

Semiannual Progress Report Selection of Remedy – OGS Ash Pond and Zero Liquid Discharge Pond

Ottumwa Generating Station
Ottumwa, Iowa

Prepared for:

Alliant Energy



SCS ENGINEERS

25220083.00 | September 13, 2023

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1.0 INTRODUCTION AND PURPOSE

The Semiannual Progress Report for remedy selection at the Interstate Power and Light Company (IPL) Ottumwa Generating Station (OGS) was prepared to comply with U.S. Environmental Protection Agency (U.S. EPA) regulations regarding the Disposal of Coal Combustion Residuals (CCR) from Electric Utilities [40 CFR 257.50-107], or the “CCR Rule” (Rule). Specifically, the selection of remedy process was initiated to fulfill the requirements of 40 CFR 257.97.

1.1 BACKGROUND

The Assessment of Corrective Measures (ACM) for the Ash Pond was completed on September 12, 2019. The ACM was completed in response to the detection of cobalt at a statistically significant level (SSL) above the Groundwater Protection Standard (GPS) in groundwater samples from downgradient monitoring well MW-305.

IPL initially completed a Selection of Remedy (SOR) Report in September 2020, but a subsequent revision to the ACM, completed in November 2020, resulted in a retraction of the SOR Report. The initial SOR Report is now considered to be the September 2020 semiannual progress report because it discusses activities completed during the March 2020 through September 2020 reporting period.

Additional information was received following the issuance of Addendum No. 1 to the ACM resulting in a second, August 2022 addendum to the ACM (Addendum No. 2). Addendum No. 2 was prepared to expand the ACM to include the Zero Liquid Discharge (ZLD) Pond. Cobalt has been detected at SSLs in monitoring wells located downgradient from both ponds, and expanding the ACM to address both will support a holistic approach to addressing the cobalt concentrations in groundwater. IPL will hold an additional public meeting with interested and affected parties to discuss Addendum No. 2 and will issue a new SOR Report.

This Semiannual Progress Report covers the Ash Pond and the ZLD Pond. This report summarizes data collected and remedy evaluation progress made since the September 2019 ACM, the November 2020 ACM No.1, and the August 2022 ACM No. 2, and outlines planned future activities to complete the SOR process. This semiannual progress report covers the 6-month period of March 2023 through August 2023.

1.2 SITE INFORMATION AND MAPS

OGS is located southwest of the Des Moines River, approximately 8 miles northwest of the City of Ottumwa in Wapello County, Iowa (**Figure 1**). The address of the plant is 20775 Power Plant Road, Ottumwa, Iowa. In addition to the coal-fired generating station, the property also contains the Ash Pond, the Low Volume Wastewater Pond (LVWWP) (constructed in the location of the former ZLD Pond, which was completely excavated in 2021), the coal stockpile, and the hydrated fly ash stockpile.

The two CCR units at the facility (Ash Pond and ZLD Pond) are each monitored with single-unit groundwater monitoring systems. Both the Ash Pond and the ZLD Pond are the subject of this Semiannual Progress Report.

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

Groundwater flow at the site is generally to the east-northeast.

In September 2020, IPL discontinued the use of the existing wet bottom ash handling system at OGS and ceased the discharge of bottom ash transport water to the Ash Pond. A dry bottom ash handling system was installed and operating as of December 2020. The Ash Pond permanently ceased receipt of all CCR and non-CCR waste as of May 2, 2022, and was completely closed by July 2023.

2.0 SUMMARY OF WORK COMPLETED

Work completed to support remedy selection for the Ash Pond and ZLD Pond is summarized in **Table 1A**. The focus of the groundwater sampling and groundwater corrective action activities during this past reporting period has been expansion of the delineation network to further characterize the nature and extent of cobalt concentrations while pond closure activities were being completed. Work completed on the Ash Pond closure is summarized in **Table 1B**. Activities completed within the 6-month period covered by this Semiannual Progress Report are discussed in more detail below.

2.1 MONITORING NETWORK CHANGES

Additional monitoring wells MW-316, MW-316A, and MW-317 were installed as delineation wells in March 2023 to provide additional groundwater quality and groundwater flow information. The wells were installed adjacent to the Des Moines River.

Surface water elevation gauges were also installed on the Middle Avery Creek as “Avery Creek 1” and “Avery Creek 2” in April 2023 to obtain additional information on surface water/groundwater interactions.

A Monitoring Well Construction Report was submitted for MW-312 and MW-313 and a separate Monitoring Well Construction Report was submitted for MW-315. A monitoring well construction report is currently in development for MW-316, MW-316A, and MW-317.

The locations of the new monitoring wells at OGS are shown on **Figure 2**.

2.2 GROUNDWATER MONITORING

Since the previous Semiannual Progress Report, groundwater samples were collected during the following sampling events:

- A supplemental February 2023 monitoring event was completed for the newly installed MW-315.
- The supplemental March 2023 monitoring event for cobalt in compliance monitoring well MW-315.
- The April 2023 monitoring event for the routine semiannual assessment monitoring program for the Ash Pond and ZLD Pond.

