ANNUAL ASH MONOFILL INSPECTION REPORT

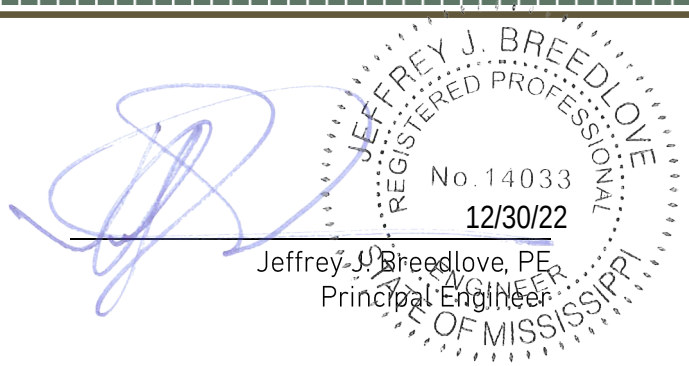
Red Hills Generation Facility AMU
Ackerman, Mississippi

December 30, 2022
Promus Project No. 190168

Prepared for:
Choctaw Generation Limited Partnership, LLLP (CGLP)

Prepared by:

PROMUS ENGINEERING



12/30/22

Jeffrey J. Breedlove, PE
Principal Engineer

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December 30, 2022

Choctaw Generation Limited Partnership, LLLP
2391 Pensacola Road
Ackerman, MS 39735

ATTN: Mr. Jim Ward

RE: Annual Inspection
Red Hills Generation Facility AMU and AMU Basin

Dear Mr. Ward:

As requested, we have completed the required annual inspection to meet the requirements of 40 CFR §257.84(b). This work was performed in accordance with our proposal dated April 22, 2019.

Thank you for the opportunity to work with CGLP in service to this facility. Should you have any questions or comments, please contact either of us via phone at (888) 811-9066 or email at jbreedlove@promusengineering.com.

Sincerely,
PROMUS ENGINEERING, LLC

Jeffrey J. Breedlove, PE
Principal Engineer

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Red Hills Generation Facility Ash Management Unit
Ackerman, Mississippi

1. INTRODUCTION AND OVERVIEW

1.1. Objective

Per the Coal Combustion Residual (CCR) Rule published by the United States Environmental Protection Agency (USEPA) and entered into the Federal Register on April 17, 2015 (40 Code of Federal Regulations [CFR] 257.84 (b)), existing and new CCR landfills (including any lateral expansion of a CCR landfill) are required to be inspected annually by a qualified professional engineer to establish that the CCR unit is in good condition and that the design, construction, operation, and maintenance conform to standard engineering practices for this type of facility. The inspection includes review of documentation and weekly reports indicating the condition of the facility, and a visual inspection of the CCR unit. The CCR rule is a self-implementing rule which regulates the handling and disposal of CCRs as non-hazardous solid waste under Subtitle D of the Resource Conservation and Recovery Act (RCRA). The objective of this report prepared by Promus Engineering, LLC on behalf of Choctaw Generation Limited Partnership, LLLP (CGLP) is to present the results of the annual inspection of the ash monofill at the Red Hills Ash Management Unit (AMU), conducted in October 2022 per the CCR Rule established by the USEPA.

1.2. Outline of Rule Requirements

In accordance with the USEPA Final CCR Rule, Promus was retained to perform an annual inspection "To ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards." The minimum requirements, as per §257.84(b) of the USEPA Final CCR Rule include the following:

- A review of available status and condition information including operational records and previous inspections,
- A visual inspection for signs of distress or malfunction, and
- Preparation of an inspection report.

The inspection (described below, within Section 3 of this report) was the annual inspection performed by Promus designed to address the items listed below, pursuant to §257.84(b)(2) of the USEPA Final CCR Rule:

(i) Any changes in geometry of the structure since the previous annual inspection;
(ii) The approximate volume of CCR contained in the unit at the time of the inspection;
(iii) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit; and

(iv) Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.

1.3. Facility Description

The CCR landfill (ash monofill or monofill) at the Red Hills Generation Facility (RHGF) is a permitted industrial waste landfill as permitted and regulated by the Mississippi Department of Environmental Quality (MDEQ). The permittee is Choctaw Generation Limited Partnership, LLLP and the facility was constructed and operates according to MDEQ permit SW0100040462.

The AMU is permitted as five (5) landfill cells for a total of approximately 150 acres. To date, Cells 1, 2 and 3 have been constructed for a total of about 64 acres of disposal area. CCR waste has been placed in all three cells to an approximate elevation of El. 580 ft MSL. The waste is graded to the top deck elevation with 4(H):1(V) side slopes with the most prominent slopes on the north and east sides of the landfill.

