



solutions and action

**Interstate Power and Light Company**

Sutherland Generation Station  
CCR Surface Impoundment Annual Inspection Report  
154.018.015.005  
Report issued: July 14, 2017

**Hard Hat Services**

ph: 877-630-7428  
hardhatinc.com  
932 N. Wright St., Suite 160  
Naperville, IL 60563

## Executive Summary

This annual inspection report has been prepared in accordance with the requirements of the United States Environmental Protection Agency published Final Rule for Hazardous and Solid Waste Management System - Disposal of Coal Combustion Residual (CCR) from Electric Utilities (40 CFR Parts 257 and 261, also known as CCR Rule) and Extension of Compliance Deadlines for Certain Inactive Surface Impoundments.

This annual inspection report has been prepared to assess the condition of the inactive CCR surface impoundments. Primarily, the annual inspection report is focused on the structural stability of the CCR surface impoundments and to ensure that the operation and maintenance of the CCR surface impoundments is in accordance with recognized and generally accepted good engineering standards.

## Table of Contents

1.	INTRODUCTION.....	1
1.1	CCR Rule Applicability.....	1
1.2	Annual Inspection Applicability.....	1
2.	FACILITY DESCRIPTION .....	3
2.1	SGS Main Pond (Inactive CCR Surface Impoundment).....	6
3.	ANNUAL INSPECTION REPORTING CRITERIA.....	7
3.1	SGS Main Pond (Inactive CCR Surface Impoundment).....	7
3.1.1	Changes in Geometry (§257.83(b)(2)(i) and §257.100(a)).....	7
3.1.2	Existing Instrumentation (§257.83(b)(2)(ii) and §257.100(a)).....	7
3.1.3	Depth and Elevation of Impounded CCR and Water (§257.83(b)(2)(iii) and §257.100(a)).....	8
3.1.4	Storage Capacity of Impounding Structure (§257.83(b)(2)(iv) and §257.100(a)).....	10
3.1.5	Volume of Impounded CCR and Water (§257.83(b)(2)(v) and §257.100(a)) .....	11
3.1.6	Structural Weaknesses and Disruptive Conditions (§257.83(b)(2)(vi) and §257.100(a)).....	12
3.1.7	Other Changes Affecting Stability or Operation of Impounding Structure (§257.83(b)(2)(vii) and §257.100(a)).....	13
4.	CERTIFICATION.....	15

## 1. INTRODUCTION

This annual inspection report has been prepared in accordance with the requirements of §257.83(b) and §257.100(a) of the United States Environmental Protection Agency (USEPA) published Final Rule for Hazardous and Solid Waste Management System – Disposal of Coal Combustion Residual (CCR), herein referenced as the CCR Rule.

### 1.1 CCR Rule Applicability

The CCR Rule requires annual inspections by a qualified professional engineer (PE) for both existing and inactive CCR surface impoundments with a height of 5 feet or more and a storage volume of 20 acre-feet or more or the CCR surface impoundment has a height of 20 feet or more (40 CFR §§ 257.73(b), 257.73(d), 257.83(b) and 257.100(a)).

### 1.2 Annual Inspection Applicability

The Interstate Power and Light Company (IPL), Sutherland Generating Station (SGS) in Marshalltown, Iowa has one inactive CCR surface impoundment that meets the requirements of Section 1.1, identified as the SGS Main Pond.

SGS has three additional inactive CCR surface impoundments that do not meet the requirements of Section 1.1, identified as the SGS North Primary Pond, SGS South Primary Pond, and SGS Polishing Pond. These three inactive CCR surface impoundments do not require annual inspections and are not covered within this annual inspection report.

The annual inspection of the inactive CCR surface impoundment at SGS was completed by a qualified PE on June 8<sup>th</sup> and 9<sup>th</sup>, 2017. The annual inspection was completed to ensure that the design, construction, operation, and

maintenance of the inactive CCR surface impoundment at SGS is consistent with recognized and generally accepted good engineering standards.

