

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, 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) 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 2023 through February 2024.

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 background wells, five downgradient compliance monitoring wells at the waste boundary, two upgradient delineation wells, and six downgradient delineation wells. The background wells include MW-301 and MW-302. The downgradient compliance wells include MW-303, MW-304, MW-305, and MW-306. New monitoring well MW-312 was added to the compliance well network in the current reporting period. The upgradient delineation wells are MW-307 and MW-308 and the downgradient delineation wells include MW-306A, MW-309, MW-310, MW-311, 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 as **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 2023 through February 2024, covered by this semiannual report are discussed in more detail below.

2.1 MONITORING NETWORK CHANGES

Monitoring well MW-312 was added to the compliance well network based on the groundwater flow direction and the location of MW-312 between compliance wells MW-305 and MW-306. The groundwater monitoring system certification was updated to include MW-312 as a compliance well installed at the waste boundary. A groundwater Monitoring System Update Certification was finalized on February 6, 2024.

2.2 GROUNDWATER MONITORING

Groundwater samples were collected during the October 2023 monitoring event.

- The October monitoring event was part of the routine semiannual assessment monitoring program.
- The wells sampled included the six wells in the original monitoring system (MW-301 through MW-306), new compliance well MW-312, two additional upgradient delineation wells (MW-307 and MW-308), and six downgradient delineation wells (MW-306A, MW-309, MW-310, MW-311, MW-313, and MW-314).

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

2.3 STATISTICAL EVALUATION

The results of the October 2023 monitoring results are reported in the February 19, 2024, Assessment Groundwater Monitoring – October 2023 results letter. The results indicate that there were detection monitoring statistically significant increases (SSIs) above background for at least one well for boron, calcium, field pH, sulfate, and total dissolved solids (TDS). There were also SSIs above background for Appendix IV monitoring parameters in compliance wells including:

- Lithium: MW-303, MW-305, MW-306, MW-312
- Molybdenum: MW-303, MW-305, MW-306, MW-312

Lithium was also detected above background at delineation wells MW-306A, MW-308, MW-309, MW-310, MW-311, MW-313, and MW-314. Lithium continues to be an observed SSL above the GPS in MW-306. Lithium is also above the GPS in MW-312, but a statistical evaluation cannot yet be completed at MW-312 because of an insufficient number of sampling results from this well.

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 ACM Addendum No. 1 is anticipated to be drafted in 2024.

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 have recently been installed to further define the downgradient nature and extent of the lithium GPS exceedances in groundwater. An additional compliance well was also installed to further refine the understanding of the limits of lithium GPS exceedances at the compliance boundary. The information collected from the expanded groundwater monitoring system and delineation wells is being used 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 at MW-306 and samples were collected from MW-307 and MW-308 for leach testing efforts on ash core samples. Six borings were drilled to collect CCR materials for leach testing and to locate the ash and native soil interface.

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 the required Selection of Remedy Report after updates to the conceptual site model, delineation of the nature and extent of impacts, and collection of additional data relevant to remedy selection are completed.

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.
- Evaluate results of leach testing on base of ash samples.
- Prepare summary memo for ash borings and ash sample results.
- Evaluate pumping test data and prepare summary memo for pumping test results.
- Review groundwater flow and groundwater quality results, ash leach testing, and aquifer pumping test results to assist in further evaluation of corrective action alternatives.
- Update the conceptual site model based on findings of nature and extent investigation.
- Prepare ACM Addendum No. 1.
- Continue evaluation of remedial options.

- Hold a public meeting.
- Issue a Selection of Remedy report.

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 identify 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 2022 - 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 2023 - February 2023	Asplundh rescheduled tree clearing for the installation of the delineation monitoring wells several times 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 2023 - 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.
Activities Completed During Current Semiannual Reporting Period	
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 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 - January 2024	Drafted a well network update memo by adding MW-312 as a compliance well.

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

Date	Activity
January 2024	Performed cap repair following the ash borings drilling in December 2023.
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.

Created by: NDK Date: 8/19/2022
 Last revision by: NLB Date: 2/12/2024
 Checked by: AJR Date: 2/22/2024

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-313	MW-314
2/3/2020	A	A	A	A	A	A	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
5/11/2020	--	--	--	--	Add.	Add.	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
2/24/2021	--	--	--	--	--	Add.	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
7/14/2021	--	--	--	--	--	Add.	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
12/9/2021	--	--	--	--	--	--	NI	NI	Add.	Add.	NI	NI	NI	NI	NI
4/21-22/2022	A	A	A	A	A	A	NI	NI	A	A	NI	NI	NI	NI	NI
5/12/2022	--	--	--	--	--	--	NI	NI	--	--	Add.	Add.	Add.	NI	NI
8/11/2022	--	--	--	--	--	--	NI	NI	--	--	Add.	Add.	Add.	NI	NI
10/10-12/2022	A	A	A	A	A	A	NI	NI	A	A	A	A	A	NI	NI
4/10-13/2023	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
10/17-20/2023	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Total Samples	9	9	9	9	10	12	2	2	5	5	5	5	5	2	2

Abbreviations:

