DTE Energy Monroe Power Plant

Inactive Bottom Ash Impoundment
CCR Rule Compliance Project

Annual Inspection Report - 2019

Project Number: 60516675

September 6, 2019

Prepared by:

AECOM

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AECOM

1. Introduction

1.1 Introduction

The 2019 Annual Inspection Report (AIR) was prepared by AECOM for the DTE Electric Company (DTE) to summarize the results of the annual inspection of the Monroe Power Plant Inactive Bottom Ash Impoundment. This annual inspection complies with the United States Environmental Protection Agency Coal Combustion Residuals Rule (40 CFR 257.73). Under the CCR Rule, the Inactive Bottom Ash Impoundment is an "existing surface impoundment" and must be inspected by a qualified professional engineer on a periodic basis, not to exceed one year.

1.2 Background Information

The Inactive Bottom Ash Impoundment area was constructed in the late 1960's by building a perimeter dike to surround a low area of the adjacent Lake Erie; the area south of the plant was removed from the Waters of the United States by an Act of Congress prior to plant construction. CCR materials have been placed and allowed to drain into the pond from the north end of the pond; these materials currently form a delta that extends about 1/3 of the way into the pond.

1.3 Personnel

The annual inspection was performed by Mr. Scott G. Hutsell, P.E., with assistance from DTE personnel. Weekly inspections have been and continue to be performed by DTE's plant personnel.

2. Annual Inspection Results

2.1 2019 Inspections

DTE performed the following visual inspections in 2019:

- The annual inspection on July 22, 2019 (provided in Appendix A)
- Weekly inspections during 2019

The annual and weekly inspections included the embankment crest, exterior slopes of the embankment, discharge structures, and discrete observations of the interior of the basins based on accessibility. In addition to the annual and weekly inspections, the general condition of the site and embankment was visually inspected by DTE on a daily basis.

In general, no sign of vegetative distress or structural issues were observed during the annual inspection on the embankment crest, exterior slopes of the embankment and discharge structure. These structures appeared to be in good condition. No changes to the geometry of the impoundment have occurred since the last inspection. Instrumentation related to geotechnical monitoring of the impoundment slopes is not present at the impoundment and no equipment has been installed at the impoundment since the last inspection.

The water elevation of the pond is approximately ~575 MSL as noted in the inspection report in Appendix A. Water depth ranges from zero along the northern shore to 3 feet along the eastern and southern perimeter and up to 25 feet in depth near the weir. The storage capacity of the impoundment has been estimated to be 18.8M cubic feet ("CCR Impoundment Inflow Design Flood Control System Plan: Inactive Bottom Ash Impoundment, Monroe Power Plant", AECOM revised August 30, 2019). CCR materials have not been placed in the impoundment since 2015.

Areas of concern are listed below; these conditions do not represent an immediate concern for the safe operation or stability of the Inactive Bottom Ash Impoundment and will be addressed through the closure of the Bottom Ash Impoundment.

- The downslope sides of the Impoundment are heavily vegetated and/or below the water surface. A thorough inspection of the entire surface perimeter of the impoundment is not practical.

3. Maintenance Activities in 2019

3.1 Maintenance Activities

DTE installed additional rip-rap along the western slope of the impoundment to repair areas where rip-rap has sloughed down the slope.

4. Conclusion and Certification

4.1 Conclusion

The annual inspection did not identify any evidence of structural weakness or instability in the Inactive Bottom Ash Impoundment at DTE's Monroe Power Plant.

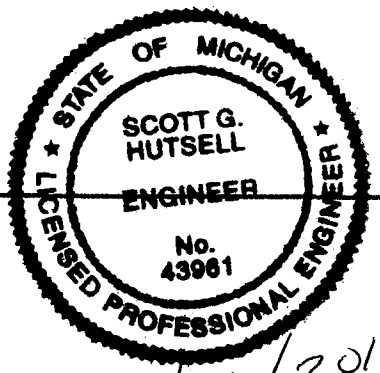
Based on the annual inspection results and review of available data (including design documents and weekly inspection documentation) the Bottom Ash Impoundment was designed and constructed with generally accepted good engineering standards. Additionally, the Inactive Bottom Ash Impoundment is operated and maintained using generally accepted good engineering practice.

4.2 Certification

Certified by:

Scott G. Hutsell, P.E. Michigan License #43961

Senior Project Manager



09/06/2019

CCR Impoundment Inspection Report

Station/Owner	**County**	**State**
Monroe Inactive Bottom Ash Impoundment / DTE Energy	Monroe	Michigan

Inspected By	**Date**	**Phone No.**
Scott G. Hutsell, P.E.	07/22/2019	517-505-1301

Type of Impoundment: ☐ Concrete Gravity ☒ Embankment ☐ Concrete Arch ☐ Stone Masonry ☐ Concrete Buttress ☐ Other	**Type of Inspection** ☐ Initial ☒ Periodic ☐ Follow up ☐ Other	**Weather** ☐ Wet ☒ Dry ☐ Snow Cover ☐ Other

Hazard Description	**Condition Assessment**	
The Inactive Bottom Ash Impoundment is an inactive surface impoundment; the northern half is deposited sluiced ash while the southern half contains from 3 to 25 ft of water surrounded by an embankment.	☒ Satisfactory ☐ Unsatisfactory ☐ Poor ☐ Not rated ☐ Fair	

Remarks	**Actions**	**Recommendations**
	☐ None ☒ Maintenance ☒ Monitoring ☒ Minor Repair ☐ Engineering	☒ Inspection letter ☐ ☐ Deficiency letter ☐ ☐ EOR notice ☐ ☐ Engineering study ☐ Periodic reinspection ☐ Inspection by EOR

Pool Level (ft)	**Total Precipitation since last inspection**
~575 ft MSL	n/a

UPSTREAM SLOPE/FACE

Problems				**COVER:**
☐ 1. None ☒ 2. Vegetation >2" dia. ☒ 3. Veg. height >6" ☒ 4. High bushes ☐ 5. Animal Burrows ☐ 6. Livestock damage	☐ 7. Wave Erosion ☐ 8. Slides ☐ 9. Depressions ☐ 10. Bulges ☐ 11. Cracks ☐ 12. Spalling	☐ 13. Scarps ☐ 14. Sloughing ☐ 15. Holes ☐ 16. Undermining ☐ 17. Displaced joints ☐ 18. Deteriorated joints	☐ 19. Exposed reinforcement ☐ 20. Veg. or sediment in rip rap ☐ 21. Displaced rip rap ☐ 22. Sparse rip rap ☐ 23. Other Erosion ☐ 24. Other	☒ Vegetation ☒ Rip rap ☐ Concrete ☐ Asphalt ☐ Other

Comments /Action Items

The embankments surrounding the Inactive Bottom Ash Impoundment is typically 20' wide at the crest – while the access road is made up of crushed rock and rip-rap the interior sideslopes are heavily vegetated. The southern embankment is a rip-rap separation berm built in 2015.

Actions ☒ None ☐ Maintenance ☐ Monitoring ☐ Minor Repair ☐ Engineering

TOP OF DAM/CREST

PROBLEMS				**COVER:**
☐ 1. None ☐ 2. Vegetation >2" dia. ☐ 3. Veg. height >6" ☒ 4. High bushes ☐ 5. Animal Burrows ☐ 6. Livestock damage	☒ 7. Ruts ☐ 8. Depressions ☐ 9. Unlevel ☐ 10. Misalignment ☐ 11. Signs of overtopping	☐ 12. Cracks ☐ 13. Deteriorated joints ☐ 14. Displaced joints ☐ 15. Exposed reinforcement ☐ 16. Settlement	☐ 17. Scarps ☐ 18. Spalling ☐ 19. Sinkholes ☐ 20. Puddles ☐ 21. Other	☒ Vegetation ☒ Rip rap ☐ Concrete ☐ Asphalt ☐ Other

Comments /Action Items

The embankments surrounding the Inactive Bottom Ash Impoundment are typically 20' wide at the crest; the access road is made up of crushed rock and rip-rap. While the access road is in fairly good condition there are some potholes and ruts along the perimeter. The southern embankment is a rip-rap separation berm built in 2015; the berm has been significantly overgrown with small vegetation since construction.

Actions ☒ None ☐ Maintenance ☐ Monitoring ☐ Minor Repair ☐ Engineering

CCR Impoundment Inspection Report

DOWNSTREAM SLOPE/FACE

PROBLEMS				COVER:
☐1. None ☒2. Vegetation >2" dia.\ ☒3. Veg. height >6" ☒4. High bushes ☐5. Poor grass cover ☐6. Animal Burrows ☐7. Livestock damage	☐8. Wetness ☐9. Seepage ☐10. Boils ☐11. Puddles ☐12. Erosion ☐13. Slope instability ☐14. Scarps	☐15. Sloughs/bulges ☐16. Depressions ☐17. Undercutting ☐18. Rutting/rills ☐19. Cracks ☐20. Scour ☐21. Spalling	☐22. Displaced joints ☐23. Deteriorated joints ☐24. Exposed reinforcement ☐25. Riprap needs attention ☒26. Veg. or sediment in rip rap ☐27. Other	☒Vegetation ☐Rip rap ☐Concrete ☐Asphalt ☐Other

28. Does standing water or seepage contain sediment?	☐Yes ☒No ☐NA
29. Is there natural hillside seepage in in embankment area?	☐Yes ☒No ☐NA

Describe seepage with regard to quantity and clarity (turbidity). Note changes:

None

Comments /Action Items

Along the outside embankment large trees (1-2' in diameter) are visible. The southern embankment is a rip-rap separation berm built in 2015.

Actions ☒None ☐Maintenance ☐Monitoring ☐Minor Repair ☐Engineering

TOE CONTACT

PROBLEMS				COVER:
☐1. None ☒2. Vegetation >2" dia. ☐3. Veg. height >6" ☒4. High bushes ☐5. Poor grass cover ☐6. Animal Burrows ☐7. Livestock damage	☐8. Wetness ☐9. Seepage ☐10. Boils ☐11. Puddles ☐12. Erosion ☐13. Slope instability ☐14. Scarps	☐15. Sloughs/bulges ☐16. Depressions ☐17. Undercutting ☐18. Rutting/rills ☐19. Cracks ☐20. Scour ☐21. Spalling	☐22. Displaced joints ☐23. Deteriorated joints ☐24. Exposed reinforcement ☐25. Riprap needs attention ☐26. Veg. or sediment in rip rap ☐27. Other	☒Vegetation ☐Rip rap ☐Concrete ☐Asphalt ☐Other

28. Does standing water or seepage contain sediment?	☐Yes ☒No ☐NA

Describe seepage with regard to quantity and clarity (turbidity). Note changes:

None

Comments /Action Items

Toe is inaccessible to direct inspection due to heavy vegetation along the northern water surface Toe is inaccessible along the western and eastern perimeter due to the water surface. Portions of the toe of slope that are visible from the south bank and other slopes look to be in good condition.

Actions ☒None ☐Maintenance ☐Monitoring ☐Minor Repair ☐Engineering

ABUTMENT CONTACTS

PROBLEMS				COVER:
☐1. None ☐2. Vegetation >2" dia. ☐3. Veg. height >6" ☐4. High bushes ☐5. Poor grass cover ☐6. Animal Burrows ☐7. Livestock damage	☐8. Wetness ☐9. Seepage ☐10. Boils ☐11. Puddles ☐12. Erosion ☐13. Slope instability ☐14. Scarps	☐15. Sloughs/bulges ☐16. Depressions ☐17. Undercutting ☐18. Rutting/rills ☐19. Cracks ☐20. Scour ☐21. Spalling	☐22. Displaced joints ☐23. Deteriorated joints ☐24. Exposed reinforcement ☐25. Riprap needs attention ☐26. Veg. or sediment in rip rap ☐27. Other	☐Vegetation ☐Rip rap ☐Concrete ☐Asphalt ☐Other

Comments /Action Items

Not applicable

Actions ☒None ☐Maintenance ☐Monitoring ☐Minor Repair ☐Engineering

CCR Impoundment Inspection Report

PRINCIPAL SPILLWAY

OBSERVATIONS

☐ No Spillway

Is spillway control system operating properly? ☒ **Yes** ☐ **No**

PROBLEMS				CHANNEL LINING
☐ 1. None ☐ 2. Trashguard ☒ 3. Debris ☒ 4. Obstructed ☐ 5. Plugged/Clogged ☐ 6. Gates Damaged ☐ 7. Gates leaking ☐ 8. Gates Rusted	☐ 9. Misalignment ☐ 10. Joints leaking ☐ 11. Joint deterioration ☐ 12. Joint displacement ☐ 13. Conduit collapsed ☐ 14. Exposed reinforcement ☐ 15. Erosion	☐ 16. Undermining ☐ 17. Voids ☐ 18. Cracks ☐ 19. Holes ☐ 20. Spalling ☐ 21. Slides ☐ 22. Outlet undercutting	☐ 23. Sloughing ☐ 24. Scarps ☐ 25. Deteriorated lining ☐ 26. Boils ☐ 27. Outlet erosion ☐ 28. Displaced rip rap ☐ 29. Sparse rip rap ☐ 30. Other	☒ Vegetation ☐ Rip rap ☐ Concrete ☐ Asphalt ☐ Other

Comments /Action Items

Spillway appears to be in good repair. There are no control systems so the spillway acts as both principal and emergency.