The annual inspection of the inactive CCR surface impoundment at SGS included a review of available information regarding the status and condition of the inactive CCR surface impoundment. The information reviewed included all relevant files available in the operating record at the time of the annual inspection, as well as all relevant publicly accessible internet site entries. These files for the inactive CCR surface impoundment at SGS included, but is not limited to, results of 7-day inspections by a qualified person.

The annual inspection also included a visual inspection of the inactive CCR surface impoundment in order to identify signs of distress or malfunction of the inactive CCR surface impoundment and appurtenant structures. Additionally, the visual inspection included hydraulic structures underlying the base of the inactive CCR surface impoundment or passing through the dikes of the inactive CCR surface impoundment for structural integrity and continued safe and reliable operation.

## 2. FACILITY DESCRIPTION

The following sub-section provides a summary description of the facility, as well as a description of the inactive CCR surface impoundment located at SGS.

SGS is located east of the City of Marshalltown and approximately one half mile west of the Iowa River in Marshall County, at 3001 East Main Street, Marshalltown, Iowa.

SGS is a fossil-fueled electric generating station consisting of three steam turbine electric generating units and three combustion turbine units. SGS initiated operations in 1954. From 1954 to 2012 sub-bituminous coal was the primary fuel for producing steam. As of the end of 2012, SGS ceased using coal and modified facility operations in order to use natural gas as the primary fuel source. As of June 30, 2017, SGS ceased generating operations as the plant is scheduled for retirement.

During the time when the burning of coal was the primary fuel for producing steam a by-product of CCR was produced. The CCR at SGS is categorized into two types, bottom ash and precipitator fly ash. The precipitator fly ash at SGS was collected by the electrostatic precipitators and conveyed dry to a temporary on-site storage area. The precipitator fly ash was then transported off-site for beneficial reuse. If the dry conveying system malfunctioned, an emergency by-pass system would utilize water to sluice the precipitator fly ash from the generating plant to one of two surface impoundments. The surface impoundments, identified as the SGS North Primary Pond and SGS South Primary Pond, are located east of the generating plant and are identified as inactive CCR surface impoundments at SGS.

In addition to precipitator fly ash, the bottom ash at SGS was also sluiced from the generating plant to the SGS North Primary Pond and SGS South Primary Pond. Other influent flows that previously discharged into the two CCR surface impoundments consisted of cooling tower blow down water, air compressor cooling water, boiler blow down water, storm water runoff from the former coal pile storage area, and other low-volume waste water streams from the generating plant via a ground-floor sump pump. Presently, the only flows that discharge into the SGS North Primary Pond and SGS South Primary Pond include cooling tower blow down water, air compressor cooling water, storm water runoff from the former coal pile storage area, and other low-volume waste water streams from the generating plant via the ground-floor sump pump.

The water within the SGS North Primary Pond and SGS South Primary Pond discharges to the east into another surface impoundment identified as the SGS Main Pond. The SGS Main Pond is located to the east of the generating plant and is also identified as an inactive CCR surface impoundment at SGS.

The water within the SGS Main Pond is designed to flow around a series of intermediate berms prior to discharging to the north through a precast concrete mixing channel into another surface impoundment identified as the SGS Polishing Pond. The SGS Polishing Pond is located to the east of the generating plant and is also identified as an inactive CCR surface impoundment at SGS.

The water within the SGS Polishing Pond is designed to discharge through the facilities National Pollutant Discharge Elimination System (NPDES) Outfall 001 which consists of a Parshall flume and flow metering equipment. The water

within the SGS Polishing Pond is designed to discharge into an outfall pond. The water would then drain through a corrugated metal pipe into a grassy ditch located north of the outfall pond. The water in the grassy ditch would then flow west for several hundred yards between the rail road tracks located north of the generating plant. At the end of the grassy ditch, an underground culvert directed the stream under the rail road tracks towards the north and into an unnamed drainage ditch parallel to the county road, eventually draining towards the east into the Iowa River.

