

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 | September 13, 2024

2830 Dairy Drive
Madison, WI 53718-6751
608-224-2830

Table of Contents

Section	Page
1.0 Introduction and Purpose	1
1.1 Background.....	1
1.2 Site Information and Maps	1
2.0 Summary of Work Completed	2
2.1 Monitoring Network Changes	2
2.2 Groundwater Monitoring.....	2
2.3 Statistical Evaluation.....	2
2.4 Evaluation of Corrective Measure Alternatives	2
3.0 Planned Activities.....	3

Tables

Table 1.	Timeline for Completed Work – Assessment of Corrective Measures
Table 2.	Groundwater Samples Summary

Figures

Figure 1.	Site Location Map
Figure 2.	Site Plan and Monitoring Well Locations

I:\25222189.00\Deliverables\2024 Semiannual - Selection of Remedy\2024 September Semiannual SOR Report\240913_SGS_Semiannual Remedy Selection_FINAL.docx

[This page left blank intentionally]

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 March 2024 through August 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 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 (MWMW-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 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 March 2024 through August 2024, 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 April 2024 monitoring event.

- The April 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. The combined radium sample at background monitoring well MW-301 was not collected because there was insufficient water to fill the entire full bottle set.

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

2.3 STATISTICAL EVALUATION

The results of the April 2024 monitoring results are reported in the August 13, 2024, Assessment Groundwater Monitoring – April 2024 results letter. The results indicate that lithium continues to be as 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. One additional sample must be collected at MW-312 to perform a lower confidence limit (LCL) evaluation, which will be completed during the next sampling event for this well (July 2024). 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 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 were installed in 2023 to further define the downgradient nature and extent of the lithium GPS exceedances in groundwater. An additional compliance well was also installed in 2023 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 was used in the current 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 at MW-306 and samples were collected from upgradient wells MW-307 and MW-308 for leach testing efforts on CCR core samples in the previous semiannual reporting period. 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. Reporting of these activities in support of the upcoming addendum to the ACM is anticipated for the next semiannual reporting period. A memo that details the results and evaluation of the leach testing was drafted during the reporting period and will be finalized for inclusion in the planned ACM addendum in the upcoming 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.
- 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.

[This page left blank intentionally]

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.
Activities Completed During Current Semiannual Reporting Period	
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.

Created by:	<u>NDK</u>	Date: <u>8/19/2022</u>
Last revision by:	<u>NLB</u>	Date: <u>9/10/2024</u>
Checked by:	<u>TK</u>	Date: <u>9/12/2024</u>

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
Total Samples	10	10	10	10	11	13	3	3	6	6	6	6	6	1	3	3

Abbreviations:

