Semiannual Progress Report Selection of Remedy – Prairie Creek Generating Station

Prairie Creek Generating Station Cedar Rapids, Iowa

Prepared for:



SCS ENGINEERS

25220084.00 | March 13, 2024

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1.0 INTRODUCTION AND PURPOSE

The Semiannual Progress Report for remedy selection at the Interstate Power and Light Company (IPL) Prairie Creek Generating Station (PCS) 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 PCS Closure Area was completed on September 12, 2019. The ACM was completed in response to the detection of molybdenum and arsenic at a statistically significant level (SSL) above the Groundwater Protection Standards (GPS) in groundwater samples from downgradient monitoring wells. Arsenic concentrations exceeded the GPS at MW-303 and MW-304, and molybdenum concentrations exceeded the GPS at MW-306. An addendum to the ACM was completed on August 9, 2021, to assess additional corrective measures appropriate for these detections. Additional data collection for a second addendum to the ACM was conducted during this reporting period.

This Semiannual Progress Report summarizes data collected and remedy evaluation progress made since the September 2019 ACM and August 2021 ACM Addendum No. 1, and outlines planned future activities to complete the selection of remedy process. This semiannual progress report covers the 6-month period of September 2023 through February 2024.

1.2 SITE INFORMATION AND MAPS

PCS is located to the south of Prairie Creek and to the west of the Cedar River, on the south side of the City of Cedar Rapids in Linn County, Iowa (**Figure 1**). The address of the generating station is 3300 C Street Southwest, Cedar Rapids, Iowa. In addition to the generating station, the property also contains a closure area located within the original footprint of the CCR impoundments and a coal stockpile.

The groundwater monitoring system at PCS monitors the Closure Area, which was created when the following CCR units were closed:

- PCS Pond 1
- PCS Pond 5PCS Pond 6
- PCS Pond 2PCS Pond 3
- PCS Pond 7

- PCS Beneficial Use
 Storage Area
- PCS Bottom Ash Pile

- PCS Pond 4
- PCS Discharge Pond (Pond 8)

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 north. The approximate depth to the water table for wells located on plant property varies from 10 to 16 feet below ground surface (bgs). The approximate depth to the water table for wells located north of the plant property varies from 0 to 11 feet bgs. These ranges in depth to groundwater are due to topographic variations across the facility and seasonal fluctuations in the groundwater surface. The downgradient area where MW-303 through MW-306, the MW-309/309A nest, and the MW-310/310A nest are located is prone to flooding when water levels in Prairie Creek and the Cedar River are high.

2.0 SUMMARY OF WORK COMPLETED

Work completed to support remedy selection for the PCS CCR units is summarized in **Table 1**. Activities completed within the 6-month period covered by this semiannual report are discussed in more detail below.

2.1 MONITORING NETWORK CHANGES

No changes were made to the certified groundwater monitoring system during the reporting period of this semiannual SOR update.

2.2 GROUNDWATER AND SURFACE WATER MONITORING

Since the previous March - August 2023 update, groundwater samples were collected during the November 2023 event. The November 2023 monitoring event was part of the routine semiannual assessment monitoring program. The wells sampled included the eight wells in the original monitoring system (MW-301 through MW-308), the six additional delineation wells and piezometers (MW-301A, MW-306A, MW-309, MW-309A, MW-310, and MW-310A), and supplemental background well MW-312. Results are summarized in a draft Assessment Groundwater Monitoring Results – November 2023 letter that will be submitted in March 2024.

A summary of groundwater samples collected from wells in the groundwater monitoring system since the completion of the September 2019 ACM is provided in **Table 2**.

Investigation activities were continued from the previous reporting period, A larger-scale pumping test was designed and will include the installation and use of a 6-inch pumping well and two 2-inch observation wells. The additional pumping test will be performed during the next reporting period. The pumping test will be a stepped test that will measure drawdown and recovery in the new pumping well, new monitoring wells and existing well MW-306. The ash samples collected during October 2023 drilling activities were submitted to the laboratory for leach testing. Reporting of these activities in support of the second addendum to the ACM is anticipated for the next semi-annual reporting period.