A summary of groundwater samples collected since the completion of the September 2019 ACM is provided in **Table 2** and **Table 3**.

2.3 STATISTICAL EVALUATION

Statistical evaluation of April 2023 semiannual sampling results during the period covered by this update will be discussed in the 2023 Annual Groundwater Monitoring and Corrective Action Reports for the Ash Pond and the ZLD Pond.

2.4 SURFACE IMPOUNDMENT CLOSURE

Closure of the ZLD Pond began in May 2021. Closure of the ZLD Pond enabled construction of the new lined LVWWP (a non-CCR surface impoundment), redirection of non-CCR wastewaters from the OGS Ash Pond, and initiation of closure of the Ash Pond.

Key activities related to closure of the CCR surface impoundments during the reporting period included:

- Removal of precipitation/contact water from the Main Ash Pond continued during March through May 2023.
- Moisture conditioning by application of lime stabilizer and application of Portland cement to CCR materials was conducted and completed in May 2023.
- Existing CCR within the MAP area that was identified to be in potential contact with the estimated shallow groundwater potentiometric surface as of May 2022 was removed and relocated to areas above the estimated potentiometric surface elevation. Soil fill (clay) was placed to reestablish MAP bottom subgrades above the estimated May 2022 shallow groundwater potentiometric surface.
- Grading of the Main Ash Pond CCR materials.
- Main Ash Pond final cover water conveyance piping installation was finalized. The final cover of compacted soil cover, topsoil, and geosynthetic cover (Hydroturf) was completed.
- Outfall 001 outlet structure modifications for the Main Ash Pond and final cover stormwater drainage were completed.

The Main Ash Pond closure was completed in June 2023 and the notification and certification by a qualified professional engineer required by 40 CFR 257.102(f)(3) and 257.102(h) were issued on July 19, 2023.

A summary of the CCR unit closure activities completed during the current reporting period is provided in **Table 1B**.

2.5 EVALUATION OF CORRECTIVE MEASURE ALTERNATIVES

A qualitative assessment of potential Corrective Measure Alternatives using the selection criteria in 40 CFR 257.97(b) and (c) was provided in the September 2019 ACM, revised in the November 2020 Addendum No 1, and revised again in the August 2022 ACM Addendum No 2.

The results of the additional investigations completed in the previous reporting period indicated that precipitation of cobalt-containing mineral phases is occurring in the aquifer downgradient of wells MW-305 and MW-307. Also, laboratory desorption trials indicated that approximately 96 percent of the cobalt remained adsorbed to the aquifer media, supporting monitored natural attenuation (MNA) as a viable remedial alternative for cobalt.

Three delineation wells were installed in March 2023 to further evaluate the extent of cobalt concentrations in groundwater downgradient of monitoring wells MW-305 and MW-307 (**Figure 2**).

Two water table wells and one piezometer MW-316, MW-316A, and MW-317, were installed along the Des Moines River. There were no cobalt exceedances in the three new delineation wells identified from the April 2023 sampling event.

Two staff gauges were installed in March 2023 along West Avery Creek to further evaluate surface water elevations (**Figure 2**).

In addition, IPL has closed the Main Ash Pond as discussed in **Section 2.4**.

Updates to the assessment discussed in the ACM and development of a new SOR Report will be completed in the future based on updates to the conceptual site model, delineation of the nature and extent of impacts, Ash Pond closure, and collection of additional data relevant to remedy selection. The specific planned activities are described in **Section 3.0**.

3.0 PLANNED ACTIVITIES

Planned activities related to the remedy selection process include the following:

- Continue semiannual assessment monitoring for the existing monitoring well network and new monitoring wells.
- Continued evaluation of groundwater flow and groundwater quality.
- Update the conceptual site model based on findings of the ongoing groundwater sampling of the new compliance well and additional delineation wells.
- Perform further evaluation of groundwater pump and treat and monitor natural attenuation, both individual and combined, as alternatives for OGS along with other alternatives included in the ACM.
- Hold an additional public meeting.
- Finalize evaluation of remedial options and issue a final SOR Report per 40 CFR 257.97(a).

The following planned activities related to the closure of the ZLD Pond include:

- Ongoing groundwater monitoring to document the completion of closure by removal per 40 CFR 257.102(c).
- Establish and implement a corrective action monitoring program after completion of the SOR per 40 CFR 257.98(a)(1).

