

# 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 12, 2022

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## Table of Contents

Section	Page
<b>1.0 Introduction and Purpose.....</b>	<b>1</b>
1.1 Background.....	1
1.2 Site Information and Maps .....	1
<b>2.0 Summary of Work Completed .....</b>	<b>2</b>
2.1 Monitoring Network Changes .....	2
2.2 Groundwater Monitoring.....	2
2.3 Statistical Evaluation.....	3
2.4 Surface Impoundment Closure.....	3
2.5 Evaluation of Corrective Measure Alternatives .....	4
<b>3.0 Planned Activities .....</b>	<b>4</b>

### Tables

Table 1.	Timeline for Completed Work – Selection of Remedy
Table 2.	CCR Rule Groundwater Samples Summary – OGS Ash Pond – Events Since the ACM Submittal
Table 3.	CCR Rule Groundwater Samples Summary – OGS ZLD Pond – Events Since the ACM Submittal

### Figures

Figure 1.	Site Location Map
Figure 2.	Site Plan and Monitoring Well Locations

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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 (USEPA) 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 OGS 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 addendum to the ACM (Addendum No. 2). Addendum No. 2 was prepared to expand the ACM to include the OGS 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 Main Ash Pond and the OGS ZLD Pond. This report summarizes data collected and remedy evaluation progress made since the September 2019 ACM and November 2020 revised ACM, and outlines planned future activities to complete the selection of remedy process. This semiannual progress report covers the 6-month period of March 2022 through August 2022.

### 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 OGS Ash Pond, the Low Volume Wastewater Pond (LVWTP) (constructed in location of the former OGS ZLD Pond), the coal stockpile, and the hydrated fly ash stockpile.

The two CCR units at the facility (OGS Ash Pond and OGS ZLD Pond) are each monitored with single unit groundwater monitoring systems. Both the OGS Ash Pond and the OGS 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 on **Figure 2**.

Groundwater flow at the site is generally to the east-northeast, and the groundwater flow direction and water levels fluctuate seasonally due to the proximity to the river. Depth to groundwater as

measured in the site monitoring wells varies from 1 to 25 feet below ground surface due to topographic variations across the facility and seasonal variations in water levels.

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 OGS Ash Pond. A dry bottom ash handling system was installed and operating as of December 2020. The OGS Ash Pond permanently ceased receipt of all CCR and non-CCR waste as of May 2, 2022.

## **2.0 SUMMARY OF WORK COMPLETED**

Work completed to support remedy selection for the OGS Ash Pond is summarized in **Table 1**. Activities completed within the 6-month period of March 2022 through August 2022 covered by this semiannual report are discussed in more detail below.

### **2.1 MONITORING NETWORK CHANGES**

Four additional water table monitoring wells, MW-302WT, MW-304WT, MW-306WT, MW-314WT, and monitoring well MW-314 were installed at OGS. The process from planning to installation was completed from April through May 2022. Installation was expedited because these wells are located outside of the regulated floodway and therefore floodplain permitting was not required. The new water table monitoring wells are screened within the surficial clay unit where the water table surface exists.

The new water table monitoring wells are located around the OGS Ash Pond to evaluate groundwater elevations during the closure of the CCR unit. These additional wells are used only to monitor groundwater elevations and they are not sampled as part of the OGS Ash Pond groundwater monitoring system because they are not installed in the uppermost aquifer.

The new monitoring well MW-314, installed as a piezometer in the uppermost aquifer, is located upgradient of the ash pond nested with MW-314WT. This monitoring well was installed to characterize site conditions, evaluate the nature and extent of CCR impacts in groundwater, and support the remedy selection process.

The existing CCR compliance wells were installed as piezometers with their screens below the water table and within the uppermost aquifer. The locations of all existing monitoring wells at OGS are shown on **Figure 2**.

Permits are currently being obtained for additional monitoring well installations. A compliance well will be installed between OGS ZLD Pond wells MW-308 and MW-309 to provide additional groundwater quality and groundwater flow information. Three delineation wells will be installed adjacent to the Des Moines River and north of existing delineation well nest MW-310/MW-310A to provide additional information on groundwater flow and groundwater quality downgradient of the cobalt impacted wells MW-305 and MW-307. The locations of the future monitoring wells at OGS are shown on **Figure 2**.

### **2.2 GROUNDWATER MONITORING**

Since March 2022, groundwater samples were collected during the sampling event in April 2022:

- The April 2022 monitoring event was part of the routine semiannual assessment monitoring program for the Ash and ZLD Ponds

- The August 2022 monitoring event was a quarterly sampling event to evaluate cobalt and monitored natural attenuation (MNA) parameters at MW-307, MW-312, and MW-313 to support the SOR.

