

# Semiannual Progress Report Selection of Remedy – Lansing Generating Station

Lansing Generating Station  
Lansing, Iowa

Prepared for:

Alliant Energy



**SCS ENGINEERS**

25220082.00 | September 12, 2022

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

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## 1.0 INTRODUCTION AND PURPOSE

The Semiannual Progress Report for remedy selection at the Interstate Power and Light Company (IPL) Lansing Generating Station (LAN) 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 LAN Landfill and Upper Ash Pond was completed on September 12, 2019. The ACM was completed in response to the detection of arsenic at a statistically significant level (SSL) above the Groundwater Protection Standard (GPS) in groundwater samples from downgradient monitoring well MW-302. An ACM Addendum was completed on November 25, 2020.

This Semiannual Progress Report summarizes data collected and remedy evaluation progress made since the September 2019 ACM and November 2020 ACM Addendum, and outlines planned future activities. This semiannual progress report covers the 6-month period of March 2022 through August 2022.

IPL has continued to evaluate the source of the arsenic GPS exceedance since the November 2020 ACM was submitted and it appears that it is not associated with the CCR units. A Selection of Remedy report (or modified Alternate Source Demonstration [ASD]) is being prepared as a continuation of the ACM process, although the CCR units may not be the source as it was originally believed. An evaluation of the arsenic GPS exceedances that triggered the ACM is ongoing.

### 1.2 SITE INFORMATION AND MAPS

LAN is located along the west bank of the Mississippi River, south of the City of Lansing, in Allamakee County, Iowa. The address of the generating station is 2320 Power Plant Drive in Lansing, Iowa (**Figure 1**). The facility includes a coal-fired generating plant, a CCR landfill (LAN Landfill), a CCR surface impoundment (LAN Upper Ash Pond), and a coal stockpile. LAN will cease operations by the end of 2022 and the CCR units will be closed.

The two CCR units at the facility (LAN Landfill and LAN Upper Ash Pond) are monitored with a multi-unit groundwater monitoring system and 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 as **Figure 2**.

Groundwater flow at the site is generally to the north-northwest, 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 75 feet below ground surface due to topographic variations across the facility and seasonal variations in water levels.

## 2.0 SUMMARY OF WORK COMPLETED

Work completed to support remedy selection for the LAN Landfill and LAN Upper Ash Pond is summarized in **Table 1**. Activities completed within the 6-month period covered by this Semiannual Progress Report are discussed in more detail below.

## 2.1 MONITORING NETWORK CHANGES

There were no changes to the LAN monitoring well network between March 2022 and August 2022. The monitoring well locations are shown on **Figure 2**.

## 2.2 GROUNDWATER MONITORING

Since confirmation of the arsenic exceedance in MW-302, multiple groundwater samples have been collected from the site to understand the nature and extent of any arsenic release. Prior to this reporting period, IPL continued with assessment monitoring and also collected samples from eight delineation wells on site for water quality parameters and supporting data that would either support the Selection of a Remedy (dissolved arsenic, total and dissolved iron, magnesium, total and dissolved manganese, dissolved molybdenum, potassium, sodium, total, carbonate and bicarbonate alkalinity) or indicate that a source other than the CCR units may be contributing to the exceedance, such as a change in the geochemistry immediately at or around monitoring well MW-302 due to the presence of organic carbon in the soil, or localized changes in the oxidation-reduction potential due to the lower ash pond closure. Samples have also been collected from an additional monitoring well installed at the downgradient waste boundary, an underground intercept drain along the waste boundary, and nearby surface waters. Additional information is presented in **Section 2.5**.

Since the March 2022 semiannual update, groundwater samples were collected during one event in April 2022. The one event included the following:

- The April monitoring event was part of the routine semiannual assessment monitoring program.
- The wells sampled and water levels measured included the wells in the original monitoring program (MW-6, MW-301, MW-302, and MW-303) and eight additional wells (MW-302A, MW-304, MW-304A, MW-305, MW-306, MW-306A, MW-307, and MW-307A).

