

40 CFR Parts 257

2021 Checklist for P.E. Annual Inspection for CCR Surface Impoundments, §

257.83(b) Sikeston BMU Sikeston Power Station Bottom Ash Surface

Impoundment Annual Inspection

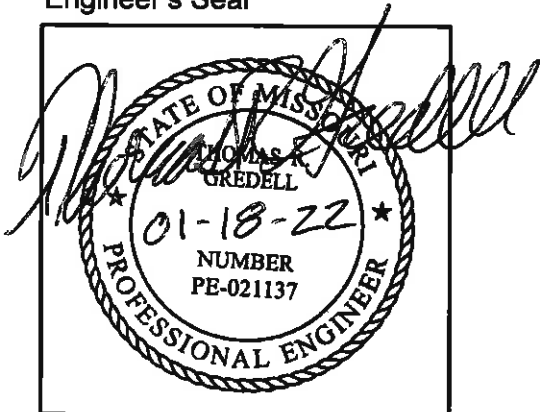
Requirements	Signs of actual or potential structural weakness	Disruptions or potential disruption to the operation and safety of the unit (257.83(b)(vi))
CCR Unit and appurtenant structures 257.83(b)(ii)	None Observed. Potential seepage along northern embankment west of the Fly Ash Pond and in the southwestern embankment noted on past inspection reports; continue to monitor.	None Observed. Continue to monitor.
Hydraulic structures underlying the base of the CCR unit 257.83(b)(iii)	None Observed. Continue to monitor.	Visual and video observations indicate most sediment in stormwater culverts have self-cleaned during heavy rains. Sediment basin capacity is sufficient, but filling up at time of inspection. Recommend cleaning in 2022 to allow continued self-cleaning of stormwater culverts. Separated corrugated metal pipe seams still require repair, but condition has not changed since 2016..

The 2021 Annual Inspection included 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 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 2021 Annual Inspection presently do not impact the structural integrity of the embankment. SBMU plans to 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 18, 2022

SIKESTON POWER STATION – BOTTOM ASH POND
2021 ANNUAL INSPECTION CHECK SHEET

SIKESTON POWER STATION
Bottom Ash Pond
Annual Inspection Check Sheet

Date	September 16, 2021
Inspector	Thomas R. Gredell, P.E.
Pool Level	Approximately el. 318.5
Temperature	High Upper 70°s
Weather	Cloudy, dry

Date of Previous Annual Inspection: December 1, 2020

Date of Previous Periodic Inspection:

The date of most recent weekly inspection report reviewed for this Annual Inspection was December 26, 2021.

Description of Emergency (EC) or Immediate Maintenance (IM) conditions observed since the last annual inspection:

Rutting and potholes in the perimeter roads and on the east berm access ramps were noted on several weekly inspection reports by plant personnel prior to August 2021. No rutting was noted for the remainder of the year. A review of weekly reports for the entire year indicate that rutting and potholes occasionally occur due to heavy truck traffic (IM & MM), but are remedied by routine maintenance (i.e., grading the road and adding gravel). Rutting on top of the berms also is not as significant as rutting and erosion on the exterior slopes of the berms.

IM conditions were also noted for vegetation height on weekly inspection reports periodically throughout the year. However, it is noted that vegetation height is not currently regulated by the federal CCR rules.

Describe any action taken to restore or improve safety and integrity of impounding structure:

The rutting and potholes were corrected by grading the road on one or more occasions in 2021.

In response to the observations of potential berm seepage, a field investigation and office evaluation 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 have not been noted to have changed since that time.

Describe any modifications to the geometry of the impounding structure since the previous annual inspection: Bottom Ash reclamation stockpile in NW has seen reduction in volume due to the ongoing excavating of bottom ash, stockpiling the ash and periodically hauling it away for reclamation. The overall volume of the material remains the nearly the same in 2021, or slightly decreased, as reported by SBMU staff and based on visual observation.

Describe any modifications to the operation of the impounding structure since the previous annual inspection: As described above, additional quantities of bottom ash are observed to have been removed for reclamation, potentially creating more CCR storage volume and more process water and rainwater storage volume. However, actual volume increases or decreases in the Bottom Ash Pond have not been quantified.

List the approximate remaining storage capacity (Cubic Yards) of the impounding structure:

Estimated available storage is > 380,000 CY below el. 320 (allowing 2+ feet of freeboard). This has not significantly changed in 2021, and may have decreased, due to SBMU's ongoing, successful bottom ash reclamation efforts.

List the approximate maximum, minimum and present depth and elevation of the impounded water since the previous annual inspection:

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Estimated from inspection reports for 2021: Max. Elev. 319.9 (Depth 17.9); Min. Elev. >315.9 (Depth >13.9); Depth on 09-16-21 = Elev. 318.4 (Depth 16.4').

List the approximate maximum, minimum and present depth and elevation of the impounded CCR since the previous annual inspection:

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 efforts.