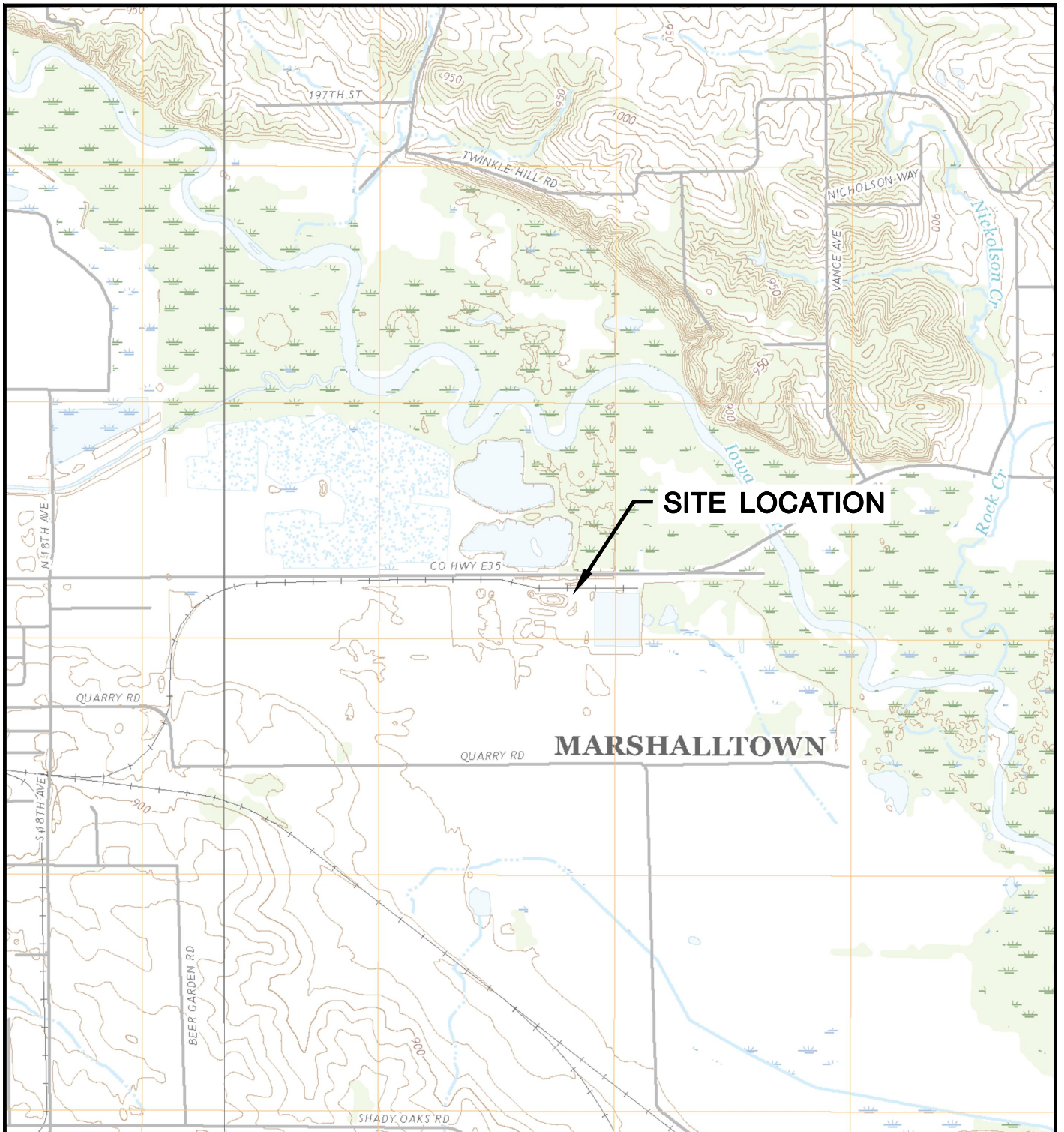
A = Assessment Monitoring Program
 Add. = Additional sample

NI = Not Installed
 -- = Not Applicable

Created by: NDK Date: 8/22/2022
 Last revision by: NLB Date: 8/2/2024
 Checked by: RM Date: 8/21/2024

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							

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

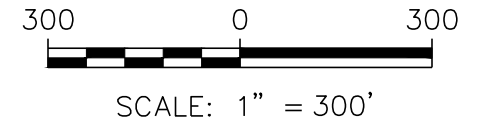


LEGEND

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

NOTES:

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. 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.
6. MONITORING WELL MW-312A WAS INSTALLED BY IMPACT 7G, INC. ON DECEMBER 27, 2023.
7. THE BACKGROUND MONITORING WELLS FOR THE SUTHERLAND GENERATING STATION ARE MW-301 AND MW-302.



PROJECT NO. 25224076.00	DRAWN BY: BSS	 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	FIGURE	2
DRAWN: 11/14/2019	CHECKED BY: TK/NDK		ENGINEER				SITE PLAN AND MONITORING WELL LOCATIONS	
REVISED: 07/30/2024	APPROVED BY: TK, 9/13/2024							

I:\25224076.00\Drawings\Site Plan and Monitoring Well Locations.dwg, 7/30/2024 2:52:09 PM