2.3 STATISTICAL EVALUATION

Statistical evaluation of the October 2022 and April 2023 sampling results were reported in the 2023 Annual Groundwater Monitoring and Corrective Action Report submitted January 31, 2024. The November 2023 sampling results obtained during the period covered by this update will be discussed in the November 2023 results letter and in the 2024 Annual Groundwater Monitoring and Corrective Action Report, due on January 31, 2025. Based on the November 2023 monitoring results, the parameters at an SSL above the GPS include arsenic at compliance wells MW-303, MW-304, and MW-308, and molybdenum at compliance well MW-306. Arsenic was above the GPS at delineation wells MW-309 and MW-310. Lithium was detected above the GPS at MW-308 but was not identified as an SSL. An LCL evaluation was performed for the delineation wells and arsenic exceeds the LCL and GPS for wells MW-309 and MW-310.

2.4 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 was revised in the August 2021 ACM Addendum No. 1. Updates to the assessment and development of the evaluation of

corrective measure alternatives discussed in the ACM and ACM Addendum No. 1 will be completed in the future based on updates to the conceptual site model, delineation of the nature and extent of impacts, and collection of additional data relevant to remedy selection, as discussed below. A second addendum to the ACM is anticipated for 2024 following investigation activities and a public meeting.

Activities completed during this reporting period to support evaluation of corrective measure alternatives included continued planning for the larger-scale aquifer pumping test near well MW-306, internal drafting of a corrective action evaluation document, updated the site conceptual model, and identification of the ash/soil interface. These efforts support additional work planned for the next semiannual reporting period and the decision for the corrective measure.

3.0 PLANNED ACTIVITIES

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

- Continue semiannual assessment monitoring in April 2024.
- Evaluate information obtained from borings performed on the closed impoundments and prepare information for the Second Addendum to the ACM.
- Prepare a summary memo with the results of the leach tests completed on ash samples collected at the base of the impoundments.
- Obtain required permits and access agreement to perform a large-scale stepped pumping test in the vicinity of molybdenum impacted well MW-306.
- Install a 6-inch-diameter well and two, 2-inch-diameter monitoring wells near well MW-306.
- Perform a pumping test on the 6-inch-diameter well and analyze the data to assist in the evaluation of a pump and treat alternative to address the molybdenum-impacted groundwater at well MW-306.
- Prepare a summary memo with the results of the MW-306 area pumping test.
- Update the assessment of corrective action alternatives after evaluating the results of the investigation activities described above.
- Update conceptual site model based on findings of the additional investigation tasks.
- Prepare a second ACM addendum.
- Conduct public meeting (40 CFR 257.96(e)).
- Prepare the Selection of Remedy Report.

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Tables

- 1 Timeline for Completed Work Selection of Remedy
- 2 Groundwater Samples Summary Events Since ACM Submittal

Table 1. Timeline for Completed Work - Selection of RemedyPrairie Creek Generating Station / SCS Engineers Project #25220084.00

Date	Activity								
	Work Completed Prior to the Current Reporting Period								
August 2019	Additional monitoring wells installed to investigate nature and extent (MW-309 and MW-310)								
September 2019	Completed Assessment of Corrective Measures (ACM)								
November 2019	Completed the Well Documentation Report for new wells								
January 2020	Completed second round of assessment monitoring sampling for the new wells (MW-309 and MW-310)								
January 2020	Completed Statistical Evaluation of October 2019 groundwater monitoring results								
January 2020	Completed 2019 Annual Groundwater Monitoring and Corrective Action Report								
Late winter or early spring 2020	Planning, permitting, and access arrangements for four additional monitoring wells (piezometers) to investigate the vertical extent of impacts								
March 2020	Completed Semiannual Progress Report for the Selection of Remedy								
June-July 2020	Additional monitoring wells (piezometers) installed to investigate vertical groundwater flow and groundwater quality								
September 2020	Completed Semiannual Progress Report for the Selection of Remedy								
September 2020	Conducted groundwater sampling at piezometers installed in June-July 2020								
January 2021	Completed 2020 Annual Groundwater Monitoring and Corrective Action Report								
March 2021	Completed Semiannual Progress Report for the Selection of Remedy								
March 2021	Completed Documentation Report for monitoring wells installed in 2020								
June - August 2021	Performed research on potential off-site sources of arsenic that may be impacting groundwater								
July 2021	Conducted additional assessment monitoring event for select parameters at MW-308								
August 2021	Updated Hydrogeochemical Conceptual Model								
August 2021	Completed ACM Addendum #1								
August 2021	Sampled Prairie Creek for arsenic at locations upstream and downstream of the plant								
September 2021 - November 2021	Preparation of Joint Permit application for installation of monitoring wells within a floodplain								
October 2021	Completed statistical evaluation of the July 2021 supplemental monitoring result								
October 2021	Conducted semiannual assessment monitoring event								
November 2021	Submitted a Joint Application Permit for monitoring well within a floodplain								

