CCR Rule – Siting Criteria
§257.64 Unstable Areas

Dave Johnston Power Plant – Unit 0 Pond

Prepared by:

Water & Environmental TECHNOLOGIES

Prepared for:

PACIFICORP

Dave Johnston Power Plant

November 2019

PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify, as a Professional Engineer in the State of Wyoming, that the information in this document was assembled under my direct supervisory control. This report is not intended or represented to be suitable for reuse by PacifiCorp or others without specific verification or adaptation by the Engineer.

I hereby certify as a Professional Engineer in the State of Wyoming that this report has been prepared in accordance with, and meets the requirements of, 40 Code of Federal Regulations §257.64 – Unstable Areas. The Dave Johnston Power Plant Unit 0 Pond meets location criteria for Unstable Areas.

Britt Siddoway

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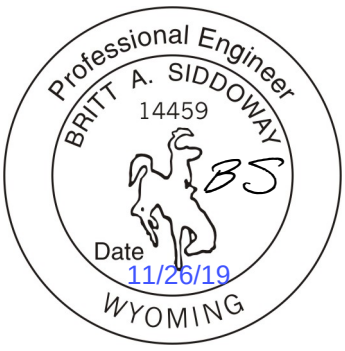
Britt Siddoway, P.E.

11/26/2019
Date



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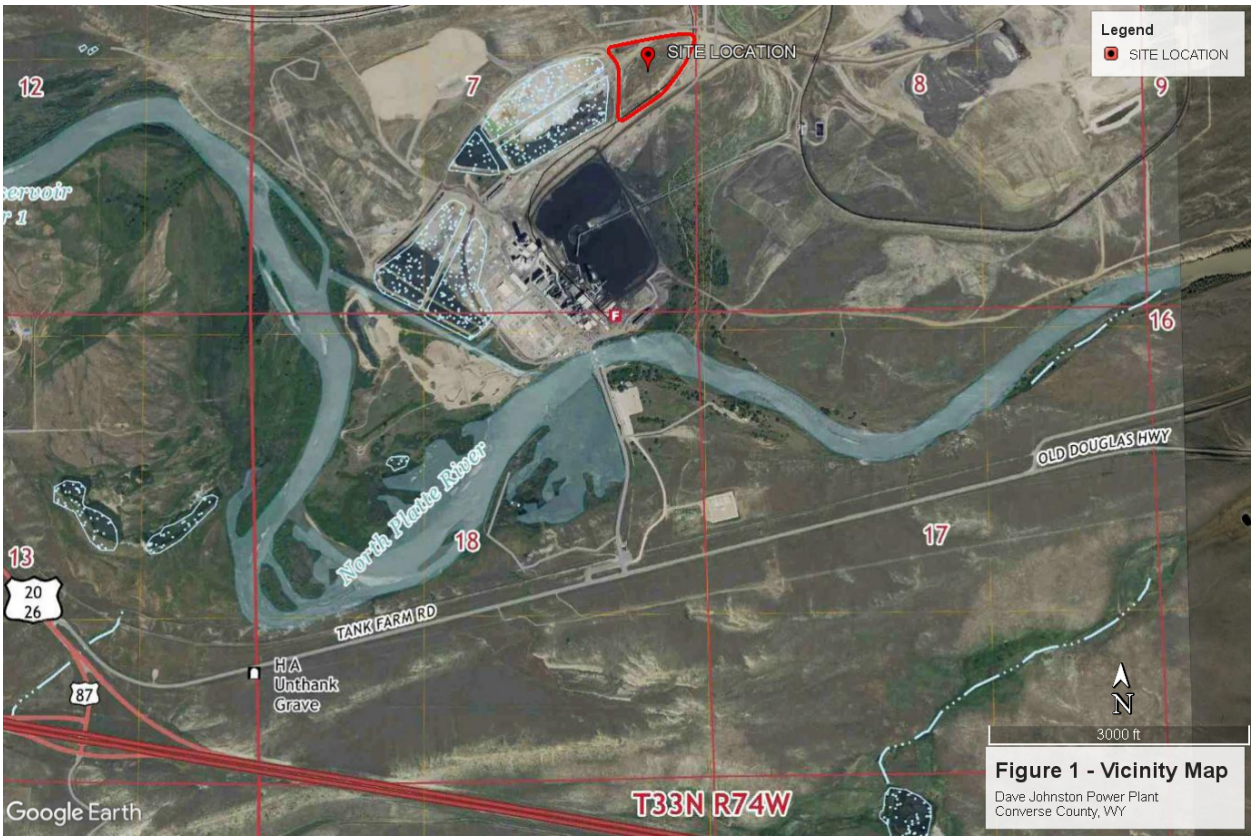
1.0 INTRODUCTION

