DTE Energy

Prepared for

DTE Electric Company
One Energy Plaza
Detroit, Michigan 48226

2019 ANNUAL INSPECTION REPORT VERTICAL EXTENSION LANDFILL

MONROE POWER PLANT

Monroe, Michigan

Prepared by

Geosyntec consultants

engineers | scientists | innovators

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January 2020

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1. INTRODUCTION

1.1 Overview

This 2019 Annual Inspection Report (AIR) was prepared by Geosyntec Consultants (Geosyntec) to provide the results of the annual inspection of the coal combustion residuals (CCR) vertical extension landfill (Landfill) at the DTE Electric Company (DTE) Monroe Power Plant disposal facility. The annual inspection has been prepared to comply with United States Environmental Protection Agency (USEPA) Coal Combustion Residuals Rule (CCR Rule) published on April 17, 2015 (40 CFR 257.84). Under the CCR Rule, the Landfill is an "existing landfill" per 40 CFR 257.53 and must be inspected by a qualified professional engineer on a periodic basis, not to exceed one year.

The Landfill 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). It is constructed on top of fly ash that was previously deposited in the Monroe Ash Basin (Ash Basin). The combined Landfill and Ash Basin is considered the "Permitted Area".

Landfill Phase 1 construction began in August 2015, the Michigan Department of Environment, Great Lakes, And Energy (EGLE) licensed the area for disposal via email communication on October 14, 2015, and CCR was placed in the unit beginning October 16, 2015. CCR disposal continued after October 19, 2015[1] as witnessed during subsequent annual inspections.

1.2 Purpose

The purpose of the inspection under the CCR Rule [40 CFR 257.84(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:

[1] Based on the CCR Rule, existing landfill is "…landfill that receives CCR both before and after October 19, 2015, or for which construction commenced prior to October 19, 2015 and receives CCR on or after October 19, 2015…".

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

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

The purpose is accomplished through periodic visual inspection (and photo-documentation) of the Landfill, review of instrumentation monitoring data and evaluations intended to detect signs of instability, review of construction certification documentation, and review of operating records since the 2018 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 – Visual Inspection Results: summarizes visual observations recorded during inspections of the Landfill
- Section 5 – Instrumentation Monitoring: provides information about the instrumentation monitoring
- Section 6 – Operation Activities: describes the operations organization and activities
- Section 7 – Evaluation: evaluates the results of the annual inspection
- Section 8 – Conclusions and Certification: 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 Mrs. Rachel Thompson, P.E. of Geosyntec. Mr. Omer Bozok, P.E. is the qualified professional engineer under the CCR

Rule. His resume is provided in Appendix A. DTE's qualified person[2], who conducts the weekly inspections, accompanied Mr. Bozok and Mrs. Thompson.

This report was prepared by Mr. Omer Bozok, P.E. of Geosyntec and reviewed by Mr. Dan Bodine, P. E. of Geosyntec.

[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	Year	Content
Operations and Monitoring Plan, DTE Energy Monroe Power Plant and Ash Basin	Golder	April 16, 2015	Appendix G contained in the Permit Modification Application Report (16 April 2015)
Construction Quality Assurance Plan – Monroe Power Plant Fly Ash Basin Overliner Construction"	Golder	April 16, 2015	Appendix H contained in the Permit Modification Application Report (16 April 2015)
Run-on/Run-off Control System Plan for Coal Combustion Residuals (CCR) Disposal Facility-Monroe Fly Ash Basin Vertical Extension Existing Landfill	AECOM	October, 2016	Describes the Run-on and run-off control features for the vertical extension.
Fugitive Dust Plan	DTE	July, 2019	Presents dust control measures and assessment of its effectiveness.

