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17 October 2018

Kansas City Board of Public Utilities
540 Minnesota Avenue
Kansas City, KS 66101

Attention: Ingrid Setzler, Director of Environmental Services

Subject: Bottom Ash Surface Impoundment Location Restriction §257.64 Unstable Areas

Conclusion:

The Bottom Ash Surface Impoundment at the Nearman Creek Power Station, Per CCR Rule §257.64, is not within an unstable area.

Unstable Areas Evaluation:

According to the CCR Rule §257.53, an unstable area is a location that is susceptible to natural or human induced events or forces capable of impairing the integrity, including structural components of some or all of the CCR impoundment.

Black & Veatch reviewed subsurface information from previous geotechnical reports for the impoundment and existing power station. According to the reports, the impoundment lies within the Missouri River alluvial valley. The geologic setting of the area is generally Quaternary alluvial sands, gravels and cobbles overlain by recent deposits of clay and silts (McCauley, 1999). Previous subsurface investigations identified shale bedrock beneath the alluvial deposits at a depth of about 110 to 125 feet below grade. Based on the geologic setting of the impoundment, Black & Veatch evaluated the following potential stability issues for the impoundment;

- Foundation bearing and settlement
- Karst terrain
- Swelling soils
- Collapsible soils
- Mass Movement /Landslides
- Land subsidence

The conclusions of this evaluation are based on the following references:

1) Jewett, J.M., and N.D. Newell, Geology of Wyandotte County, Kansas, Kansas Geological Survey Bulletin 21, Part II, 1935. http://www.kgs.ku.edu/General/Geology/Wyandotte/index.html
2) McCauley, J.R., Geologic Map of Wyandotte County, Kansas, Kansas Geological Survey, Map M-58, scale 1;50,000, 1999 http://www.kgs.ku.edu/General/Geology/County/tw/wyandotteLarge.html

3) Ohlmacher, G.C., Landslides in Kansas, Kansas Geological Survey, Public Information Circular 13, http://www.kgs.ku.edu/Publications/pic13/pic13_1.html
4) Sabatini, P.J., Bachus, R.C., Mayne, P.W., Schneider, J.A., and T.E. Zettler, Evaluation of Soil and Rock Properties, Federal Highway Administration, Geotechnical Engineering Circular No. 5, April 2002.
5) Tobin B.D., and Weary, D.J. Digital Engineering Aspects of Karst Map: A GIS Version of Davies, W.E., Simpson, J.H., Ohlmacher, G.C., Kirk, W.S., and Newton, E.G., 1984, Engineering Aspects of Karst: U.S. Geological Survey Open-File Report 2004-1352, 2004 https://pubs.usgs.gov/of/2004/1352/

Foundation Bearing and Settlement

Black & Veatch reviewed subsurface information from previous geotechnical reports for the impoundment. According to these reports, the foundation conditions for the impoundment generally consist of native low plasticity silt, silty sand and sand soil. Based on the annual inspections, there have been no signs of settlement or bearing capacity issues reported for the impoundment.

Karst Terrain

Karst hazards are present in select geologic units in Kansas due to the presence of carbonate rocks and evaporates (e.g., salts); however, the USGS indicates the impoundment is not in an area with significant subsurface fissures or caves (Tobin & Weary, 2004). Shale bedrock was identified during previous subsurface investigations. The presence of shale bedrock beneath the site does not indicate karst.

Swelling Soils

Swelling soils are found throughout the United States, however, foundation damage due to swelling clays is more common in semi-arid climates where prolonged periods of wetting and drying of the soil results in cycles of shrinking and swelling. These prolonged dry periods may result in desiccation crack formation that allows subsequent wetting of the cracks during precipitation. This mechanism is most problematic in high plasticity, stiff, fissured overconsolidated clays near the ground surface (Sabatini et al., 2002).

Subsurface information from previous geotechnical reports for the impoundment indicate that the foundation soils are native low plasticity silt, silty sand, and sand soil, which are not considered swelling soils.

Collapsible Soils

Loess or similar potentially collapsible soils were not identified within the impoundment area (Jewett, & Newell, 1935). The risk of collapsible soils is negligible.

Mass Movement/Landslides

Wyandotte County is identified as a landslide prone area with moderate risk (1.5 to 15 percent of the area is landslide prone) and includes the Missouri River corridor (Ohlmacher, 1999). These landslide prone areas are generally located in the hills and bluffs south of the impoundment where the topography becomes steeper. The impoundment is located within the level topography within the alluvial valley; therefore, the risk for mass movement or landslides at the impoundment is negligible.

Land Subsidence

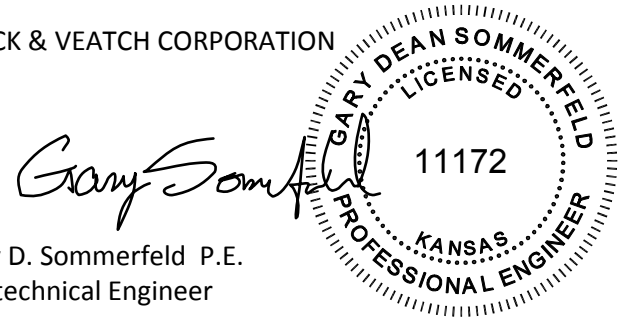
Land subsidence at the impoundment due to groundwater pumping or karst is negligible. The alluvial aquifer is primarily composed of sands and gravels that will not produce long term consolidation due to groundwater withdraw.

Certification Statement

This evaluation meets the requirements of CCR Rule paragraph (a) §257.64 Unstable area.

Very truly yours,

BLACK & VEATCH CORPORATION



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10/17/2018

cc: File
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