Since ceasing coal burning activities, water is no longer regularly discharged through NPDES Outfall 001. Additionally, as the facility ceased operations at the end of June 2017, it is anticipated that future water levels within the inactive CCR surface impoundments will continue to be minimal. The inactive CCR surface impoundments at SGS are anticipated to be closed in 2019.



## 2.1 SGS Main Pond (Inactive CCR Surface Impoundment)

The SGS Main Pond has been assigned a state identification number by the IDNR, which is 64-UDP-02-15.

The SGS Main Pond is located east of the generating plant and east of the SGS North Primary Pond and SGS South Primary Pond. The SGS Main Pond receives influent flows from the SGS North Primary Pond and SGS South Primary Pond, as well as storm water runoff from the surrounding area. The SGS North Primary Pond discharges into the northwest corner of the SGS Main Pond while the overflow pipe from the SGS South Primary Pond discharges into the west end of the SGS Main Pond.

The water within the SGS Main Pond is designed to flow around a series of intermediate berms prior to discharging into the southern end of the SGS Polishing Pond, which is located north of the SGS Main Pond. The water in the SGS Main Pond is designed to discharge into the SGS Polishing Pond via a concrete mixing channel located in the northeast corner of the SGS Main Pond. Since SGS ceased coal burning activities the water within the SGS Main Pond has receded well below the invert elevation of the concrete mixing channel, therefore, water no longer discharges into the SGS Polishing Pond during normal facility operations.

### 3. ANNUAL INSPECTION REPORTING CRITERIA

The following sub-sections address the annual inspection reporting criteria per §257.83(b)(2) and §257.100(a) of the CCR Rule for the inactive CCR surface impoundment located at SGS.

#### 3.1 SGS Main Pond (Inactive CCR Surface Impoundment)

##### 3.1.1 Changes in Geometry (§257.83(b)(2)(i) and §257.100(a))

After conducting the annual inspection, as well as review of available information provided by SGS pertaining to the status and condition of the inactive CCR surface impoundment, and discussions with SGS facility personnel who oversee and maintain the operation, maintenance, and inspection activities of the inactive CCR surface impoundment, there have been no identified changes in the geometry of the impounding structure that would warrant additional investigation or remedial activities.

Additionally, review of historical annual inspections completed from 2011 through 2014, prior to this initial CCR Rule annual inspection for the inactive CCR surface impoundment, has shown there have been no previously identified changes in the geometry of the SGS Main Pond.

##### 3.1.2 Existing Instrumentation (§257.83(b)(2)(ii) and §257.100(a))

The SGS Main Pond, at the time of this initial CCR Rule annual inspection, does not have instrumentation that supports the operation of the inactive CCR surface impoundment.

### 3.1.3 Depth and Elevation of Impounded CCR and Water (§257.83(b)(2)(iii) and §257.100(a))

As this is the initial CCR Rule annual inspection for the inactive CCR surface impoundment, there is no historical record of available information regarding the approximate minimum, maximum, and present depths and elevations of the impounded CCR and water in the SGS Main Pond from a previous annual inspection that was available for review.

However, at the time of the annual inspection, a survey was completed in order to determine the present surface water elevation of the CCR surface impoundment. Additionally, depth measurements from the water surface to the top of CCR/sediment were obtained in order to determine present depths/elevations.

Historical information of SGS was also available for review, which included a topographic/bathymetric survey of the SGS Main Pond prepared by Hard Hat Services (2005), design drawings of the reconfiguration of the SGS Main Pond prepared by Hard Hat Services (2006), as well as the most recent topographic/bathymetric survey of the SGS Main Pond completed by DLZ Industrial, LLC (2016). Reviewing the information provided within the above-mentioned documents, as well as the data collected at the time of the annual inspection, the following minimum, maximum, and present depths and elevations were approximated for the impounded CCR and water:

- At the time of the annual inspection, the water surface elevation of the SGS Main Pond was surveyed. Due to the low water elevation within the CCR surface impoundment the water surface was divided into four separate pool areas. The elevations of each of the four pool areas are as follows:
  - Pool Area #1 surface water elevation was surveyed to be approximately 856.73 feet.

