

Semiannual Progress Report Selection of Remedy – Sutherland Generating Station

Sutherland Generating Station
3001 E Main Street Road
Marshalltown, Iowa 50158

Prepared for:

Alliant Energy



SCS ENGINEERS

25222189.00 | March 13, 2025

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1.0 INTRODUCTION AND PURPOSE

The Semiannual Progress Report for remedy selection at the Interstate Power and Light Company (IPL) former Sutherland Generating Station (SGS) 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 SGS multi-unit CCR surface impoundment system consists of four closed inactive CCR surface impoundments. The SGS multi-unit system was closed and capped in 2020. A Notification of Completion of Closure pursuant to 40 CFR 257.102(d) was issued by Alliant Energy on June 12, 2020.

Post-closure groundwater monitoring concentrations of lithium were found at a statistically significant level (SSL) above the Groundwater Protection Standard (GPS) in groundwater samples from downgradient monitoring well MW-306. In response, the Assessment of Corrective Measures (ACM) for the closed and capped SGS multi-unit system was completed on June 22, 2022.

This Semiannual Progress Report summarizes data collected and remedy evaluation progress made since the ACM was completed in June 2022, and outlines planned future activities to complete the selection of remedy process. This semiannual progress report specifically covers the 6-month period of September 2024 through February 2025.

1.2 SITE INFORMATION AND MAPS

SGS is located at 3001 E. Main Street Road in Marshalltown, Marshall County, Iowa (**Figure 1**). Four closed CCR surface impoundments are present at SGS. Closure and capping of the surface impoundments were completed in 2020. A Notification of Completion of Closure pursuant to 40 CFR 257.102(d) was issued by Alliant Energy on June 12, 2020.

The SGS groundwater monitoring network is a multi-unit system that monitors the closure area for the following inactive CCR units:

- SGS North Primary Pond (inactive surface impoundment – closed June 2020).
- SGS South Primary Pond (inactive surface impoundment – closed June 2020).
- SGS Main Pond (inactive surface impoundment – closed June 2020).
- SGS Polishing Pond (inactive surface impoundment – closed June 2020).

The system is designed to detect monitored constituents at the waste boundary of the SGS CCR units as required by 40 CFR 257.91(d). The groundwater monitoring system consists of two upgradient background wells (MW-301 and MW-302), two upgradient delineation wells (MW-307 and MW-308) and five downgradient compliance monitoring wells (MW 303, MW-304, MW-305, MW-306, and MW-312) at the waste boundary, and seven downgradient delineation wells (MW-306A, MW-309, MW-310, MW-311, MW-312A, MW-313, and MW-314).

A map showing the limits of the closure area, background (or upgradient) monitoring wells, downgradient monitoring wells, and delineation wells with identification numbers for the CCR groundwater monitoring program is provided on **Figure 2**.

2.0 SUMMARY OF WORK COMPLETED

Work completed to support remedy selection for the SGS CCR Unit is summarized in **Table 1**. Activities completed within the 6-month period of September 2024 through February 2025, covered by this semiannual report, are discussed in more detail below.

2.1 MONITORING NETWORK CHANGES

There were no changes made to the monitoring well network during this reporting period.

2.2 GROUNDWATER MONITORING

Groundwater samples were collected during the October 2024 monitoring event.

- The October monitoring event was part of the routine semiannual assessment monitoring program.
- The wells sampled included the two upgradient background wells, two downgradient background wells, five downgradient compliance wells, and seven downgradient delineation wells.
- Samples were collected in accordance with the Sampling and Analysis Plan with one minor deviation. Due to a sample login error, the radium samples collected from MW-312 were not run at the same time as other samples, resulting in the radium samples from MW-312 being reported on a separate lab report. The samples were run within the required hold time.

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

2.3 STATISTICAL EVALUATION

Statistical evaluation of the October 2024 semiannual sampling results during the period covered by this update were reported in an Assessment Groundwater Monitoring Results letter (March 2, 2025). The results will be included in the 2025 Annual Groundwater Monitoring and Corrective Action Report due on August 1, 2025.