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

## 2.3 STATISTICAL EVALUATION

Statistical evaluation of April sampling results during the period covered by this update will be discussed in the 2022 Annual Groundwater Monitoring and Corrective Action Report, dated January 31, 2023. Based on the April 2022 monitoring results, the only parameter at an SSL above the GPS at the compliance wells is cobalt at MW-305. Cobalt was also at an SSL above the GPS at MW-307, which is a compliance well installed to monitor the ZLD pond CCR Unit.

## 2.4 SURFACE IMPOUNDMENT CLOSURE

Construction for the closure of the OGS ZLD Pond and OGS Ash Pond began in May 2021. Closure of the OGS ZLD Pond enabled construction of the new lined LVWT pond (a non-CCR surface impoundment), redirection of non-CCR wastewaters from the OGS Ash Pond, and initiation of closure of the OGS Ash Pond. The construction activities included:

Performed previous to the current semiannual reporting period:

- Dewatering during the closure of the OGS ZLD Pond and construction of the LVWTP, completed December 16, 2021.
- Excavation of CCR from the OGS ZLD Pond to the OGS Ash Pond was substantially completed on October 9, 2021.
- Construction of the new lined LVWT pond was substantially completed on December 17, 2021.

Performed during the current semiannual reporting period:

- The Main Ash Pond permanently ceased receipt of all CCR and non-CCR waste on May 2, 2022.
- Closure of the Main Ash Pond was formally initiated on June 1, 2022.
- During April through July 2022, the excavation of CCR in the Air Heater Wash Basin (AHWB) was completed. CCR from the AHWB excavation was consolidated within the OGS Ash Pond where the material originated. The AHWB excavation area was backfilled with general fill soil to a new subgrade elevation.
- Geosynthetics (GCL/geomembrane/geotextile) installation was completed in the Air Heater Wash Basin in July 2022.
- Grading the OGS Ash Pond CCR material began in July 2022 and is currently in progress.

- Granular material placement in the Air Heater Wash Basin was completed in late July 2022.
- Concrete forming and placement was completed in the Air Heater Wash Basin in August 2022.

## 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.

Laboratory experiments were completed during this reporting period to characterize the distribution of cobalt in groundwater and saturated sediments, and identify processes (precipitation, coprecipitation, or adsorption) that may immobilize cobalt. Saturated soil samples were collected in December 2021 by installing boreholes adjacent to MW-305, MW-307, and MW-310. Additional water samples from MW-305 were collected in January 2022. The results of the additional investigation described above indicated that cobalt precipitation was occurring in the groundwater downgradient of wells MW-305 and MW-307. Also, desorption trials indicated that approximately 96 percent of the cobalt remained adsorbed to the aquifer media, supporting MNA as a viable remedial alternative for cobalt.

In addition, IPL has developed a design for closure of the OGS Ash Pond and initiated closure construction as discussed in **Section 2.4**.

Updates to the quantitative 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 design and construction activities, 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:

- Permit, design, and install an additional OGS ZLD Pond compliance monitoring well between existing wells MW-308 and MW-309.
- Permit, design, and install three delineation monitoring wells adjacent to the Des Moines River and north of existing delineation well nest MW-310/MW-310A.
- 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 treatability study and ongoing groundwater sampling and data evaluation.
- Evaluate groundwater pumping and treating as an option for OGS based on new delineation monitoring well data and the updated conceptual site model.

- Hold an additional public meeting.
- Finalize evaluation of remedial options and issue a final SOR report per 40 CFR 257.97(a).



## Tables

- 1 Timeline for Completed Work – Selection of Remedy
- 2 CCR Rule Groundwater Samples Summary – OGS Ash Pond – Events Since the ACM Submittal
- 3 CCR Rule Groundwater Samples Summary – OGS ZLD Pond – Events Since the ACM Submittal

**Table 1. Timeline for Completed Work - Selection of Remedy  
Ottumwa Generating Station / SCS Engineers Project #25220083.00**

Date	Activity
<b>Activities Completed During Previous Semiannual Progress Periods</b>	
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
August 2019 - February 2020	OGS Ash Pond closure design (ongoing)
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).
September 2020	Discontinued wet bottom ash sluicing at OGS
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

**Table 1. Timeline for Completed Work - Selection of Remedy  
Ottumwa Generating Station / SCS Engineers Project #25220083.00**

Date	Activity
November 2020	Complete the ACM Addendum No. 1
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
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 approval letters from IDNR November 2021 for installation of monitoring wells MW-312 and MW-313
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

**Table 1. Timeline for Completed Work - Selection of Remedy  
Ottumwa Generating Station / SCS Engineers Project #25220083.00**

Date	Activity
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
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.
<b>Activities Completed During Current Semiannual Progress Period</b>	
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 - August 2022	Collection of Groundwater elevations to monitoring groundwater conditions of the Ash Pond during the closure process.
May 2022	Completion of an ASD for Cobalt SSL at MW-307
June 2022	Completed Statistical Evaluation of February 2022 groundwater monitoring results.

