DTE Energy

Prepared for

DTE Electric Company
One Energy Plaza
Detroit, Michigan 48226

2016 ANNUAL INSPECTION REPORT
ASH BASIN EMBANKMENT

MONROE POWER PLANT

Monroe, Michigan

Prepared by

Geosyntec consultants

engineers | scientists | innovators

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January 2017

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TABLE OF CONTENTS

LIST OF APPENDICES

1. INTRODUCTION

1.1 Overview

The 2016 Annual Inspection Report (AIR) was prepared by Geosyntec Consultants (Geosyntec) for the DTE Electric Company (DTE) to summarize the results of the annual inspection of the Monroe Ash Basin (Ash Basin). The annual inspection is a part of the Inspection Monitoring and Maintenance (IMM) program for the Ash Basin. The IMM program was prepared to comply with United States Environmental Protection Agency (USEPA) Coal Combustion Residual (CCR) Rule (CCR Rule) published on April 17, 2015 (40 CFR 257.73). Under the CCR Rule, the Ash Basin is an "existing surface impoundment" and must be inspected by a qualified professional engineer on a periodic basis, not to exceed one year.

The site is located about one mile southwest of the Monroe Power Plant near Monroe, Michigan, and is bounded on the east by Lake Erie and the Plant discharge canal, on the west by Interstate Highway 75 (I-75), on the south by an agricultural field, and on the north by residential property and Plum Creek.

The Ash Basin was constructed in the early 1970s to contain a 400-acre ash basin to hold sluiced ash. The Ash Basin is constructed with a 3-1/2-mile long embankment using on-site fine grained (clay) soils that were excavated within the footprint of the ash basin. Ash and water is pumped to the ash basin using four, above grade pipelines consisting of steel and high density polyethylene pipes. After treatment in the ash basin, water flows out from the ash basin through a discharge structure in accordance with the facility National Pollutant Discharge Elimination System (NPDES) permit #MI0001848.

1.2 Purpose

Inspection, monitoring and maintenance of the embankment are performed by DTE pursuant to the combined monitoring and maintenance program described in IMM program (MONPP – 1301 – Rev. A and Rev. B) and the CCR Rule. The objective of the IMM program is to detect indications of potential slope instability in time to allow planning, design, and implementation of appropriate mitigation measures. Further, the purpose of the inspection under the CCR Rule is "…to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards." (40 CFR 257.83(b)(1)).

The purpose is accomplished through periodic visual inspection (and photo-documentation) of the embankment, monitoring of instrumentation intended to detect movement of the embankment, and review of construction and operating records since the last annual inspection.

1.3 Report Organization

The remainder of this report is organized as follows:

- Section 2 - Review of available information: summarizes various historical documents that were reviewed as part of this inspection.
- Section 3 - Inspection Results: summarizes visual observations recorded during inspections of the ash basin facility.
- Section 4 - Instrumentation Monitoring and Survey Results: presents the data from subsurface instrumentation monitoring and bathometry survey of the ash basin.
- Section 5 - Maintenance Activities: describes maintenance activities performed during 2015.
- Section 6 - Evaluation: evaluates the results of the visual inspection and instrumentation monitoring and provides recommendations for corrective actions as needed.
- Section 7 - Conclusion: provides the overall conclusions of the annual inspection.

1.4 Terms of Reference

The annual visual inspection was performed by Mr. Omer Bozok, P.E. and Mr. John Seymour, P.E. of Geosyntec[1], with assistance from DTE's qualified personnel.

The weekly inspections, and monitoring of inclinometers were performed by DTE's qualified personnel.

This report was prepared by Mr. Omer Bozok, P.E. of Geosyntec. The peer review was completed by Panos Andonyadis, P.E. of Geosyntec and senior reviews were completed by Mr. John Seymour, P.E. of Geosyntec.

[1] Omer Bozok, P.E. and John Seymour, P.E. of Geosyntec are the qualified professional engineers per the requirements of §257.53 of the CCR Rule. Both engineers have been involved with Monroe Ash Basin since 2009 when the design efforts for the mitigation of the embankment started. Both engineers have extensive knowledge of the site.

2. REVIEW OF AVAILABLE INFORMATION

Geosyntec reviewed the following documents, summarized in Table 1, below.

Table 1: Documents Reviewed

Title	Documentum No.	Prepared by	Year	Content
Monroe Fly Ash Disposal Basin Technical Report	MONPP-0144-77	DTE	1977	Design, construction and operational information.
Inspection, Monitoring and Maintenance Manual	MONPP-1301-Rev. A	Geosyntec	2014	Procedures for inspection, monitoring and maintenance of various facility structures.
Structural Integrity Assessment – Hydraulic Capacity and Safety Factor Assessment		Geosyntec	Ongoing	Results of hydraulic capacity and slope stability analyses.
Fill Plan Alternatives – Rev. B	MONPP-0154-15	Geosyntec	2015	Pros and cons of various fill plan alternatives for the remaining life of the ash basin.
Potential Failure Mode Analysis Results – Rev. 3	MONPP-0152-15	Geosyntec	2015	Results of potential failure mode analysis.
Geotechnical Site Characterization Report	MONPP-0135-10	Geosyntec	2012	Summary of data from various site investigation studies conducted around the perimeter of the embankment.

Title	Documentum No.	Prepared by	Year	Content
2009 Construction Completion Report	MONPP-0134-09	Geosyntec	2010	Construction information for the 2009 construction.
2010 Construction Completion Report	MONPP-0113-10	Geosyntec	2011	Construction information for the 2010 construction.
2011 Construction Completion Report	MONPP-0132-11	Geosyntec	2012	Construction information for the 2011 construction.
2012 Construction Completion Report	MONPP-0129-12	Geosyntec	2013	Construction information for the 2012 construction.
2013 Construction Completion Report	MONPP-0147-12	Geosyntec	2014	Construction information for the 2013 construction.
2014 Annual Inspection Report	MONPP-0152-14	Geosyntec	2015	Summary of quarterly inspection results for 2014.
2015 Annual Inspection Report	MONPP-0152-15	Geosyntec	2016	Summary of annual inspection results for 2016.
Overliner Construction, Phase 1- Construction Quality Assurance Report	MONPP-0155-15	Golder	2015	Construction completion document.
Dust Control Plan	MONPP CCR Fugitive Dust Plan	DTE	2015	Dust control plan.

