

40 CFR Parts 257

Checklist for P.E. Annual Inspection for CCR Surface Impoundments, § 257.83(b)

Sikeston BMU Sikeston Power Station Bottom Ash Surface Impoundment

Annual Inspection

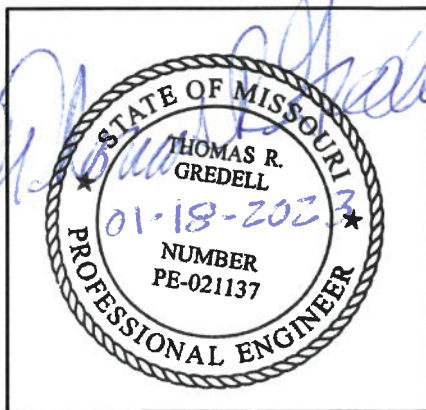
Requirements	Signs of actual or potential structural weakness	Disruptions or potential disruption to the operation and safety of the unit (257.83(b)(vi))
CCR Unit and appurtenant structures 257.83(b)(ii)	None Observed. Continue to monitor.	None Observed. However, potential seepage along northern embankment west of the Fly Ash Pond and on the southwestern embankment. No evidence of erosion or slope instability. Seepage is minor and vegetation is in very good condition. Continue to monitor.
Hydraulic structures underlying the base of the CCR unit 257.83(b)(iii)	None Observed. Continue to monitor.	Visual observation indicates sediment in stormwater box culverts continues to self-cleaned during heavy rains. Discharge sediment basin was sufficient at time of inspection. Continue ongoing observation and periodic cleaning to allow continued self-cleaning of stormwater box culverts. Separated corrugated metal pipe seams in the south culvert should be observed monthly.

The 2022 Annual Inspection included onsite observations and a review of available weekly and monthly plant inspection reports regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record in general accordance with 257.83(b)(i).

Minor maintenance items associated with routine upkeep and items that require further investigation and/or corrective action observed during the 2022 Annual Inspection presently do not impact the structural integrity of the embankment. SBMU agrees to monitor and address these items in a timely manner through normal maintenance.

GREDELL Engineering Resources, Inc.

Engineer's Seal



Thomas R. Gredell, P.E.

Missouri License: PE-021137

Date: January 17, 2023

**SIKESTON POWER STATION – BOTTOM ASH POND
2022 ANNUAL INSPECTION CHECK SHEET**

SIKESTON POWER STATION
Bottom Ash Pond
Annual Inspection Check Sheet

Date	October 20, 2022
Inspector	Thomas R. Gredell, P.E.
Pool Level	Approximately el. 317.0
Temperature	Mid 80°s
Weather	Partly cloudy, dry

1. Date of Previous Annual Inspection:
 - a. September 16, 2021
2. Date of Previous Periodic Inspection:
 - a. The date of the most recent weekly inspection report reviewed for this Annual Inspection report was December 25, 2022. Weekly and monthly inspection reports by plant personnel were reviewed for this Annual report. Some report data that could not be verified were not utilized in preparing this report.
3. Description of Emergency (EC) or Immediate Maintenance (IM) conditions observed since the last annual inspection:
 - a. IM conditions were noted for rutting of the East ramp of the Bottom Ash Pond on three weekly inspection reports by plant personnel in 2022. This rutting appears to be caused by stormwater runoff from the perimeter road and was present at the time of this inspection. Roadways were overall in good condition during our annual onsite inspection. A review of weekly reports for the entire year indicates that rutting of the East ramp was periodically noted, but is remedied by routine maintenance (i.e., grading the road and adding gravel). Short-term rutting on top of the berms is not significant if remedied by routine maintenance. Rutting on the access ramps should be repaired promptly after being identified.
 - b. IM conditions were observed during the 2022 site visit for three low spots in the berm road. Two spots are located on the north berm just west of the Fly Ash Pond, and a third spot at the northwest corner of the Bottom Ash Pond just south of the perimeter road intersection. Repair by adding gravel and grading to restore a minimum vertical alignment of ~ 322.0 is recommended along with continued monitoring.
4. Describe any action taken to restore or improve safety and integrity of impounding structure:
 - a. The rutting of the East ramp was corrected by grading the road and adding gravel on one or more occasions in 2022. The East ramp requires periodic maintenance due to short, steep slopes. Potholes and depressions located in the perimeter roads on top of the berms should also be corrected by grading and adding gravel, as required throughout the year.
 - b. In response to the observations of potential berm seepage, a field investigation and office evaluation of the north berm was completed in mid-2018 by Reitz & Jens, Inc. as a subconsultant to Gredell Engineering. The conclusion of that evaluation is that the possible seepage did not have a negative impact on the stability of the embankment. Field conditions on the north berm have not changed in 2022. Potential seepage on the west and southwest berms is less prominent with no evidence of slumping, flow or erosion. No investigations or office evaluations have been made for these areas. Continued monitoring is recommended.
5. Describe any modifications to the geometry of the impounding structure since the previous annual inspection:
 - a. Bottom Ash reclamation stockpile in northwest corner of the Bottom Ash Pond has seen minor changes in geometry due to the ongoing excavation of bottom ash, stockpiling the ash and periodically hauling it off-site for beneficial use. The overall volume of the material in the Bottom Ash Pond was observed to remain the same, or slightly decreased, in 2022.