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**Table 1A. Timeline for Completed Groundwater Sampling and Corrective Action Work
Selection of Remedy
Ottumwa Generating Station / SCS Engineers Project #25220083.00**

Date	Activity
Activities Completed During Previous Semiannual Progress Periods	
August 2019	Additional monitoring wells installed to investigate nature and extent (MW-310 and MW-311).
September 2019	Completed ACM.
November 2019	Completed Well Construction Documentation for new monitoring wells.
January 2020	Completed Statistical Evaluation of October 2019 groundwater monitoring results.
January 2020	Completed 2019 Annual Groundwater Monitoring and Corrective Action Report.
December 2019 to February 2020	Planning, permitting, and access for three additional monitoring wells (piezometers) to investigate the vertical extent of impacts.
February 2020	Collected second round of groundwater samples from the new monitoring wells (MW-310 and MW-311) and background well.
February 2020 to March 2020	Complete the installations of three piezometers (MW-305A, MW-310A, and MW-311A).
March 2020	Completed groundwater sampling for specific metals and MNA parameters from selected monitoring wells as well as the newly installed piezometers.
June 2020	Conduct assessment monitoring resample for selected parameters and monitoring well.
June 2020	Held public ACM meeting.
September 2020	Completed Semiannual Progress Report for the Selection of Remedy.
September 2020	Completed Well Documentation Report for additional piezometers (MW-305A, MW-310A, and MW-311A).
October 2020	Conducted semiannual assessment monitoring event and additional MNA parameter samples for the selection of remedy process.
November 2020	Submitted application to EPA for a site-specific alternative deadline to initiate closure of the Main Ash Pond.
November 2020	Completed the ACM Addendum No. 1

**Table 1A. Timeline for Completed Groundwater Sampling and Corrective Action Work
Selection of Remedy
Ottumwa Generating Station / SCS Engineers Project #25220083.00**

Date	Activity
January 2021	Completed Statistical Evaluation of October 2020 groundwater monitoring results.
January 2021	Completed 2020 Annual Groundwater Monitoring and Corrective Action Report.
February 2021	Held public ACM Addendum meeting on February 18, 2021.
February 2021	Conduct additional assessment monitoring for selected parameters and monitoring wells.
March 2021	Completed Semiannual Progress Report for the Selection of Remedy.
March 2021 - June 2021	Planning, design, draft permit preparation, and access evaluation for two additional monitoring wells to evaluate MNA processes.
July 2021	Submitted joint permit application to the United State Army Corps of Engineers and Iowa Department of Natural Resources.
July 2021	Submitted Notification of Groundwater Protection Standard Exceedance for lithium at MW-310A and MW-311A.
July 2021	Conduct assessment monitoring resample for selected parameters and monitoring wells.
August 2021	Received approval letters from USACE for installation of monitoring wells MW-312 and MW-313.
September 2021	Completed Semiannual Progress Report for the Selection of Remedy.
October 2021	Completion of an ASD for lithium SSLs at MW-310A and MW-311A.
November 2021	Received approval letters from IDNR November 2021 for installation of monitoring wells MW-312 and MW-313.
December 2021	Submitted well permit application for monitoring wells MW-312 and MW-313 to Wapello County and received approval of permit .
December 2021	Performed utility clearances and Hydovac clearance and installed additional monitoring wells MW-312 and MW-313 to characterize site conditions for the selection of remedy.
December 2021	Completed 3 boreholes adjacent to existing monitoring wells MW-305, MW-307, and MW-310 to collect saturated soil samples for laboratory analyses of iron and cobalt coprecipitation.
December 2021 - February 2022	Performed laboratory analysis of soil and groundwater samples as part of the cobalt treatability and attenuation study.

**Table 1A. Timeline for Completed Groundwater Sampling and Corrective Action Work
Selection of Remedy
Ottumwa Generating Station / SCS Engineers Project #25220083.00**

Date	Activity
January 2022	Completed 2021 Annual Groundwater Monitoring and Corrective Action Report.
January 2022	Completed first round of groundwater monitoring sampling at MW-312 and MW-313. Samples analysis performed in support of cobalt treatability and attenuation study.
January 2022	Measured water levels at all site monitoring wells.
February 2022	Completed second round of groundwater monitoring sampling at MW-312 and MW-313 and obtained additional samples from monitoring wells MW-305, MW-306, and MW-307.
February 2022	Measured water levels at all site monitoring wells.
March 2022	Completed Semiannual Progress Report for the Selection of Remedy.
April 2022	Conducted semiannual assessment monitoring event.
April 2022 - July 2022	Completed Treatability Study for Natural Attenuation of Cobalt in Groundwater.
May 2022	Completed Statistical Evaluation of January 2022 groundwater monitoring results.
May 2022	Completed the installation of four additional water table wells (MW-302WT, MW-304WT, MW-306WT, and MW-314WT) and one additional piezometer (MW-314) around the Ash Pond. These water table wells are intended for groundwater elevation measurement only, and will not be sampled for water quality.
May 2022	Completion of an ASD for Cobalt SSL at MW-307.
June 2022	Completed Statistical Evaluation of February 2022 groundwater monitoring results.
July 2022	Completed Statistical Evaluation of April 2022 groundwater monitoring results.
August 2022	Conducted groundwater sampling at MW-307, MW-312, and MW-313.
August 2022	Completed the ACM Addendum No. 2 for the OGS Ash Pond and Zero Liquid Discharge Pond.
September 2022	Completed Semiannual Progress Report for the Selection of Remedy.
September 2022	Submitted joint permit application to the United State Army Corps of Engineers and Iowa Department of Natural Resources for three proposed delineation monitoring wells along the banks of the Des Moines River.
October 2022	Conducted semiannual assessment monitoring event and additional MNA parameter samples for the selection of remedy process.
October 2022	Received confirmation that no county floodplain permit is required for the installation of ZLD Pond compliance well MW-315.