Cells 1 and 2 of the AMU was constructed on the southern side of the permitted area and was constructed with a composite liner system consisting of a compacted clay liner and a geomembrane liner. The bottom of waste subgrades were designed to closely follow natural grade and thus significant excavation was not required for cell construction. A sump system was also constructed during the Cells 1 and 2 construction. Leachate is conveyed to the sump via a drainage medium and leachate collection pipes. The leachate gravity drains to the AMU Basin where it is mixed with stormwater and recycled for ash hydration, or dust control, or it is pumped to the cooling towers for augmenting the cooling tower liquids.

Cell 3 was constructed with an earthen compacted clay liner ($k \leq 1x10^{-7}$ cm/sec) bottom liner system and was constructed north and east of Cells 1 and 2. The Cell 3 leachate collection system drains to the leachate collection sump for leachate discharge to the AMU Basin or the cooling towers.

A stormwater sedimentation and detention basin was constructed to manage stormwater, the AMU Basin. The AMU basin is situated on the north side of the AMU, immediately adjacent to the AMU. The approximate 4.7-acre AMU Basin is lined with an 18-inch compacted clay liner ($k \leq 1x10^{-7}$ cm/sec) overlain by a 60-mil HDPE geomembrane liner. A perimeter drainage system conveys stormwater run-off from the AMU to the AMU Basin. Likewise, run-on control stormwater conveyances were constructed on the south and east sides of the landfill and convey stormwater around the landfill and discharge north of the AMU Basin.

In 2021, a temporary exposed geomembrane cover was designed and constructed along with regrading and repair of the landfill perimeter drainage ditch and the construction of additional non-contact perimeter stormwater conveyances for stormwater that contacts the exposed geomembrane cover and does not contact ash waste. Approximately 34 acres of the eastern portion of the landfill were covered with the exposed geomembrane cap. The ash in the area that received the cap was re-graded to promote drainage and the exterior slopes were fine-graded and smoothed to remove erosion rills and provide a smooth subgrade for installation of the geomembrane. An under-cap drainage system was constructed in the landfill perimeter drainage ditch to convey contact water conveyance to the AMU Basin beneath the temporary geomembrane that was also placed in the perimeter ditch for conveyance of non-contact stormwater to a clean-water discharge

detention basin. The temporary cap was expanded an additional 12 acres on the top deck of the landfill in 2022, bringing the total area covered with exposed geomembrane cap at approximately 46 acres.

1.4. Solid Waste Stream

The solid wastes generated at RHGF are a result of the combustion of lignite coal and the cleaning of the flue gas produced by the combustion (FGC waste). The AMU accepts the CCR waste from the RHGF. Any municipal solid wastes produced at the facility is exported to a regional permitted municipal solid waste landfill. The RHGF burns lignite coal and other combustibles to heat fluidized bed boilers to produce steam to drive turbines to produce power. As such, the AMU receives ash and coal combustion residuals from the facility.

2. REVIEW OF EXISTING INFORMATION

In accordance with the USEPA Final CCR Rule §257.84(b)(i), Jeffrey J. Breedlove, PE (a professional engineer with Promus) completed "A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g., the results of inspections by a qualified person, and results of previous annual inspections)." The available information reviewed included previous inspection reports for the last three years, permit application documents, construction records and documents, and as-built and periodic waste mass topographic surveys.

3. ANNUAL INSPECTION SUMMARY

The annual inspection was conducted on Tuesday, October 22, 2022, starting at 1:30 p.m. central standard time by Mr. Jeffrey J. Breedlove, PE. The weather was clear and sunny, approximately 70 degrees Fahrenheit with little breeze. The completed Federal CCR Annual Inspection form used during the inspection is appended as Attachment 1.

3.1. Strategy and Route

The general strategy and route of the inspection included a driving inspection of the monofill along the perimeter of the top deck and along the lower perimeter road, followed by a general walkover of Cells 1 through 3 and the AMU Basin. The walk started at the south side of the top deck in the area where a temporary geomembrane had been constructed. The walk then proceeded to the west side of the AMU Basin and progressed east around the basin, traversing up and down the north slope of the landfill. The walk then progressed to the west and south around the perimeter slopes inspecting the perimeter ditch and the top of slope crest and top deck of the landfill. The entire slope around to the south side of the landfill was traversed and inspected. The run-on conveyances that are situated south of the landfill and convey stormwater around the landfill to the east and north were also walked. The top deck of the landfill was primarily inspected by driving around the top deck and making frequent stops to walk the areas, with significant attention to the edges of the top deck near the crest of the 4:1 slopes.

The AMU Basin was also inspected by walking around the basin and inspecting the condition of the geomembrane liner and inlets and outlets for the basin. Photographs were taken of the landfill and basin to document conditions and findings.