**Table 1. Timeline for Completed Work - Selection of Remedy  
Ottumwa Generating Station / SCS Engineers Project #25220083.00**

Date	Activity
June 2022	Closure notification for the OGS Ash Pond updated. The Ash Pond will be closed with CCR remaining within the footprint of the existing impoundment under the final cover system that meets the requirements of the 40 CFR 257.102(d)(3).
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

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.

Created by: SCC Date: 2/17/2020  
 Last revision by: NDK Date: 8/12/2022  
 Checked by: MDB Date: 8/12/2022

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

Abbreviations:

A = Assessment Monitoring Program  
-- = Not sampled

NI = Not Installed

A - R = Assessment Resample

Add. = Additional sampling event for selected parameters

Notes:

(1) Sufficient water for sample collection was not present in MW-311 during the October 2021 sampling event.

Created by: NDK Date: 2/17/2021  
 Last revision by: NDK Date: 8/30/2022  
 Checked by: TK Date: 8/30/2022

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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-301
4/26/2016	NI	NI	NI	B
6/23/2016	NI	NI	NI	B
8/9/2016	NI	NI	NI	B
10/26/2016	NI	NI	NI	B
1/18-19/2017	B	B	B	B
4/19-20/2017	B	B	B	B
6/20-21/2017	B	B	B	B
8/21-23/2017	B	B	B	B
11/8/2017	B	B	B	D
4/16-18/2018	B	B	B	A
5/30/2018	B-R	B-R	B-R	--
6/28/2018	B	B	B	--
7/18/2018	B-R	B-R	B-R	--
10/16/2018	B	B	B	A
4/8/2019	D	D	D	D
10/23-24/2019	D	D	D	D
12/11/2019	A	A	A	A
2/5/2020	A	A	A	A
4/13-14/2020	A	A	A	A
10/7-8/2020	A	A	A	A
2/23/2021	A-R	--	--	--
4/14/2021	A	A	A	A
7/6/2021	A-R	--	--	--
10/7/2021	A	A	A	A
2/14/2022	Add.	--	--	--
4/11-14/2022	A	A	A	A
8/25/2022	Add.	--	--	--
Total Samples	23	19	19	20

Abbreviations:

D = Detection Monitoring Sampling Event  
A = Assessment Monitoring Event  
-- = Not Applicable

B = Background Sampling Event  
B-R = Background Resampling event  
NI - Not Installed

Add. = Additional Assessment monitoring sampling event  
A-R = Assessment Monitoring Resampling Event

