TECHNICAL MEMORANDUM

DATE October 10, 2018 **Project No.** 18107517

TO Jeff Jones
Luminant Generation Company LLC

FROM Patrick J. Behling, P.E.

LUMINANT GENERATION COMPANY LLC
CCR RULE LOCATION RESTRICTION DEMONSTRATION
BIG BROWN STEAM ELECTRIC STATION – FREESTONE COUNTY, TEXAS
ASH DISPOSAL AREA II

Luminant Generation Company LLC (Luminant) formerly operated the Big Brown Steam Electric Station (BBSES) located approximately 10 miles northeast of Fairfield, Freestone County, Texas. The BBSES consisted of two coal/lignite-fired units with a combined operating capacity of approximately 1,150 megawatts. Coal Combustion Residuals (CCR) including fly ash, bottom ash and boiler slag were generated as part of BBSES unit operation. The BBSES suspended operations in early 2018.

The U.S. Environmental Protection Agency's (EPA's) entitled *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities* (CCR Rule) has established technical requirements for CCR landfills and surface impoundments (See 80 Fed. Reg. 21,302 (Apr. 17, 2015); 83 Fed. Reg. 36,435 (July 30, 2018)). The following landfill at the BBSES has been identified as an Existing CCR Landfill regulated under the CCR Rule:

- Ash Disposal Area II.

Ash Disposal Area II (ADA II) is located approximately 4,000 feet northeast of the BBSES power plant (Figure 1). Golder Associates Inc. (Golder) was retained by Luminant to evaluate ADA II against the applicable location restriction criterion for existing CCR landfills described in Section 257.64 of the CCR Rule. This memorandum sets forth Luminant's location restriction demonstration and corresponding certification required by the CCR Rule.

LOCATION RESTRICTION DEMONSTRATION – SUMMARY OF FINDINGS/CONCLUSIONS

This location restriction demonstration concludes that ADA II satisfies the CCR Rule location restriction criterion for existing CCR landfills (unstable areas). ADA II was determined to not be located in an Unstable Area in accordance with §257.64.

A professional engineering certification for the subject location restriction evaluations is included as part of this memorandum.

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MEMORANDUM ORGANIZATION

The memorandum is organized as follows:

SECTION 1.0 - Location Restriction Criterion & CCR Unit Description

SECTION 2.0 - Unstable Areas

SECTION 3.0 - Limitations

SECTION 4.0 - Professional Certification

FIGURE 1 – Site Plan – Ash Disposal Area II

SECTION 1.0 Location Restriction Criterion & CCR Unit Description

LOCATION RESTRICTION CRITERION

Existing CCR Landfills must comply with the Unstable Areas location restriction described in Section 257.64 of the CCR Rule. The CCR Rule requires that the CCR Landfill owner or operator certify that the CCR Unit meets the specified location restriction requirements by October 17, 2018 for continued operation of the CCR Unit.

CCR UNIT DESCRIPTION

ADA II received bottom ash, fly ash and related wastes from the BBSES and is considered an existing CCR Landfill under the CCR Rule. ADA II consists of ten landfill cells that have received CCR and related wastes (Cells 1 through 10) and one landfill cell that has been constructed but not yet used (Cell 11). Future landfill cells (Cells 12 through 20) were planned to the west of Cells 1 through 11, but these cells have not been constructed. ADA II was registered with the TCEQ as a Class 2 non-hazardous industrial waste landfill in 1986 under SWR No. 30080 and the landfill registration was amended in 2009 to include Cell 11 and future Cells 12 through 20.

ADA II is constructed partially above and partially below grade and is surrounded by engineered earthen dikes that extend approximately 10 to 15 feet above surrounding grade. Cells 1 through 5 were constructed in sequence beginning in approximately 1987 and Cells 6 through 11 were constructed in sequence beginning in approximately 1992. Cells 1 through 11 are constructed with a 3-foot thick compacted clay liner.