The results of the statistical evaluation of the October 2024 sampling event indicate that lithium continues to be present at an SSL above the GPS in compliance well MW-306. Lithium is also present above the GPS at an SSL at compliance well MW-312. A minimum of four samples are required to evaluate the lower confidence level (LCL), so this was the first LCL evaluation for MW-312 because October 2024 was the fourth sampling event completed for MW-312. For the previous sampling event, lithium was detected above the GPS in monitoring wells MW-306, MW-306A, MW-312, and MW-313 during the April 2024 sampling event.

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 June 2022 ACM. No updates or changes to the assessment have been made based on additional information obtained since the ACM was issued. An addendum to the ACM is anticipated to be drafted in 2025 once the results of the CCR boring evaluation, laboratory leach test results, pumping test, and geochemical modeling discussed in the previous semiannual report are finalized.

IPL continues to develop and evaluate preliminary remedy designs for the closed and capped multi-unit system at SGS. Groundwater sampling and analysis have been ongoing and continue for the development and evaluation of preliminary remedy designs.

Additional delineation wells and an additional compliance well were installed in 2023 to further define lithium impacts to groundwater from the closed impoundments. The information collected from the expanded groundwater monitoring system and delineation wells was used in the previous reporting period to refine the conceptual model of the site and further develop the groundwater corrective action alternatives.

To further support corrective action alternative evaluation, a pumping test was conducted in November 2023 at MW-306. The results were evaluated and a draft pumping test memo was drafted in March 2024. The memo recommended installing an extraction well and two observation wells in the vicinity of the lithium-impacted compliance well MW-306 and to perform a full-scale pumping test to assist in the design of a pump and treat system. A proposal was submitted to IPL in March 2025 for the installation of the extraction well and the performance of the full-scale pumping test. The installation of the extraction well is anticipated during the next reporting period.

In December 2023, six borings were drilled to collect CCR materials for leach testing and to locate the CCR and native soil interface in the last reporting period. In the current reporting period, the leach testing results, in combination with available pumping test data and geochemical modeling, were used to evaluate the potential impacts of the remaining CCR in the SGS Closure Area on the effectiveness of corrective action alternatives. The geochemical modeling was conducted in PHREEQC software, which is an open-source modeling software developed and maintained by the U.S. Geological Survey that is designed to simulate a wide array of geochemical calculations, including mineral saturation indices and aqueous component speciation. A draft memo summarizing these activities in support of the upcoming addendum to the ACM was submitted in May 2024, revised in August 2024, and is anticipated to be finalized early in the next semiannual reporting period.

An updated assessment of the potential Corrective Measure Alternatives using the selection criteria in 40 CFR 257.97(b) and (c) will be provided in an upcoming ACM addendum.

3.0 PLANNED ACTIVITIES

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

- Continue to sample the new compliance well quarterly until four sampling rounds have been completed. Analyze the samples for Appendix III and Appendix IV parameters. Include supplemental parameters to characterize aquifer conditions in at least two of the first four sampling rounds.
- Continue semiannual assessment monitoring at well network and new monitoring wells.
- Finalize results of the CCR boring evaluation, laboratory leach test results, pumping test, and geochemical modeling for the upcoming addendum to the ACM.
- Install a 6-inch-diameter groundwater extraction well and two observation wells in the vicinity of monitoring well MW-306 and MW-312.
- Perform a 72-hour pumping test on the extraction well.

- Evaluate the results of the 72-hour pumping test and summarize them in a report along with recommendations to support the design of a full-scale groundwater extraction system.
- Review groundwater flow and groundwater quality results, CCR leach testing, and aquifer pumping test results to assist in further evaluation of corrective action alternatives.
- Update the assessment of corrective action alternatives, if needed, after evaluating the results of the investigation activities described above.
- Update the conceptual site model based on findings of nature and extent investigation.
- Prepare ACM Addendum No. 1, which will include a summary of the pumping test, CCR borings, CCR leach testing, and geochemical modeling.
- Hold a public meeting in accordance with 40 CFR 257.96(e).
- Prepare the Selection of Remedy Report in accordance with 40 CFR 257.97.