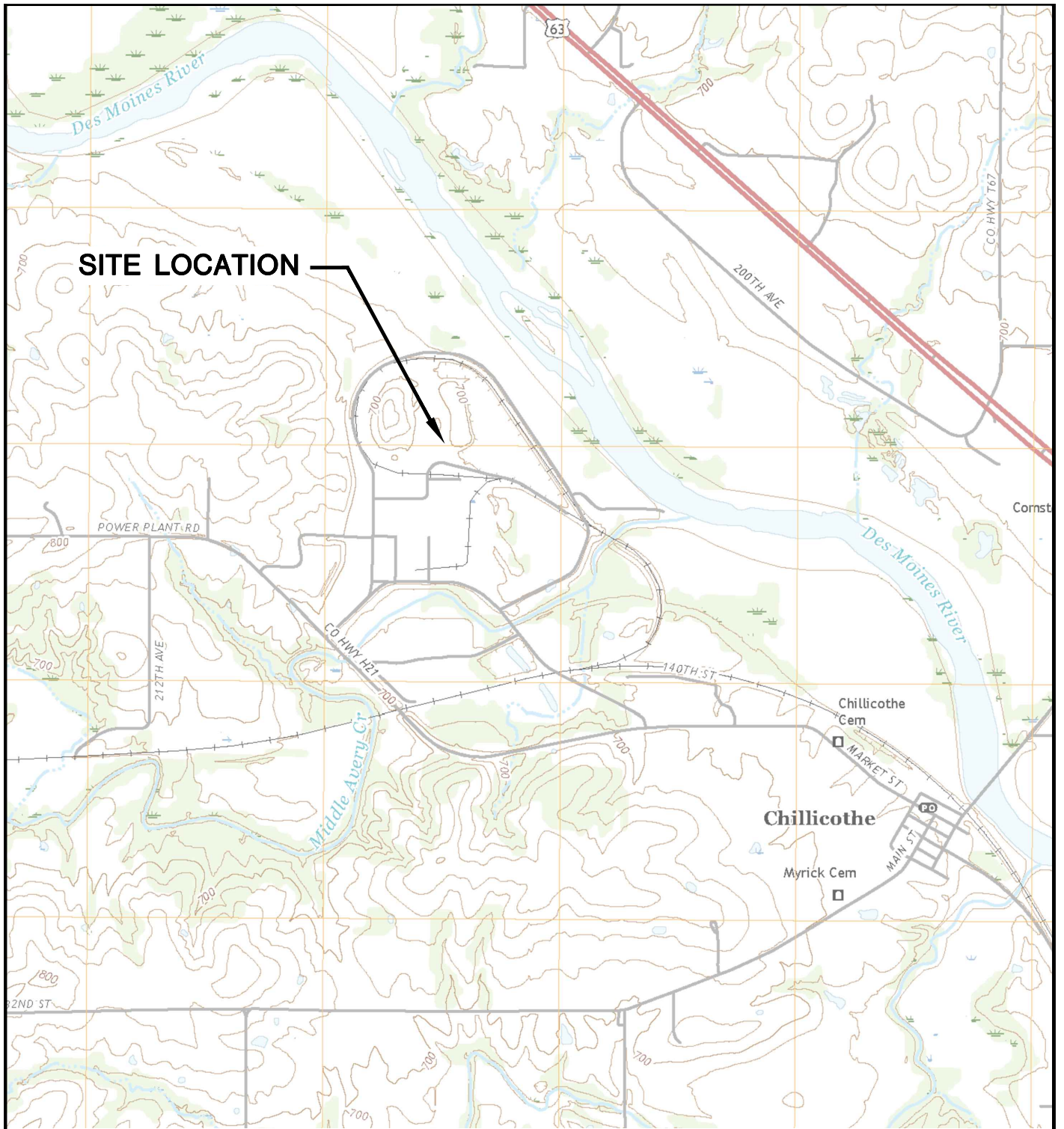
Created by: JAO Date: 7/8/2022  
Last revision by: NDK Date: 8/30/2022  
Checked by: TK Date: 8/30/2022