The majority of the surface areas of Cells 1 through 8 have been covered with either a permanent clay cap or a temporary soil cap. Small portions of Cells 1, 2, 3 and 8 and all of Cells 9 and 10 have not been covered. Cell 11 was used to manage contact water from the ADA II area; however, CCR was not placed in Cell 11.

Section 2.0 Unstable Areas

Section 257.64(a) of the CCR Rule states:

a) *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.*

Section 257.53 of the CCR Rule defines unstable area as follows:

- Unstable area: 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 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.
- Poor Foundation Conditions: those areas where features exist which indicate that a natural or human-induced event may result in inadequate foundation support for the structural components of an existing or new CCR unit.
- Areas Susceptible to Mass Movement: those areas of influence (i.e., areas characterized as having an active or substantial possibility of mass movement) where, because of natural or human-induced events, the movement of earthen material at, beneath, or adjacent to the CCR unit results in the downslope transport of soil and rock material by means of gravitational influence. Areas of mass movement include, but are not limited to, landslides, avalanches, debris slides and flows, soil fluctuation, block sliding, and rock fall.
- Karst terrain: an area where karst topography, with its characteristic erosional surface and subterranean features, is developed as a result of dissolution of limestone, dolomite, or other soluble rock. Characteristic physiographic features present in karst terrain include, but are not limited to, dolines, collapse shafts (sinkholes), sinking streams, caves, seeps, large springs, and blind valleys.

Under § 257.64(b), the following factors must be considered when determining whether an area is unstable:

- on-site or local soil conditions that may result in significant differential settling;
- on-site or local geologic or geomorphic features; and
- on-site or local human-made features or events (both surface and subsurface).

Golder reviewed investigation reports presenting the results of soil geotechnical investigation activities performed at ADA II in 1986 and 1992. The investigations concluded that soils beneath the landfill area generally consisted of interbedded layers of stiff to very stiff silty sand, sand, sandy silt, clayey sands, silty sands and clay and were stable and suitable for construction of the landfill. As a result, ADA II is not located in an unstable area as defined in the CCR Rule.

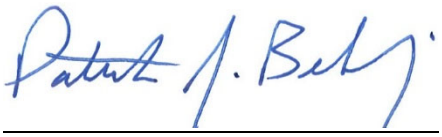
Section 3.0 Limitations

In preparing this evaluation, Golder has reviewed historic, design and investigative information and other data furnished by Luminant. Golder has relied on this information in completing the location restriction evaluations for ADA II.

The conclusions presented in this memorandum assume that subsurface site conditions in the vicinity of ADA II reasonably match those conditions associated with site borings, laboratory testing results, etc. The reported conclusions are also based on our understanding of current site operations, maintenance and CCR management practices at the BBSES at the current time as provided by Luminant.

Section 4.0 Professional Certification

I, Patrick J. Behling, being a Registered Professional Engineer in good standing in the State of Texas, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this CCR Rule Location Restriction Demonstration has been prepared in accordance with the accepted practice of engineering. I certify that the CCR Unit described in this report and as explained further in the CCR Rule Location Restriction Evaluation – Big Brown Steam Electric Station Ash Disposal Area II, Golder Associates Inc. October 10, 2018, meets the requirements of 40 CFR Section 257.64.



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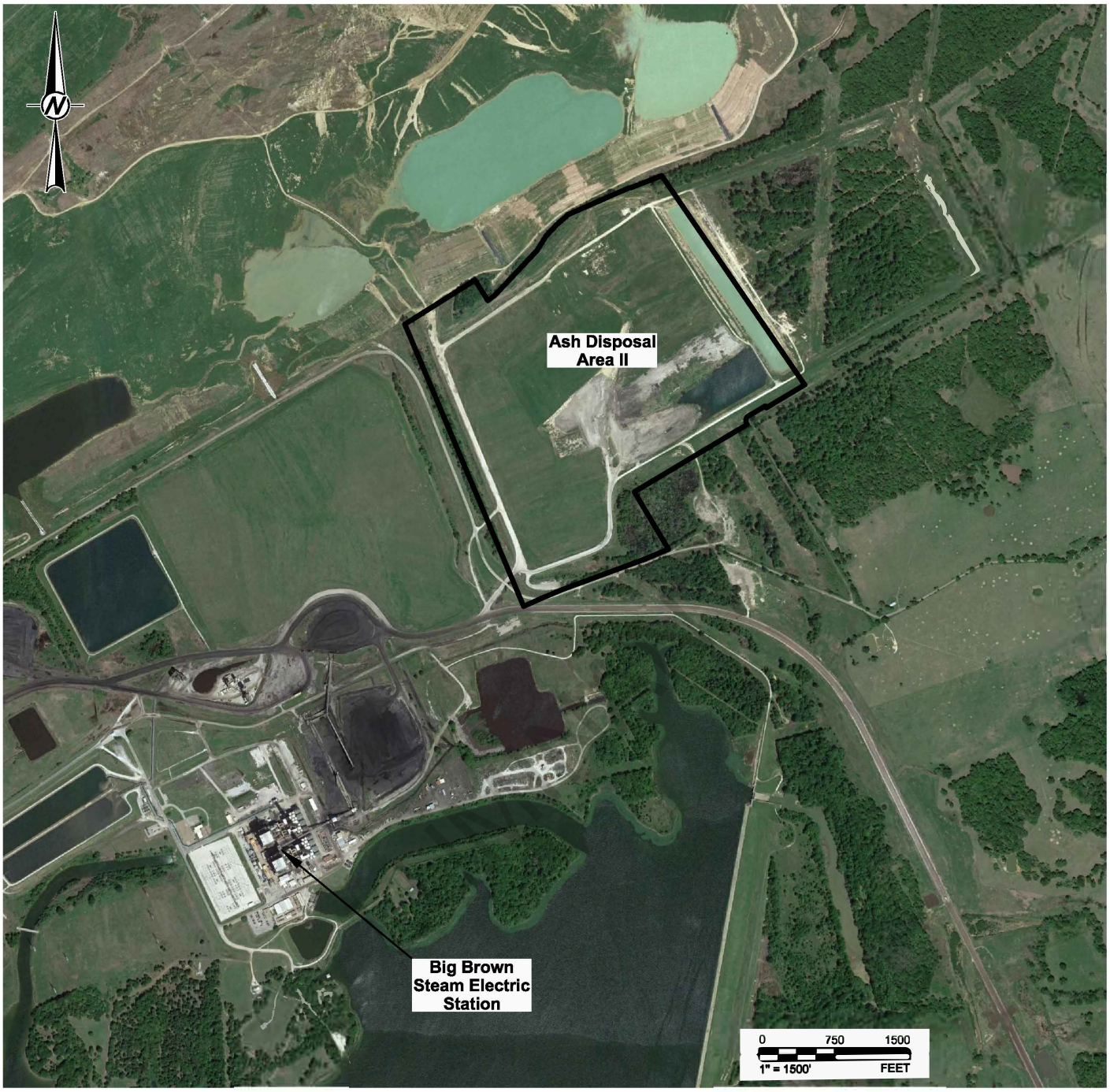
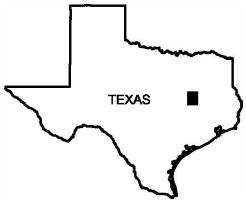
Figures





PHOTOGRAPH LOCATION

REFERENCE(S)
IMAGERY FROM GOOGLE EARTH DATED 03/30/2017.

CLIENT
LUMINANT GENERATION COMPANY LLC

PROJECT
BIG BROWN STEAM ELECTRIC STATION
ASH DISPOSAL AREA II
CCR RULE LOCATION RESTRICTION DEMONSTRATION

TITLE
SITE PLAN

CONSULTANT
GOLDER

YYYY-MM-DD	2018-10-12
DESIGNED	BZH
PREPARED	BZH
REVIEWED	PJB
APPROVED	PJB

PROJECT NO.	REV.	FIGURE
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