# Semiannual Progress Report
# Selection of Remedy –
# Prairie Creek Generating Station

Prairie Creek Generating Station
Cedar Rapids, Iowa

Prepared for:

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SCS ENGINEERS

25220084.00 | September 12, 2022

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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 (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 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.

This Semiannual Progress Report summarizes data collected and remedy evaluation progress made since the September 2019 ACM and August 2021 ACM Addendum, 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

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 2
- PCS Pond 3
- PCS Pond 4
- PCS Pond 5
- PCS Pond 6
- PCS Pond 7
- PCS Discharge Pond (Pond 8)
- PCS Beneficial Use Storage Area
- PCS Bottom Ash Pile

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

Two wells were installed during the period covered by this semiannual progress report. The locations of existing monitoring wells at PCS are shown on **Figure 2**.

MW-312 was installed in May 2022 and is located to the west of the closed impoundments and immediately adjacent to Prairie Creek (**Figure 2**).

MW-311, a water level observation well located immediately south of the impoundments (**Figure 2**), was installed in May 2022. Groundwater elevation measurements from this well are refining the accuracy of the groundwater isocontours and flow directions on future water table maps, and provide a better understanding of the water table elevation in the area of the closed impoundments.

Additional monitoring well design and permitting was performed for the following wells that are currently scheduled for installation:

- Six triple nests of temporary mini-piezometers (18 total) to be installed in Prairie Creek (**Figure 2**): Each nest will consist of three different length wells, hand driven into the creek bottom. The purpose of the mini-piezometers is to evaluate:
  - The hydraulic gradients of groundwater discharging into Prairie Creek.
  - The spatial distribution of arsenic and molybdenum within the creek bed sediments below Prairie Creek.
  - Variation in the oxidation-reduction conditions below the creek bed.

- One of the 18 piezometers was installed in August 2022 as a test to determine if the well could be driven by hand to a target depth of 10 feet below the creek bottom. The test was successful. The remaining 17 piezometers are scheduled to be installed in September 2022.

## 2.2 GROUNDWATER AND SURFACE WATER MONITORING

Since March 2022, groundwater samples were collected during the April, May, and July 2022 events:

- The April 2022 monitoring event was part of the routine semiannual assessment monitoring program. The wells sampled included the six wells in the original monitoring system (MW-303 through MW-308) and six additional delineation wells and piezometers (MW-301A, MW-306A, MW-309, MW-309A, MW-310, and MW-310A).

- The May and July 2022 monitoring events were supplemental sampling events for the newly installed monitoring well MW-312, installed in May 2022.

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

Groundwater sampling of the mini-piezometers will be performed as soon as they are installed. Additional sampling of select existing wells, upstream and downstream creek sampling will also be performed at the same time MW-311, MW-312, and the mini-piezometers are sampled. The synchronized sampling will provide for a more accurate comparison of data. The soil, groundwater, and surface water sampling data obtained will be used to update the site conceptual model originally presented in the ACM Addendum to provide a more accurate description of the site geochemistry and information needed to refine the corrective action alternatives.

## 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 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.

## 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 #1. Updates to the assessment, and development of the evaluation of corrective measure alternatives discussed in the ACM and ACM Addendum #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.

# 3.0 PLANNED ACTIVITIES

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

- Continue semiannual assessment monitoring.
- Submit soil samples from monitoring wells MW-305, MW-306, MW-306A and soil boring MW-307X to an analytical laboratory for XRF and XRD compositional metals analysis in September 2022.
- Install six sets of three temporary shallow piezometer nests in the creek bed of Prairie Creek to evaluate groundwater quality and flow as it discharges into Prairie Creek. Scheduled for fall 2022. One of the 18 piezometers was installed in August 2022.
- Collect Prairie Creek sediment samples to evaluate arsenic distribution and attenuation capacity. Scheduled for fall 2022.
- Collect additional surface water samples upstream and downstream of the closed impoundments to evaluate potential off-site sources of arsenic. Scheduled for September 2022.
- Perform stepped pumping test at monitoring well MW-306 to evaluate the hydraulic properties of uppermost aquifer in the vicinity of well MW-306, evaluate the mass of molybdenum removed during the pumping test, and inform possibility of pumping as remedy for molybdenum. Scheduled for September 2022.