The Dave Johnston Power Plant is a four-unit coal-fired electrical generation plant owned by PacifiCorp located approximately 5 miles southeast of Glenrock, Wyoming in Converse County. The physical location of the Dave Johnston Power Plant is Section 7, Township 33 North, Range 74 West in Converse County, Wyoming. The approximate coordinates of the Unit 0 Pond are 42°50'43"N and 105°46'24"W. Figure 1 shows a vicinity map of the Unit 0 Pond's location.

Figure 1. Site Location Map



This report addresses the requirements of §257.64 – Unstable Areas that state "An existing or new CCR landfill, existing or new CCR surface impoundment, or any lateral expansion of a CCR unit must not be located in an unstable area unless the owner or operator demonstrates by the dates specified in paragraph (d) of this section that recognized and generally accepted good engineering practices have been incorporated into the design of the CCR unit to ensure that the integrity of the structural components of the CCR unit will not be disrupted."

Unstable areas, per §257.53 – Definitions, are defined as locations that are "… susceptible to natural or human-induced events or forces capable of impairing the integrity, including structural components of some or all of the CCR unit that are responsible for preventing releases from such unit. Unstable areas can include poor foundation conditions, areas susceptible to mass movements, and karst terrains."

2.0 EXISTING CONDITIONS

The Unit 0 Pond is a single CCR unit consisting of two operating cells that store bottom ash generated from the production of electricity at the Dave Johnston Power Plant. Bottom ash is pumped to the Unit 0 Pond where the bottom ash and other large particles settle out. Decant water is conveyed out of the Unit 0 Pond through concrete riser structures located in each cell and a buried polyethylene pipeline that discharges into the Clearwater Pond. Decant water is then pumped back to the plant for reuse or is eventually discharged to the North Platte River under NDPES Permit. No. WY0003115.

The Unit 0 Pond is mostly incised (constructed below-grade) within a localized low-lying area east of the current Ash Pond. The cells within the Unit 0 Pond are separated by a 30-foot wide intermediate dike that spans approximately 600 feet east to west. The southeastern, southern, and southwestern portions of the pond is bounded by a 20-ft wide dike that is approximately 700 feet long with heights ranging between 0 to 6 feet above the existing grade.

3.0 SITE GEOLOGY

The Dave Johnston Unit 0 Pond is in an area of alluvial units that are underlain by the upper Cretaceous Lance Formation. The Lance is composed of shale and sandstone in the study area. The top several feet of the Lance has weathered into a clay or silt material. The irregular topography of the Lance was formed by the interaction of erosional activity of the North Platte River and the variability in consolidation in the Lance Formation.

The surface topography of the bedrock was modified by the various erosional and depositional stages of the North Platte River. On top of the bedrock, the river has deposited a classic alluvial sequence of upward fining sediments. The degree of sorting within the alluvial deposit is dependent on the stage of the river. During the early Pleistocene, deposition occurred under high-energy conditions resulting in a poorly sorted deposit. Lower energy meandering of the river during the middle to late Pleistocene resulted in a deposit that is well sorted with visible contacts between depositional sequences.