Tables

- 1 Timeline for Completed Work – Assessment of Corrective Measures
- 2 CCR Rule Groundwater Samples Summary

**Table 1. Timeline for Completed Work - Assessment of Corrective Measures
Sutherland Generating Station / SCS Engineers Project #25222189.00**

Date	Activity
Activities Completed During Previous Semiannual Reporting Periods	
June 2022	Completed the Assessment of Corrective Measures.
June 2022	Completed the statistical evaluation and results letter for the April and May groundwater monitoring events.
July 2022	Completed the 2021 Annual Groundwater Monitoring and Corrective Action Report.
August 2022	Conduct additional groundwater monitoring for MW-309, MW-310, MW-311.
August 2022	Completed the well documentation report for the monitoring wells MW-309, MW-310, and MW-311.
September 2022	Alliant Energy contacted the United States Fish and Wildlife Service (USFWS) for evaluation of potential protected bat species habitat at the proposed locations for monitoring wells MW-306A, MW-312, MW-313, and MW-314.
September 2022	Alliant Energy received approval from the USFW for the clearing of access routes and proposed delineation well locations as long as it was performed before April 1, 2023.
September 2022	Completed Semiannual Progress Report for the Selection of Remedy.
September 2022	Revised proposed locations of additional delineation wells based on groundwater elevation data from new delineation wells MW-309, MW-310, and MW-311.
September 2022	SCS performed reconnaissance proposed delineation well MW-306A, MW-312, MW-313, and MW-314 locations, and identified access routes that require tree clearing.
September 2022	SCS provided request for proposal to Asplundh to perform tree clearing of access routes and well locations for proposed delineation monitoring wells MW-306A, MW-312, MW-313, and MW-314.
October 2022	Completed the semiannual groundwater assessment monitoring event for all wells.
October 2022	Asplundh performed reconnaissance of access routes and proposed delineation well locations to determine the viability of providing access and developing a cost proposal.
October-December 2022	SCS negotiated service order terms with Asplundh for tree clearing needed to install delineation monitoring wells MW-306A, MW-312, MW-313, and MW-314.
November 2022	Statistical evaluation for the August 2022 supplemental sampling event.
December 2022	Completed August 2022 Groundwater Monitoring Results Report.
December 2022	Scheduled tree clearing for access to install delineation monitoring wells for January 2023.
January-February 2023	Asplundh rescheduled tree clearing for the installation of the delineation monitoring wells several times due to weather conditions that were too cold (below zero) or warm weather that created muddy conditions and prevented heavy equipment used. The clearing was finally completed in mid-February.
January-February 2023	Performed permitting and driller subcontracting for delineation well installations.
February 2023	Completed October 2022 Groundwater Monitoring Results Report.
February 2023	Performed utility clearance for delineation monitoring well installations.

**Table 1. Timeline for Completed Work - Assessment of Corrective Measures
Sutherland Generating Station / SCS Engineers Project #25222189.00**

Date	Activity
February 2023	Installed and developed delineation monitoring wells MW-306A, MW-313, and compliance monitoring well MW-312.
March 2023	Installed and developed delineation monitoring well MW-314. Completed development and hydraulic conductivity testing of monitoring wells MW-306A, MW-312, MW-313, and MW-314.
March 2023	Dedicated pumps were ordered for new monitoring wells and new wells were surveyed.
March 2023	Completed Semiannual Progress Report for the Selection of Remedy.
April 2023	Hydraulic conductivity testing completed on new monitoring wells.
April 2023	Semiannual groundwater sampling event completed.
May-August 2023	Continued to reassess groundwater corrective action alternatives based on new groundwater quality information provided by a new compliance well and new delineation wells.
May-August 2023	Obtained quote for modifying site fencing to allow truck access to compliance and delineation well locations.
July 2023	Monitoring Well Construction report submitted for MW-306A, MW-312, MW-313, and MW-314.
August 2023	Began preparation for bottom of ash borings on closed impoundment.
August 2023	Began preparation for pumping test in the vicinity of wells MW-306 and MW-312.
August 2023	Submitted 2022 Annual Groundwater Monitoring and Corrective Action Report.
August 2023	Submitted April 2023 Assessment Groundwater Monitoring Results Letter.
September 2023	Completed a Semiannual Progress Report for the Selection of Remedy for the period of March-August, 2023.
September 2023	Submitted a letter of intent to drill into and repair the impoundment call to the Iowa Department of Natural Resources.
October 2023	Conducted a semiannual groundwater sampling event.
October 2023	Collected groundwater samples from MW-307 and 308 to use as background water for leach testing.
November 2023	Conducted pumping tests at MW-306 and collected groundwater samples during pumping for laboratory analysis.
December 2023	Drilled six borings for the collection of CCR material samples and to measure the elevation of the ash and native soil interface.
December 2023	Installed and developed delineation piezometer MW-312A. Conducted hydraulic conductivity testing at MW-312A.
December 2023	Drilled five clay delineation borings to provide further definition of the top of clay layer underlying the uppermost aquifer. All five borings were abandoned after logging was completed.
December 2023	Received data from laboratory (Eurofins) for groundwater samples collected during aquifer pumping test.
December 2023 - January 2024	Drafted a well network update memo by adding MW-312 as a compliance well.
January 2024	Performed cap repair following the ash borings drilling in December 2023.