- Collect 24 soil samples in the immediate vicinity of Prairie Creek in an area west of the closed impoundments. The soil samples will be submitted to an analytical laboratory for x-ray fluorescence analysis of arsenic content, and x-ray diffraction analysis of mineral content.

- Collect six shallow groundwater sampling with a temporary sampling device in the vicinity of the soil sample locations. The groundwater samples will be submitted to an analytical laboratory for analysis of total and dissolved arsenic.

- 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 nature and extent investigation.

- Conduct public meeting (40 CFR 257.96(e)).

# Tables

**Table 1. Timeline for Completed Work - Selection of Remedy**
**Prairie 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 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 |

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

| Date | Activity |
|---|---|
| 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 |
| 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 Iowa 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 |
| **Work Completed during the Current Reporting Period** | |
| 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 |

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

| Date | Activity |
|---|---|
| August 2022 | Completed Documentation Report for monitoring wells installed in May 2022 (MW-311 and MW-312) |
| August 2022 | Installed first of 16 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. |

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

A-R = Resampling event under Assessment Monitoring Program

Last revision by: NDK Date: 8/16/2022

Checked by: RM Date: 8/16/2022

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

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

Abbreviations:
A = Required by Assessment Monitoring Program
Add. = Additional Sampling Event
NI = Not Installed
-- = Not Applicable

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

Created by: NDK Date: 2/19/2020
Last revision by: NDK Date: 8/12/2022
Checked by: RM Date: 8/16/2022

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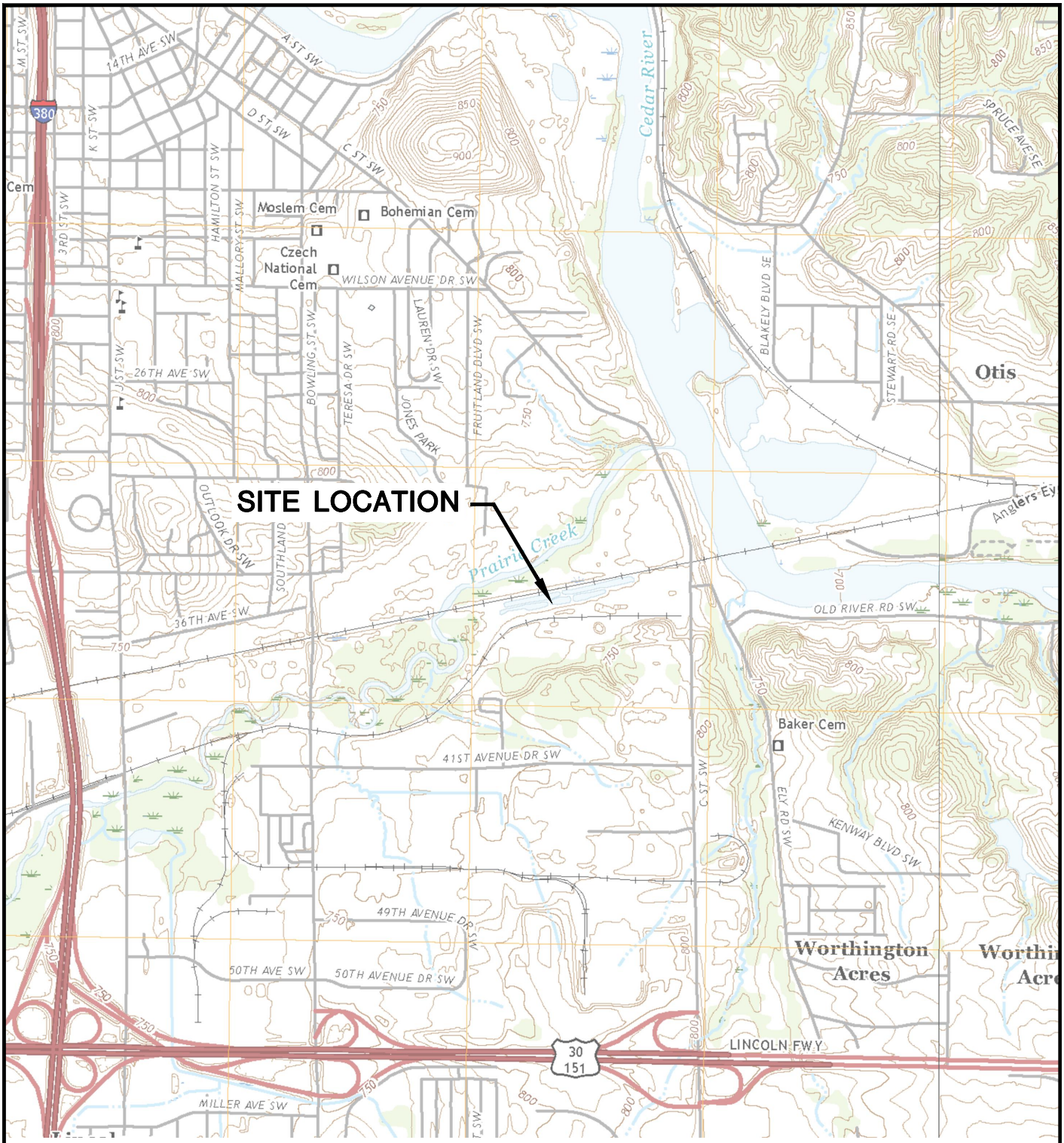
# Figures