Table 1. Timeline for Completed Work - Selection of RemedyPrairie Creek Generating Station / SCS Engineers Project #25220084.00

Date	Activity									
December 2021	Revised sampling and analysis plan									
December 2021	Received US Army Corps of Engineers approval of joint permit for monitoring well installations within a floodplain									
December 2021 - January 2022	Evaluation of potential off-site arsenic sources near Prairie Creek									
January 2022	Completed 2021 Annual Groundwater Monitoring and Corrective Action Report									
January 2022	Received lowa Department of Natural Resources approval of joint permit for monitoring well installations within a floodplain									
January 2022	Scheduled driller for installation of monitoring wells									
January 2022 - February 2022	Preparation of City floodplain permit application, City right-of-way permit application, and County monitoring well installation permit applications									
January 2022	Completed statistical evaluation of the October 2021 supplemental monitoring results									
February 2022	Conducted additional assessment monitoring event for select parameters at MW-308									
March 2022	Completed Semiannual Progress Report for the Selection of Remedy									
April 2022	Conducted semiannual 2022 assessment monitoring event									
May 2022	Completed the installation of water table observation well MW-311 and additional background monitoring well MW-312									
May 2022	Conducted additional assessment monitoring event for select parameters at MW-312									
June 2022	Completed statistical evaluation of the February 2022 supplemental monitoring result									
July 2022	Completed statistical evaluation of the April and May 2022 supplemental monitoring result									
July 2022	Conducted additional assessment monitoring event for select parameters at MW-312									
August 2022	Completed Documentation Report for monitoring wells installed in May 2022 (MW-311 and MW-312)									
August 2022	Installed first of 18 creek bed piezometers in Prairie Creek									
August 2022	Negotiated access with railroad company to performed proposed shallow soil and groundwater sampling adjacent to Prairie Creek to the west of the closed impoundments									
September 2022	Completed Semiannual Progress Report for the Selection of Remedy									
September 2022	Installed single test piezometer in Prairie Creek. Installation was successful, so parts for an additional 17 creek piezometers were ordered. The creek piezometers will be used to evaluate groundwater flow and geochemistry between the creek and local groundwater.									
September 2022	Alliant Energy contacted the property owner of the rail spur west of the site to negotiate access for soil, surface water, and groundwater sampling. Permission was granted.									
September 2022	Preliminary evaluation performed on phytoremediation as a potential groundwater corrective action alternative									

Table 1. Timeline for Completed Work - Selection of RemedyPrairie Creek Generating Station / SCS Engineers Project #25220084.00

Date	Activity									
September 2022	Performed step-drawdown pumping test at monitoring well MW-306 to evaluate local hydraulic properties of the aquifer with potential for groundwater extraction of molybdenum-impacted groundwater. Groundwater samples were obtained from MW-306 to evaluate potential changes in molybdenum during the pumping test.									
September 2022	Performed soil sampling on and near the banks of Prairie Creek to the west of the impoundments. Soil samples were submitted for metals analysis to evaluate potential background sources of naturally occurring arsenic in the creek valley soils of Prairie Creek. Submitted soil and sediment samples for laboratory analysis by x-ray fluorescence (XRF) and x-ray diffraction (XRD) to assess total arsenic content and potential arsenic-bearing mineral fraction.									
September 2022	Completed well installation, development, and hydraulic conductivity testing documentation for water level-only monitoring well MW-311 and supplemental background monitoring well MW-312									
October 2022	Conducted semiannual assessment monitoring event									
October 2022	Completed installation of temporary piezometers in Prairie Creek (6 nests of 3 piezometers each) and performed first sampling event of all 18 creek piezometers. Collected a surface water sample adjacent to each nest.									
October 2022	Performed data evaluation of results from October 2022 semiannual sampling event, creek piezometer sampling, and MW-306 pumping test									
November 2022	Performed additional soil sampling near the banks of Prairie Creek to the west of the impoundments, including so sample collection by hand auger and collection of groundwater and surface water samples. Submitted soil samples for XRF and XRD analysis. Also performed a second round of creek piezometer and surface water sampling in Prairie Creek.									
January 2023	Completed third and final round of creek piezometers sampling in Prairie Creek. Certified Iowa driller oversaw the abandonment of all 18 creek piezometers.									
January 2023	Collected surface water samples from Prairie Creek near each of the six creek piezometer nests									
January 2023	Obtained sediment cores at six locations within Prairie Creek. One core was advanced adjacent to each of the six piezometer nest locations within the creek. Submitted samples from the cores for laboratory analysis of total organic carbon and total arsenic. Also submitted samples for analysis by XRD.									
January 2023	Completed the 2022 Annual Groundwater Monitoring and Corrective Action Report									
February 2023	Completed the October 2022 groundwater results report									
February 2023	Received and evaluated the results of the XRF and XRD analysis of soil samples from the Prairie Creek valley located west and sidegradient of the impoundments. Evaluated results of the three creek piezometer and surface water sampling events.									
March 2023	Completed Semiannual Progress Report for the Selection of Remedy									
April 2023	Conducted semiannual assessment groundwater monitoring event									
April 2023	Performed data evaluation of results from April 2023 semiannual sampling event									
April 2023	Drafted corrective action evaluation									
April - June 2023	Updated site conceptual model									
May 2023	Evaluated updated survey data and potential drilling scenarios for collection of ash samples and identification of ash/soil interface elevation required for remedial design									
June 2023	Drafted an alternative plan for building a ramp and pads for vertical drilling for collection of ash samples to identify ash/soil interface elevation									