A surface water sample was collected in conjunction with the April 2022 groundwater monitoring event. The sample was obtained from the combined outfall and stream water located immediately north of monitoring well MW-302. A full round of monitoring well and staff gauge measurements was also performed in April 2022. Both CCR Rule monitoring wells and state monitoring program wells were included.

A summary of groundwater samples collected since submittal of the ACM is provided in **Table 2**.

## 2.3 STATISTICAL EVALUATION

Statistical evaluation of 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 statistical evaluation, the only SSL above the GPS at a compliance well was arsenic at well MW-302. This SSL is consistent with previous results at LAN.

## 2.4 LANDFILL AND ASH POND CLOSURE

IPL will close the landfill by placing final cover over the remaining active area. IPL will close the Upper Ash Pond by a combination of CCR removal, consolidation within the CCR surface impoundment limits, and in-place closure with a cap. Closure by removal will be performed in the North Pond Closure Area (northern portion of the Upper Ash Pond) and consolidated to the South Pond Closure

Area (southern portion of the Upper Ash Pond). In-place CCR and consolidated CCR, coal, and coal-impacted soil relocated to the South Pond Closure Area during the planned decommissioning/closure activities at LAN will be capped with a low-permeability soil cover.

IPL completed the following landfill and ash pond closure activities during previous semiannual reporting periods.

- In August 2021, IPL performed test pits in and around the Upper Ash Pond to evaluate site conditions and CCR behavior during excavation, moisture conditioning, and placement.
- In August and September 2021, IPL performed test fills on the CCR in the Upper Ash Pond. Geotechnical monitoring instruments including settlement plates and vibrating wire piezometers were installed in the test fills and underlying CCR. Settlement plate monitoring was conducted through mid-December 2021. Monitoring of the vibrating wire piezometers is ongoing.
- In October 2021, IPL installed four groundwater dewatering pilot-test wells along the west side of the Upper Ash Pond and completed a pump test to evaluate the design of a groundwater dewatering system for the closure of the Upper Ash Pond.
- In October 2021, IPL also pilot-tested in-situ stabilization of CCR using portland cement grout within the Upper Ash Pond. The closure of the Upper Ash Pond will utilize in-situ stabilization to improve the shear strength of a select portion of the existing CCR within the pond. The shear strength improvements will facilitate the consolidation and capping of CCR within the Upper Ash Pond.
- In October and November 2021, IPL completed a small-scale test of CCR dredging and dewatering methods at the Upper Ash Pond. Approximately 1,000 cubic yards of CCR was dredged from the northern open water portion of the ash pond into geotextile tubes staged at the south end of the pond to evaluate the method for CCR removal and the CCR moisture conditions in the geotextile tubes over the month following the test dredging.
- In November 2021, IPL began incorporating the results of preconstruction testing into the closure design for the landfill and ash pond. Design activities included updating material volumes that will be managed during closure, grading design, geotechnical evaluations, dredging/excavation planning, and water management planning. The design effort is ongoing.
- In January 2022, IPL began developing permit applications for ash pond closure activities. The permitting effort is ongoing.
- In February 2022, IPL completed an evaluation of a nearby off-site fill source that will be used during the closure of the Upper Ash Pond. A significant volume of imported soil is required to backfill portions of the ash pond where CCR is removed for closure. The evaluation supports the procurement of a local source of material to support the pond closure.

- In February 2022, following receipt of pilot-test data from their preconstruction services contractor, IPL began evaluating discharge requirements for a full-scale groundwater dewatering system to support the ash pond closure.

IPL completed the following landfill and ash pond closure activities during the current semiannual reporting period.

- In March 2022, the remaining bridge lift platform construction across the LAN Upper Ash Pond was completed.
- In May 2022, monitoring well MW-20 was abandoned.
- In May 2022, the ash pond closure contractor mobilized. The preparation of gravel placement and grading of contractor laydown area in the Closed Lower Pond area was completed.
- In May through June 2022, the closure contractor dewatered the southern end of the Upper Ash Pond.
- In June and July 2022, scour protection grading preparation and installation began in the LAN Upper Ash Pond - South Pond Closure Area. Drainage trenches were constructed and the 40-mil geomembrane was installed. Some CCR from the LAN Upper Ash Pond was hauled up to the LAN Landfill, placed, and conditioned.
- In May through August 2022, the closure contractor installed submersible pumps in two previously installed dewatering wells and began pumping at the west end of the LAN Upper Ash Pond to supply water for In-Situ Stabilization (ISS) wall construction.
- In June through August 2022, the closure contractor installed the ISS wall through the middle of the bridge lift platform. Prior to late July, the water level in the North Pond Closure Area of the Upper Ash Pond was drawn down during ISS work.
- In August 2022, IPL and the closure contractor raised the North Pond water level to facilitate dredging. CCR dredging began in the LAN Upper Ash Pond North Pond Closure Area. The CCR was discharged into geotextile dewatering tubes in the prepared scour protection layer area in the South Pond Closure Area.

Landfill and ash pond closure activities are included in the summary provided in **Table 1**.

## **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 and revised in the November 2020 ACM Addendum #1.

The ACM Report and ACM Addendum were originally prepared based on the potential relationship of the arsenic impacts to the disposal of CCR. Based on continued assessment of the nature and extent of arsenic, it appears that the source of the arsenic is unrelated to the LAN Landfill and LAN Upper Ash Pond.

Several activities have been completed since the initial arsenic GPS exceedances to enhance IPL's understanding of arsenic concentrations downgradient of the CCR units:

- Installation and sampling of the monitoring well nest MW-307 and MW-307A directly between the arsenic impacted well MW-302 and the CCR units.
- Installation of water level wells MW-308 and MW-309 to the north of well MW-302.
- Four rounds of groundwater sampling at monitoring wells MW-307/MW-307A.
- Re-evaluation of horizontal and vertical groundwater flow conditions after the installation of the new MW-307/MW-307A wells and water level wells MW-308 and MW-309.
- Two rounds of surface water sampling results from the surface water outfall adjacent to impacted monitoring well MW-302.
- A review of the CCR well boring logs to identify variations in soil and presence of natural sources of organic carbon.
- Water sample analysis from the Upper Ash Pond.
- Evaluation of the interceptor drain located between the Upper Ash Pond and well MW-302.
- Evaluation of the construction and closure history of the Lower Ash Pond located between the CCR units and well MW-302.
- A geochemical assessment of arsenic in groundwater by ReSolution Partners LLC.

The site conceptual model has been revised to incorporate information from the activities listed above and will be updated again with information from future data collection.

The ACM Report originally presented closure and capping in-place with monitored natural attenuation as Alternative 2. Based on the apparent absence of relationship between the presence of arsenic in groundwater and the dry ash landfill and ponds, IPL revisited the proposed alternatives within the ACM and monitored natural attenuation is no longer a component of the remedy. This will be presented in further detail as IPL finalizes the Selection of Remedy report.

### **3.0 PLANNED ACTIVITIES**

Planned activities within the next reporting period include the following:

- Continue semiannual assessment monitoring for the existing monitoring well network and new monitoring wells.
- Continue evaluation of groundwater flow and groundwater quality.
- Update conceptual site model based on findings of the ongoing groundwater sampling.
- Complete the Selection of Remedy report or a modified ASD.
- Complete ash pond closure permitting.
- Continue Upper Ash Pond closure construction.
- Advance landfill closure design and permitting.



## Tables

- 1 Timeline for Completed Work – Selection of Remedy
- 2 CCR Rule Groundwater Samples Summary

**Table 1. Timeline for Completed Work - Selection of Remedy  
Lansing Generating Station / SCS Engineers Project #25220082.00**