A = Assessment Monitoring Program

Add. = Additional sample

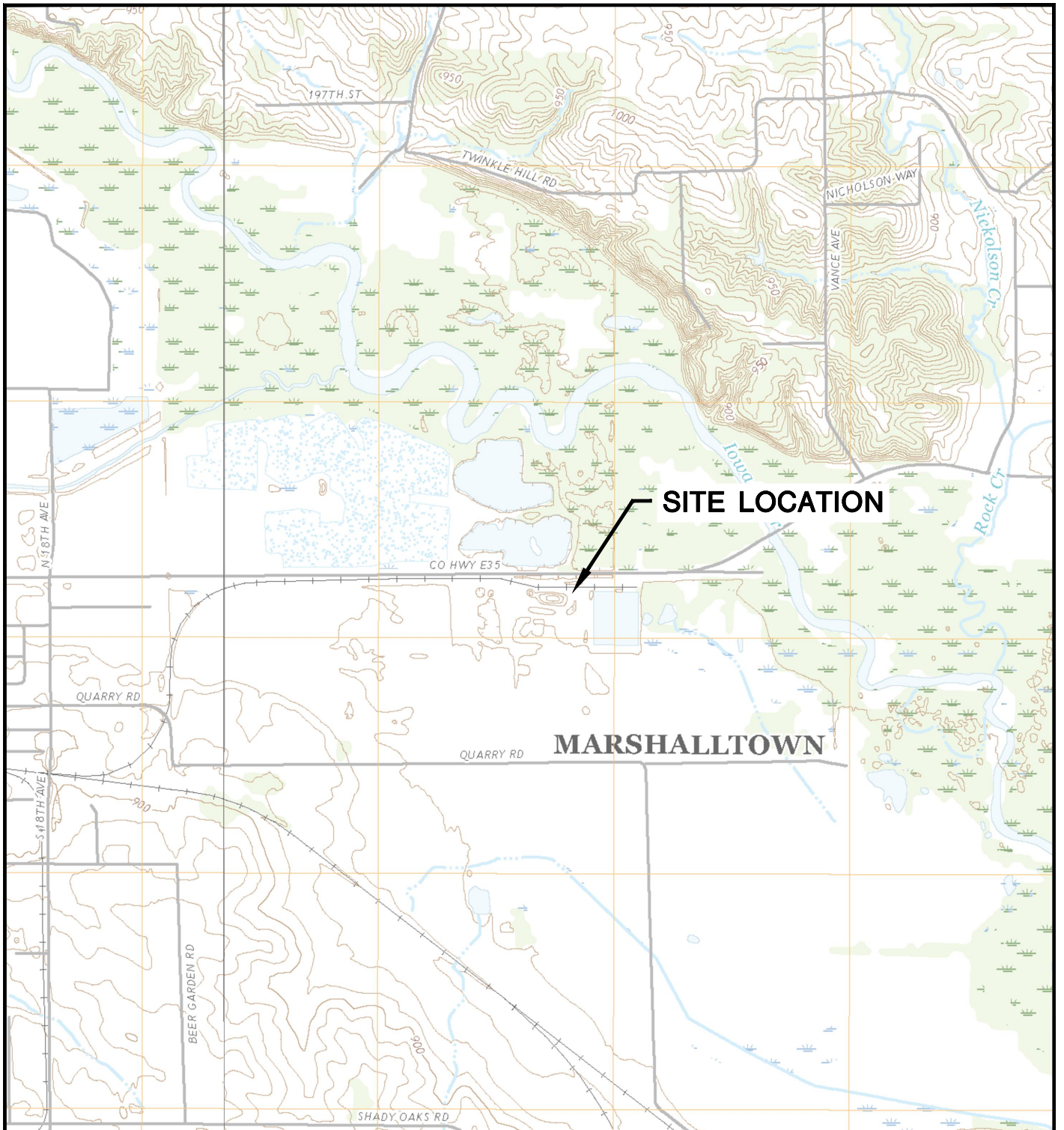
NI = Not Installed

-- = Not Applicable

Created by: NDK Date: 8/22/2022
 Last revision by: NLB Date: 2/7/2024
 Checked by: RM Date: 2/12/2024

Figures

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

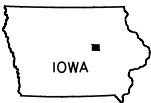


SITE LOCATION

MARSHALLTOWN



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		ENGINEER	SITE LOCATION MAP	
	PROJECT NO.	25222076.00		DRAWN BY:	BSS		SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	FIGURE
DRAWN:	11/15/2019	CHECKED BY:	MDB	APPROVED BY:	TK 3/20/2022			
REVISED:	01/14/2020							

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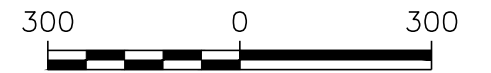


LEGEND

- CCR MONITORING WELL
- CCR BACKGROUND MONITORING WELL
- PIEZOMETER
- FINAL CLOSURE AREA LIMITS
- CCR LIMITS

NOTES:

1. 2020 AERIAL PHOTOGRAPH SOURCES: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA FSA, USGS, AEX, GETMAPPING, AEROGRIID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY.
2. MONITORING WELLS MW-301 THROUGH MW-306 WERE INSTALLED BY DIRECT PUSH ANALYTICAL, NOVEMBER 20-21, 2017.
3. MONITORING WELLS MW-307 AND MW-308 WERE INSTALLED BY TERRACON, INC. IN NOVEMBER 30, 2021.
4. MONITORING WELLS MW-309, MW-310, AND MW-311 WERE INSTALLED BY DIRECT PUSH ANALYTICAL ON MAY 4, 2022.
5. THE BACKGROUND MONITORING WELLS FOR THE SUTHERLAND GENERATING STATION ARE MW-301 AND MW-302.
6. 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.



SCALE: 1" = 300'

PROJECT NO.	25222189.00	DRAWN BY:	BSS	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 MASHALLTOWN, IOWA	SITE PLAN AND MONITORING WELL LOCATIONS	FIGURE
DRAWN:	11/14/2019	CHECKED BY:	NLB					2
REVISED:	02/27/2024	APPROVED BY:	TK, 3/12/24					

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