

**2017 ANNUAL DAM AND DIKE INSPECTION REPORT**

East and West Bottom Ash Pond Dams  
H.W. Pirkey Plant  
Harrison County, Texas

September 12, 2017

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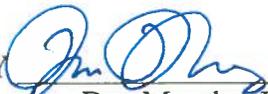
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2017 ANNUAL DAM AND DIKE INSPECTION REPORT

H. W. PIRKEY PLANT

EAST AND WEST BOTTOM ASH POND DAMS

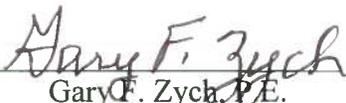
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I certify to the best of my knowledge, information and belief the information contained in this report meets the requirements of 40 CFR § 257.83 (b).

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## **INTRODUCTION**

This report was prepared by AEP- Geotechnical Engineering Services (GES) section, in part, to fulfill requirements of 40 CFR 257.83(b) for the CCR impoundments and to provide the H.W. Pirkey Plant an evaluation of the West Bottom Ash Pond and East Bottom Ash Pond.

The 2017 inspection of designated CCR Surface Impoundments at the Pirkey Power Plant were performed by Mr. Dan Murphy, P.E., Mr. Ron Franklin and Mr. William G. Carter, P.E. This report was prepared by Mr. Dan Murphy, P.E. and serves as a summary of the inspection and an assessment of the general conditions of the facility.

Mr. Ron Franklin and Mr. William G. Carter, P.E. of AEP Plant Engineering Region 5, was the facility contact for the inspection. The inspection was performed on September 12, 2017. Weather conditions were mostly cloudy, the ground surface was dry and temperatures were around 75° F.

### **General Information:**

#### **1. Background Information of West Bottom Ash Pond (BAP)**

The following section provides background information for the AEP H.W. Pirkey Generating Plant West BAP.

##### **1.1 Facility Location Description**

The AEP H.W. Pirkey Plant is located in southern Harrison County, approximately 5 miles southeast of Hallsville, Texas, and approximately 8 miles southwest of Marshall, Texas. The West BAP CCR unit is located at the north end of the Plant and approximately 3,000 feet northwest of Brandy Branch Reservoir.

##### **1.2 Description of West BAP CCR Unit**

The following section will discuss the embankment configuration, area, volume, construction and operational history, and surface water control associated with the West BAP.

###### **1.2.1 Embankment Configuration**

The West BAP embankments have a maximum height of approximately 25 feet and are constructed of compacted clay on a slope ranging from 2.5:1 (2.5 feet horizontal, 1 foot vertical) to 3:1. The elevation at the top of the embankment around the perimeter of the West BAP is approximately 357 feet above msl, and the normal operating level is approximately 354 feet above msl. At the time of inspection, the west bottom ash storage

pond was out of service and had roughly 6 inches of water in the pond area. The interior bottom elevation of the West BAP is approximately 347 feet above msl.

### **1.2.2 Construction and Operational History**

The H.W. Pirkey Power Plant West BAP was constructed in 1983 and 1984, and began operation in 1985. Throughout the life of the Plant, CCR materials (fly ash, bottom ash, economizer ash, flue gas desulfurization sludge) have been generated. The West BAP, which was placed into operation in 1985, receives bottom ash sluiced from the power plant boiler. Clear water overflow from the West BAP discharges into the Secondary Bottom Ash Pond located southeast of the West BAP. Bottom ash and economizer ash is periodically excavated from the West BAP and hauled by truck to either the on-site landfill for disposal, or sent offsite for beneficial use.

The base of the West BAP was constructed in 1983 with a compacted clay liner (Sargent & Lundy, 1983). Following installation of the compacted clay liner, soil borings S-8 through S-11 were advanced below the base of the West BAP to total depths of six feet in September 1983. The lithologic data from soil borings S-8 through S-11 confirm at least six feet of clay is present below the base of the West BAP.

### **1.2.3 Area/Volume**

The West BAP is approximately 30.9 acres in size. The design maximum ash storage capacity of the West BAP is 188 acre feet at an elevation of 354 feet above msl (normal operating level) and 216.5 acre feet at an elevation of 355 feet above msl (maximum operating level). Other pertinent information at the time of inspection is listed below:

#### **West Bottom Ash Pond**

The West Bottom Ash Pond was inactive during the 2017 Inspection. Routine periodic removal of the bottom ash from the pond occurred during April to June of 2017.