**Table 1. Timeline for Completed Work - Assessment of Corrective Measures
Sutherland Generating Station / SCS Engineers Project #25222189.00**

Date	Activity
February 2024	A Groundwater Monitoring System Update Certification was finalized for MW-312 to add this well as a compliance well.
February 2024	Submitted the October 2023 Assessment Groundwater Monitoring Results Letter.
March 2024	Submitted a Semiannual Selection of Remedy Progress Report (3/13/2024).
March 2024	Drafted a pumping test memo for aquifer testing conducted at MW-306 in support of the selection of remedy for inclusion in the ACM addendum.
March 2024	Submitted a final cap repair documentation letter submitted to IDNR (3/11/2024).
March 2024	Received laboratory (Eurofins) report for sequential leaching tests on CCR materials.
April 2024	Conducted a semiannual groundwater sampling event.
May 2024	Evaluated sequential leaching test results using a geochemical modeling software (Phreeqc).
May 2024	Submitted a draft Memo for the sequential leaching tests on CCR materials with support from geochemical modeling.
May - July 2024	Updated cross-sections that include CCR soil boring information.
June - July 2024	Revised and updated the evaluation of sequential leaching test results using a geochemical modeling software (Phreeqc).
July 2024	Completed a well documentation report for delineation well MW-312A (7/3/2024).
August 2024	Submitted 2023 Annual CCR Groundwater Report.
August 2024	Prepared a revised draft memo for evaluation of CCR Soil Borings, Groundwater and Leachable Fractions of CCR Materials for support for the selection of remedy.
August 2024	Submitted the April 2024 Assessment Groundwater Monitoring Results Letter.
Activities Completed During Current Semiannual Reporting Period	
September 2024	Finalized the Semiannual Selection of Remedy Progress Report.
October 2024	Conducted a semiannual groundwater sampling event.
November 2024	Alliant Energy met with the Iowa Department of Natural Resources (IDNR) regarding permitting of water discharged during a pumping test. IDNR concurred that the discharge is covered under the provisions of General Permit 6.
January 2025	Revised a technical memo for evaluation of CCR soil borings, groundwater leach testing, and geochemical modeling.
January 2025	Drafted a proposal for a larger scale aquifer pumping test.
February 2025	Finalized the Assessment Groundwater Monitoring results letter for October 2024 event.

Last revision by: NLB Date: 2/5/2025
Checked by: RM Date: 2/13/2025

Table 2. Groundwater Samples Summary
Sutherland Generating Station / SCS Engineers Project #25222189.00