Aeolian deposits are common on the surface along the northern site border. However, the windblown sand, characterized by frosted sand grains, has been reworked and deposited in an alluvial (well sorted) sand sequence. In addition, Sand Creek has formed an alluvial deposit which dissects the site from north to south and forms a subsurface channel of outwash sand and gravel. Well logs and water chemistry data, indicate the Sand Creek channel overlays the Lance shale at the Dave Johnston Plant. Well logs for the detection monitoring network are included in the site-specific sampling analysis plan for the Unit 0 Pond, which is part of the facility operating record.

4.0 UNSTABLE AREA DETERMINATION

§257.64(b) requires the following factors, at a minimum, be considered when determining whether an area is unstable;

(1) On-site or local soil conditions that may result in significant differential settling;

(2) On-site or local geologic or geomorphologic features; and
(3) On-site or local human-made features or events (both surface and subsurface).

4.1 §257.64(b)(1) - Local Soil Conditions

Soils within the Unit 0 Pond site can be described as clayey sand, sandy clay, and sand in very loose or medium stiff to very dense or hard conditions. Sandy soils within the area are considered very loose to very dense, while clayey soils are considered medium stiff to stiff based on standardized blow counts conducted during the site geotechnical investigation. Moderately cemented, fine-grained sandstone underlies the soils at an approximate depth of forty-five (45) feet.

The underlying foundation soils are estimated to have a settlement potential of up to thirteen (13) inches (Advanced Geotechnical Solutions, 2019). However, most of this anticipated settlement likely occurred during the construction of the embankment fills. Therefore, substantial long-term settlement of the foundation soils from embankment loading is not likely to be significant. The interior portions of the pond may experience differential settlement estimated to be up to eight (8) inches during the maximum loading conditions anticipated at the end of the design life (Advanced Geotechnical Solutions, 2019). Both settlement conditions are within the design parameters of the alternate composite liner system which is designed to accommodate sixteen (16) inches of settlement with appropriate factors of safety (Water & Environmental Technologies, 2019).

An analysis was performed as part of the initial geotechnical report to determine if poor foundation conditions could occur due-to liquefaction resulting from a substantial seismic event. Additional soil samples in the project area were sent to a lab to perform more specialized testing to determine liquefaction potential. The results of the testing indicated that the saturated sands did not liquefy. This displacement was reported to be approximately twelve (12) inches with no surcharge loading conditions. The report noted that the testing conditions in which this result was achieved was a worse-case scenario (Lein, 2019). Silty sands at the site showed liquefaction potentials when saturated and no loading surcharge is present. However, the addition of a 1,580 pounds per square foot (psf) embankment surcharge load on the foundation soils will add enough downforce to mitigate the liquefaction potential of these soils (Lein, 2019). Therefore, a poor foundation condition would not be anticipated under embankment loading. The alternate composite liner system is designed to accommodate this settlement with appropriate factors of safety (Water & Environmental Technologies, 2019).

4.2 §257.64(b)(2) - Local Geologic or Geomorphic Features

There are no local geologic or geomorphic features that would classify the Unit 0 Pond area as unstable. The area is not susceptible to mass movements, nor are any karst terrains present.

4.3 §257.64(b)(3) - Local Human-Made Features or Events

There are no local human-made features or events that would classify the Unit 0 Pond area as unstable.

5.0 CONCLUSIONS

The local soil conditions exhibit potential for varying amounts of settlement. However, the estimated potential settlement across the site is not anticipated to be significant enough to impact the integrity of the structural components of the Unit 0 Pond.

Since generally accepted good engineering practices have been incorporated into the design of the Unit 0 Pond, the Unit 0 Pond meets the requirements of §257.64 – Unstable Areas for a new CCR surface impoundment.

SOURCES

Advanced Geotechnical Solutions. (2019). *§257.74(e) Initial Factor of Safety Assessment - Dave Johnston Power Plant Unit 0 Pond.*

Lein, W. A. (2019). *Wyoming Centrifuge Liquefaction Assessment.* Hanover (NH): US Army Corps of Engineers - Engineer Research and Development Center - Cold Regions Research and Engineering Laboratory.