Approximate Minimum Depth of Ash for the Year:	0.5'
Approximate Maximum Depth of Ash for the Year:	7.5'
Approximate Average Depth of Ash for the Year:	5.0'
Approximate Minimum Depth of Water for the Year:	0.5'
Approximate Maximum Depth of Water for the Year:	7.0'
Approximate Present Depth of Water at Inspection:	5.0'
Approximate Volume of Ash in September 2017:	10,000 cubic yards
Approximate Volume of Water in September 2017:	1 Million Gallons at El. 347.5

### **1.2.4 Surface Water Control**

Surface water elevation in the West BAP is controlled by a stop log regulated window cut into a concrete riser and a manually operated gate valve on a 36-inch-diameter discharge pipe at the southeast corner of the pond. Clear water overflow from the West BAP

discharges through the 36-inch-diameter corrugated metal pipe into the 2.7- acre Secondary Bottom Ash Pond located southeast of the West BAP. Water in the Secondary Bottom Ash Pond is either pumped (recirculated) back into the boiler ash hopper, or gravity discharged through a pipe at the southwest corner of the Secondary Bottom Ash Pond into an unnamed intermittent tributary of Hatley Creek via Outfall 006 in accordance with Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0002496000.

## **2. Background Information of the East Bottom Ash Pond (BAP)**

The following section provides background information for the AEP H.W. Pirkey Generating Plant East BAP.

### **2.1 Facility Location Description**

The AEP H.W. Pirkey Plant is located in southern Harrison County, approximately 5 miles southeast of Hallsville, Texas, and approximately 8 miles southwest of Marshall, Texas. The East BAP CCR unit is located at the north end of the Plant and approximately 2,000 feet north-northwest of Brandy Branch Reservoir (Appendix A).

### **2.2 Description of East Bottom Ash Pond CCR Unit**

The following section will discuss the embankment configuration, area, volume, construction and operational history, and surface water control associated with the East BAP.

#### **2.2.1 Embankment Configuration**

The East BAP is partially incised below the existing natural ground surface with an embankment height of approximately 4 feet. The East BAP embankments are constructed of compacted clay on a 3:1 slope (3 feet horizontal, 1 foot vertical). The elevation of the top of the embankment around the perimeter of the East BAP is approximately 357 feet above msl, and the normal operating level is approximately 354 feet above msl. At the time of inspection the pool level of the East BAP was at 351.8 feet above msl. The interior bottom elevation of the East BAP is approximately 347 feet above msl.

#### **2.2.2 Area/Volume**

The East BAP is approximately 30.9 acres in size. The design maximum ash storage capacity of the East BAP is 188 acre feet at an elevation of 354 feet above msl (normal operating level). Other pertinent information at the time of inspection is listed below:

#### **East Bottom Ash Pond**

Approximate Minimum Depth of Ash for the Year:	0.5'
Approximate Maximum Depth of Ash for the Year:	7.0'
Approximate Average Depth of Ash for the Year:	4.5
Approximate Minimum Depth of Water for the Year:	0.5'

Approximate Maximum Depth of Water for the Year:	7.5'
Approximate Present Depth of Water at Inspection:	4.5'
Approximate Volume of Ash in September 2017:	75,000 cubic yards
Approximate Volume of Water in September 2017:	10 Million Gallons at El. 351

### **2.2.3 Construction and Operational History**

The H.W. Pirkey Power Plant was constructed in 1983 and 1984, and began operation in 1985. Throughout the life of the Plant, CCR materials (fly ash, bottom ash, flue gas desulfurization sludge) have been generated. The East BAP, which was placed into operation in 1985, receives bottom ash sluiced from the power plant boiler. Clear water overflow from the East BAP discharges into the Secondary Bottom Ash Pond located directly south of the East BAP. Bottom ash is periodically excavated from the East BAP and hauled by truck to either the on-site landfill for disposal, or sent offsite for beneficial use.

The base of the East BAP was constructed in 1983 with a compacted clay liner. Following installation of the compacted clay liner, soil borings S-4 through S-7 were advanced below the base of the East BAP to total depths of six feet in September 1983. The lithologic data from soil borings S-4 through S-7 confirm at least six feet of clay is present below the base of the East BAP.

### **2.2.4 Surface Water Control**

Surface water elevation in the East BAP is controlled by a stop log regulated window cut into a concrete riser and a manually operated gate valve on a 36-inch-diameter discharge pipe at the southwest corner of the pond. Clear water overflow from the East BAP discharges through the 36-inch-diameter corrugated metal pipe into the 2.7- acre Secondary Bottom Ash Pond located directly south of the East BAP. Water in the Secondary Bottom Ash Pond is either pumped (recirculated) back into the boiler ash hopper, or gravity discharged through a pipe at the southwest corner of the Secondary Bottom Ash Pond into an unnamed intermittent tributary of Hatley Creek via Outfall 006 in accordance with Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0002496000.