- Pool Area #2 surface water elevation was surveyed to be approximately 856.66 feet.
- Pool Area #3 surface water elevation was surveyed to be approximately 856.79 feet.
- Pool Area #4 surface water elevation was surveyed to be approximately 856.68 feet.
- The average surface water elevation of the four pool areas was approximately 856.72 feet, approximately 8.58 feet below the crest of the south and east embankments of the CCR surface impoundment, which have an elevation of approximately 865.3 feet at the lowest point of the embankments.
- At the time of the annual inspection, the water depths that were measured within the four pool areas of the CCR surface impoundment, as well as the average elevations of the top of CCR/sediment within the four pool areas of the CCR surface impoundment, were as follows:
  - Pool Area #1 water depths varied between 0.2 feet and 0.6 feet, with an average water depth measurement of 0.4 feet. The elevation of the top of CCR/sediment that was measured averaged approximately 856.33 feet.
  - Pool Area #2 water depth was approximately 0.5 feet. The elevation of the top of CCR/sediment that was measured was approximately 856.16 feet.
  - Pool Area #3 water depths varied between 0.2 feet and 1.8 feet, with an average water depth measurement of 0.9 feet. The elevation of the top of CCR/sediment that was measured averaged approximately 855.89 feet.
  - Pool Area #4 water depth was approximately 1.8 feet. The elevation of the top of CCR/sediment that was measured was approximately 854.88 feet.
- From the 2006 design of the SGS Main Pond reconfiguration, the original bottom contour elevation of the CCR surface impoundment varied between 851 feet and 856 feet, with an average bottom contour elevation of approximately 853.5 feet.

### 3.1.4 Storage Capacity of Impounding Structure (§257.83(b)(2)(iv) and §257.100(a))

The storage capacity (i.e. water volume) of the CCR surface impoundment at the time of the annual inspection was calculated based on the acreage of the CCR surface impoundment in the areas where water was present, and the approximate depth of water within those areas of the CCR surface impoundment. The water depth measurements of the CCR surface impoundment were collected at the time of the annual inspection.

From both the 2016 topographic/bathymetric survey of the SGS Main Pond and the survey of the water surface elevations at the time of the annual inspection, as well as the water depth data that was collected within each of the pool areas at the time of the annual inspection, the following water surface areas and average water depths of each pool area of the CCR surface impoundment were determined:

<b>SGS Main Pond - Pool Area ID</b>	<b>Water Surface Area (Acres)</b>	<b>Average Water Depth (Feet)</b>
Pool Area #1	0.44	0.4
Pool Area #2	0.23	0.5
Pool Area #3	2.76	0.9
Pool Area #4	0.34	1.8

Thus, from the water surface areas and average water depth data provided above, the total storage capacity within the SGS Main Pond at the time of the annual inspection was approximately 5,500 cubic yards.

Note, from the 2006 design of the SGS Main Pond reconfiguration, the normal surface water elevation was identified to be approximately 862.6 feet, approximately 5.88 feet higher in elevation than at the time of the annual inspection. Comparing the 2006 designed normal surface water elevation to the average top of CCR/sediment elevation measured at the time of the annual inspection, the storage capacity of the SGS Main Pond would be approximately 42,000 cubic yards.

### 3.1.5 Volume of Impounded CCR and Water (§257.83(b)(2)(v) and §257.100(a))

The volume of impounded CCR and water (i.e. total volume) within the SGS Main Pond at the time of the annual inspection was determined using information that was collected during the annual inspection, as well as from readily available historical information which included a topographic/bathymetric survey of the SGS Main Pond prepared by Hard Hat Services (2005), design drawings of the reconfiguration of the SGS Main Pond prepared by Hard Hat Services (2006), as well as the most recent topographic/bathymetric survey of the SGS Main Pond completed by DLZ Industrial, LLC (2016)

The surveyed elevation of the water surface within the SGS Main Pond at the time of the annual inspection varied between the four pool areas. Therefore, the volume of impounded CCR and water, where water was present, was determined individually for each of the four pool areas. In addition to the volume of CCR and water in the areas where water was present, the volume of impounded CCR located within, as well as located outside, the footprint of the pool areas was determined. These additional areas included the CCR located within the footprint of the pool areas that rose above the water surface

elevation at the time of the annual inspection, as well the CCR located outside the footprint of the pool areas within the original intermediate berm.

From the available information, the total volume of impounded CCR and water within the SGS Main Pond at the time of the annual inspection was approximately 34,000 cubic yards.

### **3.1.6 Structural Weaknesses and Disruptive Conditions (§257.83(b)(2)(vi) and §257.100(a))**

After review of available information provided by SGS pertaining to the status and condition of the inactive CCR surface impoundment, discussions with SGS facility personnel who oversee and maintain the operation, maintenance, and inspection activities of the inactive CCR surface impoundment, as well as conducting the on-site visual inspection of the inactive CCR surface impoundment, there have been no identified appearances of an actual or potential structural weakness of the inactive CCR surface impoundment. Additionally, there were no identified issues with the structural integrity of the hydraulic structures (concrete mixing channel) associated with the SGS Main Pond.

Regarding the existing conditions of the SGS Main Pond that are disrupting or have the potential to disrupt the operation and safety of the inactive CCR surface impoundment and appurtenant structures, the following conditions were identified:

- **Vegetation Overgrowth**
  - The upstream slope of the south embankment of the SGS Main Pond could not be properly inspected due to the presence of dense/tall vegetation along the bottom half (1/2) of the slope. The vegetation restricted the ability to properly inspect the

embankment for stability. Items such as erosion, seeps, and animal activity (if present) were unable to be observed due to the vegetation overgrowth.

- The upstream slope of the east embankment of the SGS Main Pond could not be properly inspected due to the presence of dense/tall vegetation along the bottom half (1/2) of the slope. The vegetation restricted the ability to properly inspect the embankment for stability. Items such as erosion, seeps, and animal activity (if present) were unable to be observed due to the vegetation overgrowth.
- The downstream slope of the east embankment of the SGS Main Pond could not be properly inspected due to the presence of dense/tall vegetation along the slope. The vegetation restricted the ability to properly inspect the embankment for stability. Items such as erosion, seeps, and animal activity (if present) were unable to be observed due to the vegetation overgrowth.

*{Note: Embankments of inactive CCR surface impoundments located in or adjacent to floodplains, sovereign lands, property boundaries, wetlands, and potential other restrictive areas may require various types of permits prior to conducting vegetation management activities.}*

### **3.1.7 Other Changes Affecting Stability or Operation of Impounding Structure (§257.83(b)(2)(vii) and §257.100(a))**

After review of available information provided by SGS pertaining to the status and condition of the inactive CCR surface impoundment, as well as discussions with SGS facility personnel who oversee and maintain the operation, maintenance, and inspection activities of the inactive CCR surface impoundment, there have been no other identified changes that have affected the stability or operation of the SGS Main Pond.



Additionally, review of historical annual inspections completed from 2011 through 2014, prior to this initial CCR Rule annual inspection for the inactive



CCR surface impoundment, has shown there have been no previously identified changes that have affected the stability or operation of the SGS Main Pond.

## 4. CERTIFICATION

To meet the requirements of 40 CFR §§ 257.83(b) and 257.100(a), I Mark W. Loerop hereby certify that I am a licensed professional engineer in the State of Iowa; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in 40 CFR §§ 257.83(b) and 257.100(a).

By:   
Name:   
Date: 