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6. Describe any modifications to the operation of the impounding structure since the previous annual inspection:
 - a. As described above, quantities of bottom ash are routinely removed for beneficial use, resulting in a net zero change, or slight decrease, in CCR storage volume. Process water and rainwater storage volume was not impacted. Actual volume increases or decreases in the Bottom Ash Pond were visually quantified.
7. List the approximate remaining storage capacity (Cubic Yards) of the impounding structure:
 - a. Estimated available storage is ~ 380,000 CY below el. 320 (allowing 2+ feet of freeboard). This has not significantly changed in 2022 and has not been impacted by SBMU's ongoing successful bottom ash reclamation efforts.
8. List the approximate maximum, minimum and present depth and elevation of the impounded water since the previous annual inspection:
 - a. Estimated from inspection reports for 2022: Max. Elev. 320.2 (Depth ~ 18.2); Min. Elev. 315.8 (Depth ~ 13.8); Depth on 10-20-22 = Elev. 317.0 (Depth ~ 15.0).
9. List the approximate maximum, minimum and present depth and elevation of the impounded CCR since the previous annual inspection:
 - a. Estimated from 2016 aerial survey: CCR occupies approximately 60 acres at an approx. Max. Elev. 318.8 (Depth 16.8'). Min. depth is estimated to be less than 5' or Elev. 307 located beneath the surface of the impounded water. Elevation and Depth of impounded CCR do not change rapidly from year to year due to SBMU's ongoing, successful ash reclamation/beneficial use efforts.
10. Approximate volume of impounded water and CCR at the time of the inspection:
 - a. Estimated Volume of water 75,000 CY (15 Million Gallons, or MG). Estimated Volume CCR 1,164,000 CY (235 MG). This has not significantly changed in 2022 due to SBMU's ongoing, successful bottom ash reclamation/beneficial use efforts.
11. Describe any changes to the downstream watershed since the last annual inspection:
 - a. No changes to the downstream watershed have occurred in 2022.

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Inlet and Outlet Works		
Item	Condition Code	Comments
Outlet Condition	GC	Concrete intake with stop logs, discharges into buried 10-inch carbon fiber pipe that runs north and then west to Process Waste Pond. (Water Recirculation Structure is no longer operational and the emergency overflow to the Fly Ash Pond has been blocked for several years by impounding fly ash at the emergency overflow outlet.) No change since inspections began in 2016.
Gate Condition/ Operability	GC	Stop logs originally controlled water level but are not present at the structure and are no longer used. A control valve north of the discharge is utilized for flow control. No change since 2016.
Leakage	NE	No leakage observed. No Change since 2016.
Outfall Condition	GC	Discharge pipe is at Process Waste Pond. Approximately 1.5' of the discharge pipe is damaged along the east side of the pipe at the outfall but does not compromise the operation of the discharge pipe. No change since 2016.
Discharge (color and/or sediment)	NE	No discharge was observed at the time of inspection.
Obstructions	NE	Flow to outlet structure can become obstructed by weeds and dead vegetation. Routinely trim weeds at the outlet during warm weather months.
Instrumentation	GC	<p>Water level is measured by staff gauge at the inactive Recycle Water Recirculation Structure. Staff gauge markings were repainted in 2019 and remain clear. The maximum recorded reading of the staff gauge between January 2, 2022, and December 25, 2022, was 4.2 feet or elevation 320.2 feet.</p> <p>There are two (2) piezometers (installed ~ 2011) constructed within the Bottom Ash Pond perimeter berms that serve to monitor water or saturation within the pond berms. These are identified as P-8 and P-10. Total depths are approximately 25 feet and 19.5 feet, respectively. P-8 water levels ranged from 24.3 to 24.6 feet below the top of casing in 2022. P-10 water levels fluctuated between 9.5 and 15.2 feet below casing in 2022.</p>
Inlet Piping Condition	GC	Inlet pipe for bottom ash (estimated 8 to 10-inch iron pipe) is in good condition. Pipe trench sump discharge pipe (4-inch PVC pipe) and plant operations wastewater inlet (12-inch iron pipe) were in good condition. Makeup water pipe (8-inch iron pipe) was in good condition. No discharge was observed during the site visit.