## **SUMMARY OF VISUAL OBSERVATIONS**

Results of the visual inspection performed on September 12, 2017 are summarized below. Pond water elevation is presented in the instrumentation data section of this report.

### **West Bottom Ash Pond**

At the time of the inspection, the West Bottom Ash Pond was dry and out of service. Minor bare areas were noted at many locations on the interior slope, although there were no

signs of active erosion as a result of the unprotected soils. A gravel road runs along the crest. There was no evidence of rutting, cracking, instabilities or low areas along the crest. Some minor erosion rills had formed on a ramp to the crest at the southwestern corner of the embankment. There was no evidence of rodent burrows on the embankments. Brush was present on the exterior slope around a power pole by the southeastern corner of the embankment and also present around a drainage culvert beyond the southern exterior toe. There was no evidence of seepage (although the pond was dry) or instabilities on the exterior slope. A berm has been constructed out of bottom ash for water treatment purposes inside the pond area, near the northwestern corner of the pond. The 36-inch-diameter gate valve on the discharge structure was observed to have corrosion on the exterior surface and components. The interior of the discharge structure was inundated and could not be inspected.

### **East Bottom Ash Pond**

At the time of the inspection, the pool level of the East Bottom Ash Pond was at 351.8 feet above msl. Cattails were present along the shoreline and in places on the interior slope of the dam. The crest carries a gravel road around the perimeter of the reservoir. A berm constructed out of bottom ash inside of the pond area near the northern end of the lake has been built for water treatment purposes. A surface run-off ditch exists around the eastern perimeter of the pond and was heavily vegetated in sections. Other sections of the perimeter ditch appear flat enough to allow ponding water, resulting in barren areas, although there were no signs of active erosion as a result of the unprotected soils in these barren areas. There was no evidence of rodent burrows on the embankments. The northern section of the embankment is covered with dense trees and brush. The embankment in this section is about 4 feet tall and there is a road embankment (Red Oak Road) beyond the northern dam embankment. Previous studies at the east bottom ash pond dam have concluded that removal of the trees and brush on this section of the dam is not necessary due to the low hydrostatic pressures acting on the embankment, and the natural drainage patterns in the area further to the north. The visible sections of the 36-inch-diameter gate valve exhibited moderate signs of corrosion. The interior of the discharge structure could not be inspected due to water flowing through the stoplogs.

## **REVIEW OF AVAILABLE INFORMATION**

A review of available information regarding the status and condition of the Bottom Ash Pond Complex, which include files available in the operating record, such as design and construction information, previous periodic structural stability assessments, previous 7 day inspection reports, previous 30-day instrumentation data, and previous annual inspections has been conducted. Based on the review of the data there were no signs of actual or potential structural weakness or adverse conditions.

## ASSESSMENT OF RECENT INSTRUMENTATION DATA

The monitoring instrumentation for the West Bottom Ash Pond consists of the following: two (2) active piezometers located through the main embankment and toe area. Monitoring instrumentation data is collected as part of the annual inspection program for the Pirkey Bottom Ash Ponds. The piezometer level measured on August 19, 2017, when the pool level in the West Bottom Ash Pond was at El. 350 are reported below.

<u>Pond Name</u>	<u>Crest Elevation msl</u>	<u>Boring/Piezometer</u>	<u>WSEL August 19, 2017</u>
West Bottom Ash	357.0	W-1	323.88
West Bottom Ash	357.0	W-3	319.37

Piezometers W-1 and W-3 are in service and water level readings are measured on a monthly basis. The current readings of the piezometers are in good agreement with the operating water levels of the pond and are within the tolerance that would be provide stability for a facility of this type.

## REMEDIAL ACTIONS

The following are remedial actions, general maintenance items and monitoring requirements that are recommended as a result of the inspection. Assistance or guidance with the implementation of these items can be provided by AEPSC Civil Engineering & Geotechnical Services:

1. Perform a detailed inspection of the corrugated metal pipe conduits which discharge into the Secondary Bottom Ash Pond. Results of the detailed inspection should be used during an evaluation of the structural integrity of the corrugated metal pipe conduits.
2. Protect the soils in the perimeter ditch of the Eastern Bottom Ash Pond from erosion. This can be accomplished by establishing a grass cover in the area or using alternative means of erosion protection.
3. Repair the erosion rills on the ramp near the southwestern corner of the Western Bottom Ash Pond Dam.
4. Remove the brush growing near the southeastern corner of the Western Bottom Ash Pond Dam and around the surface drainage culvert beyond the southern exterior toe of the Western Bottom Ash Pond Dam. In addition, remove the cattails growing on the interior slope of the embankments.