Approximate volume of impounded water and CCR at the time of the inspection:

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 2021 due to SBMU's ongoing, successful bottom ash reclamation efforts.

Describe any changes to the downstream watershed since the last annual inspection:

No changes to the downstream watershed have occurred since the 2021 Annual Inspection.

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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 is blocked by impounded fly ash at the emergency overflow outlet.) No change since 2016.
Gate Condition/ Operability	GC	Stop logs originally controlled water level but are not present at the structure and 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	Bottom Ash Pond was not discharging 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	Water level is measured by staff gauge at the inactive Recycle Water Recirculation Structure. Staff gauge markings were observed to be visible. The maximum recorded reading of the staff gauge between January 3, 2021, and December 26, 2021, was 4.0 feet or elevation 319.9 feet. 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 23.95 to 24.39 feet below the top of casing in 2021. P- 10 water levels fluctuated between 10.24 and 12.52 feet below casing in 2020.
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.

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Item	Condition Code	Inlet and Outlet Works Comments
Emergency Spillway	Not Operational	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 other reports completed by Gredell Engineering related to CCR compliance, it was determined to be advantageous to SBMU to construct an emergency spillway. Upon request from SBMU, Gredell Engineering designed an emergency spillway consisting of a shallow, broad-crested weir to be constructed along the northern berm of the Bottom Ash Pond and west of the Fly Ash Pond. SBMU indicated that the emergency spillway will be put out to bid in 2022, unless the BAP is required to close in 2022.
Other: Buried Storm Water Box Culvert	MM (Sediment Basin Cleaning) OB (metal culvert seam damage)	Dual buried box culvert conveys 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 appeared to have increased the flow velocity and flush out the sediment build up in the culverts during heavy rainfall events. In 2021, the sediment basin was observed to be partially filled with sediment. Therefore, it is recommended to clean out the solids/debris in the sediment basin in order to allow the culverts to self-clean during heavy discharge flow. It has been previously noted that the southern corrugated metal culvert had two small areas where the seams are 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. It is recommended that these two damaged areas continue to be observed and possibly scheduled for replacement in the future.

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Earth Embankment		Comments
Item	Condition Code	
Vertical & Horizontal Alignment of Crest Seepage/Wetness / Ponding Areas	MM OB (Northern Berm Seepage) OB (Southwest Berm Seepage)	<p>A small section of the berm between the Bottom Ash Pond and Fly Ash Pond exhibited some deformation, but the location makes it a non-factor. No other visible evidence of deformation of embankment.</p> <p>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 2021. 2021 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.</p> <p>During weekly inspections, a saturated area along the western or southwestern berm of the Bottom Ash Pond was observed to be wet. A small, potential wet spot had been noted in this area there during a previous annual inspection. Therefore, this area should be targeted for future, regular observations during weekly and annual reports.</p>
Erosion/Rutting	MM	<p>No evidence of erosion or rutting on the outside slopes of the berms were observed in 2021. However, weekly inspections noted minor rutting in gravel roads and ramps were noted in the weekly inspections. A few minor potholes were observed on the gravel berm road between the Fly Ash Pond and Bottom Ash Pond, but the gravel ramps were in good condition during our annual inspection. The rutting appears to be caused by heavy truck traffic during periods of wet weather. While these ruts 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.</p>
Fencing Vegetation	NE GC	<p>Fencing is not immediately adjacent to the Bottom Ash Pond and consists of overall plant security fencing. Vegetation on exterior slopes is generally maintained at less than 6 inches. Some weekly inspections indicated that vegetation was 12 to 24 inches in height. However, this federal CCR rule criteria has been remanded and, therefore, is not currently applicable.</p>

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Sloughs/Slides/ Cracks	NE	No evidence was observed in 2021.
Animal Control	NE	No evidence of animal burrows or holes were observed in 2021.
Other	NE	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.