3.2. Facility Conditions

In general, the AMU at Cells 1, 2, and 3 is well organized and generally well maintained. The active working area of the landfill is situated on the north-western side of the top deck and the active area is contained to an approximate 10 to 15-acre area. The waste is graded to promote drainage to areas where stormwater can be controlled and conveyed to the AMU Basin. The dust suppression sprinkler system in the active area had been de-constructed to facilitate construction of the temporary geomembrane cap. A construction project had been completed to install a temporary geomembrane cover over a portion of the southern top deck of the AMU and on the south and east slopes of the landfill.

The waste mass was graded in general accordance with the permitted final grades. Most of the exterior slopes of the landfill on the south, east, and north slopes had been covered with an exposed geomembrane cap covered with WindDefender® geosynthetic. The western half of the north slope and the west slopes had not been covered with geomembrane. The exposed waste was not covered with a daily cover soil or other cover materials as allowed by the permit. As such, erosion rills and minor washes were observed in the 4:1 portion of the waste slopes not covered with geomembrane.

3.3. Geometry of Monofill

As required by §257.84(b)(2)(i), no significant changes in geometry were noted from those reported in previous annual inspection documentation reviewed by Promus. The permit documents indicate that the general finished slope configuration should be at 4H:1V. This appears to be the case on the perimeter slopes on the north, east, and southeast sides of the landfill. Some localized areas exist in the active portion of the landfill where slopes exceed 4:1 but these slopes are considered intermediate and will change upon final grading and filling of the landfill.

3.4. Approximate Volume

Placed and remaining waste volumes were determined from landfill topographic surveys performed by Calvert-Spradling Engineers, Inc. The following table provides the consumed and available airspace since 2019.

SUMMARY OF LANDFILL VOLUMES		
As of Date	Total Airspace Consumed (CY)	Total Airspace Available (CY)
December 2019	-	3,480,740
December 2020	5,466,600	3,460,400
December 2021	5,520,130	3,406,870
December 2022	5,583,027	3,343,957

3.5. Structural Inspection

There was no observed structural weakness of the CCR monofill unit, nor any existing conditions that are disrupting or have the potential to significantly disrupt the operation and safety of the CCR unit, per CCR Regulation Section §257.84(b)(2)(iii).

3.6. Additional Changes

The ash monofill and appurtenant structures (AMU Basin) did not show any signs of major distress or malfunction other than indicated herein, per CCR Regulation Section §257.84(b)(1)(ii). Promus did not observe any other changes which may affect the stability or operation of the monofill per CCR Regulation Section §257.84(b)(2)(iv).

4. CONCLUSIONS AND RECOMMENDATIONS

As noted in the CCR Rules §257.84(b)(5), "If a deficiency or release is identified during an inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken." The previously observed potential deficiency (erosion to the perimeter stormwater conveyance system) was mitigated during the construction of the temporary exposed geomembrane cap as discussed previously in this report. The temporary cap and drainage improvements appeared to be functioning as designed. No structurally significant deficiencies were identified during the inspection.

4.1. Recommendations Other Than Normal Maintenance

The inspection resulted in no recommendations for maintenance beyond normal regular maintenance and the planned mitigation of the perimeter ditches and slopes. We understand that CGLP will reconstruct a portion of the ash sprinkler system in the active waste area as needed to control dust.

4.2. Deficiencies Discovered

No structurally significant deficiencies were noted as part of this annual inspection.

4.3. Corrective Measures Taken

No corrective measures for significant deficiencies were noted that need to be taken by RHGF as part of this annual inspection.

5. REFERENCES

Special/Industrial Waste Permit Application, Red Hills Generation Facility Choctaw County, Mississippi – Volume I, Malcolm Pirnie, Inc., March 1998.

Special/Industrial Waste Permit Application, Red Hills Generation Facility Choctaw County, Mississippi – Volume II, Malcolm Pirnie, Inc., March 1998.

Cell 1 2 & 3 2018 Report (drawing), Calvert-Spradling Engineers, Inc., January 22, 2019.

Cell 1 2 & 3 2022 Report (drawing), Calvert-Spradling Engineers, Inc., December 2022.

Engineering Plans and Specifications, Red Hills Facility Ash Management Unit – Cell 3, Aquaterra Engineering, LLC, October 24, 2003.

State of Mississippi Solid Waste Management Permit No. SW0100040462, Choctaw Generation Limited Partnership, Red Hills Generation Facility Ash Management Unit, Issued April 9, 2010, Expires March 31, 2020, Modified February 28, 2013.

ATTACHMENTS

Federal CCR Annual Inspection Form

Station:	Red Hills Power Generation	CCR Unit:	AMU
Date:	25 October 2022	Inspector(s):	J. Breedlove
Weather Conditions:	Clear, Sunny, mild	Ground Conditions:	Clear

Purpose of Inspection: Per the CCR Rule published by the USEPA and entered into the federal register on April 17, 2015, existing and new CCR landfills are required to be inspected annually by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR facility is in good condition and conforms to standard engineering practices for this type of facility.