United States Environmental Protection Agency. (2019, October 3). *Electronic Code of Federal Regulations Title 40: Protection of Environment*. Retrieved from Subpart D - Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments: https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=d9f88caf5abc14afbcaf5fa368cf0f82&mc=true&n=pt40.27.257&r=PART&ty=HTML#se40.27.257_163

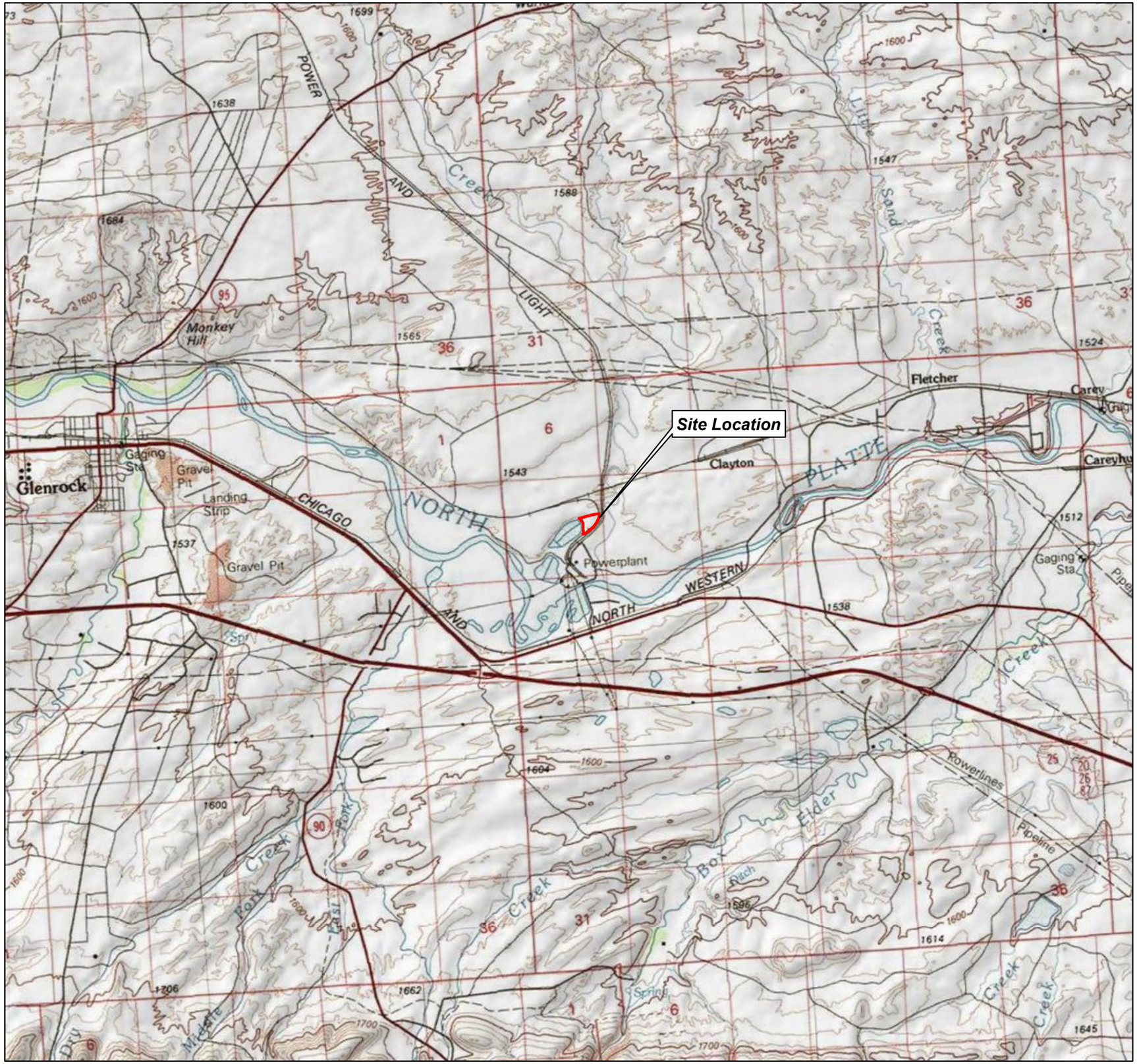
Water & Environmental Technologies. (2019). *Dave Johnston Power Plant Unit 0 Pond Project.*