Date	Activity
<b>Activities Completed During Previous Semiannual Reporting Periods</b>	
May 2019	Installed additional monitoring wells to investigate nature and extent (MW-304, MW-305, and MW-306).
June 2019	Sampled new monitoring wells (MW-304, MW-305, and MW-306).
September 2019	Completed ACM.
September 2019	Completed the Well Documentation Report for new wells.
October/November 2019	Planned field investigation for extent and quantity of source areas and geotechnical properties for remedy evaluation.
October to December 2019	Planning, permitting, and access arrangements for three additional monitoring wells (piezometers) to investigate the vertical extent of impacts.
December 2019	Installed additional monitoring wells (piezometers) to investigate vertical groundwater flow and groundwater quality.
December 2019	Sampled assessment well MW-306.
January 2020	Completed Statistical Evaluation of October 2019 groundwater monitoring results.
January 2020	Completed 2019 Annual Groundwater Monitoring and Corrective Action Report.
February 2020	Sampled assessment well MW-306.
March 2020	Completed Semiannual Progress Report for the Selection of Remedy.
May 2020	Completed hydrographic survey of the LAN Upper Ash Pond and LAN Landfill topographic survey.
June 2020	Completed field phase of a geotechnical study of the CCR surface impoundment.
July 2020	Sampled new piezometers 302A, 304A, and 306A.
August 2020	Initiated planning for the public ACM meeting.
August 2020	Completed annual landfill inspection.
September 2020	Completed Semiannual Progress Report for the Selection of Remedy.
October 2020	Held public ACM meeting.
November 2020	Submitted application to EPA for a site-specific alternative deadline to initiate closure of the Upper Ash Pond.
November 2020	Completed ACM Addendum No. 1.

**Table 1. Timeline for Completed Work - Selection of Remedy  
Lansing Generating Station / SCS Engineers Project #25220082.00**

Date	Activity
December 2020	Completed additional LAN Upper Ash Pond CCR sampling for bench scale testing.
January 2021	Completed benchtop dredge test and laboratory testing of residual CCR.
January 2021	Completed 2020 Annual Groundwater Monitoring and Corrective Action Report.
February 2021	Sampled MW-304A and MW-306 for selected parameters.
March 2021	Completed Semiannual Progress Report for the Selection of Remedy.
March 2021	Issued a Request for Proposal (RFP) to landfill and pond closure contractors to conduct pre-construction services.
June 2021	Sampled both plant water supply wells for molybdenum.
June 2021	Installed three additional monitoring wells and a piezometer to provide additional information on vertical and horizontal groundwater flow, as well as target groundwater quality parameters.
July 2021	Sampled MW-304A, MW-306, MW-307, and MW-307A for selected parameters.
July 2021	Selected a contractor to provide preconstruction services for ash pond and landfill closures.
August 2021	Performed research on regional molybdenum concentrations in bedrock.
August 2021	Completed Well Documentation Report for monitoring wells MW-307, MW-307A, MW-308, and MW-309.
August 2021	Completed additional sampling event at MW-307 and MW-307A.
August 2021	Conducted design reviews and site visits with pond and landfill closure preconstruction services contractor and evaluated permitting needs for preconstruction field testing. Initiated field testing.
August 2021	Performed test pits in and around the LAN Landfill and LAN Upper Ash Pond to evaluate site conditions and CCR behavior during excavation, moisture conditioning, and placement.
August - September 2021	Performed test fills on the CCR in the LAN Upper Ash Pond. Installed geotechnical monitoring instruments including settlement plates and vibrating wire piezometers in the test fills and underlying CCR.
September 2021	Completed Semiannual Progress Report for the Selection of Remedy.
October 2021	Completed semiannual assessment monitoring event, including additional groundwater quality parameters.
October 2021	Installed four groundwater dewatering pilot test wells along the west side of the LAN Upper Ash Pond and completed a pump test to evaluate the design of a groundwater dewatering system for the closure of the LAN Upper Ash Pond.
October 2021	Pilot-tested in-situ stabilization of CCR using portland cement grout within the LAN Upper Ash Pond.
October - November 2021	Pilot-tested CCR dredging and geotextile tube dewatering of dredged materials at the LAN Upper Ash Pond.
November 2021 - February 2022	Incorporated preconstruction testing into LAN Upper Ash Pond closure design (ongoing effort).
January 2022	Completed Statistical Evaluation of October 2021 groundwater monitoring results.

**Table 1. Timeline for Completed Work - Selection of Remedy  
Lansing Generating Station / SCS Engineers Project #25220082.00**

Date	Activity
January 2022	Completed 2021 Annual Groundwater and Monitoring and Corrective Action Report.
January - February 2022	Developed Upper Ash Pond closure permit applications (ongoing effort).
October 2021 - February 2022	Updated arsenic in groundwater evaluation and site conceptual model.
February 2022	Completed evaluation of potential off-site general fill material for use in LAN Upper Ash Pond closure.
February 2022	Evaluated groundwater dewatering pump test discharge data (ongoing effort).
February 2022	Measured water levels in all site monitoring wells.
February 2022	Collected additional sample from combined outfall 001 and surface water near well MW-302.
<b>Activities Completed During the Current Semiannual Reporting Period</b>	
March 2022	Completed Semiannual Progress Report for Selection of Remedy.
March 2022	Repaired the Upper Ash Pond West Berm Piezometer.
March 2022	The remaining bridge lift platform construction across the LAN Upper Ash Pond was completed.
April 2022	Conducted semiannual assessment monitoring event.
May 2022	Ash pond closure contractor was mobilized.
May 2022	Complete Abandonment of MW-20, a non-CCR network well used to assess groundwater elevations and groundwater quality between the LAN Landfill and LAN Upper Ash Pond. The well was abandoned to make way for closure activities.
May 2022	Preparation gravel placement and grading of contractor laydown area in the Closed Lower Pond area.
May - June 2022	The closure contractor dewatered the southern end of the Upper Ash Pond.
June 2022	Completed Statistical Evaluation of February 2022 groundwater monitoring results.
June - July 2022	Scour protection grading preparation and installation began in the LAN Upper Ash Pond - South Pond Closure Area. Drainage trenches developed and the placement of the 40-mil geomembrane.
June - July 2022	Hauled, placed, and conditioned some CCR from the LAN Upper Ash Pond up to the LAN Landfill.
June - August 2022	Installed the In-Situ Stabilization (ISS) wall. Installed ISS wall through middle of bridge lift platform.
May - August 2022	Installed two dewatering wells and pumping begins at the west end of the LAN Upper Ash Pond for ISS Wall work.
May - August 2022	The closure contractor installed submersible pumps in two previously installed dewatering wells and began pumping at the west end of the LAN Upper Ash Pond to supply water for In-Situ Stabilization (ISS) wall construction.
August 2022	North Pond water level allowed to rise for dredging. Prior to late July, the water level was drawn down for ISS work.
August 2022	Dredging the Upper Ash Pond North Pond closure area and filling geotextile dewatering tubes in the prepared scour protection layer area in the South Pond Closure Area.

Created by: NDK Date: 2/19/2020  
Last revision by: NDK Date: 8/29/2022  
Checked by: TK Date: 8/29/2022

**Table 2. CCR Rule Groundwater Samples Summary  
Lansing Generating Station / SCS Engineers Project #25220082.00**

Sample Dates	Background Well	Downgradient Wells													
	MW-6	MW-301	MW-302	MW-302A	MW-303	MW-304	MW304A	MW-305	MW-306	MW-306A	MW-307	MW-307A	MW-308	MW-309	
10/2/2019	A	A	A	NI	A	A	NI	A	A	NI	NI	NI	NI	NI	
12/5/2019	--	--	--	NI	--	--	NI	--	Add.	NI	NI	NI	NI	NI	
2/5/2020	--	--	--	--	--	--	--	--	Add.	--	NI	NI	NI	NI	
5/20/2020	A	A	A	A	A	A	A	A	A	A	NI	NI	NI	NI	
7/6/2020	--	--	--	A	--	--	A	--	--	A	NI	NI	NI	NI	
8/18/2020	Add.	Add.	Add.	Add.	Add.	Add.	Add.	Add.	Add.	Add.	NI	NI	NI	NI	
10/19-20/2020	A	A	A	A	A	A	A	A	A	A	NI	NI	NI	NI	
2/23/2021	--	--	--	--	--	--	Add.	--	Add.	--	NI	NI	NI	NI	
4/7-9/2021	A	A	A	A	A	A	A	A	A	A	NI	NI	NI	NI	
7/12/2021	--	--	--	--	--	--	Add.	--	Add.	--	A	A	--	--	
8/13/2021	--	--	--	--	--	--	--	--	--	--	A	A	--	--	
10/25-27/2021	A	A	A	A	A	A	A	A	A	A	A	A	--	--	
4/4-6/2022	A	A	A	A	A	A	A	A	A	A	A	A	WL	WL	
Total Samples	7	7	7	7	7	7	9	7	11	7	4	4	N/A	N/A	

Abbreviations:

A = Samples analyzed for assessment monitoring parameters  
Add. = Additional sampling event for selected parameters

-- = Not Sampled  
NI = Not Installed

N/A= not applicable  
WL = Water level measurement only

Notes:

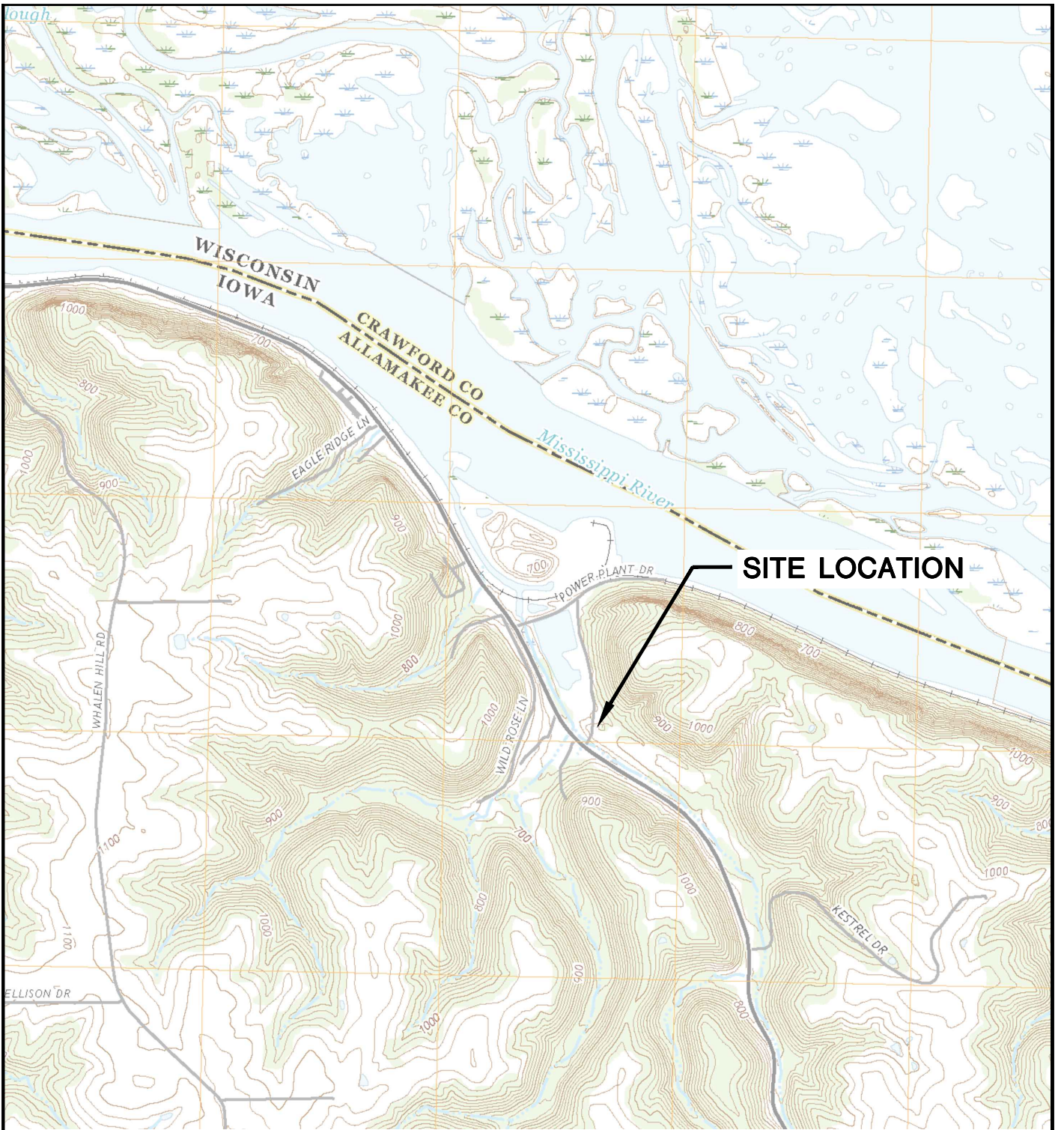
Monitoring wells MW-308 and MW309 were installed for horizontal groundwater flow and sample collection is not currently planned for these two wells.

Created by: NDK Date: 2/19/2020  
Last revision by: NDK Date: 8/8/2022  
Checked by: RM Date: 8/8/2022

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## Figures

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



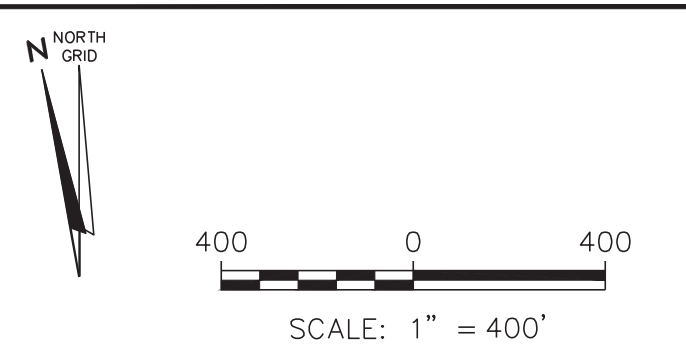
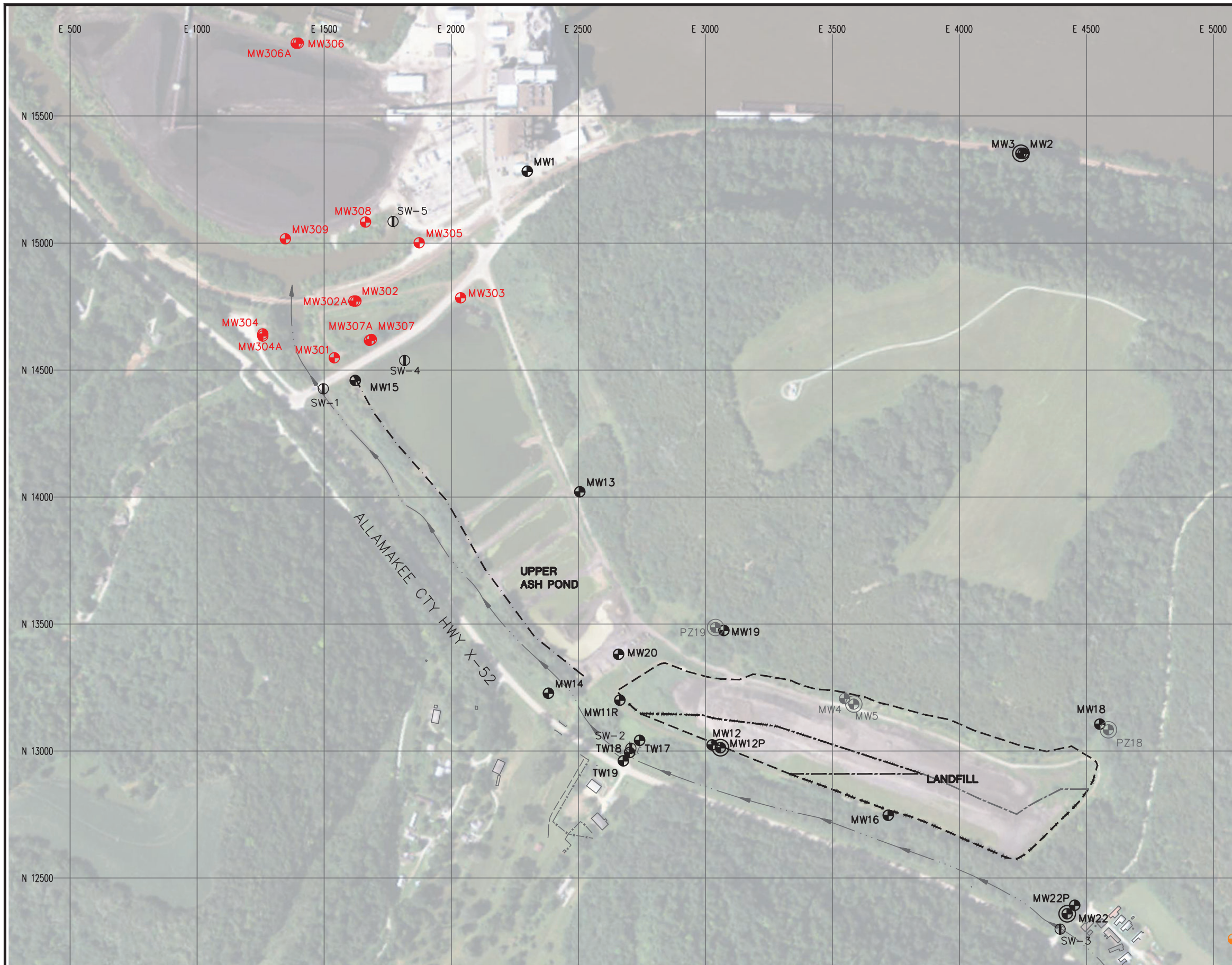
**SITE LOCATION**