Please refer to the attached figure to mark location of any identified conditions.

CCR Unit Feature	Yes	No	N/A	Location ID # or Map Identifier
CCR Placement				
1) Is waste being handled or placed differently than standard station practices?	☐	☒	☐	
Bench Conditions				
2) Any signs of surface cracking?	☐	☒	☐	
3) Any signs of depressions or sunken areas?	☐	☒	☐	
Slope Conditions (final cover and permanent slopes)				
4) Any signs of surface cracking?	☐	☒	☐	
5) Any signs of surface movement? If yes, please categorize	☐	☒	☐	
a) Sloughing (sliding of materials in sheets)	☐	☒	☐	
b) Sliding	☐	☒	☐	
c) Sinking	☐	☒	☐	
6) Any signs of erosion rills greater than 3 inches?	☐	☒	☐	
7) Any signs of erosion gullies greater than 6 inches?	☒	☐	☐	Some erosion in perimeter ditches, ditch embankments, not significant

Federal CCR Annual Inspection Form

Station: Red Hills Power Generation CCR Unit: AMU Date: 25 October 2022

CCR Unit Feature	Yes	No	N/A	Location ID # or Map Identifier
8) Any signs of holes or animal burrows?	☐	☒	☐	
Haul Road Conditions				
9) Any obstructions?	☐	☒	☐	
10) Any noticeable damage? If yes, please categorize	☐	☒	☐	
a) Rutting	☐	☒	☐	
b) Sinking	☐	☒	☐	
c) Potholes	☐	☒	☐	
Erosion Controls				
11) Any areas of active construction lacking erosion controls (silt fence)?	☐	☒	☐	
12) Any signs that existing erosion controls are not properly functioning?	☐	☒	☐	
13) Any evidence of insufficient vegetative cover?	☐	☐	☒	
Liner System Conditions (prior to CCR placement or during active liner construction)				
14) Any damage to liner protective cover?	☒	☐	☐	Some damage to exposed geocomposite over liner on west side perimeter ditch
15) Any damage to liner system observed?	☐	☒	☐	
Leachate Collection/Detection System				
16) Any signs of obstruction to leachate collection/detection pipe outlets?	☐	☒	☐	
17) Any signs of obstruction to leachate flow(s) to storage lagoon(s)?	☐	☒	☐	
Surface Water Controls (Diversion Channels/Collection Channels/Sedimentation Ponds)				
18) Any signs of uncontrolled run-on to the landfill?	☐	☒	☐	
19) Any signs of uncontrolled run-off from the landfill?	☐	☒	☐	
20) Any signs of obstruction in surface water conveyance channels?	☐	☒	☐	
21) Any cracking or separation in surface water conveyance channels?	☐	☒	☐	

Federal CCR Annual Inspection Form

Station: Red Hills Power Generation CCR Unit: AMU Date: 25 October 2022

CCR Unit Feature	Yes	No	N/A	Location ID # or Map Identifier
22) Any signs of heaving or sinking of surface water conveyance channels?	☐	☒	☐	
23) Any signs of obstruction in culverts, drop boxes, or sumps?	☐	☒	☐	
24) Any signs of sedimentation pond malfunction (excessive sediment buildup)?	☐	☒	☐	
25) Any signs of excessive sedimentation pond water loss (leaking)?	☐	☒	☐	
26) Any signs of obstruction to sedimentation pond outlet structure (in pond)?	☒	☐	☐	Emergency spillway temp. blocked; discharge by manual pumping only
27) Any signs of obstruction to sedimentation pond effluent discharge?	☒	☐	☐	See above
Fugitive Dust Controls				
28) Any evidence that fugitive dust controls are not being used?	☐	☒	☐	
Other				
29) Any nontypical operation occurring at facility? If yes, please describe:	☐	☒	☐	
	☐	☐	☐	

Additional Comments: A temporary exposed geomembrane cap was construction of a significant portion (66 acres) of the landfill, including top deck, south, east, and north side perimeter slopes and perimeter conveyance channels. Ash in the area to receive exposed geomembrane cap was re-graded and fine-graded to provide smooth subgrade for cap. Non-contact (with waste) water is diverted away from the landfill through a detention pond and contact water (under cap) is conveyed to the AMU basin. Construction project mitigated perimeter drainage ditch erosion issues identified in a previous inspection report and created additional perimeter conveyances for non-contact water conveyance. The temporary cap installed to date seems to be very effectively minimizing erosion on the slopes and perimeter ditches and minimizes amount of contact storm water that must be managed.

Individual Completing Form: Jeffrey J. Breedlove, PE (Print)  (Signature)