N

CEDAR RAPIDS SOUTH QUADRANGLE
IOWA–LINN CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
2018
SCALE: 1" = 2,000'


| | | | |
|---|---|---|---|
| CLIENT | INTERSTATE POWER AND LIGHT<br>4902 N. BILTMORE LANE, #1000<br>MADISON, WI 53718 | SITE | ALLIANT ENERGY<br>PRAIRIE CREEK GENERATING STATION<br>CEDAR RAPIDS, IA |

SITE LOCATION MAP

| | | | |
|---|---|---|---|
| PROJECT NO. | 25222074.00 | DRAWN BY: | BSS |
| DRAWN: | 11/18/2019 | CHECKED BY: | NDK |
| REVISED: | 08/31/2022 | APPROVED BY: | TK 9/2/2022 |

ENGINEER

SCS ENGINEERS
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FIGURE
1

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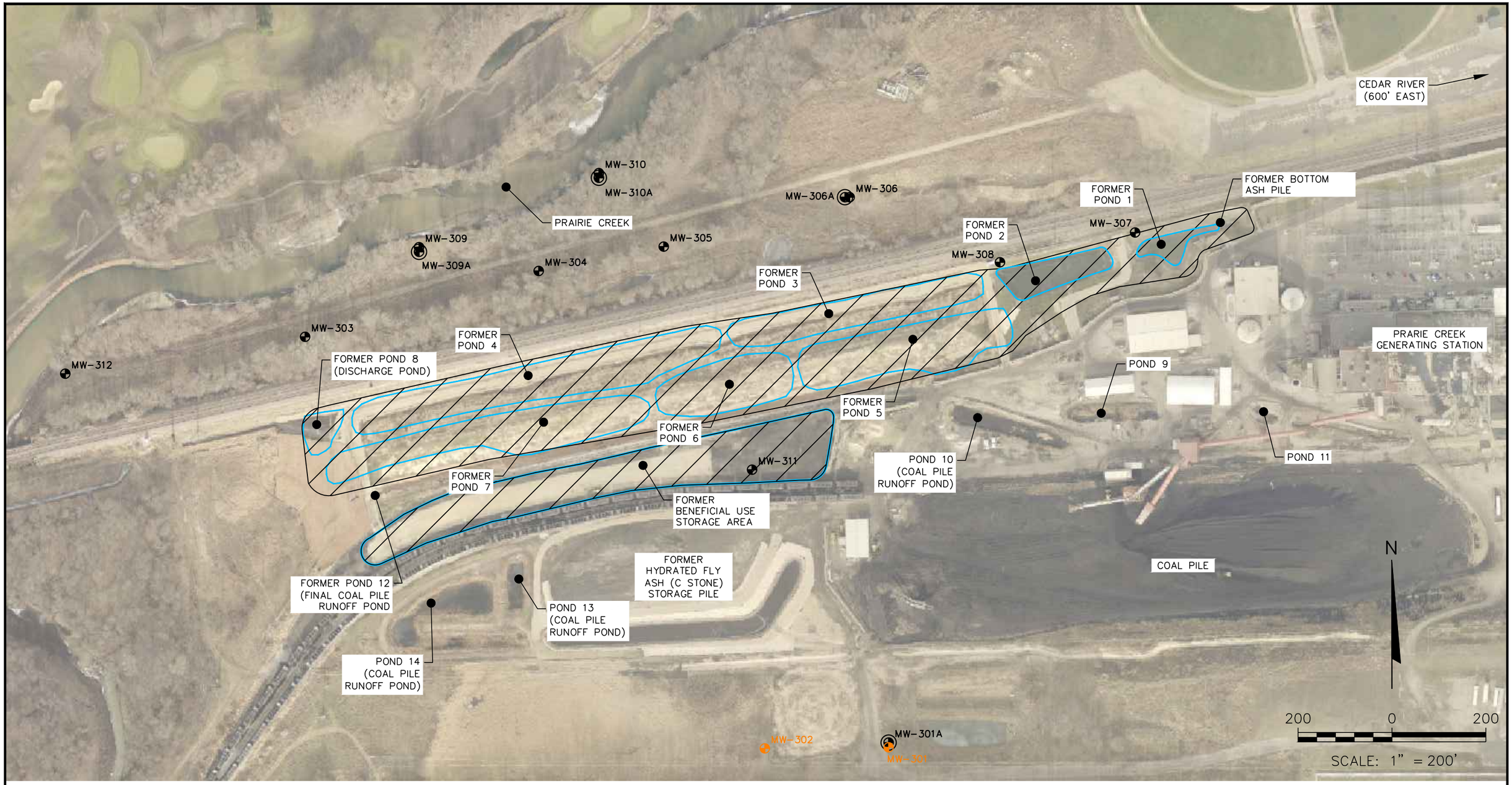


LEGEND

- MONITORING WELL
- BACKGROUND MONITORING WELL
- PIEZOMETER
- FORMER CCR UNITS
- APPROXIMATE CLOSURE AREA (SEE NOTE 1)

NOTES:

1. PCS PONDS 1-8, THE BOTTOM ASH PILE, AND THE BENEFICIAL USE STORAGE AREA WERE CLOSED IN DECEMBER 2018. LIMITS ARE APPROXIMATE.
2. AERIAL PHOTO IMPORTED FROM THE ARCMAP BASEMAP (CEDAR RAPIDS, IOWA GIS - DECEMBER 22, 2018).