LANSING QUADRANGLE  
 IOWA-ALLAMAKEE CO.  
 7.5 MINUTE SERIES (TOPOGRAPHIC)  
 2018  
 SCALE: 1" = 2,000'



CLIENT	INTERSTATE POWER AND LIGHT 2320 POWER PLANT DRIVE LANSING, IA 52151-9733		SITE	ALLIANT ENERGY LANSING GENERATING STATION LANSING, IOWA		ENGINEER	SITE LOCATION MAP	
	PROJECT NO.	25219070.00		DRAWN BY:	BSS		<b>SCS ENGINEERS</b> 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	FIGURE
DRAWN:	11/27/2019	CHECKED BY:	MDB	APPROVED BY:	TK 01/30/2020			
REVISED:	11/27/2019							



**LEGEND**

	APPROVED LIMITS OF WASTE
	LIMITS OF PHASE 1 FINAL COVER
	LIMITS OF PHASE 2 FINAL COVER
	SLURRY WALL
	EXISTING STREAM
	EXISTING STAFF GAUGE
	EXISTING MONITORING WELL
	EXISTING PIEZOMETER
	ABANDONED MONITORING WELL
	ABANDONED PIEZOMETER
	CCR MONITORING WELL
	CCR BACKGROUND MONITORING WELL

- NOTES:**
- 2011 AERIAL PHOTOGRAPH FROM THE USDA-FSA AERIAL PHOTOGRAPHY FIELD OFFICE.
  - MONITORING WELL LOCATIONS AND CCR UNIT LIMITS ARE APPROXIMATE.
  - MONITORING WELLS MW20, MW301, MW302, AND MW303 WERE INSTALLED BY CASCADE DRILLING IN NOVEMBER 2015.
  - MONITORING WELLS MW304, MW305, AND MW306 WERE INSTALLED BY ROBERTS ENVIRONMENTAL DRILLING IN MAY 2019.
  - MONITORING WELLS MW302A, MW304A, AND MW306A WERE INSTALLED BY CASCADE DRILLING IN DECEMBER 2019.
  - MONITORING WELLS MW307, MW307A, MW308, AND MW309 WERE INSTALLED BY CASCADE DRILLING IN JUNE 2021.
  - MW6 IS SAMPLED UNDER BOTH THE STATE AND CCR RULE MONITORING PROGRAMS.
  - THE BACKGROUND MONITORING WELL FOR THE LANSING POWER STATION IS MW6.

PROJECT NO.	25221070.00	DRAWN BY:	BSS/KP
DRAWN:	11/27/2019	CHECKED BY:	NDK
REVISED:	01/20/2022	APPROVED BY:	TK 9/2/2022

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

**CLIENT**  
 INTERSTATE POWER AND LIGHT  
 2320 POWER PLANT DRIVE  
 LANSING, IA 52151-9733

**SITE**  
 ALLIANT ENERGY  
 LANSING GENERATING STATION  
 LANSING, IOWA

**FIGURE**  
 SITE PLAN AND MONITORING  
 WELL LOCATIONS

**FIGURE**  
 2

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