

PERIODIC HAZARD POTENTIAL CLASSIFICATION ASSESSMENT REPORT

EVERGY MISSOURI WEST, INC.
SIBLEY GENERATING STATION
FLY ASH IMPOUNDMENT

SCS ENGINEERS

27213169.21 | October 1, 2021

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1.0 DISCUSSION

1.1 PURPOSE

The purpose of this Periodic Hazard Potential Classification Assessment is to document that the requirements specified in 40 CFR §257.73(a)(2) of the Coal Combusting Residual (CCR) Rule¹ have been met for the Evergy Missouri West, Inc. (f/k/a KCP&L Greater Missouri Operations Company), Sibley Generating Station, Fly Ash Impoundment. The Fly Ash Impoundment is an existing CCR surface impoundment as defined by 40 CFR §257.53. This Assessment is subsequent to the Initial Hazard Potential Classification Assessment completed by SCS Engineers dated October 7, 2016², and the Coal Combustion Waste Impoundment Round 7 – Dam Assessment Report by Dewberry & Davis, LLC dated June 2011³.

1.2 REGULATORY REQUIREMENT

This Periodic Hazard Potential Classification Assessment documents the hazard potential classification of the Fly Ash Impoundment as either a high hazard potential CCR surface impoundment, a significant hazard potential CCR surface impoundment, or a low hazard potential CCR surface impoundment as required by 40 CFR §257.73(a)(2). The assessment also documents the basis for the hazard potential classification. Per 40 CFR §257.73(f)(3), periodic assessments are required to be completed every 5 years; therefore, this assessment is required to be completed no later than October 7, 2021.

1.3 BRIEF DESCRIPTION OF IMPOUNDMENT

The Sibley Generating Station is located adjacent to the Missouri River in Sections 1 and 2 of Township 50 North, Range 30 West just east of Sibley, Missouri. The Fly Ash Impoundment is located to the east of the generating plant along the south bank of the Missouri River. The impoundment was designed in 1977 by Burns & McDonnell Engineering Company (Burns & McDonnell) and included stability analyses of the embankments⁴. It was originally constructed primarily using silts and clays obtained from the interior of the impoundment or from the adjacent bluffs. The construction was completed in 1977 and was overseen by staff of Burns & McDonnell³.

¹ United States Environmental Protection Agency, April 17, 2015, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities.

² SCS Engineers, October 7, 2016, Initial Hazard Potential Classification Assessment Report, Fly Ash Impoundment, KCP&L Greater Missouri Operations Company, Sibley Generating Station.

³ Dewberry & Davis, LLC, March 2011, Coal Combustion Waste Impoundment Round 7 - Dam Assessment Report, Sibley Generating Station, Fly Ash Pond.

⁴ Burns & McDonnell Engineering Company, 1977, Sibley Generating Station Contract 100 - Fly Ash Pond Construction.

1.3.1 Size Classifications

Based on the United States Army Corps of Engineers (USACOE) Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106⁵, the size classification for the Fly Ash Impoundment is “Small” based on height and “Intermediate” based on storage. Size classification is determined by either storage or height, whichever is larger, therefore, the impoundment is categorized as “Intermediate”.

Table 1. USACOE Size Classification

| Category | Storage (Ac-Ft) | Height (Ft) |
|--------------|------------------|-------------|
| Small | <1,000 | <40 |
| Intermediate | 1,000 to <50,000 | 40 to <100 |
| Large | >50,000 | >100 |

1.3.2 Impoundment Dimensions

Based on the available published information³, the approximate Fly Ash Impoundment dimensions are summarized in Table 2 below. SCS Engineers (SCS) reviewed the Dewberry information included in the table at a cursory level and found it to be accurate for the level of review completed.

Table 2. Impoundment Size

| Measurement | Quantity/Measurement |
|------------------------|----------------------|
| Surface Area | 15.8 acres |
| Dam Height | 22 feet |
| Size Classification | Small |
| Total Storage Capacity | 236 acre-feet |

1.3.3 Impoundment Operations

The Fly Ash Impoundment has ceased operations and is currently undergoing closure per a Notice of Intent to Close dated January 28, 2020. Closure will be completed by removal of material in accordance with the current closure plan titled “CCR Closure Plan, Sibley Fly Ash Impoundment, Sibley Generating Station”⁶, dated October 14, 2016, and/or any subsequent revisions, developed pursuant to 40 CFR 257.102(b).

Based on conversations with plant personnel, prior to ceasing of operations of the Fly Ash Impoundment the Fly Ash Impoundment was used for ash conditioning and as a staging area before the fly ash was disposed in a nearby landfill operated by Evergy Missouri West, Inc. Fly ash from the plant was sluiced to the impoundment at its western end. Water was ultimately discharged at the

⁵ United States Army Corps of Engineers, 1979, Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106.