3. MONITORING WELLS MW-301 THROUGH MW-306 INSTALLED BY CASCADE DRILLING BETWEEN OCTOBER 31 AND DECEMBER 6, 2016.
4. MONITORING WELLS MW-307 AND MW-308 INSTALLED BY CASCADE DRILLING ON NOVEMBER 27, 2018.
5. MONITORING WELLS MW-309 AND MW-310 INSTALLED BY ROBERTS ENVIRONMENTAL DRILLING ON AUGUST 5-6, 2019.
6. MONITORING WELLS MW-301A AND MW-306A INSTALLED BY CASCADE DRILLING ON JUNE 22-24, 2020.
7. MONITORING WELLS MW-309A AND MW-310A WERE INSTALLED BY CASCADE DRILLING ON JULY 23, 2020.
8. THE BACKGROUND MONITORING WELLS FOR THE PRAIRIE CREEK GENERATING STATION ARE: MW-301 AND MW-302.

| | | | |
|---|---|---|---|
| PROJECT NO. | 25222074.00 | DRAWN BY: | BSS/KP |
| DRAWN: | 11/18/2019 | CHECKED BY: | NDK |
| REVISED: | 08/31/2022 | APPROVED BY: | TK 9/2/2022 |

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SITE: ALLIANT ENERGY
PRAIRIE CREEK GENERATING STATION
CEDAR RAPIDS, IA

SITE PLAN AND
MONITORING WELL LOCATIONS

FIGURE
2

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