**Table 1A. Timeline for Completed Groundwater Sampling and Corrective Action Work
Selection of Remedy
Ottumwa Generating Station / SCS Engineers Project #25220083.00**

Date	Activity
October 2022	Received a letter from the U.S. Army Corps of Engineers that an archeological and geomorphological survey will be required prior to the installation of three delineation wells along the banks of the Des Moines River.
October 2022 - November 2022	Delays in accessing proposed delineation well locations to perform the archeological and geomorphological survey due to the need to wait for a corn crop harvest at the survey location.
November 2022	Completed permitting for the installation of compliance well MW-315.
December 2022	Received a letter from the Iowa Department of Natural Resources approving the installation of three delineation monitoring wells along the banks of the Des Moines River.
December 2022	Installed compliance monitoring well MW-315 downgradient of the ZLD Pond.
December 2022	Completed fieldwork for the archeological and geomorphological survey.
December 2022	Completed the August 2022 Groundwater Results Report.
January 2023	Compliance well MW-315 was developed.
January 2023	Received the archeological and geomorphological survey report. Nothing was discovered that would prevent the installation of the delineation monitoring wells. The report was submitted to the USACE and IDNR.
January 2023	Received a letter from the U.S. Army Corps of Engineers authorizing installation of the three delineation wells along the banks of the Des Moines River.
January 2023	Received a letter from the U.S. Army Corps of Engineers rescinding the authorization granted earlier in January 2023 for installation of the three delineation wells along the banks of the Des Moines River. The Army Corps was required to coordinate the archaeological survey with the State Historic Preservation Office. Communication from the Army Corps indicated the SHPO review period would be 30 days.
January 2023	Completed 2022 Annual Groundwater Monitoring and Corrective Action Report for the Ash Pond.
February 2023	Installed a dedicated low-flow pump in the ZLD Pond compliance well MW-315 and performed the initial groundwater sample collection.
February 2023	Completed Statistical Evaluation of October 2022 groundwater monitoring results.
February 2023	Completed the October 2022 Groundwater Results Report.
February 2023	Completed a Financial Assurance Post-Closure Cost Estimate for the CCR Impoundment.
February 2023	Completed 2022 AP CCR Federal Annual Report.

**Table 1A. Timeline for Completed Groundwater Sampling and Corrective Action Work
Selection of Remedy
Ottumwa Generating Station / SCS Engineers Project #25220083.00**

Date	Activity
Activities Completed During Current Semiannual Progress Period	
March 2023	Second supplemental sampling event completed for cobalt in new ZLDP compliance well MW-315.
March 2023	Completed Semiannual Progress Report for the Selection of Remedy.
March 2023	Requested a flood plain permit waiver from the county engineer, which was waived.
March 2023	Submitted Monitoring Well Construction Report for MW-312 and MW-313.
March 2023	Submitted Monitoring Well Construction Report for MW-315.
March 2023	Installed delineation wells MW-316, MW-316A, and MW-317. SCS conducted hydraulic conductivity testing on new wells.
March 2023	Installed staff gauges SG-2 and SG-3 in Middle Avery Creek.
April 2023	Conducted semiannual assessment monitoring event.
April 2023	Joint Permit Notice of Completion filed.
July 2023	Submitted MW-315 Groundwater Monitoring System Update Recertification for ZLDP MW-315 and submitted Update Certification Supporting Documentation.
July 2023	Completed an Assessment Groundwater Monitoring results report for February and March 2023 sampling for ZLDP.
August 2023	Completed April 2023 Assessment Groundwater Monitoring Results Letters for Ash Pond and ZLD Pond.
August 2023	Completed 2022 ZLDP CCR Federal Annual Report.
August 2023	Completed draft Monitoring Well Construction Report for MW-316, MW-316A, MW-317, SG-2, and SG-3.

A-R = Resampling event under Assessment Monitoring Program

* = Resampling event completed in 2019 but analytical results will be used for evaluation for the October 2018 sampling event.