Sample Dates	Background Wells		Compliance Wells					Delineation Wells								
	MW-301	MW-302	MW-303	MW-304	MW-305	MW-306	MW-312	MW-306A	MW-307	MW-308	MW-309	MW-310	MW-311	MW-312A	MW-313	MW-314
2/3/2020	A	A	A	A	A	A	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
4/7/2020	A	A	A	A	A	A	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
5/11/2020	--	--	--	--	Add.	Add.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
10/13/2020	A	A	A	A	A	A	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
2/24/2021	--	--	--	--	--	Add.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
4/6/2021	A	A	A	A	A	A	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
7/14/2021	--	--	--	--	--	Add.	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
10/26/2021	A	A	A	A	A	A	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
12/9/2021	--	--	--	--	--	--	NI	NI	Add.	Add.	NI	NI	NI	NI	NI	NI
4/21-22/2022	A	A	A	A	A	A	NI	NI	A	A	NI	NI	NI	NI	NI	NI
5/12/2022	--	--	--	--	--	--	NI	NI	--	--	Add.	Add.	Add.	NI	NI	NI
8/11/2022	--	--	--	--	--	--	NI	NI	--	--	Add.	Add.	Add.	NI	NI	NI
10/10-12/2022	A	A	A	A	A	A	NI	NI	A	A	A	A	A	NI	NI	NI
4/10-13/2023	A	A	A	A	A	A	A	A	A	A	A	A	A	NI	A	A
10/17-20/2023	A	A	A	A	A	A	A	A	A	A	A	A	A	NI	A	A
4/9-11/2024	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
10/14-17/2024	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Total Samples	11	11	11	11	12	14	4	4	7	7	7	7	7	2	4	4

Abbreviations:

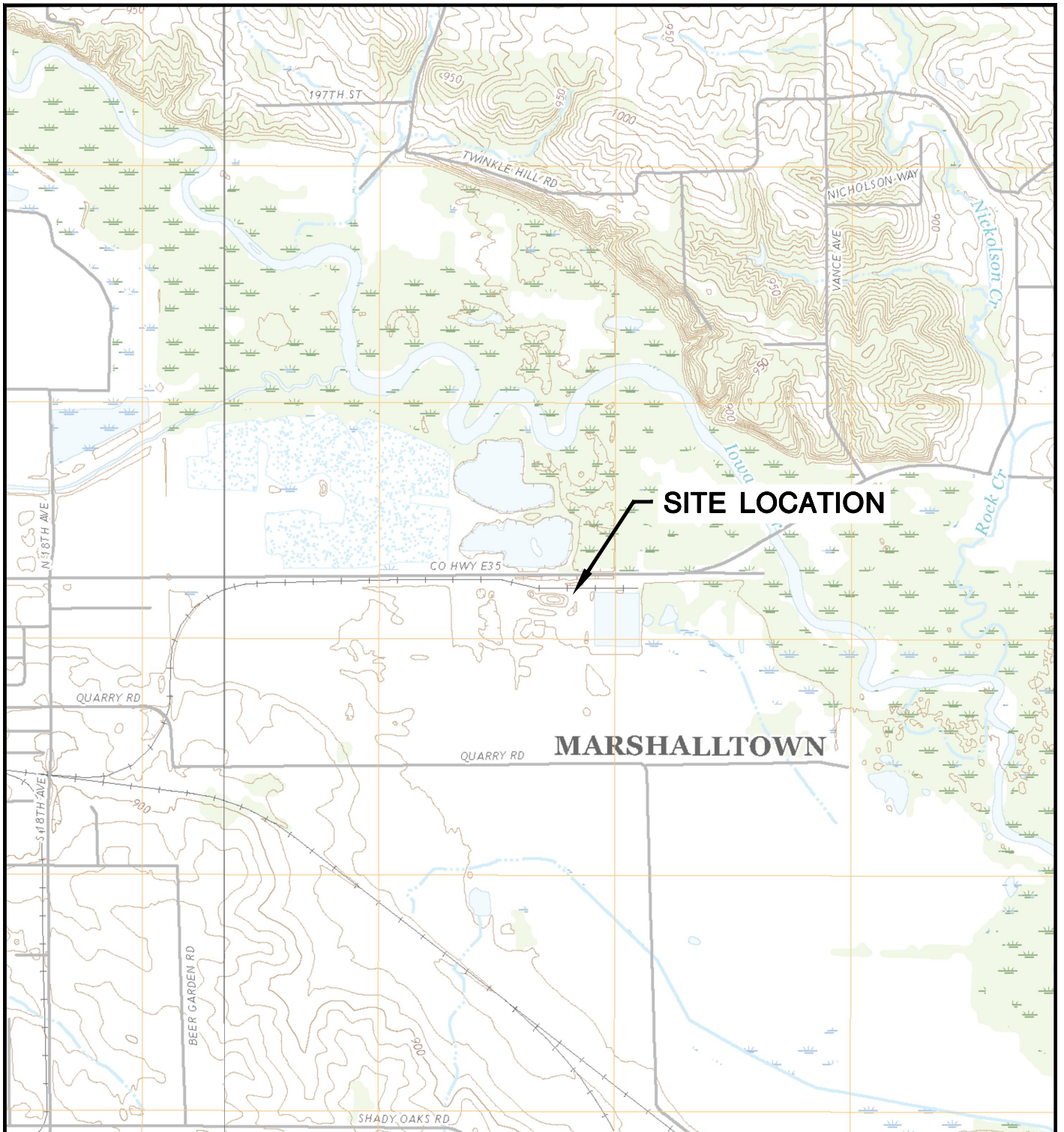
A = Assessment Monitoring Program
Add. = Additional sample