5. Monitoring procedures and maintenance activities should be implemented in coordination with AEP Geotechnical Group;
6. Continue Plant inspections of the facility in accordance with the Circular Letter and CCR Rules.

## CONCLUSIONS

Based on the visual inspection, the overall condition of the Designated CCR Impoundments (East and West Bottom Ash Ponds) appears to be operating as designed. Inspection and monitoring activities being performed by the Plant and AEPSC Civil Engineering & Geotechnical Services should continue. Specific conclusions related to this inspection include:

1. There is no evidence of distress that would indicate the possibility of immediate sliding, slope instability, settlement, misalignment or cracking of the bottom ash pond embankments. As such it is concluded that the dam and dikes are performing as designed.
2. The condition of the corrugated metal discharge pipes could not be inspected due to the water levels in the ponds/discharge structures. Due to the age of these conduits and the corrosive environment around the pipes, these conduits should be investigated to ensure the structural integrity of the corrugated metal pipe material. Being aware of the condition of these conduits might allow for the implementation of trenchless technologies (i.e. slip-lining) and budgeting of any repair or replacement costs.
3. Vegetation management for the facilities is considered sufficient. However, some areas have sparse vegetation and/or are overgrown and should be managed accordingly. Cattail along the interior slopes of the embankments should be periodically removed.

If you have any questions with regard to this report, please do not hesitate to contact Dan Murphy at (614) 716-2279 (Audinet-200-2279).

## APPENDIX A

**Photo # 1**

View of the discharge structure at the West Bottom Ash Pond.



**Photo # 2**

Close-up view of the corrosion on the discharge structure of the West Bottom Ash Pond.



**Photo # 3**

View showing the staff gauge on the discharge structure



**Photo # 4**

Typical view of the interior slope of West Bottom Ash Pond Dam.



**Photo # 5**

Typical crest area of the West Bottom Ash Pond Dam.



**Photo # 6**

View of the erosion rills on the ramp to the crest near the southwest corner of West Bottom Ash Pond.



**Photo # 7**

View of some minor brush growing on the exterior slope, near the southeast corner of the West Bottom Ash Pond Dam.



**Photo # 8**

View of the crest and exterior slope of the West Bottom Ash Pond Dam.



**Photo # 9**

View of a berm constructed of bottom ash inside the West Bottom Ash Pond area, indicated by a white arrow.



**Photo # 10**

View of the pump intake line at the secondary Bottom Ash Pond Dam.



**Photo # 11**

View of a formerly used outlet at the Secondary Bottom Ash Pond Dam. This is Outfall 006.



**Photo # 12**

View of the outlet of the formerly used outlet at the Secondary Bottom Ash Pond Dam, indicated by the white arrow. This is Outfall 006.



**Photo # 13**

View of the interior slope and crest of the Secondary Bottom Ash Pond Dam.



**Photo # 14**

View of the interior slope of the Secondary Bottom Ash Pond Dam.



**Photo # 15**

View of the exterior slope of the Secondary Bottom Ash Pond Dam.



**Photo # 16**

View of the boiler-blow down pipe, which outlets on the interior slope of the Secondary Bottom Ash Pond Dam. Notice the recently constructed concrete stairs.



**Photo # 17**

View of the interior slope of the splitter dike between the East Bottom Ash Pond and Secondary Bottom Ash Pond.



**Photo # 18**

View of the interior slope of the Secondary Bottom Ash Pond.



**Photo # 19**

View of the discharge structure at the East Bottom Ash Pond.



**Photo # 20**

View of the crest of the East Bottom Ash Pond Dam.



**Photo # 21**

View of the exterior slope and perimeter ditch around the East Bottom Ash Pond.



**Photo # 22**

View of the perimeter ditch around the East Bottom Ash Pond Dam.



**Photo # 23**

View of a berm constructed inside the East Bottom Ash Pond area for water treatment purposes, indicated by the white arrow.



**Photo # 24**

View of the influent line, discharging sluiced bottom ash into the East Bottom Ash Pond Dam.





**Legend**

- Discharge Structure
- Perimeter Ditch
- Influent Lines

Mature trees along exterior slope of the northern embankment

Ash Berm

East Bottom Ash Pond

Discharge Structure

Secondary Bottom Ash Pond

Outfall 006

West Bottom Ash Pond

Ash Berm

Discharge Structure

Brush near Power Pole on Exterior Slope

Brush around culvert headwall

County Road 3200

County Road 3200

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Pirkey Bottom Ash Ponds  
 Drawn By: Dan Murphy  
 Date: 9/18/2017