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**Table 1B. Timeline for Closure Activities Work
Selection of Remedy
Ottumwa Generating Station / SCS Engineers Project #25220083.00**

Date	Activity
Activities Completed During Previous Semiannual Progress Periods	
August 2019 - February 2020	OGS Ash Pond closure design (ongoing).
September 2020	Discontinued wet bottom ash sluicing at OGS.
October 2021	Submitted Closure Permit Application for Main Ash Pond to IDNR Land Quality Bureau.
October 2021	Received approval of Antidegradation Analysis from IDNR.
November 2021	Received Closure Permit for Main Ash Pond from IDNR Land Quality Bureau.
November 2021	Received Facility Plan Approval letter for new wastewater outfall to Des Moines River.
November-December 2021	Prepared NPDES Wastewater Permit Amendment Request.
May 2022	The Ash Pond permanently ceased receipt of all CCR and non-CCR waste as of May 2, 2022.
May 2022	Completed the installation of four additional water table wells (MW-302WT, MW-304WT, MW-306WT, and MW-314WT) and one additional piezometer (MW-314) around the Ash Pond. These water table wells are intended for groundwater elevation measurement only, and will not be sampled for water quality. The water level information will assist with the Ash Pond closure.
May - August 2022	Collection of Groundwater elevations to monitoring groundwater conditions of the Ash Pond during the closure process.
June 2022	Closure notification for the OGS Ash Pond issued. The Ash Pond will be closed in accordance with CFR 257.102(d).
September 2022	Completed documentation report for the installation of water level only wells surrounding the Ash Pond.
September 2022	Completed concrete forming and concrete placement in Air Heater Wash Basin that began in August.
September 2022	Placed riprap in Air Heater Wash Basin.
September 2022 - November 2022	Removed CCR down to native soils in order to get CCR out of estimated groundwater elevation and placement of clay material to replace CCR. Activities happened concurrently.
December 2022	Completed grading of Main Ash Pond CCR material and moisture conditioning that began in July for the 2022 construction season. Lime stabilizer and Portland cement were added to CCR for moisture conditioning. Stabilization geosynthetics were added as needed during CCR grading/placement.
January 2023	CCR grading to cover exposed geogrid material.

**Table 1B. Timeline for Closure Activities Work
Selection of Remedy
Ottumwa Generating Station / SCS Engineers Project #25220083.00**

Date	Activity
Activities Completed During Current Semiannual Progress Period	
March 2023	Dewatering of the Main Ash Pond. Grading of Main Ash Pond CCR material. Moisture conditioning with lime stabilizer and Portland cement of CCR was resumed.
April 2023	Dewatering of the Main Ash Pond. Grading of Main Ash Pond CCR material and moisture conditioning with lime stabilizer and Portland cement of CCR.
May 2023	Dewatering of the Main Ash Pond. Grading of Main Ash Pond CCR material. Lime stabilizer and Portland cement addition for moisture conditioning ceased. Main Ash Pond final cover water conveyance piping installation finalized. Main Ash Pond final cover installation of compacted soil cover, topsoil, and geosynthetic cover (Hydroturf) began.
June 2023	Outfall 001 outlet structure modifications for Main Ash Pond final cover stormwater drainage completed. Main Ash Pond final cover installation of compacted soil cover, topsoil, and geosynthetic cover (Hydroturf) completed. Restoration seeding of the Main Ash Pond final cover area completed. Main Ash Pond closure complete.
July 2023	Engineer of Record (Burns & McDonnell) certification for closure completion of the Main Ash Pond (Bottom Ash Pond).
August 2023	Main Ash Pond Closure Construction Documentation Report submitted to state agency.

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**Table 2. CCR Rule Groundwater Samples Summary - Events Since the ACM Submittal
Ottumwa Generating Station - Ash Pond / SCS Engineers Project #25220083.00**

Sample Dates	Background Well	Compliance Wells					Delineation Well	Compliance Well	Delineation Wells							
	MW-301	MW-302	MW-303	MW-304	MW-305	MW-305A	MW-306	MW-310	MW-310A	MW-311	MW-311A	MW-312	MW-313	MW-316	MW-316A	MW-317
10/23-24/2019	A	A	A	A	A	NI	A	A	NI	A	NI	NI	NI	NI	NI	NI
2/5/2020	A	--	--	--	--	NI	--	A	NI	A	NI	NI	NI	NI	NI	NI
3/12-13/2020	Add.	--	--	--	Add.	Add.	--	Add.	Add.	Add.	Add.	NI	NI	NI	NI	NI
4/13-14/2020	A	A	A	A	A	A	A	A	A	A	A	NI	NI	NI	NI	NI
6/30/2020	--	--	--	--	--	--	--	--	--	--	A - R	NI	NI	NI	NI	NI
10/8-12/2020	A	A	A	A	A	A	A	A	A	A	A	NI	NI	NI	NI	NI
2/23/2021	--	--	--	--	--	--	Add.	Add.	--	--	Add.	NI	NI	NI	NI	NI
4/12-16/2021	A	A	A	A	A	A	A	A	A	A	A	NI	NI	NI	NI	NI
7/6/2021	--	--	--	--	--	--	Add.	Add.	--	--	Add.	NI	NI	NI	NI	NI
10/6-8/2021	A	A	A	A	A	A	A	A	A	A ⁽¹⁾	A	NI	NI	NI	NI	NI
1/12/2022	--	--	--	--	--	--	--	--	--	--	--	Add.	Add.	NI	NI	NI
2/14/2022	--	--	--	--	--	--	--	--	--	--	--	Add.	Add.	NI	NI	NI
4/12/2022	A	A	A	A	A	A	A	A	A	A	A	A	A	NI	NI	NI
8/25/2022	--	--	--	--	--	--	--	--	--	--	--	Add.	Add.	NI	NI	NI
10/26-28/2022	A	A	A	A	A	A	A	A	A	A	A	A	A	NI	NI	NI
4/4-6/2023	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Total Samples	10	8	8	8	9	8	10	12	8	10	11	6	6	1	1	1

Abbreviations:

A = Assessment Monitoring Program
-- = Not sampled

NI = Not Installed
A - R = Assessment Resample

Add. = Additional sampling event for selected parameters

Notes:

(1): MW-311 had insufficient water for sample collection during the October 2021 sampling event.

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**Table 3. CCR Rule ZLDP Groundwater Samples Summary
Ottumwa Generating Station / SCS Engineers Project #25220083.00**

Sample Dates	Downgradient Wells				Background Well
	MW-307	MW-308	MW-309	MW-315	MW-301
4/26/2016	NI	NI	NI	NI	B
6/23/2016	NI	NI	NI	NI	B
8/9/2016	NI	NI	NI	NI	B
10/26/2016	NI	NI	NI	NI	B
1/18-19/2017	B	B	B	NI	B
4/19-20/2017	B	B	B	NI	B
6/20-21/2017	B	B	B	NI	B
8/21-23/2017	B	B	B	NI	B
11/8/2017	B	B	B	NI	D
4/16-18/2018	B	B	B	NI	A
5/30/2018	B-R	B-R	B-R	NI	--
6/28/2018	B	B	B	NI	--
7/18/2018	B-R	B-R	B-R	NI	--
10/16/2018	B	B	B	NI	A
4/8/2019	D	D	D	NI	D
10/23-24/2019	D	D	D	NI	D
12/11/2019	A	A	A	NI	A
2/5/2020	A	A	A	NI	A
4/13-14/2020	A	A	A	NI	A
10/7-8/2020	A	A	A	NI	A
2/23/2021	A-R	--	--	NI	--
4/14/2021	A	A	A	NI	A
7/6/2021	A-R	--	--	NI	--
10/7/2021	A	A	A	NI	A
2/14/2022	Add.	--	--	NI	--
4/11-14/2022	A	A	A	NI	A
8/25/2022	Add.	--	--	NI	--
10/25-26/2022	A	A	A	NI	A
2/2/2023	--	--	--	Add.	--
3/6/2023	--	--	--	Add.	--
4/4-6/2023	A	A	A	A	A
Total Samples	25	21	21	3	22

Abbreviations:

B = Background Sample Event

NI = Not Installed

B-R = Background Resampling event

-- = Not Applicable

D = Detection Monitoring Sampling Event

A = Assessment Monitoring Event

A-R = Assessment Monitoring Resampling Event

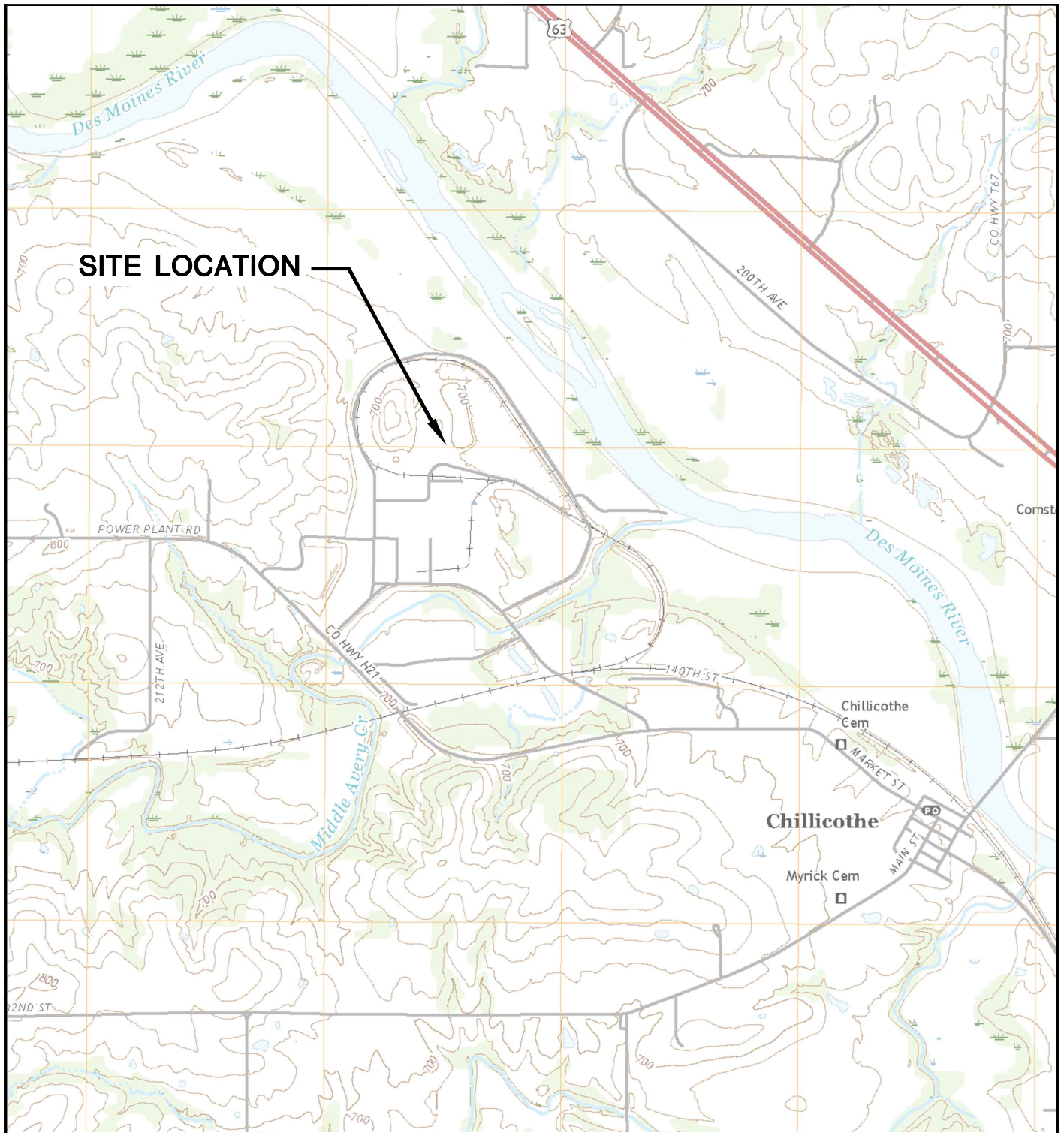
Add. = Additional Assessment monitoring sampling event