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## Figures

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

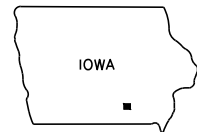




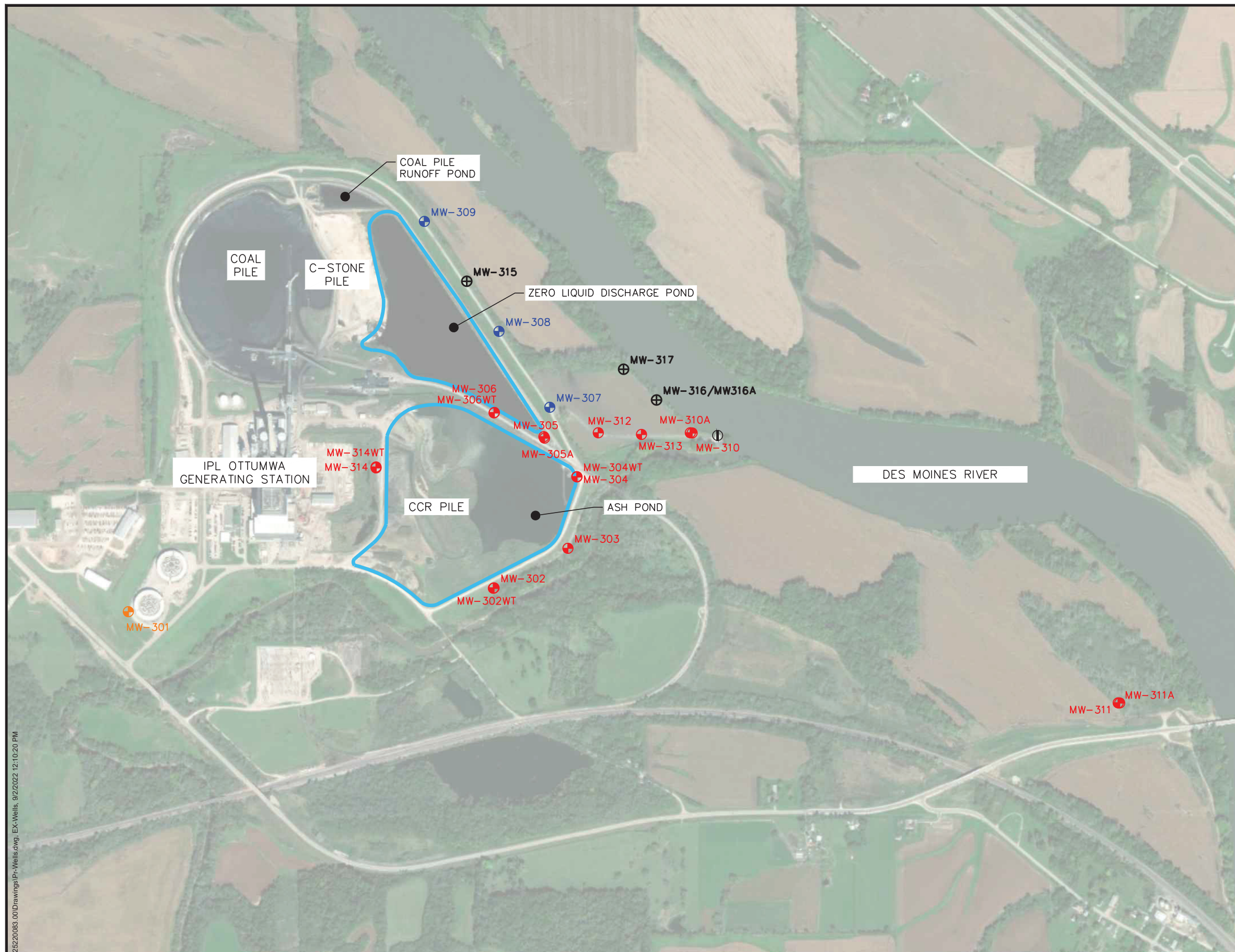
**SITE LOCATION**



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



CLIENT	INTERSTATE POWER AND LIGHT CO. 20775 POWER PLANT ROAD OTTUMWA, IA 52501		SITE	ALLIANT ENERGY OTTUMWA GENERATING STATION OTTUMWA, IOWA		ENGINEER	SITE LOCATION MAP	
	PROJECT NO.	25219072.00		DRAWN BY:	BSS		SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	FIGURE
DRAWN:	11/15/2019	CHECKED BY:	MDB	1				
REVISED:	01/10/2020	APPROVED BY:	TK 01/30/2020					



LEGEND

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

NOTES:

1. 2014 AERIAL PHOTOGRAPH SOURCES: ESRI, DIGITALGLOBE, GEOEYE, 1-CUBED, USDA FSA, USGS, AEX, GETMAPPING, AERGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY.
2. MONITORING WELLS MW-301, MW-302, AND MW-304, WERE INSTALLED BY CASCADE DRILLING, LLP. UNDER THE SUPERVISION OF SCS ENGINEERS FROM NOVEMBER 11-12, 2015.
3. MONITORING WELLS MW-303 AND MW-305 WERE INSTALLED BY CASCADE DRILLING LLP. UNDER THE SUPERVISION OF SCS ENGINEERS ON DECEMBER 7-8, 2015.
4. MONITORING WELLS MW-307, MW-308, AND MW-309 WERE INSTALLED BY CASCADE DRILLING, LLP. UNDER THE SUPERVISION OF SCS ENGINEERS FROM OCTOBER 25-27, 2016.
5. MONITORING WELLS MW-310 AND MW-311 WERE INSTALLED BY ROBERTS ENVIRONMENTAL DRILLING ON AUGUST 27, 2019.
6. MONITORING WELLS MW-305A, MW-310A, AND MW-311A WERE INSTALLED BY ROBERTS ENVIRONMENTAL DRILLING BETWEEN FEBRUARY 27, 2020 AND MARCH 3, 2020.
7. MONITORING WELLS MW-302WT, MW-304WT, MW-306WT, MW-314, AND MW-214WT WERE INSTALLED BY DIRECT PUSH ANALYTICAL ON APRIL 27-28, 2022.



SCALE: 1" = 800'

PROJECT NO.	25220083.00	DRAWN BY:	KP
DRAWN:	07/07/2022	CHECKED BY:	NDK
REVISED:	09/02/2022	APPROVED BY:	TK 9/2/2022

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 OTTUMWA, IA 52501

SITE  
 ALLIANT ENERGY  
 OTTUMWA GENERATING STATION  
 OTTUMWA, IOWA

SITE PLAN  
 AND MONITORING WELL LOCATIONS

FIGURE  
 2

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