Title	Prepared by	Year	Content
Annual Fugitive Dust Report	DTE	November, 2018	Annual report of dust control actions, any complaints, and corrective actions taken, if any. Completed pursuant to 40 CFR 257.80(c). Descriptions and Actions Taken to Control CCR Fugitive Dust.
Weekly Inspection Reports	DTE Energy	2018-2019	Qualified person inspections from December April 2018 through May 2019
Closure Plan	AECOM	October, 2016	Documenting how the plan will meet the CCR Rule. Plan remains unchanged.
Post-Closure Plan	AECOM	October, 2016	Documenting how the plan will meet the CCR Rule. Plan remains unchanged.
Run-on/Run-off Plan	AECOM	October, 2016	Documenting how the plan meets the CCR Rule. Plan remains unchanged.
Headwaters Letter & DTE email	Headwaters & DTE	April 2016 & November 2016, respectively[3]	Documenting the training of operations personnel per the Operating Plan
Groundwater Monitoring System Summary Report	TRC	October, 2017	Information on groundwater monitoring system components and details for the Monroe Ash Basin and Landfill
Groundwater Statistical Evaluation Plan	TRC	October, 2017	Basis for statistical evaluation for groundwater monitoring events for the Monroe Ash Basin and Landfill
Annual Groundwater Monitoring Report	TRC	January, 2019	Summary of annual groundwater monitoring results for 2018 for the Monroe Ash Basin and Landfill

[3] Most recent training documentations to be reviewed.

Title	Prepared by	Year	Content
Location Restrictions Demonstration	TRC	September, 2018	Provides details of location restrictions demonstration for the Landfill
Operations, Monitoring and Action Plan	Golder	April, 2019	Provides details of operations, monitoring, action levels and items for the Landfill
2018 Annual Inspection	Geosyntec	January, 2019	Results of annual inspections conducted from 2015 to 2018
DTE Monroe Ash Basin Overliner Construction Phase 1 – Construction Quality Assurance Report	Golder	September, 2015	Documents details of Phase 1 construction.

3. FACILITY DESCRIPTION

3.1 Overall Site Description

The permitted facility description includes a 79-acre Landfill and 331-acre Ash Basin for a permitted area of 410 acres. The permitted area is in Section 16, Township 7 south, Range 9 east, of Monroe Township, Michigan shown on Figure 1. The Landfill is a Type III low-hazard industrial waste landfill. The Ash Basin is a Type III industrial waste surface impoundment. The Landfill is licensed with the Ash Basin under Michigan Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 License No. 9393.

The Landfill is designated as a 79 acre "dry" disposal area located on top of an area of the Ash Basin that has been filled with CCR approximately to the originally planned final grade. The site investigation conducted in 2015 identified the fly ash below the Landfill to be approximately 50-ft deep from preconstruction ground surface. The maximum water level in the Ash Basin is maintained below 609 ft.

The Landfill is licensed to receive bottom ash, fly ash, flue gas desulfurization (FGD) scrubber wastewater sludge solidified with fly ash or bottom ash, synthetic gypsum, inert material and any other waste allowed by the Rule or obtained through specific regulatory approval (Permit Modification Report, Golder, April 16, 2015).

Phase 1 of the Landfill, finished in September 2015, is the western portion shown on Figure 1. Record drawings of the construction were provided in Appendix B of the 2015 Annual Inspection Report. Phase 2 cell construction has been completed and the certification report was sent to the EGLE in November 2017. EGLE provided approval on 24 January 2018 for CCR disposal. No CCR has been placed in Phase 2 at the time of 2019 annual inspection.

3.2 Design

The design was provided by Golder Associates in the Permit Modification report (April 16, 2015). The components of the Landfill include:

- Perimeter Collection Swale
- Prepared subgrade consisting of in-situ sluiced fly ash and placed general fill;
- 30-inch thick pore pressure relief layer, including from the bottom up, of:
    - 24-inches of bottom ash or limestone

  - Perforated collection piping encased in a filter fabric ("sock")
  - Separation geotextile, non-woven, needle-punched geotextile
  - 6-inch embedment layer
- Perimeter berm.

The Landfill ("Overliner") system components are described by Golder in the Construction Quality Assurance Report (Section 5) as follows:

> "Phase 1 of the overliner is trapezoidal in shape with an overall length of approximately 880-feet generally in the north-south direction and a width that increases from approximately 530-feet generally east-west along the north, to approximately 770-feet along the south. The subgrade slopes away from a generally trending east-west centerline at a 0.5 percent grade towards the perimeter swale. Phase 1 is shown in the Record Drawings included with this report. The perimeter swale encompasses the entire perimeter of the overliner footprint. The Phase 1 subgrade occupies the western approximately 13.4 acres of the overliner…"
>
> Perimeter Swale
>
> "The perimeter swale provides the collection for the pore water relief piping drainage, and outlets the collected water to the south through one of three outfalls. The swale has a typical 12-foot-wide bottom, 3-foot depth, and 3 horizontal to 1 vertical (3H:1V) side slopes. The swale is divided into four main runs, R1 along the north and west limits, R2 along the north and east limits, R3 along the west half of the south, and R4 along the east half of the south limits."

Pore Pressure Relief System

"The pore pressure relief system is constructed directly over the subgrade. The system is comprised of a 30-inch thick granular layer, a series of socked perforated collection pipes and a geotextile separation layer. The granular layer consists of on-site bottom ash and imported limestone; the piping is made up of 6-inch and 8-inch diameter socked corrugated landfill piping from ADS, and the separation layer is Geoturf N800, a non-woven 8 ounce per square yard geotextile."

Perimeter Berm

"Along the north, west, and south limits of Phase 1 there is a perimeter berm built at the outer edge and on top of the pore pressure relief layer, which provides the limits for CCR fill placement. The berm is built from on-site structural fill soils and is 29-feet wide across the bottom, 5-feet wide across the top, 4-feet high, and has three horizontal to one vertical (3H:1V) external and internal slopes."

Monitoring Equipment

"During the construction of the overliner, DTE installed monitoring equipment consistent with the equipment specified in the currently permitted Operations Plan. This equipment consisted of five settlement plates, six vibrating wire piezometers, and two slope inclinometers. The purpose of the equipment is to allow DTE to monitor the ash fill during future operations."

3.3 Construction

Construction of Phase 1 was certified by David List, P.E., of Golder & Associates on September 19, 2015; the certification is contained in the Phase 1 Construction Documentation Report (Golder).

Phase 2 cell construction has been completed and the certification report was sent to the EGLE in November 2017. EGLE provided approval on 24 January 2018 for CCR disposal. No CCR material was placed within Phase 2 by the time of 2019 inspection.

4. VISUAL INSPECTION RESULTS

The annual inspection was completed on May 8, 2019. The completed inspection report form and photographs are presented in Appendix B.

In general, non-optimal conditions include:

(i) sediment build-up within the pore pressure relief pipes within Phase 1 footprint (see Photograph 3);

(ii) erosion and sparse vegetation on the perimeter access road embankment and perimeter clay embankment (see Photograph 5 for typical conditions);

(iii) high water level in the perimeter swale. One of the pore pressure relief drain under Phase 2 footprint was underwater.

DTE should inform the design engineer about the sediment build-up within pore pressure relief pipes. **In summary, no visual and monitoring evidence of instability or detrimental settlement was noted.** The entire Landfill, including the Perimeter Berms and Perimeter Swales, are located within the interior drainage area of the Ash Basin. Any potential sediments from erosion will be deposited in the Ash Basin. Any potential runoff will be managed under the NPDES permit for the Ash Basin

As of July 2019, Geosyntec estimated the total volume of CCRs in the Landfill above the geotextile separation embedment layer to be approximately 150,000 CY, based on data provided by DTE.

5. INSTRUMENTATION MONITORING

5.1 Slope Inclinometers

Slope inclinometer (SI) locations are shown on Figure 2. Readings are obtained at least monthly.

5.2 Piezometers

Piezometer locations are shown on Figure 2. The piezometers have been incorporated into the existing continuous monitoring system established for the Monroe Ash Basin. Readings from the piezometers are taken every six hours and automatically uploaded to cloud system and interpreted as part of the continuous monitoring system for the Monroe Ash Basin.

5.3 Settlement Plates

Settlement plate (SP) locations are shown on Figure 2. Readings are obtained approximately every two weeks.

6. OPERATION ACTIVITIES

6.1 Operations Organization

The responsible personnel include:

- Lisa Lockwood, Heather Lucier and Kailyn Gerzich, DTE Environmental, Monroe Power Plant, Inspections
- David Desbrough, Fuel Supply, Supervisor for the site operations.

