Luminant

Office Memorandum

Date: November 14, 2020

To: Cynthia Vodopivec

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cc: Charles Koudelka

From: Vic Modeer

East Ash Pond Structural Stability Assessment
Electric Energy, Inc.
Subject: Joppa Power Station

The October 2016 certified "CCR Rule Report: Initial Structural Stability Assessment for the East Ash Pond at the Joppa Power Station" prepared by AECOM describes the outlets for the northern portion and southern portion of the East Ash Pond. The AECOM report states that the 26" (24" inside diameter) HDPE pipe cannot be structurally certified due to inability to complete a closed-circuit television inspection of the pipe. However, the outfall structure and the pipe section from the structure to the bottom of the embankment have been inspected numerous times by me and found to be structurally sufficient.

The 24" pipe was placed at an elevation 1' below the 36" pipe connecting the northern and southern portions of the East Ash Pond. The 24" HDPE outfall has an inlet invert elevation of approximately 372.0' and penetrates the embankment at a 1.0% slope until it reaches the downstream face, at which point the pipe follows the exterior contour of the slope until past the toe. The conduit was laid at grade just off the toe of the embankment back to the north where it outfalls into the acid basin. The interconnecting 36" diameter corrugated metal pipe (CMP) (Water Detention Facilities Inspection, March 17, 2009) was not included in the initial structural stability assessment as it was an internal pipe not affecting the structural stability. However, the 36" CMP pipe is significant because it originally carried the discharge from the southern portion of the East Ash Pond and it will carry any extreme rainfall events and any flow that is greater than 1' above the 24" outlet, and can be used as the main outlet for closure or maintenance of the 24" outlet.

AECOM's 2016 report could not certify that the pipe met the requirements of § 257.73(d)(1)(vi) because of the inability to access the pipe beyond a 90° bend beyond the toe of the dike in order to complete the inspection and was not because of any issues related to structural integrity. It is important to note that the HDPE pipe is not subject to a corrosion related failure based on the material of the pipe. Also, the pipe does not carry abrasive ash at a high enough velocity to cause erosive depletion in the wall thickness. This 24" outlet pipe has a location, configuration and surrounding dike soil conditions that do not lend themselves to a seepage type of failure. As background, in 1992, the 24" outlet, which connects to a 24" HDPE pipe that discharges in the acid basin located in the northeast tip of the north section of the impoundment, was added to allow drying and grading of the northern portion of the pond to reduce pond maintenance.

The embankment soil throughout the dike is a well compacted, very stiff, medium plasticity clay. The stability of the East Ash Pond embankment section at the south main outlet (Cross Section C-C, "CCR Rule Report: Initial Structural Stability Assessment for the East Ash Pond at the Joppa Power Station") had calculated factors of safety of 1.77, (§ 257.73(e)(1)(i) Minimum FS = 1.50), 1.71 (§ 257.73(e)(1)(ii) Minimum = 1.40) and 1.26 (§ 257.73(e)(1)(iii) Minimum = 1.00). The inspection history does not reveal any seepage throughout the entire embankment, including at the south section outlet. The soil type does not meet the criteria to be susceptible to concentrated leak erosion, backward erosion piping, or any other internal erosion process that would result from the low water head and velocity that exists around the south outlet discharge through the embankment (USBR-USACE (US Bureau of Reclamation–US Army Corps of Engineers), 2015. "Best Practices in Dam and Levee Safety Risk Analysis."; USACE, 2014. ER 1110-2-1156, "Safety of dams–Policy and procedures. Engineering and Design"; Briaud, Jean-Louis. "Case histories in soil and rock erosion: Woodrow Wilson bridge, Brazos River Meander, Normandy Cliffs, and New Orleans Levees." Journal of Geotechnical and Geoenvironmental Engineering 134, no. 10 (2008): 1425-1447.).

Please let me know if you have any questions.

Sincerely,

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