Prepared for

DTE Electric Company
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Detroit, Michigan 48226

2023 ANNUAL INSPECTION REPORT FLY ASH BASIN

MONROE POWER PLANT

Monroe, Michigan

Prepared by

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1. INTRODUCTION

1.1 Overview

The 2023 Annual Inspection Report (AIR) was prepared by Geosyntec Consultants of Michigan, Inc. (Geosyntec) to provide the results of the annual inspection of the Monroe Fly Ash Impoundment (Ash Basin) at DTE Electric Company's (DTE) Monroe Power Plant disposal facility. The annual inspection has been prepared to comply with the United States Environmental Protection Agency (USEPA) Coal Combustion Residual (CCR) Rule (CCR Rule) published on April 17, 2015, as amended July 30, 2018 (40 CFR Parts 257 and 261), August 28, 2020 (Part A Rule), and November 12, 2020 (Part B Rule). Under the CCR Rule, the Ash Basin is an "existing surface impoundment" per 40 CFR 257.53 and must be inspected by a qualified professional engineer on a periodic basis, not to exceed one year. The annual inspection is also required as part of the Inspection, Monitoring, and Maintenance (IMM) program for the Ash Basin.

The Ash Basin 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 (see Figure 1).

1.2 Purpose

Inspection, monitoring, and maintenance (IMM) of the Ash Basin and embankment are performed by DTE pursuant to the combined monitoring and maintenance program described in the IMM program (MONPP – 1301 – Rev. D) and the CCR Rule. The objective of the inspections that are part of the IMM program is to detect indications of instability in time to allow planning, design, and implementation of appropriate mitigation measures. The purpose of the inspection under the CCR Rule [40 CFR 257.83(b)(1)] is:

> "…to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards."

The inspection must, at a minimum, include:

(i) A review of the available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g., the results of an inspection by a qualified person, and results of previous annual inspections);

(ii) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit; and

(iii) A visual inspection of any hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit for structural integrity and continued safe and reliable operation.

The purpose is accomplished through periodic visual inspection (and photo-documentation) of the Ash Basin, review of the previous inspection, review of instrumentation monitoring data, and discussions with site personnel about the history of the site and general operations at the Ash Basin. Observations from the visual inspection, document and instrumentation data review, and discussions are summarized in an inspection report. The inspection report addresses the following under the CCR Rule [40 CFR 257.83(b)(2)]:

(i) Any changes in geometry of the impounding structure since the previous annual inspection;

(ii) The location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection;

(iii) The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection;

(iv) The storage capacity of the impounding structure at the time of the inspection;

(v) The approximate volume of the impounded water and CCR at the time of the inspection;

(vi) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit and appurtenant structures; and

(vii) Any other change(s) which may have affected the stability or operation of the impounding structure since the previous 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 - Facility Description: provides information about the facility.

- Section 4 - Observations from Annual Inspection: summarizes visual observations recorded during the 2023 inspection of the Ash Basin.

- Section 5 - Instrumentation Monitoring and Bathymetric Survey: provides information about the instrumentation monitoring and bathymetry survey of the Ash Basin.

- Section 6 - Current Operations and Maintenance Activities: describes DTE's current operations and maintenance activities performed since the 2022 annual inspection.

- Section 7 - Evaluation of Observations: based on the inspection results, evaluated if the design, construction, operation, and maintenance of the Ash Basin are consistent with recognized and generally accepted good engineering standards.

- Section 8 - Conclusions: provides the overall conclusions of the annual inspection and certification of the AIR.

1.4 Terms of Reference

The annual visual inspection was performed on May 3, 2023, by Dr. Clinton Carlson, Ph.D., P.E. and Dr. Jorge Romaña Giraldo, Ph.D. of Geosyntec[1], with assistance from DTE staff.

The weekly inspections and monitoring of inclinometers are performed by DTE's qualified person[2].

This report was prepared by Dr. Carlson and Dr. Romaña Giraldo and reviewed by Mr. John Seymour, P.E. of Geosyntec.

[1] Clinton Carlson, Ph.D., P.E., is the qualified professional engineer per the requirements of §257.53 of the CCR Rule. He has nine years of experience with coal ash related projects. His resume is provided in Appendix B.

[2] Qualified person means a person or persons trained to recognize specific appearances of structural weakness and other conditions which are disrupting or have the potential to disrupt the operation or safety of the CCR unit by visual observation and, if applicable, to monitor instrumentation.

2. REVIEW OF AVAILABLE INFORMATION

Geosyntec reviewed the following documents for the annual inspection. These documents are summarized in the table below.

Table 1: Available Information Reviewed for Annual Inspection

Title	Prepared by	Date	Content
Monroe Fly Ash Disposal Basin Technical Report	DTE	1977	Design, construction and operational information.
2009 Construction Completion Report	Geosyntec	March 8, 2010	Construction information for the 2009 construction.
2010 Construction Completion Report	Geosyntec	May 4, 2011	Construction information for the 2010 construction.
Geotechnical Site Characterization Report	Geosyntec	September 2012	Summary of data from various site investigation studies conducted around the perimeter of the embankment.
2012 Construction Completion Report	Geosyntec	November 30, 2012	Construction information for the 2012 construction.
2013 Construction Completion Report	Geosyntec	December 13, 2013	Construction information for the 2013 construction.
Potential Failure Mode Analysis Results – Rev. 3	Geosyntec	January 2015	Results of potential failure mode analysis for the Monroe Power Plant. Reassessed certain potential failure modes based on changes in operational procedures prior to the analysis.
Fill Plan Alternatives – Rev. B	Geosyntec	April 22, 2015	Pros and cons of various fill plan alternatives for the remaining life of the ash basin.

Table 1: Available Information Reviewed for Annual Inspection

Title	Prepared by	Date	Content
Overliner Construction, Phase 1- Construction Quality Assurance Report	Golder	September 16, 2015	Construction completion document.
Groundwater Monitoring System Summary Report	TRC	October 2017	Information on groundwater monitoring system components and details for the Monroe Ash Basin and Vertical Extension Landfill.
Groundwater Statistical Evaluation Plan	TRC	October 2017	Basis for statistical evaluation for groundwater monitoring events for the Monroe Ash Basin and Vertical Extension Landfill.
Location Restrictions Demonstration	TRC	October 2018	Provides details of location restrictions demonstration for the Ash Basin per CCR Rule.
Emergency Action Plan	DTE	August 2020	Provides the emergency action plan to safeguard lives and reduce the potential for damage to public resources and private property per the CCR Rule 40 CFR 257.73.
Structural Stability Assessment	Geosyntec	October 15, 2021	Structural stability assessment per the CCR Rule. Provides a five-year update to the original assessment performed in 2016.
Hydrologic and Hydraulic Capacity Assessment	Geosyntec	October 15, 2021	Hydraulic capacity assessment per the CCR Rule. Provides a five-year update to the original assessment performed in 2016.
Hazard Potential Assessment	Geosyntec	October 15, 2021	An assessment of the hazard potential of the Ash Basin per the

Table 1: Available Information Reviewed for Annual Inspection

Title	Prepared by	Date	Content
			CCR Rule. Includes a dam breach analysis.
Fugitive Dust Control Plan	DTE	November 8, 2021	Presents fugitive dust control measures. Added operating license information, updated process for the inactive bottom ash impoundment, and further defined activities for assessing and monitoring effectiveness of dust control measures.
Inspection, Monitoring and Maintenance Manual, Rev. D.	Geosyntec	November 2021	Provides details of operations, monitoring, action levels and items for the Ash Basin.
2022 Annual Inspection Report	Geosyntec	January 9, 2023	Provides the results of the 2022 annual inspection.
Annual Groundwater Monitoring Report	TRC	January 31, 2023	Summary of annual groundwater monitoring results for 2022 for the Monroe Ash Basin and Vertical Extension Landfill
Weekly Inspection Reports	DTE	January 2023 to May 2023	Qualified person inspections from January 2023 through May 2023.
Safety Factor Assessment – Revised	Geosyntec	February 22, 2023	Safety factor assessment per the CCR Rule. Provides a five-year update to the original assessment performed in 2016. Updated peak horizontal acceleration, horizontal seismic coefficient, and slope stability analyses.
Final Alternate Liner Demonstration	Geosyntec	April 10, 2023	Details the alternate liner demonstration for the Monroe Fly

Table 1: Available Information Reviewed for Annual Inspection

Title	Prepared by	Date	Content
			Ash Basin in accordance with the CCR Rule (Part B) 40 CFR 257.71(d)(ii)(A).
Closure Plan	Burns & McDonnell	October 6, 2023	Documenting how the plan will meet the CCR Rule. Update to October 2016 Closure Plan.
Post-Closure Plan	Burns & McDonnell	October 6, 2023	Documenting how the plan will meet the CCR Rule. Update to October 2016 Post-Closure Plan
Monroe Emergency Action Plan Meeting	DTE	November 10, 2023	Documentation of annual meeting for emergency preparedness table-top study of the Monroe Power Plant. Completed pursuant to 40 CFR 257.73(a)(3)(i)(E).
Annual Fugitive Dust Report	DTE	November 17, 2023	Annual report of dust control actions, any complaints, and corrective actions taken, if any. Completed pursuant to 40 CFR 257.80(c).
Bathymetric Survey	Sevenson	2023	Bathymetry survey of the ash basin.

3. FACILITY DESCRIPTION

The permitted area for the site is located in Section 16, Township 7 South, Range 9 East, of Monroe Township, Michigan. The facility includes the 331-acre Ash Basin and a 79-acre vertical extension landfill (Landfill) for a total permitted area of 410 acres. The Ash Basin is a coal ash surface impoundment under Michigan Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994, Operating License No. 9579. The Landfill is a coal ash landfill located within the northwest drainage area of the Ash Basin, including the Landfill perimeter berms and swales.

The Ash Basin was constructed in the early 1970s as a 410-acre basin to impound sluiced ash. The Ash Basin includes a 3.5-mile-long embankment constructed of on-site fine grained (clayey) soils that were excavated from within the footprint of the Ash Basin. Ash and water are pumped to the Ash Basin from the Monroe Power Plant using four active, above grade steel and high-density polyethylene pipes. After treatment within 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.

4. OBSERVATIONS FROM ANNUAL INSPECTION

The annual visual inspection and DTE's weekly inspections included the embankment crest, exterior slopes of the embankment, ash discharge points within the Ash Basin, stormwater features, discharge structure and canal, and pipes on the embankment. Inspection results and photographs from the annual visual inspection are provided in Appendix A. The key visual observations from the annual inspection are summarized below.

1. The exterior slopes of the embankment were generally observed to be in satisfactory condition (Photographs #1, #17, #20, #22, #38, #42, #45). The slopes were covered in grass and appeared to be well-maintained. Specific observations related to the exterior slopes of the embankment included the following.

    a. The crack/slough observed on the perimeter embankment slope near approximate Station 12+00 during the 2022 annual inspection had reopened after being repaired after the 2022 annual inspection. The crack had a scarp with a depth of approximately 6 inches upslope of the repair over the approximate length of 100 feet (Photograph #6). The scarp was initially observed by DTE personnel in March 2023 and staked. Geosyntec inspected this area shortly after it was identified by DTE. No significant changes were observed between the initial inspection performed by Geosyntec in March 2023 and the annual inspection. The initial sand and bentonite repairs of the crack were observed during the visual inspection (Photograph #6). Surficial movements appeared to be causing "bunching" of materials at the toe of the embankment in this area (Photograph #7). No significant ground movements were observed in the adjacent instrumentation monitoring (i.e., slope inclinometer at Station 11+50).

    b. The gravel placed on the perimeter embankment slopes at approximate Station 67+00 appeared to have raveled from the upper portion of the slope to the lower portion of the slope (Photographs #25, #26). Portions of the slotted high-density polyethylene (HDPE) pipe covered by the gravel was exposed (Photograph #26).

    c. Bentonite and sand repairs made to cracks that formed near approximate Stations 65+00 and 78+00 were in satisfactory condition (Photographs #23, #30) and no indications of additional movement were observed at these cracks during the visual inspection.

    d. A fire on I-75 spread to the vegetation on the perimeter embankment slopes on the west side of the Ash Basin in March 2023. The fire burned the vegetation on the perimeter embankment slopes between approximate Stations 82+50 and 91+00.

The vegetation appeared to be starting to re-establish along this portion of the embankment during the visual inspection (Photograph #31).

e. Bentonite and sand repairs made to a gouge in the perimeter embankment slope from construction equipment near approximate Station 88+00 were in satisfactory condition (Photograph #34) and no indications of additional movement were observed during the visual inspection.

f. Small, mossy areas were observed at a couple locations on the northeastern perimeter embankment slopes (Photograph #8). No water was observed flowing out of these areas at the time of the inspection.

g. A prior wet area filled with gravel near approximate Stations 175+00 to 177+00 was inspected and not observed to be wet (Photograph #47).

h. A couple small Autumn Olive shrubs were observed on the perimeter embankment slopes (Photograph #3) but were not widespread.

2. The perimeter road atop the perimeter berm was generally in satisfactory condition with minimal rutting (Photographs #2, #46). However, multiple ruts were observed along the perimeter road on the north side of the Ash Basin between approximately Stations 15+00 and 20+00 (Photograph #10). Access roads to the perimeter road atop the perimeter berm were also inspected and observed to be in good condition with no erosion rills (Photographs #21, #51).

3. The instrumentation monitoring equipment including the slope inclinometer casings, equipment boxes, solar panels, antennae, and wiring were inspected. The instrumentation monitoring equipment appeared to be in good condition (Photographs #4, #5). The desiccant canisters in the equipment boxes appeared to be degraded (Photograph #5).

4. The SmartDitch® features (corrugated HDPE channels used to manage stormwater) on the midslopes were inspected. The following observations were made.

   a. Erosion was observed at all the SmartDitch outlets into the riprap downchutes (Photograph #18 shows typical conditions). Over one foot of riprap appeared to have eroded from below the SmartDitch outlets into the riprap downchutes at approximate Stations 18+00 (Photograph #11), 32+00 (Photograph #19), 87+50 (Photograph #33), 139+00 (Photograph #41), and 150+50 (Photograph #44).

   b. Water had eroded a hole below the SmartDitch near the outlet at approximate Station 18+00 and was observed flowing into the hole during the visual inspection

(Photograph #12). Downslope of the hole, finer sediments were observed within the riprap downchute (Photograph #13).

c. The geotextile fabric was exposed and torn below the SmartDitch outlet at approximate Station 32+00 (Photograph #19).

d. The SmartDitch outlet at approximate Station 87+50 appeared to have settled and rotated back towards the upper slope of the embankment (Photograph #33) as a result of erosion.

e. Some fire damage to the SmartDitch was observed (i.e., melted HDPE) (Photograph #32) along the perimeter embankment slopes on the west side of the Ash Basin damaged by the fire in March 2023. The functionality of the SmartDitches to conduct sufficient stormwater flow did not appear to be affected by the fire damage. However, there was one location where a small erosion rill appeared downslope of the SmartDitch (Photograph #32).

f. Cut vegetation from general maintenance operations was observed within the SmartDitches throughout the Site (Photograph #9). The vegetation did not appear to affect the functionality of the SmartDitches to conduct sufficient stormwater flow.

g. The covered HDPE pipes connecting portions of the SmartDitches were observed to have minimal sediments and vegetation and were overall in good condition (Photographs #15, #16). There was one gated covering to a covered HDPE pipe that was damaged near Station 67+00 (Photograph #24). One of the inspection ports for the covered HDPE pipe near approximate Station 143+00 was missing a cover (Photograph #43).

5. The riprap downchutes generally appeared to be in satisfactory condition (i.e., minimal erosion of riprap, minimal vegetation) (Photograph #14 shows typical conditions). Some vegetation was observed in the riprap downchutes near Station 70+00 (Photograph #28) and Station 139+00 (Photograph #41). No adverse conditions were identified that appeared to affect the functionality of the riprap downchutes to convey stormwater.

6. The perimeter swales on the north and west sides of the Ash Basin had standing water (Photograph #27). No flow was observed, and the water was well below the top of the swale berms. These swales were observed to be in satisfactory condition.

7. The asphalt road on the crest of the embankment used for access to the Vertical Extension Landfill was observed to be in good condition (Photographs #29, #35, #36). The asphalt road extends from approximate Station 110+00 to approximate Station 65+00. As part of

the asphalt road construction, stormwater features were added at the toe of the embankment slope between approximate Stations 105+00 and 110+00 (Photograph #36). The associated stormwater features appeared to be in good condition.

8. No adverse conditions were identified within the perimeter of the embankment and on the interior slopes (Photograph #35).

9. Sluice lines 5 (northern side of Ash Basin) (Photograph #54) and 1, 3, and 6 (southern side of Ash Basin) (Photograph #37) were inspected and observed to be in good condition. The outlets of the sluice lines were near open water, and no breaks or leaks were observed in the sluice lines along the embankment. Lines 1 and 5 (Photographs #37, #54) were actively sluicing ash into the Ash Basin at the time of the inspection.

10. The perimeter swales on the east and south sides of the Ash Basin had some water that was observed to be flowing towards the pump house on the southeast corner of the Ash Basin (Photographs #39, #42). The swales were observed to be in satisfactory condition.

11. The pump house and access road on the southeast corner of the Ash Basin were inspected and observed to be in good condition (Photograph #39). No obstructions were observed in the culverts below the access road to the pump house (Photograph #40)

12. The low point in the perimeter road atop the embankment near approximate Station 165+00 used in case of emergency overflow was observed to be in good condition (i.e., no rutting, erosion, or excessive vegetation) (Photograph #46).

13. The pool level within the Ash Basin at the time of the inspection was approximately 608.7 feet (Photograph #48), which is less than the maximum operating pool level of 609.0 feet.

14. The discharge structure and its features were inspected and observed to be in satisfactory condition. No structural damage was detected in the gates, stop logs, or concrete and no obstructions were observed in the gates and discharge pipes (Photographs #48, #49). No signs of distress were observed in the slope between the inlet and outlet and no turbidity (i.e., suspended solids) was observed in the outflow (Photograph #50).

15. The end of the discharge canal into Plum Creek was inspected. The silt curtain upstream of the weir and the weir were in satisfactory condition (Photographs #52, #53). There was some growth on top of the water within the discharge canal (Photograph #52); however, water was flowing out of the weir and was clear.

5. INSTRUMENTATION MONITORING AND BATHYMETRY SURVEY RESULTS

5.1 Slope Inclinometers

5.1.1 Background and Overview

Ten automated slope inclinometers (SIs) have been installed along the Ash Basin perimeter embankment. The purpose of the SIs is to provide continuous measurements of any outward movements of the perimeter embankment. The SIs were installed in late 2015 to replace the decommissioned manual SIs and baseline readings were taken on January 1, 2016. The SIs were installed from the crest of the embankment to depths of approximately 45 to 50 feet below the crest.

The SI measurements provide values of horizontal displacement at discrete depths (at 1.6-foot 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 SI at the time of the reading. The orientation of the A-axis and B-axis are unique to each SI. Displacements in the positive A-axis correspond to an outward displacement of the embankment from the Ash Basin approximately perpendicular to the embankment. The B-axis is oriented parallel to the perimeter embankment.

5.1.2 Displacements

The horizontal displacements at select depths are summarized below for the readings at the approximate time of the annual inspection (April 27, 2023). The selected depths correspond to sensor locations below ground surface where outward movements have historically been more prominent (i.e., approximately 0.2 inches or more) for the given direction.

5.1.2.1 *Station 11+50 Slope Inclinometer*

- A-axis direction
    - Cumulative displacement magnitude and direction: +0.52 inches at approximately five feet below ground surface.

5.1.2.2 *Station 34+00 Slope Inclinometer*

- A-axis direction
    - Cumulative displacement magnitude and direction: +0.13 inches at approximately six feet below ground surface.

- Cumulative displacement magnitude and direction: +0.22 inches at approximately 25 feet below ground surface.

5.1.2.3 *Station 56+00 Slope Inclinometer*

- A-axis direction
  - Cumulative displacement magnitude and direction: +0.26 inches at approximately six feet below ground surface.
- B-axis direction
  - Cumulative displacement magnitude and direction: -0.39 inches (movement to the east) at approximately six feet below ground surface.

5.1.2.4 *Station 65+50 Slope Inclinometer*

- A-axis direction
  - Cumulative displacement magnitude and direction: +0.01 inches at approximately six feet below ground surface.
  - Cumulative displacement magnitude and direction: +0.04 inches at approximately 29 feet below ground surface.
- B-axis direction
  - Cumulative displacement magnitude and direction: +0.27 inches (movement to the west) at approximately 29 feet below ground surface.

5.1.2.5 *Station 77+00 Slope Inclinometer*

- A-axis direction
  - Cumulative displacement magnitude and direction: +0.24 inches at approximately six feet below ground surface.
- B-axis direction
  - Cumulative displacement magnitude and direction: -0.21 inches (movement to the north) at approximately six feet below ground surface.

5.1.2.6 ***Station 118+00 Slope Inclinometer***

- A-axis direction
    - Cumulative displacement magnitude and direction: +1.16 inches at approximately six feet below ground surface.
- B-axis direction
    - Cumulative displacement magnitude and direction: -0.31 inches (movement to the west) at approximately six feet below ground surface.

5.1.2.7 ***Station 133+00 Slope Inclinometer***

- A-axis direction
    - Cumulative displacement magnitude and direction: +2.93 inches at approximately five feet below ground surface.

5.1.2.8 ***Station 142+00 Slope Inclinometer***

- A-axis direction
    - Cumulative displacement magnitude and direction: +0.22 inches at approximately six feet below ground surface.

5.1.2.9 ***Station 162+50 Slope Inclinometer***

- A-axis direction
    - Cumulative displacement magnitude and direction: +2.05 inches at approximately six feet below ground surface.

5.1.2.10 ***Station 178+00 Slope Inclinometer***

- A-axis direction
    - Cumulative displacement magnitude and direction: +0.33 inches at approximately six feet below ground surface.
- B-axis direction

- Cumulative displacement magnitude and direction: -0.16 inches (movement to the south) at approximately six feet below ground surface.

5.2 Bathymetric Survey Results

The bathymetric survey of the Ash Basin was performed by Sevenson Environmental Services, Inc. in November 2023. The following were observed or estimated based on the survey results.

1. Water level at the time of survey was at elevation 608.2 feet[3], which is lower than the maximum operation water level of 609 feet.

2. Approximately 86 percent of the Ash Basin footprint is filled with ash above the water level.

3. The maximum water depth is approximately 34 feet. The top of ash at this location is slightly less than approximate elevation 574 feet.

4. The maximum ash thickness is approximately 50 feet, measured from the top of ash at approximate elevation 613 feet to the bottom of the Ash Basin, which is at approximate elevation 563.4 feet. The minimum thickness of ash is approximately 11 feet.

5. At the time of the bathymetry measurements:

    a. the remaining storage capacity of the Ash Basin is approximately 1.5 million cy.

    b. approximately 27.9 million cy of ash is deposited in the Ash Basin.

    c. approximately 311 million gallons of water is impounded in the Ash Basin.

[3] Elevations in this AIR are reported in the National Geodetic Vertical Datum of 1929 (NGVD29).

6. CURRENT OPERATIONS AND MAINTENANCE ACTIVITIES

6.1 Operations Organization

The Ash Basin is operated by DTE. The responsible personnel include:

- Ben Goehmann – DTE Energy Supply, Plant Manager, Monroe Site Operations
- Gerald Chilson and Eric Molnar – DTE Environmental Management and Safety (EM&S), Monroe Power Plant

6.2 Operation Activities

Operation details are provided in the Inspection, Monitoring, and Maintenance Manual (IMMM) Rev. D. and Operations Plan Drawings Rev. D. (Geosyntec, 2021). In addition, the following are currently being completed as required by the CCR Rule.

- Weekly inspections by a qualified person.
- Dust control in accordance with the Fugitive Dust Control Plan.
- Annual Fugitive Dust Control Report.
- Annual Groundwater Monitoring and Corrective Action Report.

6.3 Maintenance Activities Since Previous Annual Inspection

The following maintenance activities were performed in addition to general site maintenance between the 2022 and 2023 inspections (see Section 4 for additional details). Additional maintenance activities completed after the visual inspection are discussed in Section 7.

1. Bentonite and sand repairs were made to the perimeter embankment slopes near approximate Stations 12+00 (crack/slough) and 88+00 (gouge from equipment).
2. Chemical sprays were applied to the embankment slopes with Autumn Olive shrubs to kill the shrubs and prevent future growth.

7. EVALUATION OF OBSERVATIONS

The Ash Basin was not observed to have any existing structural weaknesses or conditions that would disrupt the overall operation and/or safety of the Ash Basin. The maximum cumulative displacement observed within the slope inclinometers is 2.93 inches (since 2016) at Station 133+00 and no evidence of movement of the perimeter embankment at the monitored locations that would suggest global instabilities has been observed. However, there are two maintenance conditions that have the potential to develop into structural weaknesses or disrupt the overall operation and or/safety at the Ash Basin in the future.

- The crack/slough observed on the perimeter embankment slope near approximate Station 12+00 reopened after being repaired with a sand and bentonite mix in 2022. The crack/slough was believed to be the result of the freezing and thawing cycle of the surficial soils because no movements were observed in the adjacent instrumentation monitoring. Therefore, the crack was judged not to be indicative of an existing structural weakness in the perimeter embankment. However, additional movements have occurred since the 2022 annual inspection. Additional sand and bentonite repairs were made to the crack/slough in this area in September 2023 after the visual inspection.

- Erosion was observed below the SmartDitch outlets into the riprap downchutes at all locations; multiple locations had over one foot of erosion. At approximate Station 18+00, there was a hole with water flowing into it and fine sediments observed downslope within the riprap downchute from the erosion. The erosion at approximate Station 32+00 has exposed the geotextile fabric below the SmartDitch outlet and the fabric is torn. The erosion below the SmartDitch outlet at approximate Station 87+50 has caused the outlet to settle and rotate back towards the upper slope. The erosion at these locations could act as preferential pathways for continued erosion if not addressed. Therefore, the erosion below the SmartDitch outlets into the riprap downchutes should be repaired. Geosyntec has been tasked with developing recommendations for repairs.

There are other maintenance conditions identified during the 2023 annual inspection that should be addressed in accordance with the IMMM. Some of these conditions have already been addressed by DTE after the visual inspection.

1. Ruts on the perimeter road atop the perimeter berm between approximately Stations 15+00 and 20+00 should be filled.

2. The slotted HDPE pipe at approximate Station 67+00 that was exposed due to raveling of the gravel should be covered with gravel. This area should be monitored for additional movement or raveling of the gravel on the upper portion of the slope.

3. The vegetation on the west side of the perimeter embankment that was burned in March 2023 had begun to re-establish at the time of the visual inspection. DTE should continue to monitor this area for the regrowth of the vegetation.

4. A couple Autumn Olive shrubs were observed on the perimeter embankment slopes. Chemical sprays should be applied to the embankment slopes with Autumn Olive shrubs to kill the shrubs and prevent future growth.

5. The SmartDitches had multiple conditions that should be addressed in accordance with the IMMM.

    a. The erosion rill downslope of the SmartDitch in the area damaged by the fire in March 2023 should be filled.

    b. Cut vegetation from maintenance operations was observed within the SmartDitches at multiple locations. This vegetation should be cleared out of the SmartDitches.

    c. One of the inspection ports for the covered HDPE pipe near approximate Station 143+00 was missing a cover. The cover should be replaced.

    d. A gated cover on the covered HDPE pipe near approximate Station 67+00 was damaged. The cover should be repaired.

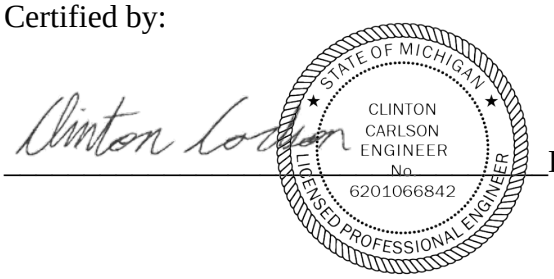
6. Vegetation was observed in two of the riprap downchutes (approximate Stations 70+00 and 139+00). These conditions did not appear to affect the functionality of the features, but the vegetation should be cleared.

7. The desiccant canisters within the instrumentation monitoring equipment boxes should be replaced.

8. CONCLUSIONS AND CERTIFICATION

The design, construction, operation, and maintenance of the Ash Basin is generally consistent with recognized and generally accepted good engineering standards in accordance with the CCR Rule [40 CFR 257.84(b)(1)]. The 2023 annual visual inspection did not identify any existing structural weaknesses or conditions that are disrupting the operation and safety of the Ash Basin. There are two maintenance conditions that could develop into structural weaknesses in the future if not addressed in the next one to two years. Geosyntec identified other conditions that require maintenance in accordance with the IMMM as detailed in Section 7. Recommendations to address the maintenance conditions are provided in Section 7 for DTE's consideration.

Certified by:

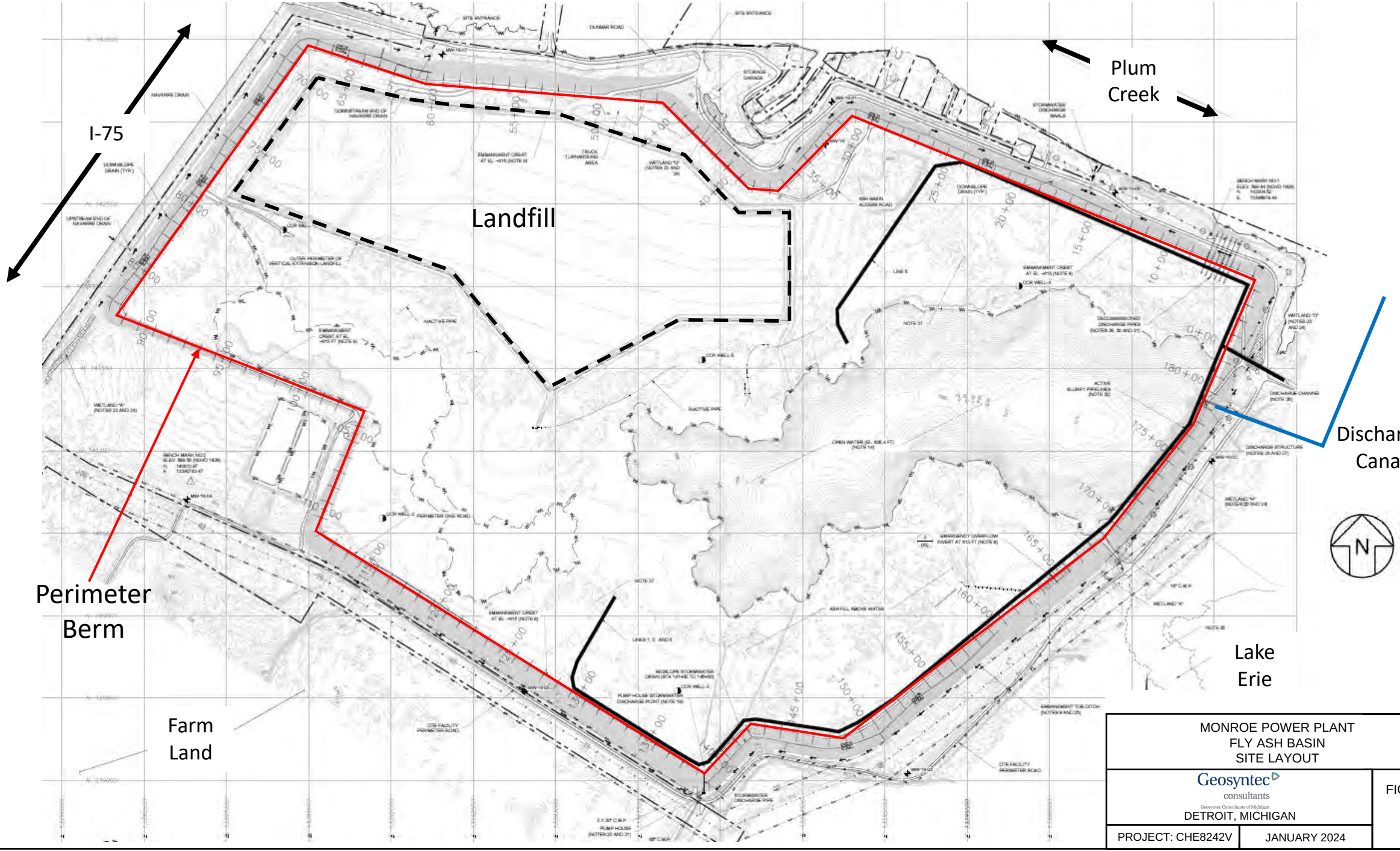


Date January 9, 2024

Clinton Carlson, Ph.D., P.E.

Michigan License Number 6201066842

Project Engineer



MONROE POWER PLANT
FLY ASH BASIN
SITE LAYOUT

Geosyntec consultants
DETROIT, MICHIGAN

FIGURE 1

PROJECT: CHE8242V

JANUARY 2024

APPENDIX A

Resume of Clinton Carlson, Ph.D., P.E.
(Qualified Professional Engineer)

Clinton P. Carlson, PhD, PE

Qualifications

Dr. Carlson is a geotechnical engineer with nine years of experience on projects related to design and remediation of landfills and coal combustion residual impoundments, dam safety, and geotechnical instrumentation. He is a Project Engineer with Geosyntec and part of the firm's dams and levees practice area. His work has included managerial responsibilities for project budgets and schedules and has primarily supported federal and power clients for both small and large projects. Clinton has managed and supported projects for risk assessments, slope stability analyses, and instrumentation for landfills and dams.

Specialties

Landfill and CCR Design and Remediation
Dam Safety
Geotechnical Instrumentation

Education

PhD, Civil Engineering, University of Michigan, Ann Arbor, MI, 2014
MSE, Civil Engineering, University of Michigan, Ann Arbor, MI, 2010
BSE, Civil & Environmental Engineering, University of Michigan, Ann Arbor, MI, 2009

Licenses/Certifications

Professional Engineer: MI

Relevant Project Experience

Annual Inspections of CCR Units, Confidential Client, Southeast Michigan | Inspections of CCR units are conducted annually as part of the CCR Rule to identify any site conditions that pose a concern to the safe operation and stability of the CCR units. Project manager in charge of financials and engineer in charge of performing annual inspections for three CCR units for a client in Southeast Michigan. Prepared inspection reports to summarize observed conditions at the three CCR units. Interacted with client representatives to discuss necessary actions to address potential concerns. (Mar. 2022–Present)

Monitoring and Maintenance for CCR Units, Confidential Client, Southeast Michigan | Project manager in charge of financials and engineer in charge of overseeing inspections, monitoring, and maintenance of geotechnical instrumentation system of two CCR units for a client in Southeast Michigan. The geotechnical instrumentation system included multiple monitoring wells, settlement plates, vibrating wire piezometers, manual inclinometers, and ShapeArray inclinometers. Instrumentation data were evaluated to identify near real-time concerns for the safe operation and stability of the CCR units. Provided monthly summary reports to the client representatives and met with them to discuss the monitoring data on a bi-monthly basis. Conducted site inspections of observed conditions posing concerns for the safe operation and stability of the CCR units on at the request of the client. (Mar. 2022–Present)

FERC Part 12D Periodic Inspections for Barton and Superior Dams, City of Ann Arbor, Ann Arbor, MI | The City of Ann Arbor owns and operates the Barton and Superior Hydroelectric Projects (Barton and Superior Dams) in Ann Arbor, Michigan. Barton and Superior Dams are used by the City of Ann Arbor for power generation and thus, are under regulation by the Federal Energy Regulatory Commission (FERC). FERC regulations require dam safety inspections are performed every five years by Independent Consultant (IC) Teams. Geosyntec served as the IC Team for the City of Ann Arbor for the Ninth FERC Part 12D Periodic Inspections of Barton and Superior Dams performed in 2023. Served as the project manager and point-of-contact with the City of Ann Arbor on behalf of the IC Team. Member of the IC Team (geotechnical engineering support and field inspection team) that performed the document review, developed the Inspection Plans, prepared the Pre-Inspection Preparation Reports, performed the field inspections, and prepared the Periodic Inspection Reports. The Periodic Inspection Reports were completed and submitted to FERC before the December 2023 deadline. (Jan. 2023–Dec. 2023)

Landfill Stability Evaluation, Confidential Client, Southeast US | Contacted by the client to evaluate an instability at an existing landfill including the implementation of instruments to measure and evaluate progression of instability. Project manager in charge of financials and engineer in charge of developing instrumentation plan and evaluating measurements of instrumentation. Conventional surveying stakes

and an automated monitoring total station were implemented to measure progression of instability. Evaluation of measurements was used to inform the client on progression of instability and provide recommendations for implementation of mitigation measures. Weekly summary reports of instrumentation measurements were provided to the client while implementing mitigation measures. Additional support was provided to the client in discussions with the state regulator. The monitoring systems were also utilized to provide additional safety measures during the staged temporary removal of a buttress berm in order to tie-in liner systems for new landfill cells to the existing liner system. Monitoring data are currently summarized in monthly reports and provided to the client. (Aug. 2019–Present)

Landfill Design Projects for Power Company, Confidential Client, Southeast US | Engineer in charge of coordinating and performing the geotechnical analyses for the permitting and closure of multiple sites for a power company. Geotechnical analyses performed for the sites included subsurface investigation and geotechnical material properties interpretation, slope stability analyses (including veneer and liner stability), settlement calculations for liner and cover systems, and hydrologic evaluations for liner and cover systems. The computer programs Slide and HELP were used to perform the slope stability analyses and hydrologic evaluations, respectively. (June 2015–Present)

Portsmouth Gaseous Diffusion Plant On-Site Waste Disposal Facility, Fluor-BWXT Portsmouth, Piketon, OH | The Department of Energy's Portsmouth On-Site Waste Disposal Facility is being constructed for the disposal of on-site hazardous waste materials. Engineer that aided geotechnical analyses for the design and construction of the facility. Geotechnical analyses performed during the design phase included slope stability analyses (including veneer and liner stability), settlement calculations for liner and cover systems under variable loads, and foundation design for leachate conveyance systems. During construction, performed slope stability analyses for excavation conditions and geo-structural calculations and reinforcement detailing for reinforced concrete valve houses constructed as part of a leachate transmission system and a footing for an interim transfer ramp. The computer program Slide was used to perform the slope stability analyses. (Apr. 2015–Present)

Inspections and Mitigation for CCR Landfill, Confidential Client, Southeast Michigan | Probabilistic slope stability analyses for a CCR landfill in Southeast Michigan identified unsatisfactory conditions for existing slopes that required mitigation measures. Project manager in charge of project financials and schedule and engineer in charge of developing inspection and construction plans to mitigate unsatisfactory conditions. Developed an inspection plan to identify indicators of slope instabilities and allow for safe operation conditions. The inspection plan was carried out by site personnel prior to and during construction and supported by Geosyntec. Developed a construction plan to regrade the slopes and mitigate the unsatisfactory conditions. Performed site inspections and met with client representatives and contractors during construction to verify safe working conditions and satisfactory slope conditions were achieved. (Feb. 2022–May 2022).

Probabilistic Slope Stability Assessment for CCR Landfill, Confidential Client, Southeast Michigan | Previous site inspections identified potentially unstable slopes at a CCR landfill in Southeast Michigan, so probabilistic slope stability analyses were performed to evaluate the reliability of the slope conditions given limited site information. Engineer that aided in review of probabilistic slope stability analyses and slope stability assessment report. Recommendations were developed and provided to the client to address unsatisfactory conditions for existing slopes identified in the probabilistic site response analyses. (Nov. 2021–May 2022).

Quantitative Risk Assessment for Dam in Southeast US, Confidential Client, Southeast US | The project further refines estimates of risk developed from previous potential failure mode analyses and semi-quantitative risk analyses performed for an embankment dam and its primary and auxiliary spillways located in the Southeastern U.S. Project manager in charge of financials and schedule for the Quantitative Risk Assessment (QRA) of the dam. The main objectives of the QRA are to estimate the risk, in terms of annual failure probabilities and downstream consequences, for seismic, internal erosion, and spillway hydrologic failure modes and the uncertainties associated with the risks. Actively participated in the expert elicitation process to develop risk models and meetings with the client to present the models and results of the QRA. Prepared calculation packages and reports summarizing the methods used in the

QRA and the results for the client. Aided in the ground motion selection, internal erosion evaluation, and evaluation of the erodibility of the embankment soils. (May 2018–Apr. 2022)

Field Investigation of Primary Spillway for Dam in Southeast US, Confidential Client, Southeast US | Field engineer for oversight of a visual inspection and investigation of the foundation of the primary spillway slabs and control structure for a dam in the Southeast U.S. Observations from the field investigation were used to inform a QRA performed for the dam and its spillways. The visual inspection was performed to identify vertical offsets and gaps in the joints between the slabs of the primary spillway. A field investigation consisting of shallow cores through the concrete slabs of the spillway and deep borings into competent rock below the control structure was performed to evaluate the foundation materials of the primary spillway and the presence of voids. (Jan. 2021–May 2021)

Landfill Stability Evaluation, Confidential Client, Southeast US | Contacted by the client to evaluate an instability at an existing landfill including the root cause of the instability. Project manager in charge of financials and engineer in charge of coordinating and performing slope stability analyses. Slope stability analyses were performed to evaluate the root cause of the instability and mitigation measures required to stabilize the landfill. Results of the analyses were used to support the client in discussions with the state regulator and advise the client on a path forward for stabilizing the landfill. A facility-wide stability plan was also developed based on the stability of the landfill for the existing conditions and the final planned conditions. Analyses were also performed for a staged temporary removal of a buttress berm in order to tie-in liner systems for new landfill cells to the existing liner system. Aiding in ongoing annual landfill stability assessments. (Aug. 2019–Dec. 2020)

Onondaga Lake Geotechnical Monitoring, Honeywell, Syracuse, NY | Contaminated sediments were dredged from Onondaga Lake and consolidated within geotextile tubes at an off-site landfill as part of a Superfund project. Geotechnical instrumentation systems were implemented to monitor (i) a sheetpile wall around a portion of the Lake dredged for remediation and (ii) a landfill closure comprised of geotextile tubes filled with sediments dredged from the Lake. Manager in charge of financials and engineer in charge of monitoring the instrumentation data. The monitoring systems included manual and automated inclinometers, settlement cells, vibrating wire piezometers, and surface monitoring points. (Feb. 2015–Oct. 2018)

Stability and Internal Erosion Assessment of Clear Creek Dam and Beaver Creek Dam, Tennessee Valley Authority, Bristol, TN and VA | Static and seismic stability of two earthen embankment dams in the twin cities of Bristol, TN and VA, Clear Creek Dam (BTC) and Beaver Creek Dam (BTB), were assessed along with the internal erosion for potential failure modes identified in the Potential Failure Mode Analyses (PFMA). Engineer in charge of seismic site response analyses and internal erosion evaluations for two earthen embankment dams. Performed seismic response analyses and used the results to perform the liquefaction potential evaluation. The seismic response analysis was performed using the computer program Strata. Internal erosion evaluations were performed for the critical potential failure modes identified by the project team for each dam. (Mar. 2017–Sept. 2017)

Onondaga Lake Capping and SCA Design, Honeywell, Syracuse, NY | Contaminated sediments were dredged from Onondaga Lake and consolidated within geotextile tubes at an off-site landfill as part of a Superfund project. Engineer that aided in slope stability analyses and hydrologic evaluations for: (i) a sheetpile wall around a portion of the lake dredged for remediation and (ii) a landfill closure comprised of geotextile tubes filled with sediments dredged from the lake. Stability analyses for the sheetpile wall included the internal stability (i.e., overturning and bending) of the sheetpile wall adjacent to the dredged lakebed and the global stability of the wall under the loading of an adjacent railroad line. The stability analyses of the landfill closure included the veneer stability of the liner and cover systems and the internal, interface, and global stability of the stacked geotextile tubes. The computer programs ShoringSuite, Slide, and HELP were used to perform the internal stability analyses for the sheetpile wall, global stability analyses of the wall and landfill closure, and the hydrologic evaluations, respectively. (Feb. 2015–May 2016)

APPENDIX B

2023 Annual Inspection Forms and Photos

Monroe Power Plant
Ash Basin
2023 Annual Inspection Report

Name of Surface Impoundment: **Monroe Power Plant Ash Basin**
Surface Impoundment ID Number:
Owner: **DTE Electric Company**
Operator: **DTE Electric Company**
Site Conditions: Some wet areas from light rain during the day of the visit

Qualified Engineer: Clinton Carlson, PhD, PE
Date: 5/3/2023 **Time:** 9:00 am to 3:00 pm
Weather: Slight Rain, 50s, Cloudy
Precipitation (since previous weekly inspection): 0.1 in.