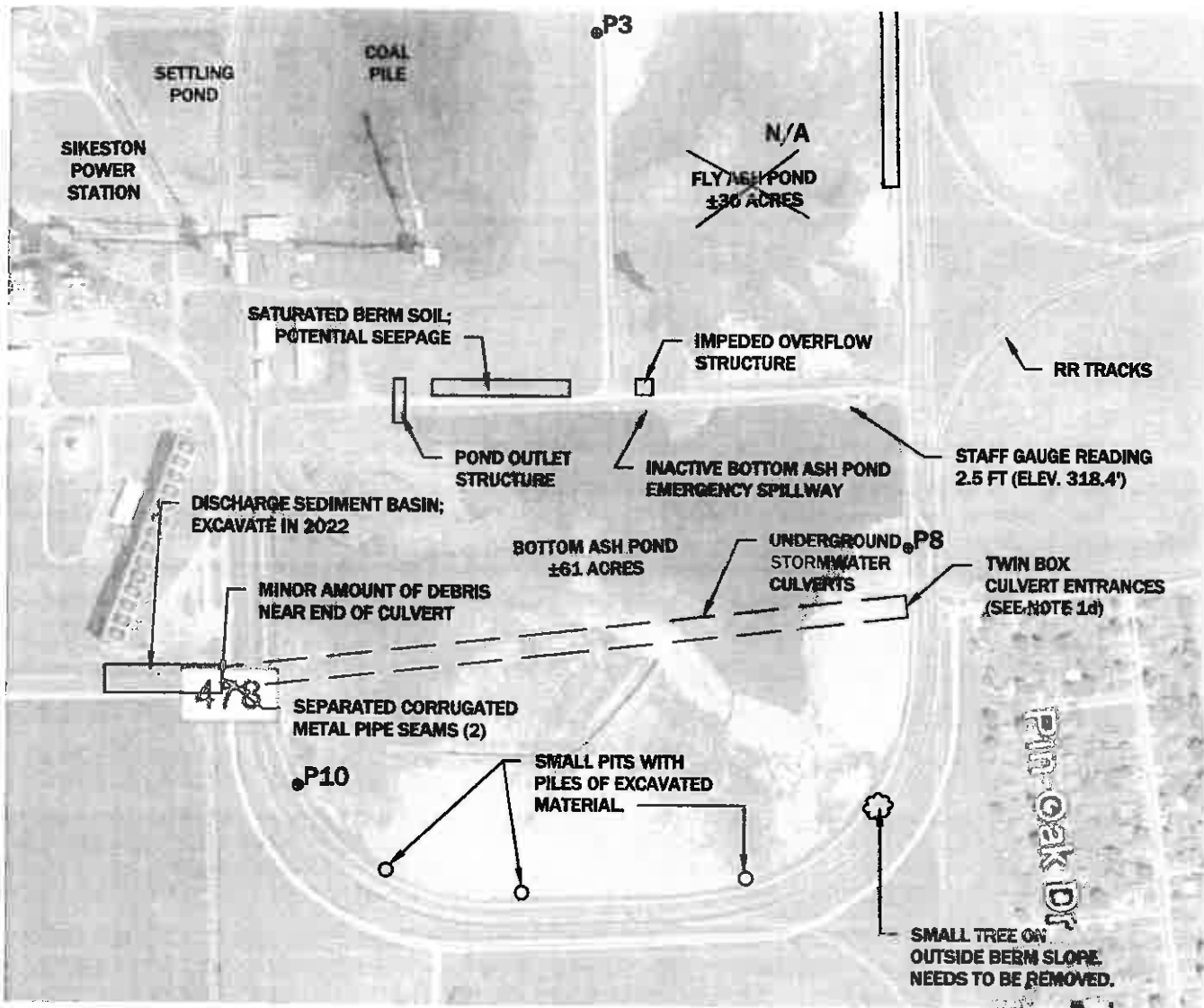
Note location of observations on attached plan sheet (Figure 1).

Additional Notes:

1. NONE

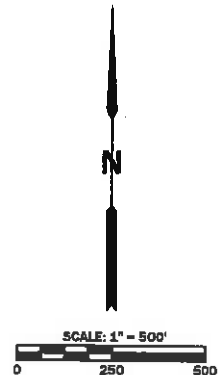
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NOTES

1. ITEMS REQUIRING FURTHER OBSERVATION, INVESTIGATION OR CORRECTIVE ACTION INCLUDE:
 - a. SATURATED BERM SOIL ALONG NORTHERN BERM, WEST OF THE FLY ASH POND. (SAME AS 2020)
 - b. SEPARATED CORRUGATED METAL PIPE SEAMS AT THE DISCHARGE OF THE SOUTHERN STORMWATER CULVERT PASSING BENEATH THE BOTTOM ASH POND. (SAME AS 2020. REPORTED NOT REPAIRED)
 - c. GRASS LINED CHANNEL AT THE DISCHARGE OF THE STORMWATER AT THE OUTLET OF THE STORMWATER CULVERTS PASSING BENEATH THE BOTTOM ASH POND FROM EAST TO WEST HAS BEEN CLEARED OF BRUSH A SEDIMENT BASIN. BASIN FILLED WITH SEDIMENT AND DEBRIS. RE-EXCAVATE MOSTLY IN 2022.
 - d. TWIN BOX CULVERT VIDEO INSPECTION PERFORMED TO VERIFY STRUCTURAL STABILITY.
2. ITEMS IDENTIFIED DURING THE ANNUAL INSPECTION WHICH DO NOT REQUIRE MAINTENANCE:
 - a. THE IMPEDED OVERFLOW STRUCTURE BETWEEN THE BOTTOM ASH POND AND THE FLY ASH POND.



**FIGURE 1
2021 ANNUAL P.E. INSPECTION
BOTTOM ASH POND**

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SIKESTON POWER STATION

DATE 01/2022	SCALE 1" = 500'	PROJECT NAME SIKESTON	REVISION
DRAWN CM	APPROVED TG	FILE NAME 2021 PE Inspection	SHEET # 1 OF 1