Table 1. Timeline for Completed Work - Selection of RemedyPrairie Creek Generating Station / SCS Engineers Project #25220084.00

Date	Activity									
July 2023	Draft Investigation summary and recommendations report									
July 2023	Met with Cascade Drilling on site to evaluate potential angle drilling options to obtain ash samples and identify elevation of ash-soil contact									
August 2023	Completed the April 2023 Assessment Groundwater Monitoring Results Letter									
August 2023	Began full-scale pumping test design for pump and treat groundwater corrective action alternative in the vicinity of well MW-306									
	Work Completed During the Current Reporting Period									
September 2023	Completed a Semiannual Progress Report for the Selection of Remedy.									
September 2023	Designed pumping test in the vicinity of monitoring well MW-306. Designed pumping test well and observation well.									
September 2023	Submitted a notification letter of intent to the lowa Department of Natural Resources to perform borings and repairs on the impoundment cap.									
October 2023	Conducted a semiannual groundwater sampling event.									
October 2023	Performed pre-drilling and post drilling survey of cap boring locations.									
October 2023	Drilled two angle borings into the closed impoundments to identify the ash and native soil contacts and collect ash samples at the base of the impoundments.									
October 2023	Ash samples from the base of the impoundments were submitted to the laboratory for leach testing.									
December 2023	Survey work for railroad right-of-way, MW-306 nest, and as-built ground surface elevation survey were completed.									
January 2023 - February 2024	Prepared permit applications for off-site pumping test and observation well, right-of way permit, and floodplain permit.									
January 2024	Completed the 2023 Annual Groundwater Monitoring and Corrective Action Report.									
February 2024	Applied to and received approval from CRWPCF to discharge groundwater.									
February 2024	Discussed with DNR and county installation and purpose of pumping wells.									
March 2024	Recived final results leach test results from laboratory.									

Notes:

*: Spring semiannual sampling events are typically completed in April; spring 2020 sampling of selected wells was delayed due to the COVID-19 pandemic.