I. Crest

1. Were there any indications of existing structural weaknesses or conditions that have the potential to develop into structural weaknesses (ruts, holes, erosion, cracking, slides, depressions, undesired vegetation etc.)? Provide approximate size and location of any structural weaknesses. Yes ____ No X

The crest of the perimeter embankment and the road were generally in satisfactory condition with minimal rutting (Photographs #2, #46). Multiple ruts were observed along the road on the north side (Stations 15+00 to 20+00) (Photograph #10). An asphalt road was constructed on the crest for access to the Vertical Extension Landfill (Photographs #29, #35). The asphalt road extends from approximate Sta 110+00 to Sta 65+00. The asphalt road and access to the crest were in good condtion (Photograph #36). The low point of the crest used in case of emergency overflow was in good condition (Photograph #46). Aggregate access roads to the embankment crest were in good condition (Photographs #21, #51).

2. Were there any significant changes since the last inspection? Yes ____ No X

II. Embankment Slopes

1. Were there any indications of existing structural weaknesses or conditions that have the potential to develop into structural weaknesses on the embankment slopes (ruts, holes, erosion, cracking, sloughs, depressions, bulges, undesired vegetation etc.)? Provide approximate size and location of any structural weaknesses. Yes X No ____

Overall, the embankment slopes were in satisfactory condition (Photographs #1, #17, #20, #22, #38, #42, #45). However, there was one condition that has the potential to develop into a structural weaknesses if left unaddressed.

- The crack/slough previously repaired near approximate Sta 12+00 reopened and had a scarp of approximately 6 inches (Photographs #6, #7). Additional repairs were made to the slope in September 2023.

There were a couple conditions that require maintenance in accordance with the IMMM Rev. D.

- The gravel placed on the slopes at approximate Sta 67+00 appeared to have raveled from the upper portion of the slope to the lower portion of the slope and exposed the slotted HDPE pipe (Photographs #25, #26). The HDPE pipe should be covered with gravel and the area should be monitored for additional movements.
- Vegetation on the west perimeter embankment slopes between approximate Sta 82+50 and Sta 91+00 burned during a fire in March 2023. Vegetation appeared to be re-establishing during the visual inspection (Photograph #31), but this area should continue to be monitored.
- Small Autumn Olive shrubs were observed on the slopes (Photograph #3), but were not widespread.

2. Were there any visible wet areas on the embankment slopes? Yes ____ No X

No visible wet areas were observed on the slopes. There were a couple small, mossy areas on the northeastern slopes (Photograph #8), though no water was observed during the inspection. A prior wet area filled with gravel near approximate Sta 175+00 to 177+00 was inspected and not wet (Photograph #47).

3. Were there any significant changes since the last inspection? Yes X No ____

Bentonite-sand backfill repairs were made to cracks observed near approximate Sta 12+00 (Photograph #6) and approximate Sta 88+00 (Photograph #34). The crack at approximate Sta 12+00 had reopened. Additional repairs were made. DTE has continued to monitor these repairs during weekly inspections.

III. Surface Impoundment Conditions

1. Were the sluice lines to the surface impoundment flowing freely to open water? If 'No' describe obstructions. Yes X No ____

Lines 1, 3, 5, and 6 were inspected; the outlets were near open water (Photographs #37, #54). Lines 1 and 5 were actively sluicing ash into the Ash Basin at the time of the inspection.

2. What was the water level in the surface impoundment at the time of the inspection?

Pool Level at Time of Inspection 608.7 ft / NGVD29 Maximum Pool Level / Datum 609.0 ft / NGVD29

3. Was there an excessive amount of CCR above the water surface that could lead to overtopping of the perimeter berm? Yes ____ No X

There is CCR above the water level within the Ash Basin; however, sluice lines 1, 3, 5, and 6 discharge near open water. The CCR above the water surface is mainly due to the pond operating level being lowered several years ago. Generally the ash is below the embankment crest elevation and a spillway prevents overtopping of the perimeter berm.

4. Were there any significant changes since the last inspection? Yes ____ No X

IV. Stormwater Feature Conditions

1. Were there any existing or potential conditions (erosion, impediments, etc.) that could affect the function of the stormwater features or the stability of the embankments? Provide approximate size and location of any conditions. Yes X No

Erosion was observed at all of the SmartDitch outlets into the riprap downchutes (Photograph #18). Over one foot of riprap appeared to have eroded from below the outlets at approximate Sta 18+00, Sta 32+00, Sta 87+50, Sta 139+00, and Sta 150+50 (Photographs #11, #19, #33, #41, #44). These conditions have the potential to develop into a structural weakness if left unaddressed. Repairs are recommended for the SmartDitch outlets into the riprap downchutes.

- Water eroded a hole below the SmartDitch near Sta 18+00. Water was observed flowing into the hole during the visual inspection (Photograph #12). Downslope of the hole, finer sediments were observed within the riprap downchute (Photograph #13).
- The geotextile fabric was exposed and torn below the SmartDitch outlet near Sta 32+00 (Photograph #19).
- The SmartDitch outlet near Sta 87+50 appeared to have settled and rotated back towards the upper slope of the embankment (Photograph #33).

There were a couple conditions that require maintenance.

- Some fire damage was observed on the SmartDitches along the west side of the Ash Basin (Photograph #32); however, the overall function of the SmartDitches did not appear to be affected. There was one location where a small erosion rill appeared downslope of the SmartDitch (Photograph #32) that should be filled.
- The SmartDitches were filled with cut vegetation from general maintenance operations throughout the Site (Photograph #9); however, the overall function of the SmartDitches to sufficiently convey stormwater did not appear to be affected.
- Some vegetation was osbserved in the riprap downchutes near Sta 70+00 and Sta 139+00 (Photographs #28, #41). The vegetation should be removed.
- An inspection port for the covered HDPE pipe near approximate Sta 143+00 that was missing a cover (Photograph #43). The cover should be replaced.
- There was one gated covering to a covered HDPE pipe near Sta 67+00 that was damaged (Photograph #24). The cover should be repaired.

2. Were there any significant changes since the last inspection? Yes No X

V. Discharge Structure and Canal

1. Are there any cracks or breaks in concrete or steel parts or obstructions to discharge at the discharge structure? If 'Yes' report the location and severity. Yes No X

No damage was detected in the gates, stop logs, or concrete at the discharge structure (Photographs #48, #49).

No obstructions were observed in the gates and discharge pipes (Photographs #48, #49).

2. Are there signs of slope distress or seepage on the slope between the inlet and outlet structures or turbidity in the outflow? Yes No X

No signs of distress were observed in the slope between the inlet and outlet and no turbidity was observed in the outflow (Photograph #50).

3. Is the weir at the exit of the discharge canal in working condition? If 'No', describe any issues. Yes X No

The silt curtain upstream of the weir and the weir were in satisfactory condition (Photographs #52, #53).

There was some growth on top of the water within the discharge canal (Photograph #52); however, the water flowing out of the weir was clear.

VI. Slurry Piping

1. Were there any breaks or leaks in the sluice lines along the embankment? If 'Yes' describe the line #, location, severity, etc. Yes No X

VII. Repairs, Maintenance, Action Items

2. Has this inspection identified any need for repair or maintenance? 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 approximately one year, and "Not Urgent" for maintenance that should be conducted within approximately three years. Yes X No

Moderate - Perform additional repairs to the slope at approximate Sta 12+00. (**Addressed by DTE after inspection**)

Moderate - Repair significant erosion (up to one foot) observed below the SmartDitch outlets into the riprap downchutes (e.g., Sta 18+00).

Geosyntec to develop recommendations for repairs.