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Inlet and Outlet Works		
Item	Condition Code	Comments
Emergency Spillway	Not Operational	<p>A buried 30-inch pipe was designed to convey excess water from the Bottom Ash Pond to the Fly Ash Pond, as needed. The discharge end of the structure in the Fly Ash Pond is blocked by impounded CCR. The swing gate on the Bottom Ash Pond inlet side of the structure is closed. As a result of earlier reports completed by Gredell Engineering related to CCR compliance, it was determined to be advantageous to SBMU to construct an emergency spillway. However, the emergency spillway was never constructed. Due to the current operating status and planned closure of the Fly Ash Pond and the net zero CCR quantity increase, the construction of an emergency discharge structure is not considered critical at this time.</p>
Other: Buried Storm Water Box Culvert	OB (overall)	<p>Dual buried box culverts convey offsite stormwater from the east side of the Bottom Ash Pond (west end of Compress Road) to the west side of the Pond. The inlet was observed to be dry and in good condition. The culverts discharge through corrugated metal culverts into an open channel on the west side. In 2017, a sediment basin was dug out below the pipe discharges, increasing the sediment capacity below discharges. This apparently has increased the flow velocity and flushed out the sediment build up in the culverts during heavy rainfall events.</p> <p>In 2022, the sediment basin was observed to be partially filled with sediment. Therefore, it is recommended to continue to monitor the sediment basin and to clean out solids/debris before it has the potential to restrict discharge flow.</p> <p>It has been previously noted that the southern corrugated metal culvert has two small areas where the seams were damaged and separated. The bituminous lining in both culverts is degraded in the area of the damage. Ongoing observation has indicated that the damaged areas are currently stable and do not impact the stability of the Bottom Ash Pond. In addition, the damaged areas are not located beneath the Bottom Ash Pond or the pond berm. Therefore, it is recommended that these two damaged areas continue to be observed and scheduled for repair in the future.</p>

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Earth Embankment		
Item	Condition Code	Comments
Vertical & Horizontal Alignment of Crest	IM	Three low spots less than 1 foot in depth were observed in the roadway surface on top of the berm during the 2022 site visit. Two spots are located on the north berm just west of the Fly Ash Pond, and a third spot at the northwest corner of the bottom ash pond just south of the perimeter road intersection. Repair by filling with gravel and grading to restore the minimum vertical elevation and berm alignment is recommended along with continued monitoring.
Seepage/Wetness / Ponding Areas	OB (Ponding)	Past inspections note ponding in the perimeter flat bottom ditch inside rail loop. This appears to be caused by the flat grade of the railroad bed and does not appear to be seepage. The ponding restricts mowing of the ditch during wet periods, but otherwise is not a concern. No ponding was observed in 2022 due to drought conditions.
	OB (Northern Berm Seepage)	An area along the northern berm of the Bottom Ash Pond, west of the Fly Ash Pond was identified as an area of potential seepage from the Bottom Ash Pond during prior inspections. No visual observation of erosion of the outer berm soils were observed in 2016 through 2022. 2022 observation indicates the area continues to be maintained. In mid-2018, Gredell Engineering subcontracted to Reitz & Jens, Inc. (St. Louis) to complete an evaluation of the area of the northern embankment of the Bottom Ash Pond. The report stated that the possible seepage did not have a negative impact on the stability of the embankments. Therefore, it is recommended that this area continue to be visually monitored to note any change in conditions. Future remediation of the wet area may be appropriate at a future date based on regulatory or other considerations.
	OB (Southwest Berm Seepage)	A saturated area along the southwestern berm of the Bottom Ash Pond was observed during the 2021 annual inspection. The surficial soil in this area was identified to be soft and appeared wet in this area. Green vegetation was observed at this location in 2022 during an annual drought condition, but no visual signs of erosion of the outer berm soils were observed in 2022 or during prior inspections. The area was able to be routinely maintained (i.e., mowed) and there was no evidence of rutting or other distress from mowing equipment observed in the area. Therefore, it is recommended that this area continue to be visually monitored to note any change in conditions. Future investigation of the wet area may be appropriate at a future date based on regulatory or other considerations.