Actions ☒ None ☐ Maintenance ☐ Monitoring ☐ Minor Repair ☐ Engineering

EMERGENCY SPILLWAY

OBSERVATIONS

☐ No emergency spillway ☒ Same as primary spillway

PROBLEMS				CHANNEL LINING
☐ 1. None ☐ 2. Debris in channel ☐ 3. Gates ☐ 4. Misalignment	☐ 5. Joint deterioration ☐ 6. Joint displacement ☐ 7. Exposed reinforcement ☐ 8. Erosion	☐ 9. Undermining ☐ 10. Voids ☐ 11. Cracks ☐ 12. Holes ☐ 13. Outlet erosion	☐ 14. Displaced rip rap ☐ 15. Sparse rip rap ☐ 16. Outlet undercutting ☐ 17.Inadequate capacity ☐ 18. Other	☐ Vegetation ☐ Rip rap ☐ Concrete ☐ Asphalt ☐ Other

Comments /Action Items

See Principal Spillway Above

Actions ☒ None ☐ Maintenance ☐ Monitoring ☐ Minor Repair ☐ Engineering

DRAINS/OUTLET STRUCTURE

Observations			
1.	Is discharge system operating properly?	☒ **Yes**	☐ **No** ☐ **N/A**
2.	Valves and operators in good condition?	☐ **Yes**	☐ **No** ☒ **N/A**
3.	Walkway in good condition?	☒ **Yes**	☐ **No** ☐ **N/A**
4.	Is there any turbidity observed at the outlet?	☐ **Yes**	☒ **No** ☐ **N/A**
5.	Seepage at pipe outlet	☐ **Yes**	☐ **No** ☒ **N/A**
6.	No Bottom Drain	☐ **Yes**	☐ **No** ☒ **N/A**
7.	Bottom Drain Operable	☐ **Yes**	☐ **No** ☒ **N/A**
8.	Subsurface Drain Dry	☐ **Yes**	☐ **No** ☒ **N/A**
9.	Subsurface drain muddy flow	☐ **Yes**	☐ **No** ☒ **N/A**
10.	Subsurface drain obstructed	☐ **Yes**	☐ **No** ☒ **N/A**
11.	Animal guard	☐ **Yes**	☐ **No** ☒ **N/A**
12.	other	☐ **Yes**	☐ **No** ☐ **N/A**

Comments /Action Items

None

Actions ☒ None ☐ Maintenance ☐ Monitoring ☐ Minor Repair ☐ Engineering

CCR Impoundment Inspection Report

RESERVIOR/POOL

OBSERVATION					
Has there been a sudden drop in the content level of the Impoundment					☐Yes ☒No
PROBLEMS					
☒1. None ☐2. Inadequate freeboard	☐3. Skimmer ☐4. Depressions	☐5. Whirlpools	☐6. Sinkholes	☒7. Unwanted growth in pond water	

Comments /Action Items

Pool level has been relatively steady since observations were first begun by this inspector in late 2015. Southern separation berm has 2 pipes and a lowered section to allow for equalization of water levels between the Inactive Bottom Ash Impoundment and the Coal Pile Runoff Basin. The surrounding waters (Lake Erie, Discharge Canal) are at their highest levels since inspections have begun.

Actions ☒None ☐Maintenance ☐Monitoring ☐Minor Repair ☐Engineering

OTHER

OBSERVATIONS		
1.	leachate/stormwater (RCP; CMP) drain pipes that pass through or under an ash basin intact?	☐**Yes** ☐**No** ☒**N/A**
2.	Drainage/ diversion ditches/riprap-lined channels in good condition?	☐**Yes** ☐**No** ☒**N/A**
3.	Other steel structures/steel reinforcement in concrete structures in good condition?	☐**Yes** ☐**No** ☒**N/A**
4.	Other concrete structures in good condition?	☐**Yes** ☐**No** ☒**N/A**
5.	Overflow pipes and flap gates on filter dam/ drain pipe filter zone in good condition?	☐**Yes** ☐**No** ☒**N/A**
6.	Howell Bunger Valves in good condition?	☐**Yes** ☐**No** ☒**N/A**
7.	Weirs in good condition?	☐**Yes** ☐**No** ☒**N/A**
8.	Perimeter Fences and Gates in good condition?	☒**Yes** ☐**No** ☐**N/A**
9.	Security devices in good condition	☐**Yes** ☐**No** ☒**N/A**
10.	Signs in good condition	☐**Yes** ☐**No** ☒**N/A**
11.	Instrumentation in good condition	☐**Yes** ☐**No** ☒**N/A**
12.	Reference monuments/Survey Monuments in good condition	☐**Yes** ☐**No** ☒**N/A**
13.	other	☐**Yes** ☐**No** ☒**N/A**

Comments /Action Items

Actions ☒None ☐Maintenance ☐Monitoring ☐Minor Repair ☐Engineering

Are there any other abnormal conditions at the Impoundment that could pose a risk to public health, safety or welfare; the environment or natural resources ☐Yes ☒No

Inspector Signature Scott G. Hutsell

Date: 07/22/19

Photo 1: Looking north along east access road

Photo 2: Looking west from east access road at south separation berm.

Photo 3: Looking west south separation berm to western edge of impoundment.

Photo 4: Area along the west berm repaired with additional rip-rap since 2018 inspection

Photo 5: Looking northwest from the walkway of the weir – water levels in the discharge canal are significantly higher than previous years