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

Date: 7/8/2022
 Date: 8/30/2023
 Date: 8/30/2023

Figures

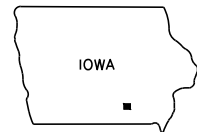
- 1 Site Location Map
- 2 Site Plan and Monitoring Well Locations



SITE LOCATION

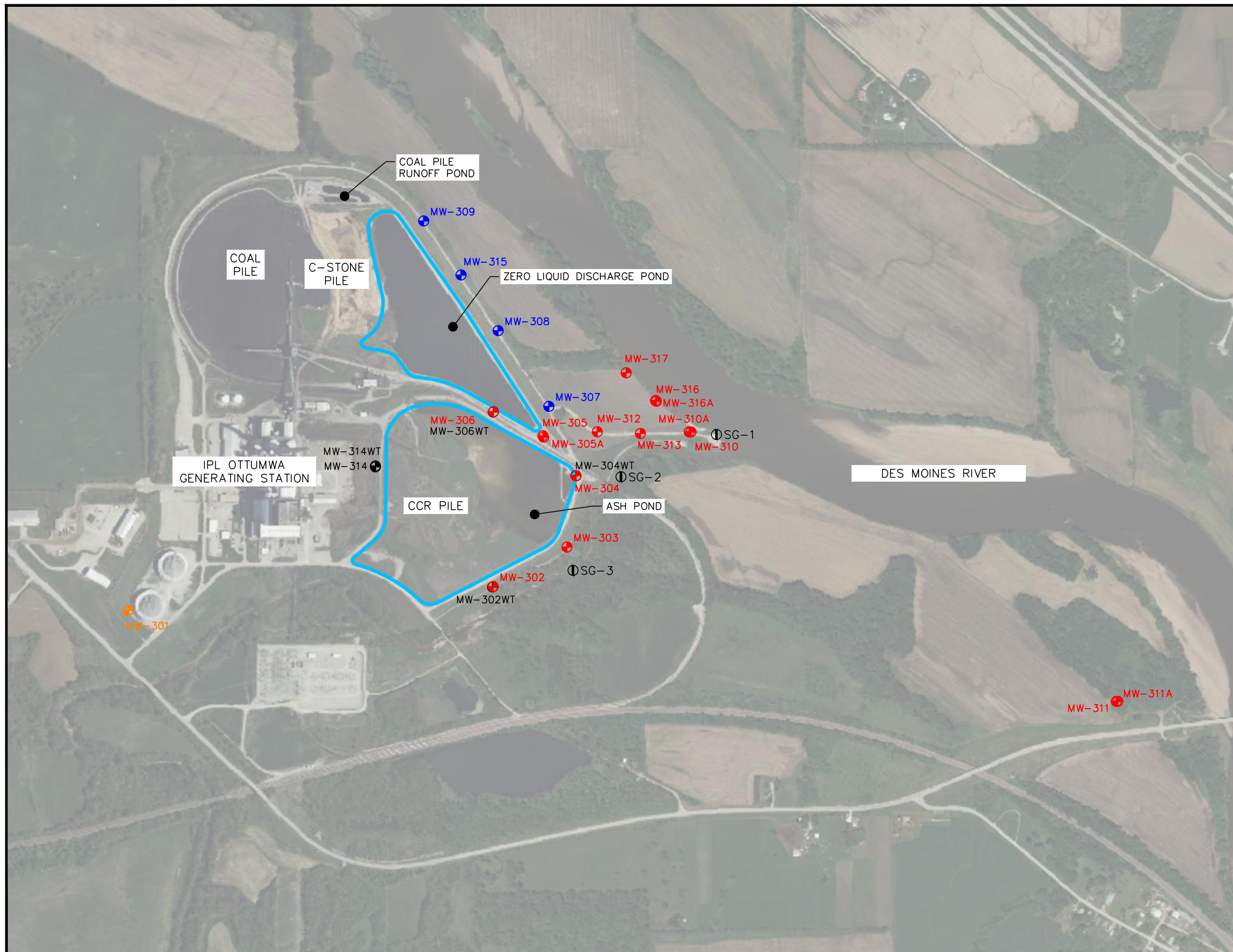


CHILICOTHE QUADRANGLE
 IOWA—WAPELLO CO.
 7.5 MINUTE SERIES (TOPOGRAPHIC)
 2018
 SCALE: 1" = 2,000'



CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501		SITE	ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA		ENGINEER	SITE LOCATION MAP	
	PROJECT NO.	25219072.00		DRAWN BY:	BSS		SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	FIGURE
	DRAWN:	11/15/2019		CHECKED BY:	MDB			1
REVISED:	01/10/2020	APPROVED BY:	TK, 3/25/2022					

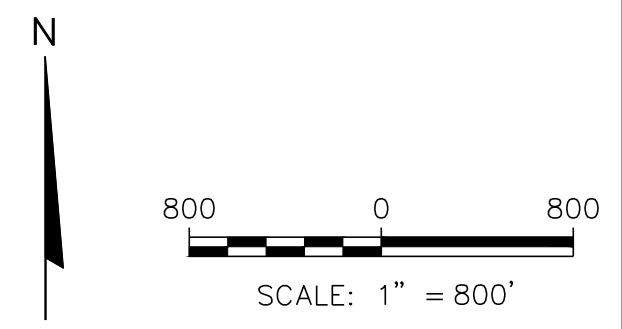
I:\25219072.00\Drawings\CCR 2019 Annual Report\Site Location Map.dwg, 1/15/2020 6:15:47 PM



LEGEND

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

- NOTES:
1. AERIAL PHOTOGRAPH SOURCE: AUTOCAD AND BING MAPS.
 2. MONITORING WELLS MW-301, MW-302, AND MW-304, WERE INSTALLED BY CASCADE DRILLING, LLP. UNDER THE SUPERVISION OF SCS ENGINEERS FROM NOVEMBER 11-12, 2015.
 3. MONITORING WELLS MW-303 AND MW-305 WERE INSTALLED BY CASCADE DRILLING LLP. UNDER THE SUPERVISION OF SCS ENGINEERS ON DECEMBER 7-8, 2015.
 4. MONITORING WELLS MW-307, MW-308, AND MW-309 WERE INSTALLED BY CASCADE DRILLING, LLP. UNDER THE SUPERVISION OF SCS ENGINEERS FROM OCTOBER 25-27, 2016.
 5. MONITORING WELLS MW-310 AND MW-311 WERE INSTALLED BY ROBERTS ENVIRONMENTAL DRILLING ON AUGUST 27, 2019.
 6. MONITORING WELLS MW-305A, MW-310A, AND MW-311A WERE INSTALLED BY ROBERTS ENVIRONMENTAL DRILLING BETWEEN FEBRUARY 27, 2020 AND MARCH 3, 2020.
 7. STAFF GAUGE SG-1 WAS INSTALLED BY SCS ENGINEERS ON MARCH 3, 2020.
 8. MONITORING WELLS MW-312 AND MW-313 WERE INSTALLED BY CASCADE DRILLING ON DECEMBER 14, 2021.
 9. MONITORING WELL MW-315 WAS INSTALLED BY DIRECT PUSH ANALYTICAL, UNDER THE SUPERVISION OF SCS ENGINEERS, ON NOVEMBER 29, 2022.
 10. STAFF GAUGES SG-2 AND SG-3 WERE INSTALLED BY SCS ENGINEERS ON MARCH 27, 2023.
 11. MONITORING WELLS MW-316, MW-316A, AND MW-217 WERE INSTALLED BY CASCADE DRILLING, LLP, UNDER THE SUPERVISION OF SCS ENGINEERS, ON MARCH 28-29, 2023.



PROJECT NO. 25221162.00	DRAWN BY: KP/SB	 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501	SITE ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA	FIGURE 2
DRAWN: 07/07/2022	CHECKED BY: NLB				
REVISD: 08/30/2023	APPROVED BY: TK 08/30/2023				
ENGINEER					

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