⁶ Burns & McDonnell, 2016, CCR Closure Plan, Sibley Fly Ash Impoundment, Sibley Generating Station.

eastern end of the impoundment via a NPDES-permitted outfall. The western 1,400 feet of the impoundment was used to settle out the majority of the fly ash. An excavation operation periodically removed the ash, after which it was loaded into trucks and transported to the landfill. The approximate middle 200 feet of the impoundment was used to further settle out ash, while the eastern 525 feet of the impoundment was used as a final settling basin before the excess water was discharged to the Missouri River from a structure located on the eastern embankment of the Fly Ash Impoundment. The Fly Ash Impoundment is presented in Figure 1 below as it appeared near the end of the removal process.

Aerial image obtained from Google Earth dated April 11, 2021

Figure 1. Fly Ash Impoundment



SCS' estimate of the relative volume of fly ash and water in the three operational areas of the impoundment based on visual observation and a review of available construction documentation is summarized in the table below.

Table 3. Relative Volume of Fly Ash

| Operational Area | Volume of Ash / Water |
|------------------|-----------------------|
| Western | No Ash or Water |
| Middle | No Ash or Water |
| Eastern | Minimal Ash and Water |

1.4 PLAN APPROACH

As this is the first periodic assessment for the Fly Ash Impoundment subsequent to the initial assessment completed in 2016, SCS took a similar approach as with the initial assessment. Particular attention was paid to changes to operations and the impoundment. As part of the Hazard Potential Classification Assessment, SCS completed the following tasks.

1. Reviewed available site information and history pertaining to the Fly Ash Impoundment and surrounding facility and infrastructure.
2. Visited the site (September 13, 2021) to validate information and data gathered during site information review noted above and to potentially identify additional infrastructure or receptors that may be impacted. In addition, the impoundment and facility infrastructure were inspected for changes or modifications since the Initial Hazard Potential Classification Assessment completed by SCS in 2016.
3. Completed an assessment of the Fly Ash Impoundment utilizing guidance from the “Federal Guidelines for Dam Safety: Hazard Potential Classification Systems for Dams – April 2004” published by the Federal Emergency Management Agency (FEMA).

2.0 ANALYSIS

2.1 RELEASE SCENARIOS

The Fly Ash Impoundment has safely operated for approximately 40 years. In the unlikely event that a failure should occur, it would most likely result from erosion of the south alluvial bank of the Missouri River, undermining the north portion of the impoundment embankment. It is unlikely that the erosion would occur without warning, given the operational history of the site and frequent unit inspections; therefore SCS does not consider a catastrophic failure of the impoundment a likely release scenario.

The most likely release scenario is that a portion of the embankment would be undermined by river flooding, causing a slope failure of the impoundment embankment. At the time of the site inspection, all of the CCR materials and water had been removed from the impoundment with only minimal residual CCR material being present on portions of the southern embankment. Therefore, even in the event of a flood event and subsequent slope failure, only residual amounts of ash could potentially enter the adjacent Missouri River.

