituents in groundwater, in accordance with 40 CFR 257.95(g)(1).

The following factors contributed to delays in the installation and sampling of the new wells, which in turn created the need for the extension of the ACM deadline by up to 60 days as allowed under 40 CFR 257.96(a):

- Permitting for the new wells included Federal, state, and local permit reviews related to floodplains, wetlands, and sovereign lands, which significantly delayed well installation.

- Extensive flooding in the area of the Ottumwa Generating Station significantly delayed well installation. The wells have not been installed as of the date of this letter due to continued flooding.

Additional information regarding the nature and extent of groundwater impacts will provide further understanding of existing risks associated with the groundwater impacts identified at the Ottumwa Generating Station, which provides the basis for evaluating potential corrective measures as required under 40 CFR 257.96. While evaluation of the nature and extent of impacts may continue in parallel with the ACM and selection of remedy, extending the ACM deadline as allowed under the coal combustion residuals (CCR) rule will allow for the consideration of additional information and provide for a more complete ACM. Thus, the 60-day extension is needed.

As required by 40 CFR 257.96(a), a professional engineer's certification of the accuracy of this demonstration is enclosed.

PE Certification

<table>
<tr><td rowspan="5"> 
</td><td>As required by 40 CFR 257.96, I, Eric J. Nelson, hereby certify that this demonstration of need for the 60-day extension of the deadline for completing an Assessment of Corrective Measures is accurate. I am a duly licensed Professional Engineer under the laws of the State of Iowa.

7/10/2019</td></tr>
<tr><td>(signature) (date)</td></tr>
<tr><td>Eric J. Nelson
(printed or typed name)</td></tr>
<tr><td>License number 23136

My license renewal date is December 31, 2020.

Pages or sheets covered by this seal:

ACM - Demonstration of Need for Deadline Extension</td></tr>
<tr><td>Ottumwa Generating Station</td></tr>
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Sincerely,

Eric J. Nelson, PE
Project Director
SCS Engineers

Thomas J. Karwoski
Senior Project Manager
SCS Engineers

EJN/AJR/SC

cc: Matt Hanson, Interstate Power and Light Company
Jeff Maxted, Alliant Energy

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