6.2 Operation Activities

Operations are defined in Operations, Monitoring and Action Plan (Golder, 2019) (Operations Plan). The following operation activities are described in the Operations Plan:

1. Hours of Operation
2. Site Access and Barriers
3. Traffic Routing
4. Nuisance Control
5. Temporary Storage
6. Proposed Waste Types
7. Personnel and Training
8. Recordkeeping
9. Equipment
10. Filling Operations
11. Intermediate Cover Use
12. Water
13. Bottom Ash

14. Soil Cover

15. Chemical Sprays

16. Geotextiles and Rolled Erosion Control Products

17. Intermediate Cover Use Summary

18. Ditch Maintenance

In addition, the following are specifically currently required by the CCR Rule:

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

6.3 Run-On/Run-Off Control System Plan for CCR Disposal Facility Observations

The overall intent of the Operations Plan was being followed. Run-on and Run-off is controlled by the perimeter swale and it appeared to be in working condition.

7. EVALUATION

7.1 Design

The design was completed by Golder in 2015 and it is documented in the April 16, 2015 Permit Modification Report and signed by a professional engineer licensed in Michigan. The design appears to be consistent with recognized and generally accepted good engineering standards, based on available information.

7.2 Construction

Construction of Phase 1 was completed in September 2015 and is documented in the September 16, 2015 Construction Documentation report, which was signed by a professional engineer licensed in Michigan. Construction is consistent with recognized and generally accepted good engineering standards, based on available information.

Construction of subsequent phases east of the completed portion were completed at the time of inspection and the certification report was submitted to the EGLE in November 2017. EGLE provided approval on 24 January 2018 for CCR disposal.

7.3 Maintenance

The following maintenance items have been implemented since the 2018 annual inspection:

- Mowed vegetation within the perimeter swale.
- Repaired some of the erosion features on the outer perimeter berm.
- Performed maintenance on continuous monitoring system components.

7.4 Operations

7.4.1 Operations Plan

Operations were consistent with recognized and generally accepted good engineering standards.

7.4.2 Fugitive Dust Control Plan

A Fugitive Dust Control Plan was provided by DTE and is posted on the DTE CCR publicly accessible website.

No dusting occurred during the site inspection to assess whether the plan was being implemented. Water trucks were used to control dust on the roads. In the absence of contrary information, dust control is consistent with recognized and generally accepted good engineering standards, based on available information and observations. Dusting appears to be managed appropriately.

7.4.3 Run on and Run off Control

Run on and run off control is maintained by the perimeter ditch and perimeter berm shown in the design and as constructed. The plan is posted on the CCR website and is consistent with good engineering standards, based on available information.

7.4.4 Inspections

Weekly inspections have been completed and documented by qualified persons. The qualified persons were initially trained in April 2015 and new inspectors were trained by DTE personnel. Weekly inspections for the Landfill are conducted concurrent with the Ash Basin inspections.

The inspection reports were reviewed through May 2019. No indications of any significant deficiencies were identified in the weekly inspections. Inspections were consistent with recognized and generally accepted good engineering standards, based on available information.

7.4.5 Monitoring

The operations instrumentation monitoring included measurement of piezometers, settlement plates and inclinometers. Data since the 2018 annual inspection were reviewed and there are no significant findings identified by DTE.

Groundwater monitoring is being implemented as part of the Monroe Ash Basin operations.

7.4.6 Annual Visual Inspection

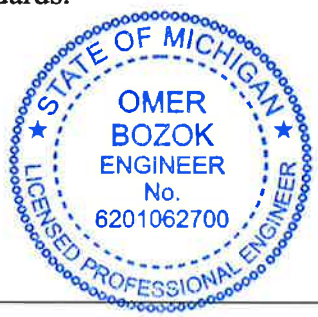
The annual visual inspection did not identify any evidence of structural weakness or instability.

8. CONCLUSIONS AND CERTIFICATION

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

Based on the annual inspection results and review of the available data, the Landfill was designed, constructed, operated and maintained consistent with recognized and generally accepted good engineering standards.