2.2 DOWNSTREAM ENVIRONMENT AND INFRASTRUCTURE

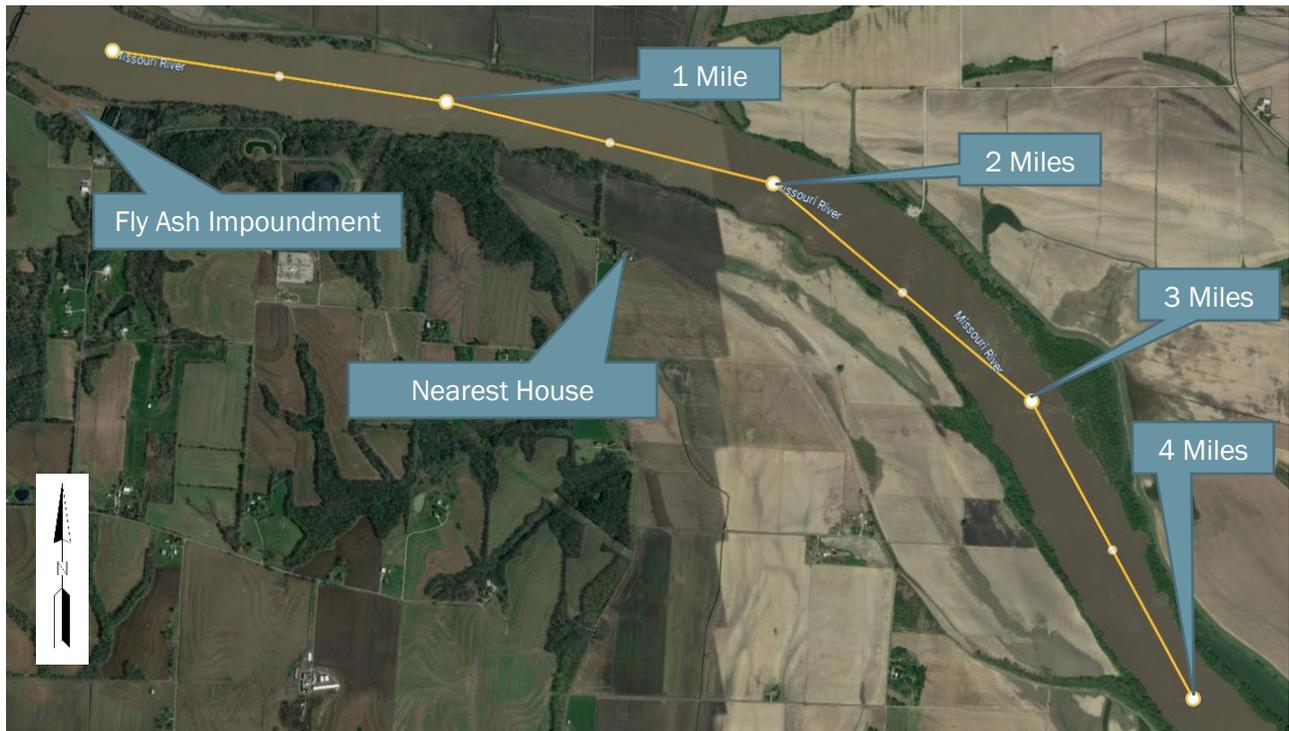
The Sibley Fly Ash Impoundment is located along the southern bank of the Missouri River in a rural area of western Missouri. The downstream environment is located within the alluvial flood plain of the Missouri River, which is subject to natural flooding on a nearly annual basis. The downstream environment is summarized in Table 4 and is shown on the aerial photograph below.

Table 4. Downstream Environment

| Potential Receptor | Approximate Distance From Impoundment |
|---|---|
| Distance to nearest house | 1.5 miles (Located outside river levee) |
| Distance to nearest road | Not Applicable |
| Distance to nearest body of water | 50 feet (Missouri River) |
| Distance to nearest town | 6.5 Miles (Napoleon, Mo) |
| Distance to nearest affected State Park | 116 Miles (Arrow Rock, Arrow Rock, Mo) |

Aerial image obtained from Google Earth dated April 11, 2021

Figure 2. Downstream Environment



2.3 BREACH ANALYSIS

While SCS considers a catastrophic failure highly unlikely, the Federal Hazard Potential Classification System and the EPA is concerned with the resulting impact from a catastrophic failure. In the “Coal Combustion Waste Impoundment Dam Assessment Report”³ for the Sibley Generating Station prepared for the EPA, Dewberry staff conducted a Breach Impact Analysis for the site. In its analysis, Dewberry assumed the total volume of ash and water was catastrophically released into the river with no residual left on site. Dewberry concluded the release would cause “a momentary rise in the river” elevation and the “impact to the river would be a layer of inert ash along the bank and an addition of water to the river which would be absorbed quickly. No environmental damage or property damage should result”.

Based on site observations and data collected during this assessment, SCS agrees with the Dewberry & Davis breach analysis that no environmental damage or property damage should result. The impoundment being in the final stages of closure by removal only reinforces that belief.

Infrastructure along the Missouri River includes surface water intakes and recreational areas. According to the Missouri Department of Natural Resources 2020 Census of Missouri Public Water

Systems⁷, eight public water systems maintain surface water intakes downstream on the Missouri River as shown below. The Kansas City intake is located upstream of the Sibley Generating Station and would not be impacted by a release from the impoundment.

Public Water System Surface Water Sources

| PWS ID | System Name | Stream Name | County |
|-----------------------|--|------------------------------|---------------|
| Missouri River | | | |
| MO3010089 | BOONVILLE PWS | MISSOURI RIVER | COOPER |
| MO1010415 | KANSAS CITY PWS | MISSOURI RIVER | JACKSON |
| MO1010464 | LEXINGTON PWS | MISSOURI RIVER | LAFAYETTE |
| MO3010409 | MO AMERICAN JEFFERSON CITY DISTRICT | MISSOURI RIVER | COLE |
| MO6010716 | MO AMERICAN ST LOUIS ST CHARLES COUNTIES | MISSOURI RIVER NORTH | ST LOUIS |
| MO6010716 | MO AMERICAN ST LOUIS ST CHARLES COUNTIES | MISSOURI RIVER CENTRAL 1 & 2 | ST LOUIS |
| MO6010716 | MO AMERICAN ST LOUIS ST CHARLES COUNTIES | MISSOURI RIVER CENTRAL 3 & 4 | ST LOUIS |
| MO6010715 | ST LOUIS CITY PWS | MISSOURI RIVER | ST LOUIS CITY |

The nearest downstream surface water intake is Lexington, located approximately 18 miles downstream of Sibley. The next closest downstream intake is located at Higginsville, located approximately 28 miles downstream of Sibley. Treatment of water taken from the Missouri River requires the removal of a large amount of sediment from the river; therefore a release of ash into the Missouri River is not expected to cause a shutdown of water systems taking water from the Missouri River.

The Missouri River carries a large load of sediment in the water. The nearest state park to the Sibley Generating Station is the Katy Trail State Park, located along the Missouri River, near Rocheport, Missouri. Recreational uses of the Missouri River and areas along the river are not expected to be significantly impacted should a breach occur.

⁷ Missouri Department of Natural Resources, Division of Environmental Quality, Water Protection Program, Public Drinking Water Branch, 2020, Census of Missouri Public Water Systems 2020 (<https://dnr.mo.gov/document-search/2020-census-missouri-public-water-supplies>).

3.0 SCS HAZARD POTENTIAL ASSESSMENT

The 2004 Federal guidelines for dam safety classification system focuses on the loss of human life and economic and environmental losses resulting from a dam (ash impoundment) failure. The following table summarizes the Hazard Classification System.

Table 5. FEMA Federal Guidelines for Dam Safety Hazard Classification

| | Loss of Human Life | Economic, Environmental Losses |
|-------------|-----------------------|--|
| Low | None | Low and generally limited to the owner |
| Significant | None | Yes |
| High | Probable, one or more | Yes |

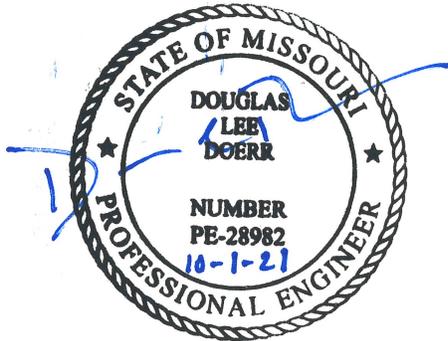
SCS' assessment of the Sibley Generating Station Fly Ash Impoundment is that a catastrophic failure of the impoundment dikes is highly unlikely, the same result as provided in the Initial Hazard Potential Classification Assessment completed in 2016². In the event of a catastrophic failure, the loss of human life is highly unlikely and the economic and environmental impact of a failure is generally limited to Evergy property. Based on this assessment, SCS believes the appropriate hazard classification for the Sibley Generating Station Fly Ash Impoundment is **LOW**. Below is the table summarizing the hazard assessment of the Sibley Generating Station Fly Ash Impoundment.

Table 6. Fly Ash Impoundment Dam Safety Hazard Classification

| | Loss of Human Life | Economic, Environmental Losses |
|-------------|--------------------|--------------------------------|
| Low | X | X |
| Significant | | |
| High | | |

4.0 CERTIFICATION

I, Douglas L. Doerr, hereby certify that I am a Qualified Professional Engineer licensed in Missouri, and that the Periodic Hazard Potential Classification Assessment for the Evergy Missouri West, Inc., Sibley Generating Station, Fly Ash Impoundment, was conducted in accordance with the requirements of §257.73(a)(2) and (f)(3), of the CCR Rule. The Hazard Potential Classification Assessment consists of all of the pages in Sections 1 through 4 of this document.



Douglas L. Doerr, P.E.

Missouri Professional Engineer

License No. 28982

5.0 REFERENCES

1. United States Environmental Protection Agency, April 17, 2015, *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities*.
2. SCS Engineers, October 7, 2016, *Initial Hazard Potential Classification Assessment Report, Fly Ash Impoundment, Kansas City Power & Light Company, La Cygne Generating Station*.
3. Dewberry & Davis, LLC, June 2011, *Coal Combustion Waste Impoundment Round 7 - Dam Assessment Report, La Cygne Generating Station, Bottom Ash Settling, Upper and Fly Ash Ponds, Kansas City Power & Light Company, La Cygne, Kansas*.
4. *Burns & McDonnell Engineering Company, 1977, Sibley Generating Station Contract 100 - Fly Ash Pond Construction*.
5. United States Army Corps of Engineers, 1979, *Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106*.
6. *Burns & McDonnell Engineering Company, 2016, CCR Closure Plan, Sibley Fly Ash Impoundment, Sibley Generating Station*.
7. Missouri Department of Natural Resources, Division of Environmental Quality, Water Protection Program, Public Drinking Water Branch, 2020, *Census of Missouri Public Water Systems 2020* (<https://dnr.mo.gov/document-search/2020-census-missouri-public-water-supplies>).