3. VISUAL INSPECTION RESULTS

DTE performed the following visual inspections in 2016:

- Annual inspection (fall inspection) on September 20, 2016 (provided in Appendix A); and
- Weekly inspections since the beginning of 2016.

DTE's visual inspection for the annual and weekly inspections included the embankment crest, exterior slopes of the embankment, ash discharge point, discharge structure, discharge pipes through the embankment, and discharge channel to Lake Erie. Photographs of observed conditions were taken at the time of the inspection.

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 distress was 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 with the exception of a couple of areas. Non-optimal conditions that were observed during visual inspections are summarized below. These conditions do not represent an immediate concern for the safe operation or stability of the ash basin embankment as discussed in Section 6.

1. Surficial sloughs up to several feet deep were observed on the exterior slope of the embankment at two separate areas: (i) from Station ~162+00 to ~168+00 (Photographs 33 thru 36 in Appendix A); and (ii) from Station ~53+00 to ~58+00 (Photograph 82 in Appendix A).

2. Cracks up to several inches wide were observed on the exterior slope of the embankment at several areas: (i) Station ~161+75 (Photographs 38 and 39); (ii) from Station ~142+00 to Station ~145+00 (Photographs 46 thru 49); (iii) Station ~122+00 (Photograph 56); (iv) Station ~65+00 (Photograph 77 thru 79); (v) Station ~62+00 (Photograph 80).

3. Cracks that are one-inch wide or less were observed on the exterior slope of the embankment at two areas: (i) Station ~88+00 (Photographs 68 and 69); Station ~84+50 (Photographs 68 and 69); and (iii) Station ~75+00 (Photograph 74).

4. A depression was observed on the outside slopes under the trestles at Station 0+00. The area was approximately 20 ft by 20 ft and the approximately 8-in deep. This area was identified to have erosion gullies in 2015, and subsequently filled. It appears that the

repaired area settled after installation. No erosion features were observed during this inspection.

5. The mid-slope stormwater ditch appeared to lose contact with adjacent soil along the downstream edge at multiple locations. In general, the upslope edge appeared to have good contact with adjacent soil. A zone approximately 10-ft long at Station 150+00 heaved approximately 6-in.

6. Downchutes at the following stations have lost contact with the embankment at the upstream end and/or soil had washed around the parts of the downchute.

    - Station 26+00 (Photographs 9 thru 11)
    - Station 145+00 (Photograph 45)
    - Station 81+00 (Photograph 72)

7. Potholes and ruts on the embankment crest were observed along the southern embankment, which are scattered between Stations 110+00 and 139+00 (Photographs 55, 58, and 60).

8. Erosion rills up to 6-in deep were observed at locations listed below.

    - Station ~22+00 (Photograph 14).
    - Station ~0+00 (Photographs 24 and 25).
    - Station ~110+00 (Photographs 61 and 62).
    - Station ~68+00 (Photograph 76).

9. Sparse vegetation was observed at multiple locations around the embankment. These areas and dimensions are summarized in Appendix A.

10. Embankment crest was lowered down to elevation 613 ft between Stations 164+00 and 166+00.

11. Embankment crest elevation was increased to a minimum elevation 614 ft around Station 138+00.

4. INSTRUMENTATION MONITORING AND BATHOMETRY SURVEY RESULTS

4.1 Inclinometers

4.1.1 Inclinometer Monitoring Procedures

Ten inclinometers (SIs) are currently being monitored at the embankment. The inclinometer casings were installed from the crest of the embankment to depths of approximately 45 to 50 feet below the crest. The purpose of the inclinometers is to provide a means of measuring horizontal displacement of the ground around the casing. The inclinometer readings provide values of horizontal displacement at discrete depths (at 1.6 ft intervals) in two orthogonal directions (A-axis and B-axis). Plots of horizontal displacement versus depth are generated that provide a vertical profile of the horizontal displacement experienced by the inclinometer casing at the time of the reading.

The orientation of the A-axis and B-axis are unique to the individual inclinometer casing. In general, the positive A-axis corresponds to a direction oriented outward from the basin and approximately perpendicular to the embankment crest station baseline. The B-axis is oriented parallel to the embankment crest station baseline.

Inclinometers were installed in late 2015 and baseline readings were taken on January 1st, 2016. These inclinometers continuously record measurements and were installed to replace the decommissioned inclinometers that required manual recording.

4.1.2 Characterization of Displacement versus Depth Profile Plots

The horizontal displacement versus depth profiles are summarized below for the readings from the time of the annual inspection (September 2016). These conditions do not represent an immediate concern for the safe operation or stability of the ash basin embankment as discussed in Section 6.

4.1.2.1 *Station 11+50 Inclinometer*

- A-axis direction
  - Maximum cumulative displacement magnitude and direction: +0.2 inch at the ground surface.
- B-axis direction
  - Maximum cumulative displacement magnitude and direction: 0 inch at the ground surface.

4.1.2.2 ***Station 34+00 Inclinometer***

- A-axis direction
  - Maximum cumulative displacement magnitude and direction: -0.1 inch at the ground surface.
- B-axis direction
  - Maximum cumulative displacement magnitude and direction: -0.1 inch at the ground surface.

4.1.2.3 ***Station 56+00 Inclinometer***

- A-axis direction
  - Maximum cumulative displacement magnitude and direction: +0.1 inch at 8 feet below ground surface.
- B-axis direction
  - Maximum cumulative displacement magnitude and direction: -0.1 inch at 10 feet below ground surface.

4.1.2.4 ***Station 65+50 Inclinometer***

- A-axis direction
  - Maximum cumulative displacement magnitude and direction: +0.1 inch at the ground surface.
- B-axis direction
  - Maximum cumulative displacement magnitude and direction: +0.1 inch at the ground surface.

4.1.2.5 ***Station 77+00 Inclinometer***

- A-axis direction
  - Maximum cumulative displacement magnitude and direction: +0.1 inch at the ground surface.
- B-axis direction
  - Maximum cumulative displacement magnitude and direction: -0.1 inch at 2 feet below ground surface.

4.1.2.6 ***Station 118+00 Inclinometer***

- A-axis direction

- Maximum cumulative displacement magnitude and direction: +0.2 inch at the ground surface.

- B-axis direction
  - Maximum cumulative displacement magnitude and direction: -0.1 inch at 3 feet below ground surface.

4.1.2.7 *Station 133+00 Inclinometer*

- A-axis direction
  - Maximum cumulative displacement magnitude and direction: +0.6 inch at 4 feet below ground surface.
- B-axis direction
  - Maximum cumulative displacement magnitude and direction: -0.2 inch at the ground surface.

4.1.2.8 *Station 142+00 Inclinometer*

- A-axis direction
  - Maximum cumulative displacement magnitude and direction: +0.1 inch at the ground surface.
- B-axis direction
  - Maximum cumulative displacement magnitude and direction: -0.1 inch at 2 feet below ground surface.

4.1.2.9 *Station 162+50 Inclinometer*

- A-axis direction
  - Maximum cumulative displacement magnitude and direction: +0.5 inch at the ground surface.
- B-axis direction
  - Maximum cumulative displacement magnitude and direction: -0.1 inch at 4 feet below ground surface.

4.1.2.10 *Station 178+00 Inclinometer*

- A-axis direction
  - Maximum cumulative displacement magnitude and direction: +0.2 inch at the ground surface.
- B-axis direction

- Maximum cumulative displacement magnitude and direction: -0.1 inch at the ground surface.

4.2 Bathometry Survey Results

The bathometry survey of the ash basin was performed by DTE survey crew in September 2016. The following were observed or estimated based on the survey results.

1) Water level at the time of survey was at elevation 608.5 ft[2], which is lower than the maximum operation water level of 609 ft.

2) Approximately 60 percent of the ash basin footprint is filled with ash above the water level.

3) The maximum water depth is approximately 37 ft. The top of ash at this location is at approximate elevation 571.6 ft.

4) The maximum ash thickness is approximately 50 ft, measured from the top of ash at approximate elevation 613 ft to the bottom of the ash basin, which is at approximate elevation 563.4 ft. The minimum thickness of ash is approximately 8.2 ft. The maximum and minimum ash thicknesses were approximately 50 ft and 7 ft, respectively in 2015.

5) At the time of the bathymetry measurements:

    a. the storage capacity of the Ash Basin is approximately 3.9 million cubic yards.

    b. approximately 20 million cubic yards of ash is deposited in the ash basin.

    c. approximately 780 million gallons of water is impounded in the ash basin.

[2] Elevations referred to in this report are based on National Geodetic Vertical Datum of 1929 (NGVD29).

5. MAINTENANCE ACTIVITIES PERFORMED IN 2016

The following maintenance activities were performed in 2016 prior to the annual inspection:

- Discharge structure was modified to: (i) fix broken welds between sheetpile and struts; and (ii) cut rectangle openings in the sheet piling to allow high water levels to pass over the notch in the sheetpile to avoid overtopping of the embankment during major storm events.
- Periodically mowed the embankment.
- Maintained the ditch within the ash basin to promote stormwater and slurry to flow into open water.
- Replaced HDPE downchutes at Stations 18+00, 26+00, 69+50, 75+50, 81+00, 87+00, and 156+00 with aggregate downchutes.
- Replaced one of the pumps at the pump house at Station 139+00.

DTE is planning to address the surficial slope instabilities described in Section 3 in 2017.

6. EVALUATION

6.1 Visual Inspection

Non-optimal conditions noted from the 2016 annual inspection are discussed below:

- Sloughs observed on the embankment from Station ~162+00 to ~168+00, and from ~53+00 to ~58+00 do not represent an immediate concern for global stability of the ash basin embankment; these sloughs should be fixed as soon as practical.

- Several inches wide cracks were observed on the exterior slope of the embankment at Station ~161+75, from Station ~142+00 to Station ~145+00, at Station ~122+00, Station ~65+00, and at Station ~62+00 do not represent an immediate concern for global stability of the ash basin embankment; these cracks should be fixed as soon as practical.

- One-inch wide cracks and thinner were observed on the exterior slope of the embankment at Station ~88+00, Station ~84+50, and Station ~75+00 do not represent an immediate concern for global stability of the ash basin embankment; these cracks should be monitored on a regular basis at a frequency of once every 30 days (maximum).

- A depression area observed under the trestle structure does not represent an immediate concern for the safe operation or stability of the ash basin embankment.

- Isolated problems with the midslope ditch bedding (i.e. pea stone and underlying soil) washing out were observed at downchutes at Stations 26+00, 81+00 and 145+00. The observed problems do not represent an immediate concern for the safe operation or stability of the ash basin embankment. However, these downchutes shall be fixed in accordance with IMM Manual to reduce erosion along downchutes.

- The gap between midslope ditch flap and adjacent ground was observed at various sections along the embankment. These gaps do not represent an immediate concern for the safe operation or stability of the ash basin. However, gaps on the upstream side of the midslope ditch shall be filled in accordance with IMM Manual to direct stormwater into the midslope ditch.

- Potholes and ruts on the embankment crest do not represent an immediate concern for the safe operation or stability of the ash basin embankment. However, they should be maintained within a year in accordance with IMM Manual.

- Erosion rills do not represent an immediate concern for the safe operation or stability of the ash basin embankment. However, they should be maintained within a year in accordance with IMM Manual.

- Sparse vegetation does not represent an immediate concern for the safe operation or stability of the ash basin embankment.

6.2 Inclinometer Monitoring

The maximum cumulative displacement for all of the inclinometers is 0.6 inches at 4 ft below ground surface at Station 133+00. There is no evidence of movement (i.e. cracks, heaving) of the embankment at the monitored locations that would suggest a detrimental change in the condition of the embankment or a reduction in the stability of the structure.

7. CONCLUSION AND CERTIFICATION

The annual visual inspection did not identify evidence of structural weakness or instability.

Based on the annual inspection results and review of the available data, the Monroe Ash Basin facility was designed, constructed, operated and maintained with generally accepted good engineering standards.

Certified by:

Date 1/9/17

Omer Bozok, P.E. Michigan License Number 6201062700
Project Engineer

Date 1/9/2017

John Seymour, P.E. Michigan License Number 6201033056
Senior Principal

APPENDIX A
2016 ANNUAL INSPECTION FORMS AND PHOTOS

DTE Energy

Example CCR Surface Impoundment
2016 Annual Inspection Report

Name of Surface Impoundment: Monroe Ash Basin
Surface Impoundment ID Number:
Owner: DTE Energy
Operator: DTE Energy
Site Conditions: Dry

Qualified Professional Engineer: Omer Bozok
John Seymour
Date: 9/20/2016 **Time:** 9 PM to 2 PM
Weather: Sunny
Precipitation (since last inspection): 8/10 in.

I. Crest

1. Describe the condition of the crest. Are there any depressions, ruts, or holes on the crest? (Provide size, location, etc.)

In general, the crest is in good condition. There are several ruts and depressions on the crest. These are at: (i) Station ~119+00 (Photograph 55); Station ~118+00 (Photograph 58); (iii) Station ~114+00 (Photograph 60).

2. Are there are cracks on the crest? If there are, describe depth, length, width, location and direction of cracking, etc.

No cracks were observed on the crest.

3. Are there any trees or other undesired vegetation on the crest? ___ Yes x No
If 'Yes', describe (type of vegetation, size, location, etc.)

4. Other observations on the crest (changes since last inspection, etc.):

II. Embankment Slopes

1. How would you describe the vegetation on the downstream slope? (Check all that apply)

x Recently Mowed
x Slope surface visible
x Overgrown (Greater than 6-in.)
x Good Cover
___ Sparse

Other (describe): In general, vegetation is well established and it is greater than six inches. However, the slope surface was visible for inspection. Several areas were noticed to have sparse vegetation. These areas are at: (i) Station ~27+00 (~3 ft x ~1ft) (Photograph 7); (ii) Station ~10+00 (~5 ft x ~3 ft) (Photograph 19); (iii) Station ~8+00 (~20 ft x ~10 ft) (Photographs 20 and 21); (iv) Station ~139+75 (~5 ft x ~4 ft) (Photograph 50); (v) Station ~89+50 (~5 ft x ~3 ft) (Photograph 65); (vi) Station ~83+00 (~20 ft x ~5 ft) (Photograph 70); (vii) Station ~82+00 (~20 ft x ~5 ft) (Photograph 71); (viii) Station ~119+00 (~15 ft x ~3 ft).

2. Are there any areas of hydrophilic (lush, water-loving) vegetation on downstream slope? ___ Yes x No
If 'Yes', describe (size, location, severity, etc.)

3. Are there any trees or other undesired vegetation on the downstream slope? x Yes ___ No
If 'Yes', describe (type of vegetation, size, location, etc.) Various weeds were observed across the embankment. However, it does not pose threat to the structural integrity of the embankment.

4. Are there any depressions, bulges, holes, or erosion on the downstream slope? x Yes ___ No
If 'Yes', describe (size, location, severity, etc.) Several areas had depressions and bulges. These areas are at:

Name of Surface Impoundment: Monroe Ash Basin **Qualified Professional Engineer** Omer Bozok
Surface Impoundment ID Number: John Seymour

(i) Station 0+00 - depression was observed (Photograph 26) and (ii) Station 162+00 to 168+00 - bulging at the toe was observed (Photograph 36). Several areas had erosion rills. These areas are at: (i) Station ~22+50 (Photograph 14); (ii) Station ~0+00 (Photographs 24 and 25); (iii) Station ~110+00 (Photograph 61 and 62); (iv) Station ~68+00 (Photograph 76); (v) Station ~35+00.

5. Are there any cracks, sloughs, or indications of slope distress on the downstream slopes? x Yes ___ No
If 'Yes', describe (size, location, severity, etc.) Up to several foot deep sloughs were observed from Station 162+00 to 168+00 (Photographs 33 through 36). Up to several foot deep sloughs were observed from Station ~53+00 to ~58+00 (Photograph 82). Approximately 1.5-in wide cracks were observed at Station ~161+75, immediately above the area that was repaired in 2015. (Photographs 38 and 39). Up to several inches wide cracks were observed from Station 142+00 to 145+00 (Photograph 46 through 49). Up to several inches wide crack was observed at Station 122+00 (Photograph 56). Less than one inch wide cracks were observed towards the top of embankment around Stations 88+00 and 84+50 (Photographs 68 and 69). Approximately one inch wide crack was observed at Station ~75+00 towards the top of the embankment (Photograph 74). Up to three-inches wide cracks were observed around Station ~65+00 between crest and mid-slope ditch, along ~75 ft stretch (Photograph 77 through 79). Up to three-inches wide crack was observed at Station 62+00 between crest and mid-slope ditch, along ~5 ft stretch (Photograph 80).

6. Are there wet areas on the downstream slope? ___ Yes x No
If 'Yes', describe (size, location, etc.)

7. Are there any active seeps (flowing water) from the slope of the embankment? ___ Yes x No
If 'Yes', describe (size, location, flow quantity and color, etc.)

8. Are there any active seeps or wet areas at the toe of the embankment? ___ Yes x No
If 'Yes', describe (size, location, etc.)
along the east side.

9. Are there any animal burrows (larger than 2 in.) on the downstream slope? ___ Yes x No
If 'Yes', describe (size, extent, location, etc.)

10. Other observations on the downstream slope (changes since last inspection, etc.):

III. Surface Impoundment Conditions

1. Is the in-flow piping to the surface impoundment obstructed? ___ Yes x No
If 'Yes', describe (type of debris, reason for obstruction, etc.)

2. What is the water level in the surface impoundment today?
Maximum Pool Level / Datum 609 ft / NGVD29 ___ Above Normal Pool ___ feet
Pool Level is 608.5 ft x Below Normal Pool 1 feet

3. Is there any erosion protection around the impoundment (e.g., riprap)? x Yes ___ No
If 'Yes', describe what type and its condition (riprap - adequate, inadequate, obstructed, etc.)

Name of Surface Impoundment: Monroe Ash Basin **Qualified Professional Enginee** Omer Bozok
Surface Impoundment ID Number: John Seymour

The most inner perimeter of the ash basin is covered with ash and phragmites obscuring the majority of the ash bas upstream slope. Historical documents indicate that riprap was placed along the upper portion of the embankment and can be observed at the edge of the crest road in many places.

4. Is there excessive CCR build-up above the water surface? x Yes ___ No
If 'Yes', describe (size of area, location, severity, etc.) Approximately 60 percent the ash basin is at capacity and above the water elevation.

5. Is the pump house stormwater outlet into the basin clear of obstruction and water flowing freely? x Yes ___ No
If 'No', describe the condition.

6. Other observations around the impoundment (changes since last inspection, etc.):

IV. Discharge Structure and Channel

1. Are there any cracks or breaks in concrete or steel parts of the discharge structure? (If 'Yes' report the location and severity).
None.

2. How would you describe the overall condition of discharge structure? (Check all that apply)

x Functioning Normally
___ Not Functional
___ Deteriorated
___ Damaged
___ Adequate
___ Inadequate

Other (describe): Discharge structure has been recently modified. MONPP 6C695W-0056-001 provides details of the modificiation

3. Is water flowing freely through the discharge structure? x Yes ___ No
If 'No', describe (type of debris, reason for obstruction, etc.)

4. Are there any cracks, sloughs, or indications of slope distress on the upstream slope in the vicinity of discharge structure? If 'Yes', describe (size or area, location, severity, etc.)
No.

5. Describe the turbidity of discharge from the concrete outlet. Water coming out of the concrete outlet appeared to be clear.

DTE Energy

Example CCR Surface Impoundment
2016 Annual Inspection Report

Name of Surface Impoundment: Monroe Ash Basin **Qualified Professional Engineer** Omer Bozok
Surface Impoundment ID Number: John Seymour

6. Is the weir at the downstream of discharge channel in working condition? x Yes ___ No
If 'No', describe the issue

VI. Slurry Piping

1. Are there any breaks or leaks along the embankment? ___ Yes x No
If 'Yes', describe (the line #, location, severity, etc.)

VII. Repairs, Maintenance, Action Items

1. Has any routine maintenance been conducted since the last inspection? x Yes ___ No
If 'Yes', describe. See Section 5 of the report.

2. Have any repairs been made since the last inspection? ___ Yes x No
If 'Yes', describe.

3. Has this inspection identified any need for repair or maintenance? x Yes ___ No
If 'Yes', describe and state the urgency of maintenance. "Urgent" for maintenance that should be conducted as soon as possible, "Moderate" for maintenance that should be conducted within three months, and "Not Urgent" for maintenance that can be conducted in a year.
See Section 6.1 of the report.

VIII. Photography

Photographs can be taken of notable features. List of photographs:

	Location	Direction of Photo	Description
i.	SEE THE ATTACHED PHOTO LOG.		
ii.			
iii.			
iv.			
v.			
vi.			
vii.			
viii.			
ix.			
x.			

DTE ELECTRIC COMPANY

Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 1

Date: 20 September 2016

Comments: Photo taken at Station ~45+00, facing east. The embankment appeared to have uniform slopes without sign of distress.

Photograph 2

Date: 20 September 2016

Comments: Photo taken at Station ~32+00, facing east. HDPE downchute has been replaced with a riprap downchute.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 3 Date: 20 September 2016 Comments: In general, the mid-slope ditch has a good contact with upslope, but there are often localized gaps between the edge and the adjacent soil.	
Photograph 4 Date: 20 September 2016 Comments: Mid-slope ditch at Station 32+00 connecting to riprap downchute. Vegetation build-up was noticed in the mid-slope ditch.	

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 5 Date: 20 September 2016 Comments: Photo taken at Station 29+50, facing east. The embankment appeared to have uniform slopes without sign of distress.	
Photograph 6 Date: 20 September 2016 Comments: Photo taken at Station 30+00, facing east. In general, the mid-slope ditch appeared to be in good condition. Vegetation build-up was observed in the mid-slope ditch at various locations.	

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 7 Date: 20 September 2016 Comments: Sparse vegetation was noticed on the embankment at Station ~27+00. No erosion was observed.	
Photograph 8 Date: 20 September 2016 Comments: Photo taken at Station ~26+00, facing east. Vegetation was observed in the mid-slope ditch.	

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 9 Date: 20 September 2016 Comments: Downchute at Station 26+00. A gap up to six-inches wide was noticed between the flange and adjacent soil.	
Photograph 10 Date: 20 September 2016 Comments: Downchute at Station 26+00. Sediment build-up was noticed at the downstream end of downchute.	

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 11 Date: 20 September 2016 Comments: Upstream end of downchute at Station 26+00. Couple of inches wide gap was observed between the mid-slope ditch flange and upslope soil.	
Photograph 12 Date: 20 September 2016 Comments: In general, good contact between the mid-slope ditch and upslope soil was observed.	

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 13 Date: 20 September 2016 Comments: Photo taken at Station 25+00, facing west. The embankment appeared to have uniform slopes without sign of distress.	
Photograph 14 Date: 20 September 2016 Comments: Station ~22+50. Erosion rill was observed downstream of bleed-out.	

DTE ELECTRIC COMPANY

Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 15	
Date: 20 September 2016 Comments: Photo taken at Station 22+00, facing west. The embankment appeared to have uniform slopes without sign of distress. Vegetation buildup was observed in the ditch.	
Photograph 16	
Date: 20 September 2016 Comments: Downchute at Station 18+00 appeared to be in good condition.	