NI = Not Installed
-- = Not Sampled

Last revision by: NLB Date: 1/10/2025
Checked by: RM Date: 2/13/2025

Figures

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



LE GRAND QUADRANGLE
IOWA-MARSHALL COUNTY
7.5 MINUTE SERIES (TOPOGRAPHIC)
2018
SCALE: 1" = 2,000'



CLIENT ALLIANT ENERGY 4902 N. BILTMORE LANE, #1000 MADISON, WI 53718	SITE ALLIANT ENERGY SUTHERLAND GENERATING STATION MARSHALLTOWN, IOWA	SITE LOCATION MAP	
PROJECT NO. 25222076.00 DRAWN: 11/15/2019 REVISED: 01/14/2020	DRAWN BY: BSS CHECKED BY: MDB APPROVED BY: TK 3/20/2022	ENGINEER SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	FIGURE 1

I:\25222076.00\Drawings\Site Location Map.dwg, 2/17/2022 4:49:10 PM



LEGEND



CCR MONITORING WELL



CCR BACKGROUND MONITORING WELL



CCR PIEZOMETER

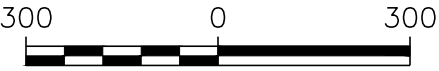


FINAL CLOSURE AREA LIMITS

NOTES:

- 2020 AERIAL PHOTOGRAPH SOURCES: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA FSA, USGS, AEX, GETMAPPING, AEROGRIID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY.
- MONITORING WELLS MW-301 THROUGH MW-306 WERE INSTALLED BY DIRECT PUSH ANALYTICAL, NOVEMBER 20-21, 2017.
- MONITORING WELLS MW-307 AND MW-308 WERE INSTALLED BY TERRACON, INC. IN NOVEMBER 30, 2021.
- MONITORING WELLS MW-309, MW-310, AND MW-311 WERE INSTALLED BY DIRECT PUSH ANALYTICAL ON MAY 4, 2022.
- MONITORING WELLS MW-306A, MW-312, MW-313, AND MW-314 WERE INSTALLED BY DIRECT PUSH ANALYTICAL ON FEBRUARY 28, 2023 THROUGH MARCH 1, 2023.
- MONITORING WELL MW-312A WAS INSTALLED BY IMPACT 7G, INC. ON DECEMBER 27, 2023.
- THE BACKGROUND MONITORING WELLS FOR THE SUTHERLAND GENERATING STATION ARE MW-301 AND MW-302.

N



SCALE: 1" = 300'

PROJECT NO.	25224076.00	DRAWN BY:	BSS	ENGINEER	SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT	ALLIANT ENERGY 4902 N. BILTMORE LANE, #1000 MADISON, WI 53718	SITE	ALLIANT ENERGY SUTHERLAND GENERATING STATION MARSHALLTOWN, IOWA	SITE PLAN AND MONITORING WELL LOCATIONS	FIGURE
DRAWN:	11/14/2019	CHECKED BY:	TK/NDK								2
REVISED:	07/30/2024	APPROVED BY:	TK, 9/13/2024								

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