Not Urgent - Fill in ruts along the crest road on the perimeter embankment on the north side (Stations 15+00 to 20+00).

Not Urgent - The exposed HDPE pipe at approximate Sta 67+00 should be covered with gravel and the area should be monitored for additional movements.

Not Urgent - Continue to monitor regrowth of vegetation on the west side of the perimeter embankment in the area that was burned.

Not Urgent - Apply chemical spray to remove Autumn Olive shrubs.

Not Urgent - Fill erosion rill downslope of the SmartDitch in the area that burned.

Not Urgent - Clear vegetation from within the SmartDitches.

Not Urgent - Clear vegetation from within the riprap downchutes near Sta 70+00 and Sta 139+00.

Not Urgent - Replace the cover of the inspection port for the covered HDPE pipe near approximate Sta 143+00.

Not Urgent - Repair the cover on the covered HDPE pipe near approximate Sta 67+00.

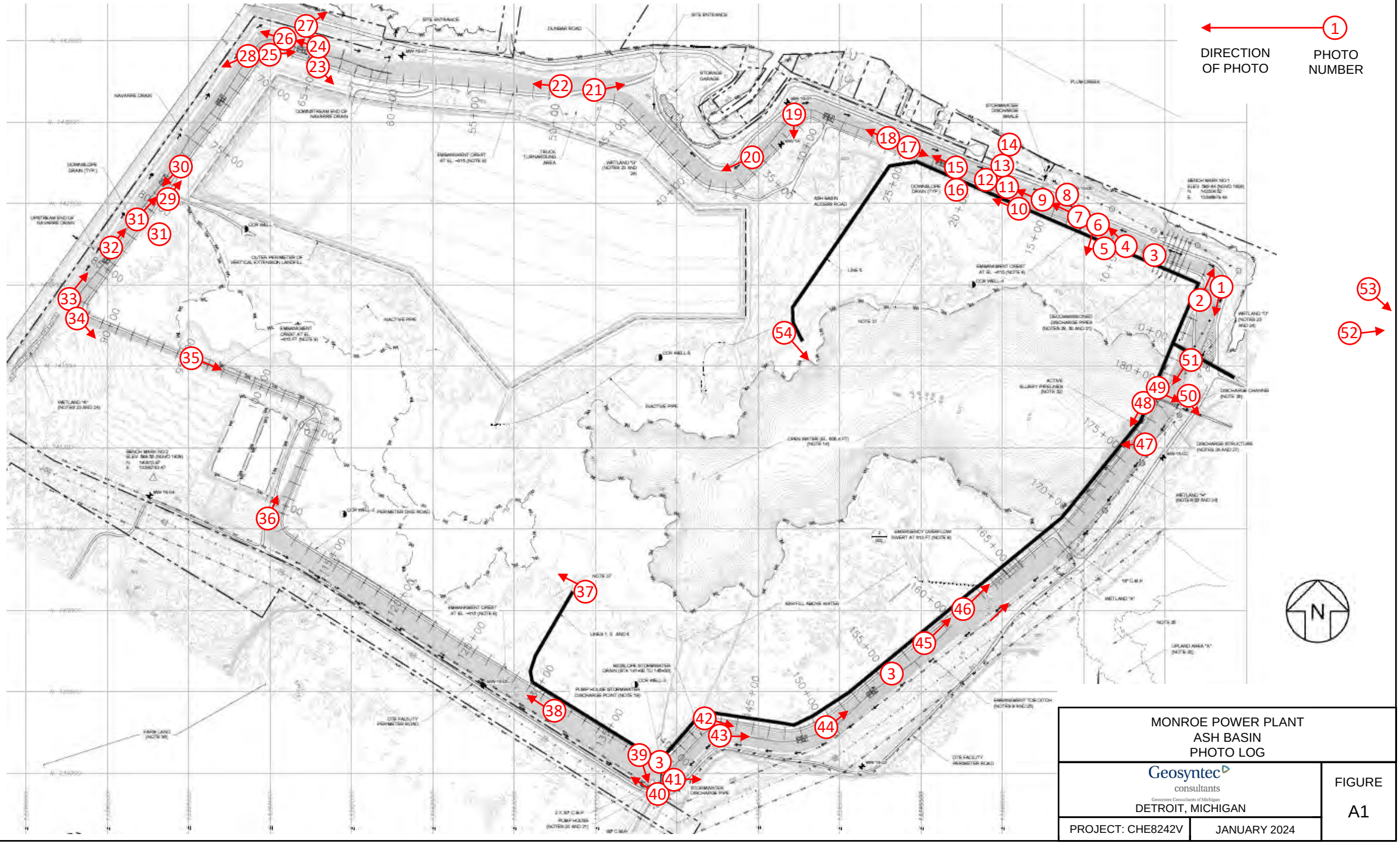
Not Urgent - Replace desiccant canisters within the instrumentation monitoring equipment boxes.

Additional details provided in the Annual Inspection Report.

VIII. Photography

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

	Location	Direction of Photo	Description
1	SEE ATTACHED PHOTO LOG.		
2			
3			
4			
5			
6			
7			
8			
9			
10			


DIRECTION OF PHOTO
PHOTO NUMBER
1
N
MONROE POWER PLANT
ASH BASIN
PHOTO LOG
Geosyntec consultants
Geosyntec Consultants of Michigan
DETROIT, MICHIGAN
FIGURE
A1
PROJECT: CHE8242V
JANUARY 2024

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 1 **Date:** 5/3/2023 **Direction:** South **Comments:** Exterior slopes of the perimeter embankment were in satisfactory condition (east embankment near Station 4+00 shown).	
Photograph 2 **Date:** 5/3/2023 **Direction:** North **Comments:** Perimeter road atop the perimeter berm was generally in satisfactory condition with minimal rutting (typical conditions shown).	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 3 **Date:** 5/3/2023 **Direction:** North **Comments:** A couple Autumn Olive shrubs were observed on the perimeter embankment slopes but were not widespread (typical conditions shown).	
Photograph 4 **Date:** 5/3/2023 **Direction:** Northwest **Comments:** The instrumentation monitoring equipment including the slope inclinometer casings, equipment boxes, solar panels, and antennae were in good condition (typical conditions shown).	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 5 **Date:** 5/3/2023 **Direction:** North **Comments:** The instrumentation monitoring equipment including the equipment boxes and wiring were in good condition. The desiccant canisters in the equipment boxes were degraded (circled) (typical conditions shown).	
Photograph 6 **Date:** 5/3/2023 **Direction:** South **Comments:** The crack/slough on the perimeter embankment slope near approximate Station 12+00 during the 2022 annual inspection had reopened after being repaired. The crack had a scarp with a depth of approximately 6 inches over the approximate length of 100 feet. The initial sand and bentonite repairs were observed.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 7 **Date:** 5/3/2023 **Direction:** West **Comments:** Surficial movements appeared to be causing "bunching" of materials at the toe of the embankment where the crack/slough near approximate Station 12+00 had reopened after being repaired.	
Photograph 8 **Date:** 5/3/2023 **Direction:** North **Comments:** Small, mossy areas observed at a couple locations on the northeastern perimeter embankment slopes (typical conditions shown). No water was observed flowing out of these areas.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 9 **Date:** 5/3/2023 **Direction:** West **Comments:** Cut vegetation from general maintenance operations was observed within the SmartDitches® throughout the site (typical conditions shown). The vegetation did not appear to affect the functionality of the SmartDitches to conduct sufficient stormwater flow.	
Photograph 10 **Date:** 5/3/2023 **Direction:** West **Comments:** Multiple ruts observed along the perimeter road on the north side of the Ash Basin between approximately Stations 15+00 and 20+00.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 11 **Date:** 5/3/2023 **Direction:** Southwest **Comments:** Over one foot of riprap appeared to have eroded from below the SmartDitch outlet into the riprap downchute at approximate Station 18+00.	
Photograph 12 **Date:** 5/3/2023 **Direction:** Southwest **Comments:** Water had eroded a hole below the SmartDitch near the outlet at approximate Station 18+00 and was observed flowing into the hole.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 13 **Date:** 5/3/2023 **Direction:** South **Comments:** Finer sediments were observed within the riprap downchute (circled) downslope of the hole below the SmartDitch near the outlet at approximate Station 18+00.	
Photograph 14 **Date:** 5/3/2023 **Direction:** North **Comments:** The riprap downchutes were generally in satisfactory condition (i.e., minimal erosion of riprap, minimal vegetation) (typical conditions shown) (downchute at approximate Station 18+00 shown). No adverse conditions were identified that appeared to affect the functionality of the riprap downchutes to convey stormwater.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 15 **Date:** 5/3/2023 **Direction:** West **Comments:** The covered high density polyethylene (HDPE) drainpipes connecting portions of the SmartDitches were observed to have minimal sediments and vegetation and were overall in good condition (typical conditions shown) (covered pipe near approximate Station 22+00 shown).	
Photograph 16 **Date:** 5/3/2023 **Direction:** West **Comments:** The covered high density polyethylene (HDPE) drain pipes connecting portions of the SmartDitches were observed to have minimal sediments and vegetation and were overall in good condition (typical conditions shown).	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 17 **Date:** 5/3/2023 **Direction:** East **Comments:** Exterior slopes of the perimeter embankment were in satisfactory condition (northeast embankment near Station 22+00 shown).	
Photograph 18 **Date:** 5/3/2023 **Direction:** West **Comments:** Erosion was observed at all the SmartDitch outlets into the riprap downchutes (typical conditions shown) (outlet near Station 27+00 shown).	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 19 **Date:** 5/3/2023 **Direction:** South **Comments:** Over one foot of riprap appeared to have eroded from below the SmartDitch outlet into the riprap downchute at approximate Station 32+00. The geotextile fabric was exposed and torn below the SmartDitch outlet (circled).	
Photograph 20 **Date:** 5/3/2023 **Direction:** Southwest **Comments:** Exterior slopes of the perimeter embankment were in satisfactory condition (north embankment near Station 36+00 shown).	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 21 **Date:** 5/3/2023 **Direction:** East **Comments:** Access roads to the perimeter road atop the perimeter berm were in good condition with no erosion rills (north access road near Station 56+00 shown).	
Photograph 22 **Date:** 5/3/2023 **Direction:** West **Comments:** Exterior slopes of the perimeter embankment were in satisfactory condition (north embankment near Station 51+00 shown).	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 23 **Date:** 5/3/2023 **Direction:** East **Comments:** Bentonite and sand repair made to crack near approximate Station 65+00 was in satisfactory condition. No indications of additional movement were observed.	
Photograph 24 **Date:** 5/3/2023 **Direction:** North **Comments:** The gated covering to the covered HDPE drainpipe near approximate Station 67+00 was damaged.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 25 **Date:** 5/3/2023 **Direction:** East **Comments:** Gravel placed on the perimeter embankment slopes at approximate Station 67+00 appeared to have raveled from the upper portion of the slope to the lower portion of the slope.	
Photograph 26 **Date:** 5/3/2023 **Direction:** West **Comments:** Gravel placed on the perimeter embankment slopes at approximate Station 67+00 appeared to have raveled from the upper portion of the slope to the lower portion of the slope. Portions of the slotted high-density polyethylene pipe were exposed as a result.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 27 **Date:** 5/3/2023 **Direction:** Northeast **Comments:** Perimeter swales on the north and west sides of the Ash Basin had standing water. No flow was observed, and the water was well below the top of the swale berms. The swales were in satisfactory condition.	
Photograph 28 **Date:** 5/3/2023 **Direction:** West **Comments:** Some vegetation observed in the riprap downchute near Station 70+00. No adverse conditions were identified that appeared to affect the functionality of the riprap downchutes to convey stormwater.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 29 **Date:** 5/3/2023 **Direction:** Northeast **Comments:** The asphalt road on the crest of the embankment for access to the Vertical Extension Landfill was in good condition.	
Photograph 30 **Date:** 5/3/2023 **Direction:** Southwest **Comments:** Bentonite and sand repair made to crack near approximate Station 78+00 was in satisfactory condition. No indications of additional movement were observed.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 31 **Date:** 5/3/2023 **Direction:** Northeast **Comments:** A fire burned vegetation on the perimeter embankment slopes between approximate Stations 82+50 and 91+00. The vegetation appeared to be starting to re-establish along this portion of the embankment.	
Photograph 32 **Date:** 5/3/2023 **Direction:** Northeast **Comments:** Some fire damage to the SmartDitch was observed along the perimeter embankment slopes on the west side. The functionality of the SmartDitches to conduct sufficient stormwater flow did not appear to be affected. However, there was one location were a small erosion rill appeared downslope of the SmartDitch (circled).	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 33 **Date:** 5/3/2023 **Direction:** Northeast **Comments:** Over one foot of riprap appeared to have eroded from below the SmartDitch outlet into the riprap downchute at approximate Station 87+50. The outlet appeared to have settled and rotated back towards the upper slope of the embankment.	
Photograph 34 **Date:** 5/3/2023 **Direction:** Southeast **Comments:** Bentonite and sand repair made to gouge near approximate Station 88+00 was in satisfactory condition. No indications of additional movement were observed.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 35 **Date:** 5/3/2023 **Direction:** East **Comments:** No adverse conditions were identified within the perimeter of the embankment and on the interior slopes. The asphalt road on the crest of the embankment for access to the Vertical Extension Landfill was in good condition.	
Photograph 36 **Date:** 5/3/2023 **Direction:** North **Comments:** The asphalt road for access to the Vertical Extension Landfill was in good condition. Associated stormwater features added at the toe of the embankment slope between approximate Stations 105+00 and 110+00 were in good condition.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 37 **Date:** 5/3/2023 **Direction:** Northwest **Comments:** Sluice lines 1, 3, and 6 on the south side of the Ash Basin were in good condition. The outlets were near open water, and no breaks or leaks were observed in the lines along the embankment. Line 1 was actively sluicing ash into the Ash Basin during the inspection.	
Photograph 38 **Date:** 5/3/2023 **Direction:** Northwest **Comments:** Exterior slopes of the perimeter embankment were in satisfactory condition (southeast embankment near Station 135+00 shown).	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 39 **Date:** 5/3/2023 **Direction:** South **Comments:** The pump house and access road on the southeast corner of the Ash Basin were in good condition. The perimeter swales on the east and south sides of the Ash Basin had some water that was observed flowing towards the pump house. The swales were in satisfactory condition.	
Photograph 40 **Date:** 5/3/2023 **Direction:** North **Comments:** No obstructions were observed in the culverts below the access road to the pump house.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 41 **Date:** 5/3/2023 **Direction:** East **Comments:** Over one foot of riprap appeared to have eroded from below the SmartDitch outlet into the riprap downchute at approximate Station 139+00. Some vegetation observed in the riprap downchute near Station 139+00. No adverse conditions were identified that appeared to affect the functionality of the riprap downchutes to convey stormwater.	
Photograph 42 **Date:** 5/3/2023 **Direction:** East **Comments:** Exterior slopes of the perimeter embankment were in satisfactory condition (southeast embankment near Station 143+00 shown). The perimeter swales on the east and south sides of the Ash Basin had some water that was observed flowing towards the pump house. The swales were in satisfactory condition.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 43 **Date:** 5/3/2023 **Direction:** East **Comments:** One of the inspection ports for the covered HDPE pipe near approximate Station 143+00 was missing a cover.	
Photograph 44 **Date:** 5/3/2023 **Direction:** Northeast **Comments:** Over one foot of riprap appeared to have eroded from below the SmartDitch outlet into the riprap downchute at approximate Station 150+50.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 45 **Date:** 5/3/2023 **Direction:** Northeast **Comments:** Exterior slopes of the perimeter embankment were in satisfactory condition (east embankment near Station 160+00 shown).	
Photograph 46 **Date:** 5/3/2023 **Direction:** Northeast **Comments:** The low point in the perimeter road atop the embankment near approximate Station 165+00 (circled) for emergency overflow was in good condition. Perimeter road atop the perimeter berm was generally in satisfactory condition with minimal rutting.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 47

Date: 5/3/2023

Direction: West

Comments: A prior wet area filled with gravel near approximate Stations 175+00 to 177+00 was not observed to be wet.

Photograph 48

Date: 5/3/2023

Direction: South

Comments: The pool level within the Ash Basin at the time of the inspection was approximately 608.7 feet. No structural damage or obstructions were observed in the gates or stop logs.

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 49 **Date:** 5/3/2023 **Direction:** East **Comments:** No structural damage was observed in the concrete or discharge pipes. No obstructions were observed in the discharge pipes.	
Photograph 50 **Date:** 5/3/2023 **Direction:** Southeast **Comments:** No turbidity was observed in the outflow from the discharge structure.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 51 **Date:** 5/3/2023 **Direction:** Southwest **Comments:** Access roads to the perimeter road atop the perimeter berm were in good condition with no erosion rills (east access road near Station 0+00 shown).	
Photograph 52 **Date:** 5/3/2023 **Direction:** East **Comments:** The silt curtain upstream of the weir was in satisfactory condition. There was some growth on top of the water within the discharge canal.	

DTE ELECTRIC COMPANY
Photographic Record

Client: DTE Electric Company | **Project Number:** CHE8242V

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

Photograph 53 **Date:** 5/3/2023 **Direction:** Southeast **Comments:** The weir outlet for the discharge canal was in satisfactory condition. Water was flowing out of the weir and was clear.	
Photograph 54 **Date:** 5/3/2023 **Direction:** Southeast **Comments:** Sluice line 5 on the north side of the Ash Basin was in good condition. The outlet was near open water and no breaks or leaks were observed in the line along the embankment. Line 5 was actively sluicing ash into the Ash Basin during the inspection.