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 17 Date: 20 September 2016 Comments: Photo taken at Station 6+00, facing east. The embankment appeared to have uniform slopes without sign of distress.	
Photograph 18 Date: 20 September 2016 Comments: Photo taken at Station 13+00, facing east. The embankment appeared to have uniform slopes without sign of distress.	

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 19 Date: 20 September 2016 Comments: Sparse vegetation observed on the embankment at Station ~10+00. No erosion was observed.	
Photograph 20 Date: 20 September 2016 Comments: Vegetation at Station ~8+00 appeared to be damaged during mowing operations.	

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 21 Date: 20 September 2016 Comments: Vegetation at Station ~8+00 appeared to be damaged during mowing operations.	
Photograph 22 Date: 20 September 2016 Comments: Photo taken at Station ~6+00, facing west. Crest road appeared to be in good condition with no signs of crack, ruts and pot holes.	

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 23

Date: 20 September 2016

Comments: Approximately one-inch diameter animal burrows were noticed on the embankment at discrete locations.

Photograph 24

Date: 20 September 2016

Comments: Erosion rills were observed on the access ramps at Station 0+00.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 25

Date: 20 September 2016

Comments: Erosion rills were observed on the access ramps at Station 0+00.

Photograph 26

Date: 20 September 2016

Comments: The area that had erosion gullies under the trestles in 2015 appeared to be filled in, but the area appeared to be lower than the surrounding ground.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 27

Date: 20 September 2016

Comments: Discharge structure appeared to be in good working condition. Water level was at elevation 608.6 ft.

Photograph 28

Date: 20 September 2016

Comments: Discharge structure appeared to be in good working condition.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 29

Date: 20 September 2016

Comments: Water discharging at the concrete outlet appeared to be clear.

Photograph 30

Date: 20 September 2016

Comments: Photo taken at Station ~178+00, facing south. The embankment appeared to have uniform slopes without sign of distress.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 31

Date: 20 September 2016

Comments: Photo taken at Station ~176+00, facing south. Crest road appeared to be in good condition with no signs of crack, ruts and pot holes.

Photograph 32

Date: 20 September 2016

Comments: Erosion rills were observed on the access ramp at Station ~169+00.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 33 Date: 20 September 2016 Comments: Photo taken at Station 169+00, facing south. Surficial sloughs and cracks were observed at some areas between Station 162+00 and 168+00.	
Photograph 34 Date: 20 September 2016 Comments: Surficial sloughs and cracks were observed at some areas between Station 162+00 and 168+00.	

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 35

Date: 20 September 2016

Comments: Surficial sloughs and cracks were observed at some areas between Station 162+00 and 168+00.

Photograph 36

Date: 20 September 2016

Comments: Surficial sloughs and cracks were observed at some areas between Station 162+00 and 168+00.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 37

Date: 20 September 2016

Comments: The area that was repaired last year at Station 161+75 appeared to be in good condition. However, cracks were observed upslope of the repaired area (see the next photo).

Photograph 38

Date: 20 September 2016

Comments: Crack forming (approximately 1.5-in wide, 10-ft long) upslope of the repaired area at Station 161+75.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 39

Date: 20 September 2016

Comments: Crack forming (approximately 1.5-in wide, 8-ft long) upslope of the repaired area at Station 162+00.

Photograph 40

Date: 20 September 2016

Comments: Photo taken at Station ~160+00, facing south. The embankment appeared to have uniform slopes without sign of distress.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 41

Date: 20 September 2016

Comments: Photo taken at Station ~156+00, facing south. The embankment appeared to have uniform slopes without sign of distress.

Photograph 42

Date: 20 September 2016

Comments: Downchute at Station 156+00 appeared to be in good working condition.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 43

Date: 20 September 2016

Comments: Mid-slope ditch at Station ~150+00 appeared to heave.

Photograph 44

Date: 20 September 2016

Comments: View of southeast corner from Station ~148+00 looking southwest.

DTE ELECTRIC COMPANY

Photographic Record

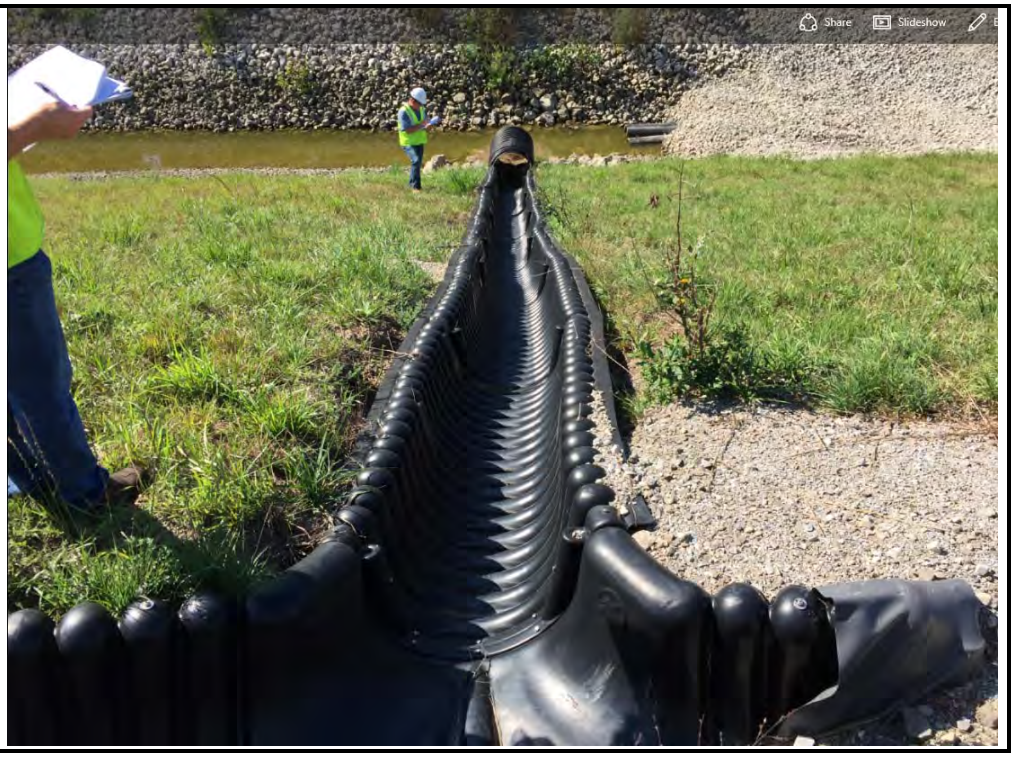
Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 45

Date: 20 September 2016

Comments: Downchute at Station 145+00 appeared to be in good working condition. However, up to six-inch wide gaps were observed along the sides.