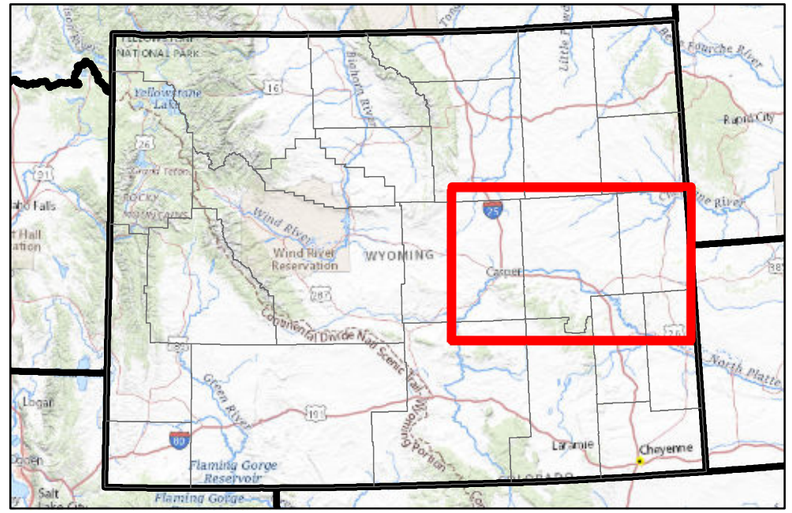
REVISIONS

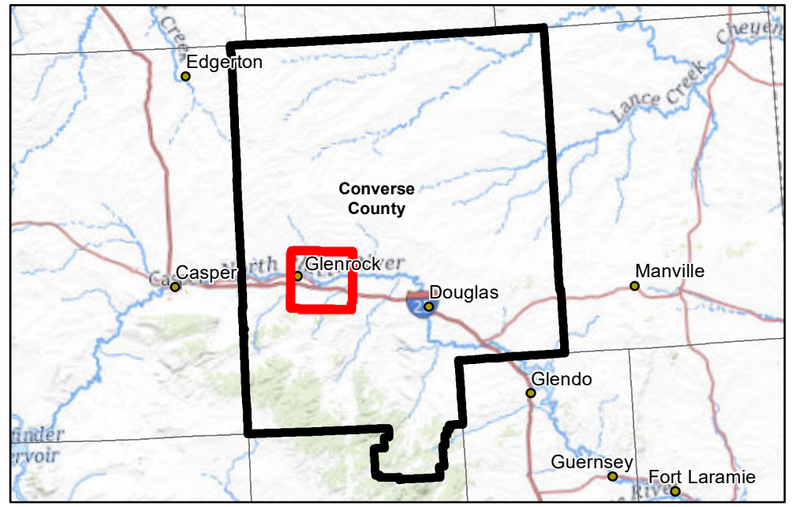
Revision Number	Date	Revision Made (description)	By:
0	11/1/2019	Initial Issue	WET
1	11/26/2019	Revised and re-issued	WET

APPENDIX A

Site Maps







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DAVE JOHNSTON POWER PLANT

Unit 0 Pond - Site Location Map

Job#: PERC 105

Date: 11/22/2019

FIGURE 1

Path: M:\PERCM105 - DJPP Unit 0 Pond Construction\GIS\Figure 1 - Unit 0 Pond - Site Location Map.mxd, Author: