

PERIODIC HAZARD POTENTIAL CLASSIFICATION ASSESSMENT REPORT

EVERGY METRO, INC.
LA CYGNE GENERATING STATION
UPPER AQC IMPOUNDMENT

SCS ENGINEERS

27217233.21 | 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 Metro, Inc., La Cygne Generating Station, Upper Air Quality Control (AQC) Surface Impoundment. The Upper AQC 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 Upper AQC 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 IMPOUNDMENTS

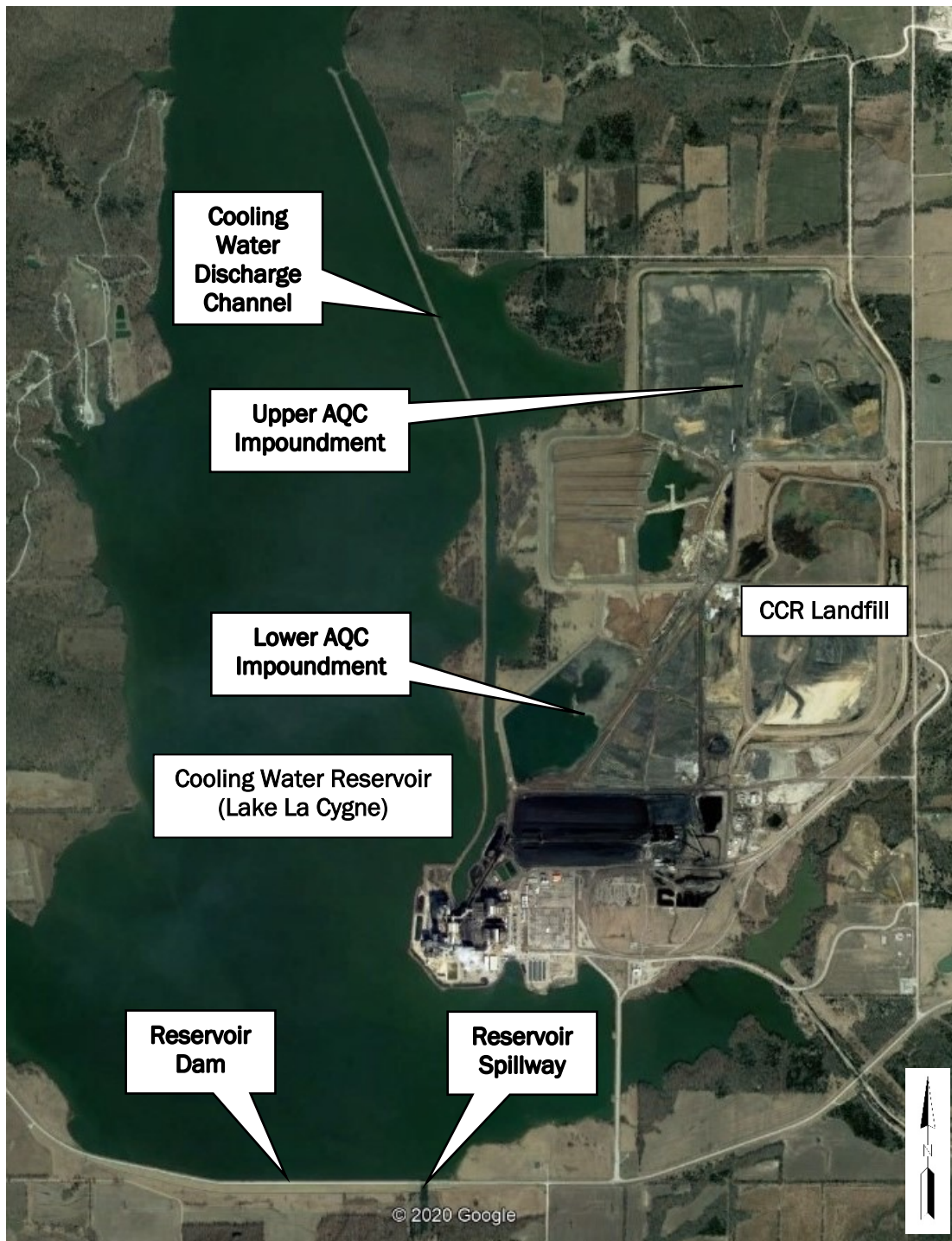
The La Cygne Generating Station is located adjacent to and east of Lake La Cygne and approximately 6.6 miles east of the town of La Cygne, Kansas. The 7,500-acre site contains a 2,600-acre cooling water reservoir (Lake La Cygne), the generating station, and two air quality control (AQC) impoundments containing fly ash and flue gas desulphurization (FGD) residuals, both considered CCR waste. The power station and impoundments are generally located in Sections 27, 28, 33 and 34 of Township 19 South, Range 25 East.

The initial AQC Pond (now called the Lower AQC Impoundment) was constructed in 1973 as part of the original generating station development to store FGD waste and is located to the north of the generating station and to the east of Lake La Cygne. The Lower AQC Impoundment was formed by an approximate 10,500-foot long side hill embankment. In 1979, the Upper AQC Pond (now called the Upper AQC Impoundment) was constructed to store FGD waste. The Lower AQC impoundment was designed by Ebasco and the Upper AQC impoundment was designed by Woodward Clyde Consultants. The locations of the AQC impoundments are shown on Figure 1.

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, Upper AQC 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 Lower AQC Ponds, Kansas City Power & Light Company, La Cygne, Kansas.



Aerial image obtained from Google Earth dated March 2, 2020.

Figure 1. Locations of AQC Impoundments

1.3.1 Size Classifications

Based on the United States Army Corps of Engineers (USACOE) Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106⁴, the size classification for the Upper AQC Impoundment is “Intermediate” based on height and 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 Upper AQC 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	332 acres
Dam Height	45 feet
Size Classification	Intermediate
Total Storage Capacity	8,430 acre-feet

1.3.3 Impoundment Operations

The Upper AQC Impoundment collects stormwater falling on the impoundment area which then discharges to Lake La Cygne. Pumps in the Lower AQC Impoundment are used to either discharge water to Lake La Cygne or to consume water in the scrubber. Dry CCR is being regraded in the Upper AQC Impoundment to facilitate closure.

⁴ United States Army Corps of Engineers, 1979, Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106.

1.4 PLAN APPROACH

As this is the first periodic assessment for the Upper AQC 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 Upper AQC Impoundment and surrounding facility and infrastructure.
2. Visited the site 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 Upper AQC 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 site visit conducted on November 4, 2020 indicated that the Upper AQC Impoundment and other infrastructure that may impact release scenarios generally remained unchanged from the 2016 assessment. The Lower AQC Impoundment and Cooling Water Reservoir remain in a very similar condition as in 2016. The Upper AQC Impoundment located upstream of the Lower AQC Impoundment has initiated closure in-place, to include final cover construction. Areas adjacent to and surrounding the La Cygne Generating Station generally remain the same as 2016. As such, the same approach to analyzing release scenarios was used for this assessment.

The embankment of the Upper AQC Impoundment is an engineered/constructed retaining structure that has safely operated for over 40 years. Based on the design of the impoundment and lake systems, multiple unrelated failures of the Upper and Lower AQC Impoundments and the Lake La Cygne dam would have to occur to result in catastrophic damage. This is an unrealistic scenario.

If a failure were to occur, it would most likely occur due to a large storm event that exceeded the capacity of the Upper AQC Impoundment discharge structure or otherwise overtopped the embankment at another location, resulting in the erosion of the embankment and the potential loss of CCR from the storage unit. Surface water flow from other areas does not enter this impoundment. It is unlikely that a failure would occur without warning signs, given the configuration and operational history of the site.

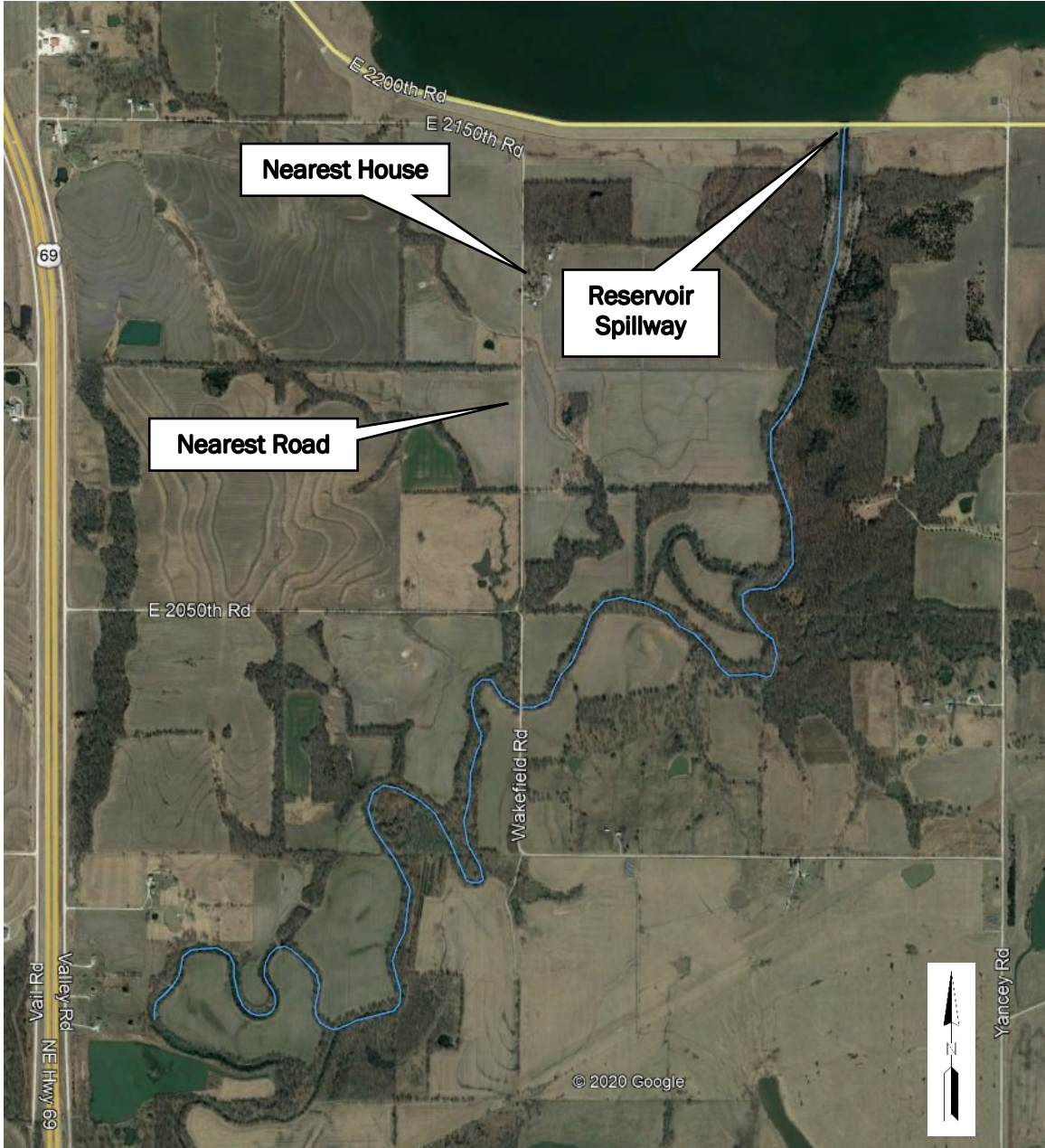
The La Cygne AQC Impoundments are located on the east side of the plant Cooling Water Reservoir as shown in Figure 1. The cooling water discharge channel that is used to direct cooling water into the reservoir, is located along the east side of the reservoir, between the AQC impoundments and the main body of the reservoir. A release of CCR from the Upper AQC Impoundment would flow into the cooling water discharge channel where the water and CCR would mix with the cooling water. The potential release would then have to travel approximately 6,000 feet (~1.1 miles) to reach the north end of the discharge channel and enter the main body of the Cooling Water Reservoir. From that point, the CCR and water would have to flow approximately 16,000 feet (~3 miles) to the south, to the reservoir spillway, before the CCR could leave the site. This is an unrealistic scenario.

2.2 DOWNSTREAM ENVIRONMENT AND INFRASTRUCTURE

The La Cygne Generating Station is located on the east side of Lake La Cygne, which serves as the Cooling Water Reservoir for the station. The environment downstream of the reservoir is a rural area of Linn County, Kansas. Water from the Cooling Water Reservoir flows approximately 9 miles southwest via North Sugar Creek where the water enters the Marais Des Cygnes River. SCS developed Table 3 below to summarize the downstream environment, which is shown on the aerial photograph in Figure 2.

Table 3. Downstream Environment

Potential Receptor	Approximate Distance From Impoundment
Distance to nearest house	2 miles
Distance to nearest road	1.8 miles (Wakefield Road)
Distance to nearest body of water	9 miles (Marais Des Cygnes River)
Distance to nearest town	13 miles (Trading Post, Kansas)
Distance to nearest affected State Park	>60 miles (Truman Reservoir)



Aerial image obtained from Google Earth dated March 2, 2020.

Figure 2. Downstream Environment

2.3 BREACH ANALYSIS

While SCS considers a catastrophic failure unlikely, the Federal Hazard Potential Classification System and the EPA are concerned with the resulting impacts from a catastrophic failure.

A failure of the Upper AQC Impoundment would potentially release water and CCR into the Cooling Water Discharge Channel. During the SCS site visit, the water level in the Cooling Water Reservoir was approximately 10 feet below the top of the radial gate, approximate elevation 841.5, the approximate maximum operating pool elevation during normal flow conditions. This elevation provides approximately 12.5 feet of freeboard between the water surface and the top of the dam. The volume provided by this freeboard could be used to store water and ash from a catastrophic failure of the Upper AQC Impoundment.

The worst-case failure would be a catastrophic failure of the Upper AQC Impoundment into the Lower AQC Impoundment causing a subsequent catastrophic failure of the Lower AQC Impoundment. However, most of the water has been removed from the Upper AQC Impoundment and is not present to transport the CCR waste out of the impoundment. Regardless, SCS assumed the entire volume of the Upper and Lower AQC Impoundments would be released into the Cooling Water Reservoir for the breach analysis.

The surface area of the cooling water reservoir, at the maximum operating level during a design storm event (Elev 847 msl) is 3,350 acres, resulting in more than 23,450 acre-feet of storage between the maximum operating level and the dam crest.

The total storage capacity of the Upper and Lower AQC Impoundments is approximately 8,430 and 2,900 acre-feet, respectively. As the storage capacity of the Cooling Water Reservoir between the maximum operating level and the dam crest is approximately 2 times larger than the total volume of CCR and water storage, SCS has determined the Cooling Water Reservoir would contain a catastrophic release from both of the Upper and Lower AQC impoundments.

In the Dewberry Report³ prepared for the EPA, Dewberry staff reviewed a Breach Impact Analysis for the site, prepared by URS and KCP&L (now Evergy Metro, Inc.), analyzing the possibility of a catastrophic failure during a maximum precipitation event. The Dewberry report reached the same conclusion as SCS; “Dewberry was able to make the determination that if a catastrophic failure were to happen each AQC Pond would overflow into the La Cygne Generating Station Cooling Water Reservoir. This structure has adequate capacity to absorb the release from a catastrophic failure.”

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 4. 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 La Cygne Generating Station Upper AQC Impoundment is that a catastrophic failure of the impoundment dikes is unlikely, the same result as provided in the Initial Hazard Potential Classification Assessment completed in 2016. 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 La Cygne Generating Station Upper AQC Impoundment is **LOW**. Below is the table summarizing the hazard assessment of the La Cygne Generating Station Upper AQC Impoundment.

Table 5. Upper AQC 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 Kansas, and that the Periodic Hazard Potential Classification Assessment for the Evergy Metro, Inc., La Cygne Generating Station, Upper AQC Surface 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.

Kansas Professional Engineer

License No. 14136

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 6, 2016, *Initial Hazard Potential Classification Assessment Report, Upper AQC 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 Lower AQC Ponds, Kansas City Power & Light Company, La Cygne, Kansas*.
4. United States Army Corps of Engineers, 1979, *Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106*.