Photograph 46

Date: 20 September 2016

Comments: Various cracks were observed within the area (from 142+00 to 145+00) that was repaired in 2015.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 47

Date: 20 September 2016

Comments: Various cracks were observed within the area (from 142+00 to 145+00) that was repaired in 2015.

Photograph 48

Date: 20 September 2016

Comments: Various cracks were observed within the area (from 142+00 to 145+00) that was repaired in 2015.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 49

Date: 20 September 2016

Comments: Various cracks were observed within the area (from 142+00 to 145+00) that was repaired in 2015.

Photograph 50

Date: 20 September 2016

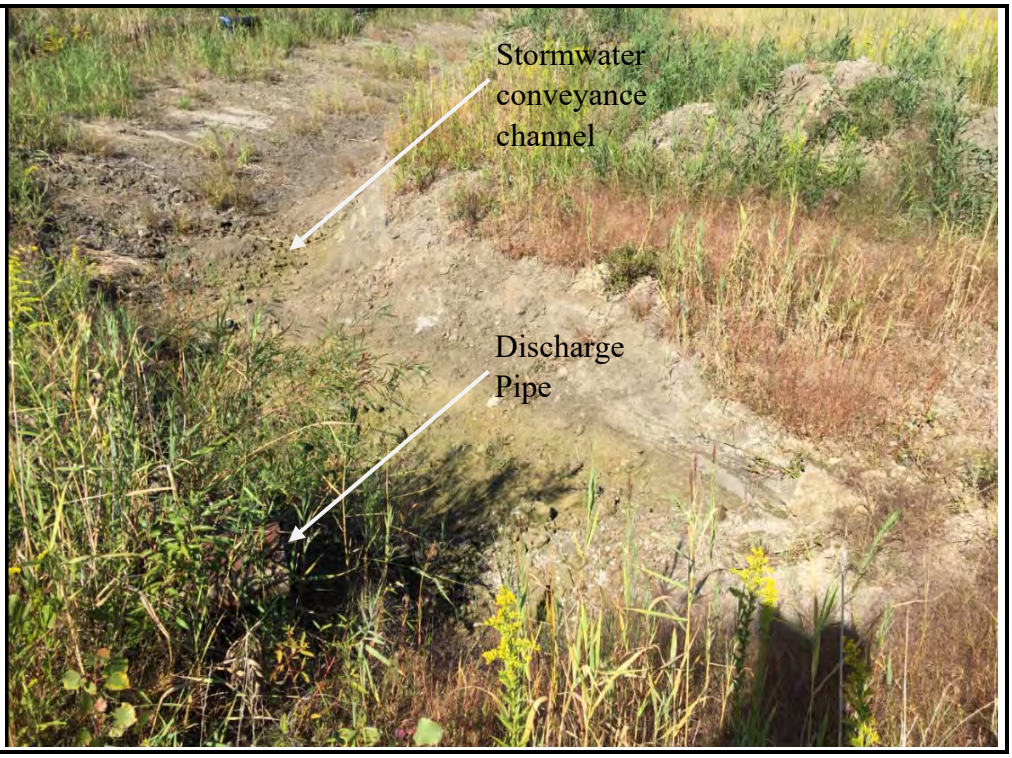
Comments: Sparse vegetation at Station 139+75 (~5 ft x ~4 ft).

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 51



Date: 20 September 2016

Comments: Pump house discharge pipe is not obstructed.

Photograph 52

Date: 20 September 2016

Comments: Photo taken at Station ~135+00, facing west. Crest road appeared to be in good condition with no signs of crack, ruts and pot holes.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 53

Date: 20 September 2016

Comments: Exposed ash at the southeast area has bare to sparse vegetation.

Photograph 54

Date: 20 September 2016

Comments: Photo taken at Station 130+00, facing east. The embankment appeared to have uniform slopes without sign of distress.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

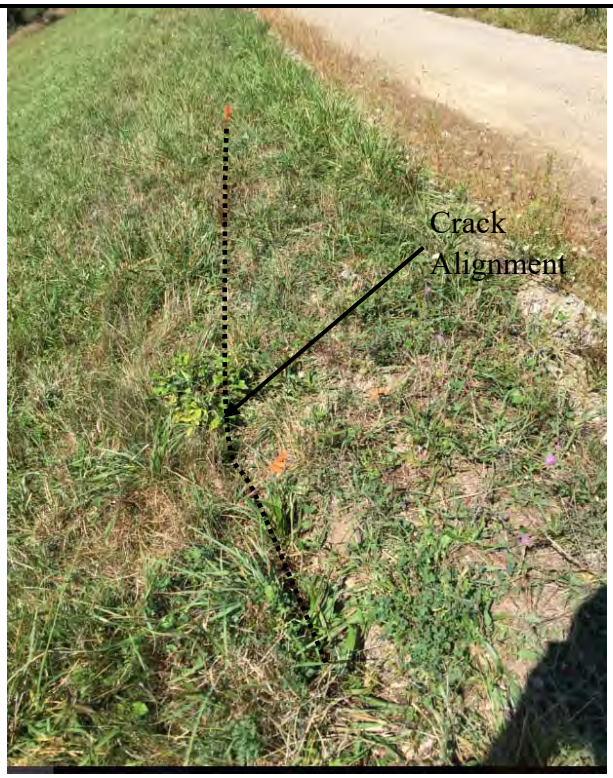
Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 55

Date: 20 September 2016

Comments: Low spot on the embankment crest at Station 119+00.

Photograph 56



Date: 20 September 2016

Comments: Crack (several inches wide and 20-ft long) that was observed in 2015 at Station 122+00 did not appear to have worsened.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 57

Date: 20 September 2016

Comments: Sparse vegetation was observed on the embankment at Station 119+00 (~15 x ~3). No erosion was observed.

Photograph 58

Date: 20 September 2016

Comments: Photo taken at Station 118+00, facing west. Tire rut and standing water were observed at the crest.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 59

Date: 20 September 2016

Comments: No obstruction was observed at the slurry line discharge location at Station 116+50.

Photograph 60

Date: 20 September 2016

Comments: Photo taken at Station 114+00, facing east. Low spot was observed at the embankment crest.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 61

Date: 20 September 2016

Comments: Erosion rills were observed with the area that was repaired last year at Station 110+00.

Photograph 62

Date: 20 September 2016

Comments: Erosion rills were observed with the area that was repaired last year at Station 110+00.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 63

Date: 20 September 2016

Comments: Access ramp at Station 104+00 has erosion rills.

Photograph 64

Date: 20 September 2016

Comments: Photo taken at Station 102+00, facing west. The embankment appeared to have uniform slopes without sign of distress.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 65

Date: 20 September 2016

Comments: Sparse vegetation observed at Station 89+50 (~5 ft x ~3 ft).

Photograph 66

Date: 20 September 2016

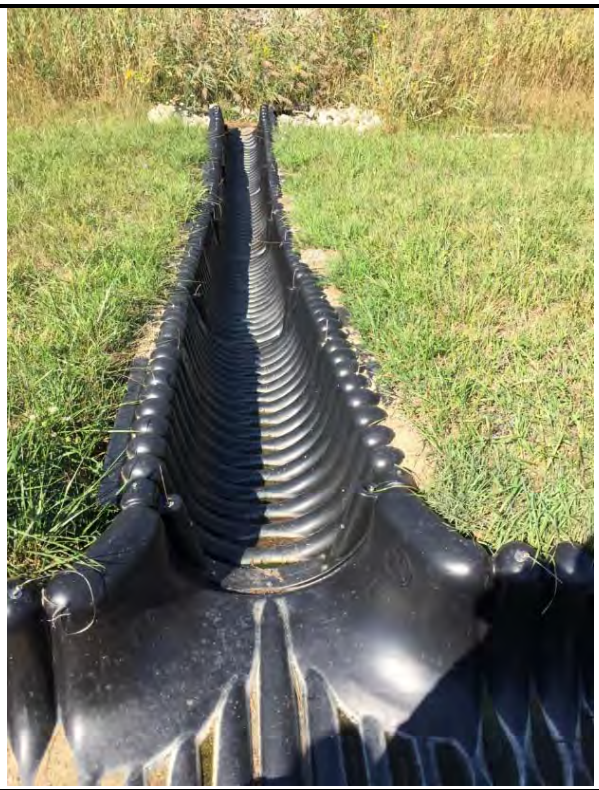
Comments: Photo taken at Station 87+00, facing north. The embankment appeared to have uniform slopes without sign of distress.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 67



Date: 20 September 2016

Comments: Downchute at Station 87+00 appeared to be in good condition.

Photograph 68

Date: 20 September 2016

Comments: Cracks (less than an inch wide) were observed at Station ~84+50 across 30 ft. These cracks are flagged. Similar cracks were observed at Station 88+00 (towards the top of embankment, by the crest).

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 69

Date: 20 September 2016

Comments: Cracks (less than an inch wide) were observed at Station ~84+50; along 30 ft. These cracks are flagged. Similar cracks were observed at Station 88+00 (towards the top of embankment, by the crest).

Photograph 70

Date: 20 September 2016

Comments: Photo taken at Station ~83+00, facing north. The embankment appeared to have uniform slopes without signs of distress. Sparse vegetation was observed (~20 ft x ~5 ft). Erosion was not observed.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 71

Date: 20 September 2016

Comments: Photo taken at Station ~82+00, facing south. The embankment appeared to have uniform slopes without sign of distress. Sparse vegetation was observed (~20 ft x ~5 ft). Erosion was not observed.

Photograph 72

Date: 20 September 2016

Comments: Downchute at Station 81+00 appeared to be in working condition. However, the soil along the sides have been washed off.

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 73 Date: 20 September 2016 Comments: Downchute at Station 75+50 appeared to be in good working condition.	
Photograph 74 Date: 20 September 2016 Comments: Approximately one-inch wide, 25-ft long cracks were observed at Station ~75+00 towards the top of the embankment.	

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 75

Date: 20 September 2016

Comments: Downchute at Station 69+50 appeared to be in good working condition.

Photograph 76

Date: 20 September 2016

Comments: Erosion rills were observed within the area that was repaired in 2015 (Station ~68+00).

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 77

Date: 20 September 2016

Comments: Up to approximately 3-in wide cracks were observed along approximately 75-ft stretch around Station 65+00 (between mid-slope ditch and crest).

Photograph 78

Date: 20 September 2016

Comments: Up to approximately 3-in wide cracks were observed along approximately 75-ft stretch around Station 65+00 (between mid-slope ditch and crest).

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 79 Date: 20 September 2016 Comments: Up to approximately 3-in wide cracks were observed along approximately 75-ft stretch around Station 65+00 (between mid-slope ditch and crest).	
Photograph 80 Date: 20 September 2016 Comments: Up to approximately 3-in wide cracks were observed along approximately 5-ft stretch around Station 62+00 (between mid-slope ditch and crest).	

DTE ELECTRIC COMPANY
Photographic Record

Client: Detroit Edison | Project Number:

Site Name: Monroe Power Plant Ash Basin | Site Location: Monroe, MI

Photograph 81

Date: 20 September 2016

Comments: Up to approximately 3-in wide cracks were observed along approximately 5-ft stretch around Station 62+00 (between mid-slope ditch and crest).

Photograph 82

Date: 20 September 2016

Comments: Up to 3-ft deep surficial sloughs were observed in areas between Station ~53+00 and ~58+00.