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Erosion/Rutting	IM	No evidence of erosion or rutting on the outside slopes of the berms were observed in 2022. However, three weekly inspection reports noted minor erosion of the East ramp, and erosion damage was observed during the site visit. The gravel berm roads were in good condition during the site inspection with the exception of the three low spots affecting the vertical alignment of the berm. While these minor erosion damages do not have the same significance as rutting and erosion on the outside slopes of the berms, they should be corrected to maintain a consistent vertical height of the perimeter berms. SBMU staff periodically remediated the conditions noted by grading the road surfaces and adding gravel where necessary.
Fencing	NI	Fencing is not adjacent to the Bottom Ash Pond.
Vegetation	GC	Vegetation on exterior slopes is generally maintained at less than 6 inches, however this federal CCR rule criteria has been remanded and, therefore, is not currently applicable.
Sloughs/Slides/ Cracks	GC	No evidence was observed in 2022.
Animal Control	GC	No evidence of animal burrows or holes were observed in 2022.
Other	NA	No other items were observed that are applicable to the federal CCR rules.

- Condition Codes:
- EC Emergency Condition – a serious safety condition exists that requires immediate action.
 - IM Immediate Maintenance – an item that requires maintenance within about 30 days to ensure safety or operation.
 - MM Minor Maintenance – item needing minor maintenance or repair within 6 months.
 - OB Observation – condition requires regular observation to ensure that the condition does not become worse.
 - GC Good Condition.
 - NE No Evidence of a problem.
 - NI Not Inspected. State reason in comments.

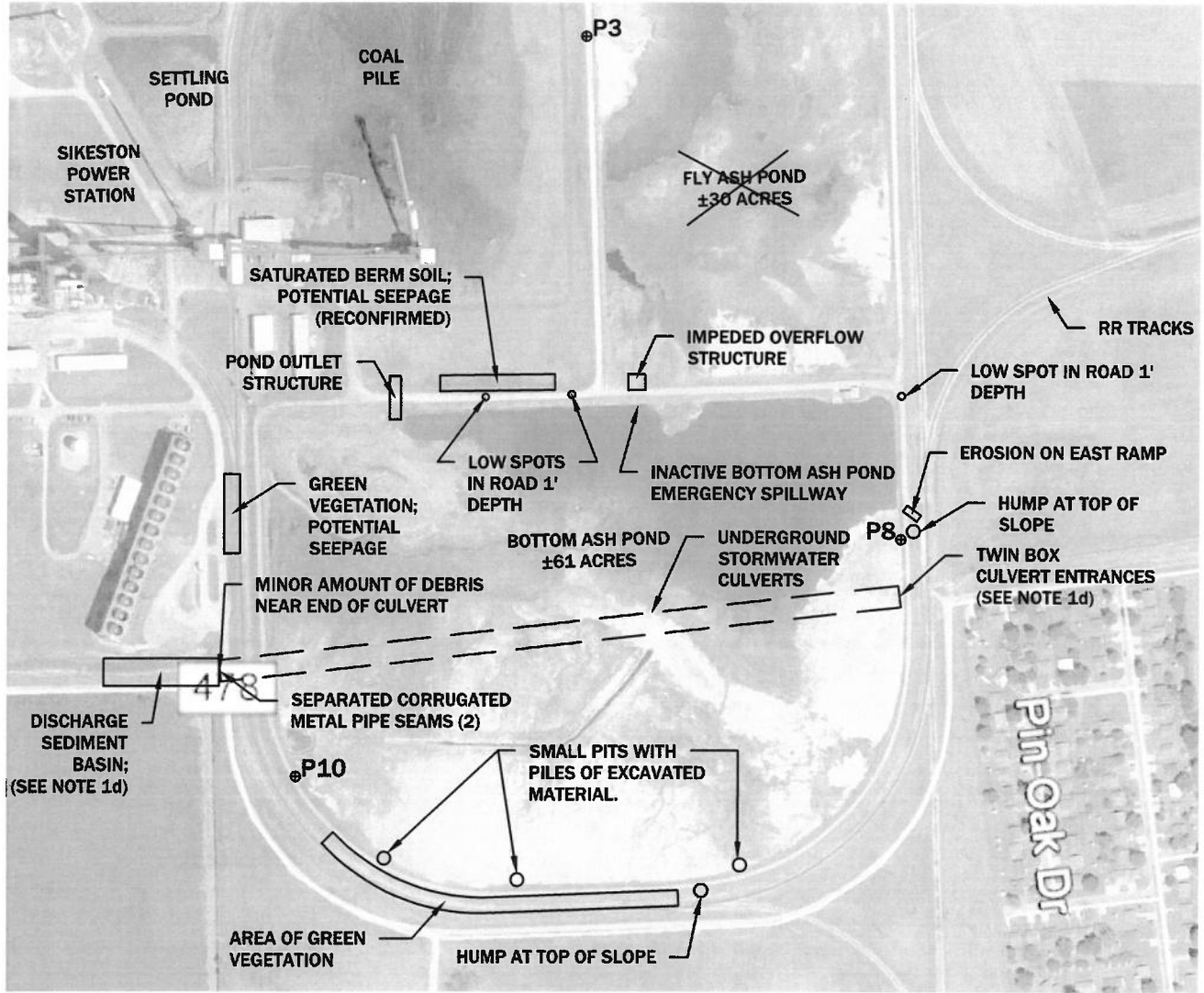
Note location of observations on attached plan sheet (Figure 1).

Additional Notes:

1. NONE

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NOTES

1. IMMEDIATE MAINTENANCE ITEMS INCLUDE:
 - a. MINOR EROSION OF EXTERIOR ACCESS RAMP ON THE NORTHEAST BERM.
 - b. TWO LOW SPOTS IN THE BERM ROAD ON THE NORTH BERM EAST OF THE FLY ASH POND AND ONE LOW SPOT NEAR THE NORTHEAST CORNER OF THE BERM ROAD.
2. ITEMS REQUIRING FURTHER OBSERVATION INCLUDE:
 - a. SATURATED BERM SOIL ALONG NORTHERN BERM, WEST OF THE FLY ASH POND. (CONDITIONS ARE UNCHANGED SINCE 2016)
 - b. GREEN VEGETATION (DURING DROUGHT YEAR) ON WESTERN AND SOUTHWESTERN BERM SLOPES INDICATE POSSIBLE SEEPAGE. CONTINUED OBSERVATION AND MONITORING RECOMMENDED.
 - c. SEPARATED CORRUGATED METAL PIPE SEAMS AT THE DISCHARGE END OF THE SOUTHERN STORMWATER CULVERT PASSING BENEATH THE BOTTOM ASH POND. (CONDITIONS ARE UNCHANGED SINCE 2016)
 - d. GRASS LINED CHANNEL AT THE OUTLET OF THE STORMWATER CULVERTS PASSING BENEATH THE BOTTOM ASH POND FROM EAST TO WEST REMAINS CLEAR OF BRUSH. THE SEDIMENT BASIN IS PARTIALLY FILLED WITH SEDIMENT AND DEBRIS. RE-EXCAVATION OF THE SEDIMENT BASIN IS RECOMMENDED IN 2023.
 - e. TWIN BOX CULVERT VIDEO INSPECTION WAS COMPLETED IN 2021 TO VERIFY STRUCTURAL STABILITY.
3. ITEMS IDENTIFIED DURING THE ANNUAL INSPECTION WHICH DO NOT REQUIRE MAINTENANCE:
 - a. THE HISTORICALLY IMPEDED OVERFLOW STRUCTURE BETWEEN THE BOTTOM ASH POND AND THE FLY ASH POND.

LEGEND:

PIEZOMETER ⊕ P5



**FIGURE 1
2022 ANNUAL INSPECTION
BOTTOM ASH POND**

SIKESTON POWER STATION

GREDELL Engineering Resources, Inc.

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DATE 01/2023	SCALE 1" = 500'	PROJECT NAME SIKESTON	REVISION N/A
DRAWN WE	APPROVED TG	FILE NAME 2022 Inspection BAP	SHEET # 1 OF 1