 Created by: NDK
 Date: 2/19/2020

 Last revision by: NLB
 Date: 3/5/2024

 Checked by: TK
 Date: 3/11/2024

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Sample Dates	Background Wells			Downgradient Wells										Supplemental Background Well		
	MW-301	MW-301A	MW-302	MW-303	MW-304	MW-305	MW-306	MW-306A	MW-307	MW-308	MW-309	MW-309A	MW-310	MW-310A	MW-311	MW-312
10/28-29-2019	А	NI	А	A	A	A	А	NI	А	А	A-NE	NI	A-NE	NI	NI	NI
1/9/2020		NI						NI			A-NE	NI	A-NE	NI	NI	NI
4/27 & 5/27 2020	А	NI	A	A	А	A	А	NI	А	А	A-NE	NI	A-NE	NI	NI	NI
9/15/2020		Add.						Add.				Add.		Add.	NI	NI
10/19-21/2020	А	А	A	A	А	А	А	A-NE	А	А	A-NE	A-NE	A-NE	A-NE	NI	NI
4/26-28/2021	А	A	A	А	A	А	А	A-NE	А	A	A-NE	A-NE	A-NE	A-NE	NI	NI
7/14/2021										Add.					NI	NI
10/20-22/2021	А	А	A	A	А	А	А	A-NE	А	А	A-NE	A-NE	A-NE	A-NE	NI	NI
2/22/2022							-		-	Add.					NI	NI
4/25-27/2022	A	A	A	A	A	A	А	A-NE	A	A	A-NE	A-NE	A-NE	A-NE	NI	NI
5/25/2022							-								N/A	Add.
7/15/2022																Add.
10/12-13/2022	А	А	A	A	А	А	А	A-NE	А	А	A-NE	A-NE	A-NE	A-NE	N/A	A
4/19-20/2023	А	А	А	A	А	А	А	A-NE	А	А	A-NE	A-NE	A-NE	A-NE	N/A	A
11/6-7/2023	А	А	A	A	А	Α	А	A-NE	А	А	A-NE	A-NE	A-NE	A-NE	N/A	A
Total Samples	9	8	9	9	9	9	9	8	9	11	10	8	10	8	N/A	5

Table 2. Groundwater Samples Summary – Events Since ACM Submittal Prairie Creek Generating Station / SCS Engineers Project #25220084.00

Abbreviations:

A = Required by Assessment Monitoring Program

Add. = Additional Sampling Event

ACM = Assessment of Corrective Measures

N/A = Not Applicable. Water Level Only.

NI = Not Installed

Only. in Table 2 because they are not compliance samples and will not be included in the statistical evaluations.

1. MW-311 was installed in May 2022 for groundwater elevation evaluation only.

2. A series of five groundwater samples were collected from monitoring well MW-306 during a January 28, 2022

stepped drawdown test. The samples were analyzed for molybdenum. The sample event is not included

A-NE = Assessment monitoring for nature and extent, well sampled for select Appendix IV and selection-of-remedy parameters

Notes:

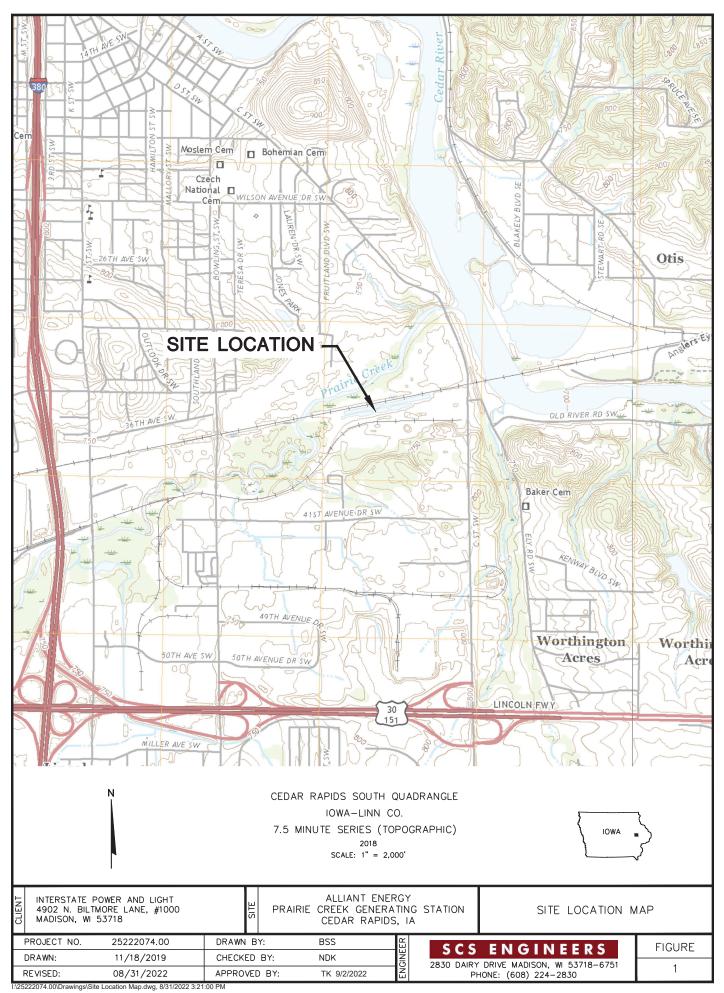
-- = Not Sampled

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Checked by:	RM	Date:	2/12/2024			

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Figures

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



04/08/2024 - Classification: Internal - ECRM13266923

