Semiannual Progress Report Selection of Remedy – Lansing Generating Station

Lansing Generating Station Lansing, Iowa

Prepared for:



SCS ENGINEERS

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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 (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 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 No. 1, and outlines planned future activities. This semiannual progress report covers the 6-month period of September 2022 through February 2023.

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 second ACM addendum is being prepared to update the current No-Action alternative since further investigation has concluded there are no GPS exceedances associated with the CCR Units. Following the completion of ACM Addendum No. 2, a selection of remedy report will be prepared as a continuation of the ACM process.

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 coal-fired generating plant at LAN ceased coal-fired electric generating activities at the end of 2022 and is currently being decommissioned. The facility also includes a CCR landfill (LAN Landfill) and a CCR settling pond (LAN Upper Ash Pond), which 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 1A**. Work completed on the landfill and impoundment closures 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

There were no changes to the LAN monitoring well network between September 2022 and February 2023. 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 groundwater quality parameters (dissolved arsenic, total and dissolved iron, magnesium, total and dissolved manganese, dissolved molybdenum, potassium, sodium, total, carbonate, and bicarbonate alkalinity). This and supporting data indicate that a source other than the CCR units is likely causing 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. 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; all additional samples indicate the CCR units are not the source of the arsenic concentrations above the GPS in groundwater samples from MW-302. Additional information is presented in **Section 2.5**.

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

- The October 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-306A, MW-306A, MW-307, and MW-307A).

A full round of monitoring well and staff gauge measurements was also performed in October 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 2023 Annual Groundwater Monitoring and Corrective Action Report, due on January 31, 2024. Based on the statistical evaluation completed for the October 2022 monitoring event, the only SSL above the GPS at a compliance well was for 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 LAN Landfill in 2023 by placing a final cover over the remaining active area. IPL will close the Upper Ash Pond in 2023 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. Key activities completed during the reporting period included:

- Hydraulic dredging in the LAN Upper Ash Pond and dewatering of CCR using geotubes was completed in late 2022. Some CCR excavation and decommissioning material consolidation was conducted.
- Permitting and construction of temporary groundwater dewatering wells was completed.
- IPL completed and submitted an application for the state sanitary disposal project closure permit for the LAN Landfill. Iowa Department of Natural Resources (IDNR) issued an updated sanitary disposal project permit incorporating the closure plan on December 5, 2022.
- All sluicing of CCR to the pond permanently ended in December 2022. The only remaining discharges to the LAN Upper Ash Pond are limited to pumping for freeze protection, landfill contact water, and precipitation.
- IPL completed and submitted an application for the state sanitary disposal project closure permit for the LAN Upper Ash Pond. IDNR issued the permit on February 9, 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 and revised in the November 2020 ACM Addendum No. 1.

The ACM Report and ACM Addendum No. 1 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. This additional assessment will be summarized in ACM Addendum No. 2, which is now in progress.

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 included in ACM Addendum No. 2.

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 ACM Addendum No. 2 to update the No-Action alternative.
- Hold a public meeting.
- Complete the Selection of Remedy report.
- Continue LAN Upper Ash Pond closure construction.
- Initiate LAN Landfill closure construction.

Tables

- 1A Timeline for Completed Groundwater Sampling and Corrective Action Work – Selection of Remedy
- 1B Timeline for Closure Related Work Selection of Remedy
- 2 CCR Rule Groundwater Samples Summary

Table 1A. Timeline for Completed Groundwater Sampling and Corrective Action Work Selection of Remedy Lansing Generating Station / SCS Engineers Project #25220082.00

Date	Activity
	Activities Completed During Previous Semiannual Reporting Periods
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.
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.
December 2020	Completed additional LAN Upper Ash Pond CCR sampling for bench scale testing.

Table 1A. Timeline for Completed Groundwater Sampling and Corrective Action Work Selection of Remedy Lansing Generating Station / SCS Engineers Project #25220082.00

Date	Activity
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.
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.
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.
September 2021	Completed Semiannual Progress Report for the Selection of Remedy.
October 2021	Completed semiannual assessment monitoring event, including additional groundwater quality parameters.
January 2022	Completed Statistical Evaluation of October 2021 groundwater monitoring results.
January 2022	Completed 2021 Annual Groundwater and Monitoring and Corrective Action Report.
October 2021 - February 2022	Updated arsenic in groundwater evaluation and site conceptual model.
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.
March 2022	Completed Semiannual Progress Report for Selection of Remedy.
April 2022	Conducted semiannual assessment monitoring event.
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.
June 2022	Completed Statistical Evaluation of February 2022 groundwater monitoring results.

Table 1A. Timeline for Completed Groundwater Sampling and Corrective Action Work Selection of Remedy Lansing Generating Station / SCS Engineers Project #25220082.00

Date	Activity							
	Activities Completed During the Current Semiannual Reporting Period							
September 2022	Completed Semiannual Progress Report for the Selection of Remedy.							
September 2022	Met with EPA to discuss format of an ASD/ACM Addendum, or SOR that permits moving forward with no planning corrective actions for an arsenic SSL.							
October 2022	Completed semiannual assessment monitoring event, including additional groundwater quality parameters.							
December 2022	Received feedback from EPA on the process for documenting nature and extent analysis within an ACM addendum and the SOR report.							
December 2022- February 2023	Prepared draft ACM Addendum No. 2 that provides evidence of no SSLs related to the CCR Units							
January 2023	Completed Statistical Evaluation of October 2022 groundwater monitoring results.							
January 2023	Completed 2022 Annual Groundwater and Monitoring and Corrective Action Report.							
February 2023	Completed the October 2022 Groundwater Results Report							

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Table 1B. Timeline for Closure Related WorkSelection of RemedyLansing Generating Station / SCS Engineers Project #25220082.00

Date	Activity							
	Activities Completed During Previous Semiannual Reporting Periods							
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.							
January 2021	Completed benchtop dredge test and laboratory testing of residual CCR.							
March 2021	Issued a Request for Proposal (RFP) to landfill and pond closure contractors to conduct pre-construction services.							
July 2021	Selected a contractor to provide preconstruction services for ash pond and landfill closures.							
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.							
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 - February 2022	Developed Upper Ash Pond closure permit applications (ongoing effort).							
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).							
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.							
May 2022	Ash pond closure contractor was mobilized.							
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 - 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.							

Table 1B. Timeline for Closure Related WorkSelection of RemedyLansing Generating Station / SCS Engineers Project #25220082.00

Date	Activity
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	Dredged 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.
	Activities Completed During the Current Semiannual Reporting Period
September 2022 - October 2022	Dredged the Upper Ash Pond North Pond closure area and filled geotextile dewatering tubes in the prepared scour protection layer area in the South Pond Closure Area. Hauled coal and soil impacted with coal from the Coal Yard to the South Pond Closure Area.
September 2022	Submitted a Temporary and Limited (T&L) Antidegradation request to the IDNR for the addition of the polymers/coagulant used in the dredging and geotube dewatering process on September 14, 2022. The IDNR issued the T&L Antidegradation approval on September 16, 2022.
November 2022	Excavated CCR from the Upper Ash Pond North Pond closure area and placed it in the South Pond Closure Area. Hauled coal and soil impacted with coal from the Coal Yard to the South Pond Closure Area.
November 2022	Completed and submitted an application to the Allamakee County Board of Health for drilling remaining temporary groundwater dewatering wells at the Upper Ash Pond. Permit coverage was granted on November 30, 2022.
November 2022	Submitted the state sanitary disposal project closure permit applications for the LAN Landfill and LAN Upper Ash Pond.
November 2022	Issued the annual progress report required by 40 CFR 257.103(f)(2)(x), Annual Progress Report – Site-Specific Alternative Deadline to Initiate Closure of CCR Surface Impoundments
December 2022	Received an updated state sanitary disposal project permit for the LAN Landfill incorporating the closure plan.
December 2022	Submitted a Joint Permit Application for Upper Ash Pond closure and decommissioning activities that may impact navigable waterways and the floodplain in the vicinity of the LAN facility.
December 2022	Coal-fired electrical generating activities ceased as of December 31, 2022. No significant CCR unit closure-related construction work was completed in December 2022.
January 2023	Completed updates to the Water Well Pollution Prevention Plan (WWPPP) to obtain INDR NPDES GP#6 coverage for temporary groundwater dewatering well construction. Temporary groundwater dewatering wells installed around the north half of the Upper Ash Pond.
January 2023	Prepared an Antidegradation Alternatives Analysis for temporary groundwater dewatering discharges to surface water.
February 2023	Published a public notice initiating the public review/comment period for the Antidegradation Alternatives Analysis for temporary groundwater dewatering discharges to surface water. Permit coverage by IDNR NPDES GP9 for these surface water discharges will be covered following the public review/comment period, development of a Dewatering Pollution Prevention Plan (DWPPP), and electronic Notice of Intent (eNOI).
February 2023	Submitted responses to agency review questions on the state sanitary disposal project closure permit application.
February 2023	Received approval of the state sanitary disposal project closure permit for the LAN Upper Ash Pond.
February 2023	Submitted a request for and received a Temporary and Limited Degradation Approval for the use of a flocculant and acid during treatment and surface water discharges of water from the Upper Ash Pond during closure construction.
February 2023	Temporary groundwater dewatering wells installed around the north half of the Upper Ash Pond. Excavation, hauling, and placement of CCR from the northeast limits of the Upper Ash Pond to the South Pond Closure Area. Construction of a dewatering treatment system laydown pad with imported soil fill at the northeast limits of the Upper Ash Pond.

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Table 2. CCR Rule Groundwater Samples SummaryLansing Generating Station / SCS Engineers Project #25220082.00

Sample Dates	Background Well						Down	gradient We	lls					
	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	Α	А	А	NI	Α	А	NI	A	А	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	Α	А	А	Α	Α	А	Α	A	A	A	NI	NI	NI	NI
7/6/2020				Α			Α			Α	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	А	А	А	Α	Α	А	Α	A	A	A	NI	NI	NI	NI
2/23/2021							Add.		Add.		NI	NI	NI	NI
4/7-9/2021	Α	А	А	A	A	А	Α	A	A	A	NI	NI	NI	NI
7/12/2021							Add.		Add.		A	A		
8/13/2021											A	A		
10/25-27/2021	А	А	А	A	A	A	Α	A	A	A	A	A		
4/4-6/2022	A	А	А	A	A	А	A	А	А	A	А	А	WL	WL
10/17-19/2022	А	А	А	А	А	А	A	А	А	A	А	А	WL	WL
Total Samples	8	8	8	8	8	8	10	8	12	8	5	5	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:

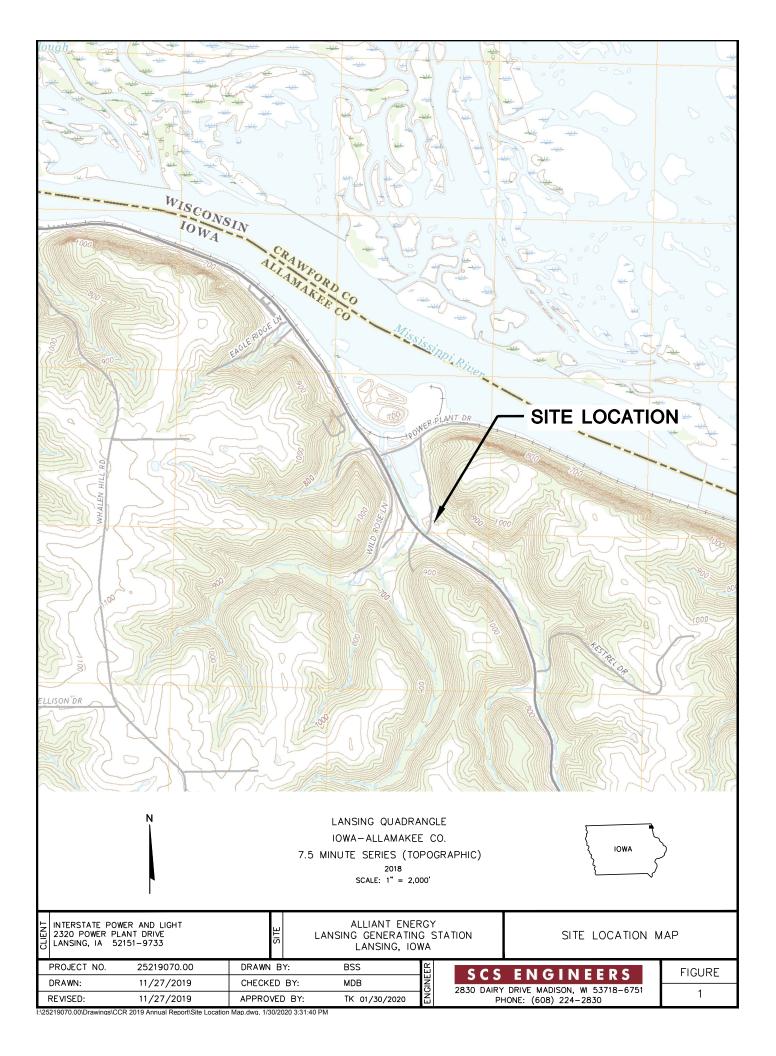
Monitoring wells MW-308 and MW309 were installed for horizontal groundwater flow and sample collection is not currently planned for these two wells.

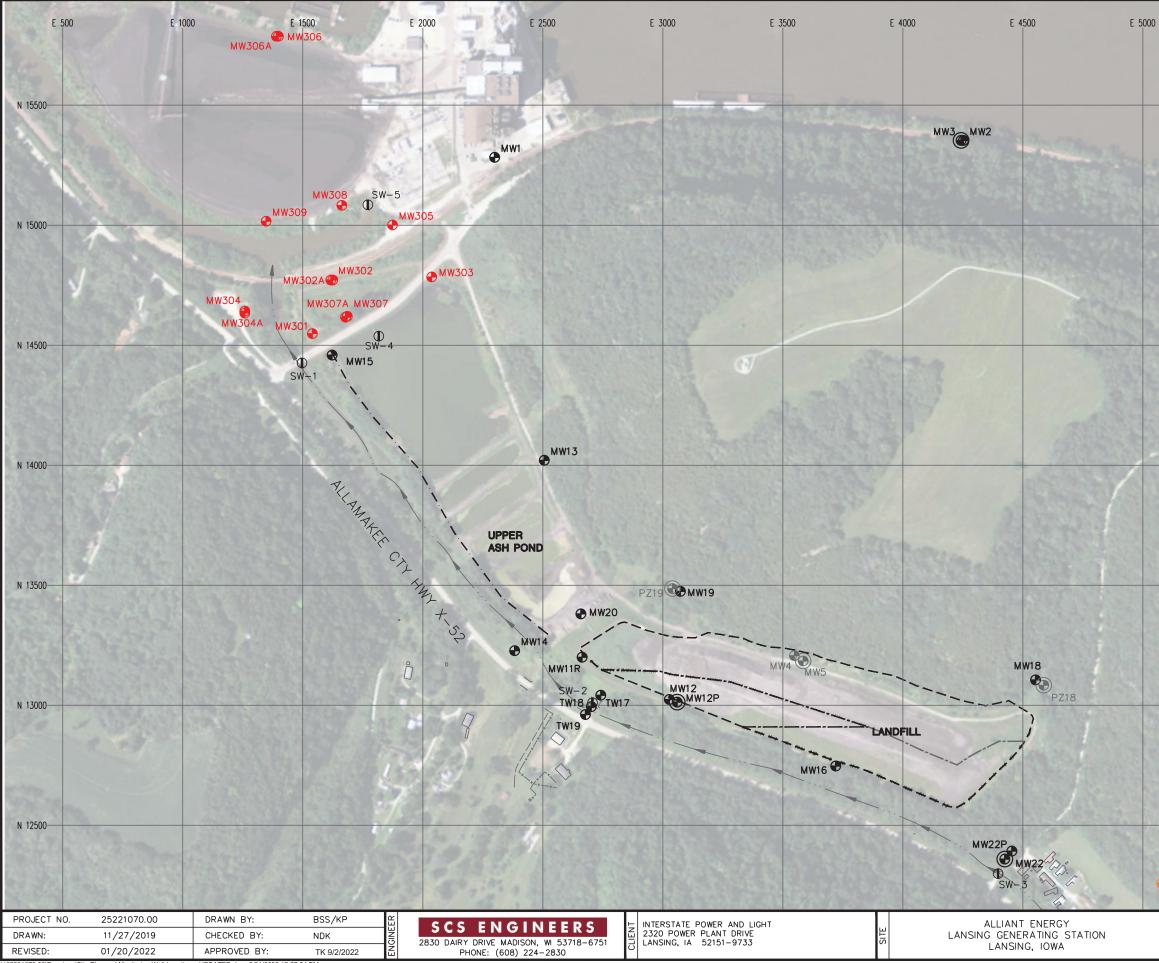
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Figures

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





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N GRID 400	0 400 SCALE: 1" = 400'
	LEGEND
	- APPROVED LIMITS OF WASTE
	- LIMITS OF PHASE 1 FINAL COVER
	- LIMITS OF PHASE 2 FINAL COVER
	- SLURRY WALL
	- EXISTING STREAM
⊕ SW-1	EXISTING STAFF GAUGE
	EXISTING MONITORING WELL
MW12P	EXISTING PIEZOMETER
€ MW4	ABANDONED MONITORING WELL
() MW5	ABANDONED PIEZOMETER
€ M₩301	CCR MONITORING WELL
е мw6	CCR BACKGROUND MONITORING WELL
NOTES:	
1. 2011 AERIAL PHOTOGRAPH FROM THE USDA- FSA AERIAL PHOTOGRAPHY FIELD OFFICE.	

- 2. MONITORING WELL LOCATIONS AND CCR UNIT LIMITS ARE APPROXIMATE.
- 3. MONITORING WELLS MW20, MW301, MW302, AND MW303 WERE INSTALLED BY CASCADE DRILLING IN NOVEMBER 2015.
- 4. 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.
- 7. MW6 IS SAMPLED UNDER BOTH THE STATE AND CCR RULE MONITORING PROGRAMS.
- 8. THE BACKGROUND MONITORING WELL FOR THE LANSING POWER STATION IS MW6.

SITE PLAN AND MONITORING WELL LOCATIONS