Certified by:



_____ Date 1/9/2020

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

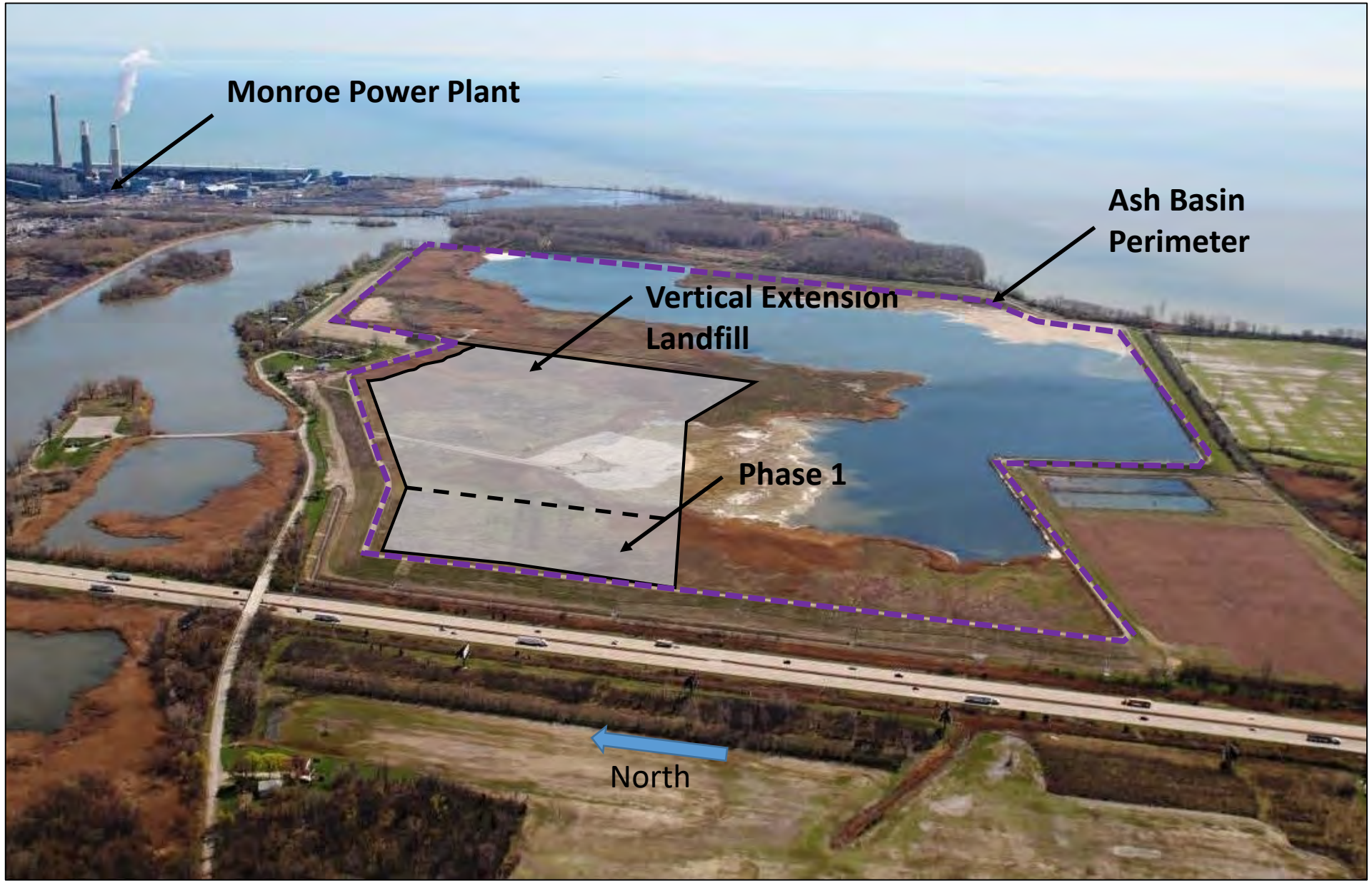
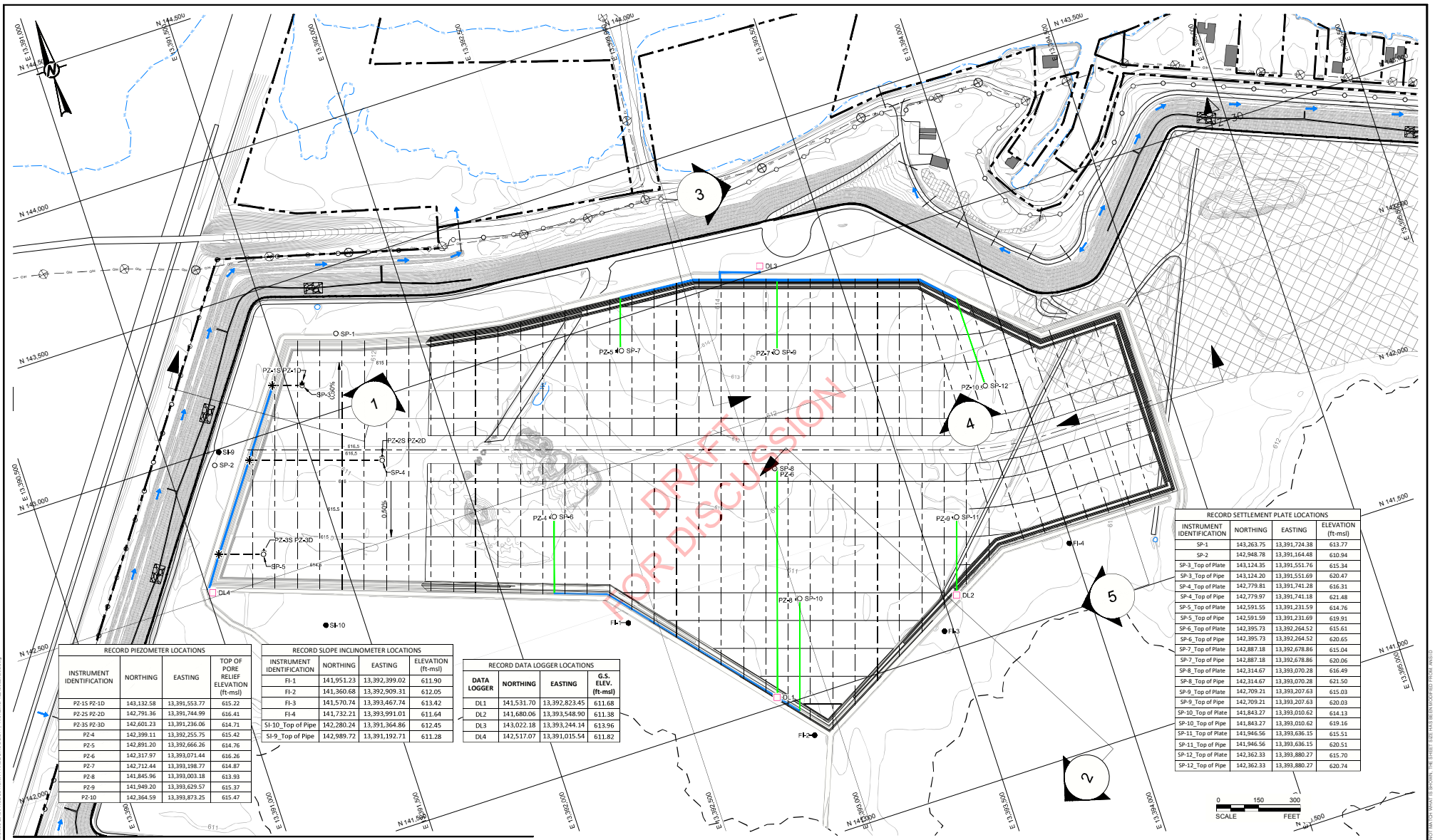


Figure 1: Site Location
Vertical Extension
Landfill
Monroe Power Plant



RECORD PIEZOMETER LOCATIONS

INSTRUMENT IDENTIFICATION	NORTHING	EASTING	TOP OF PORE RELIEF ELEVATION (ft-msl)
PZ-1S PZ-1D	143,132.58	13,391,553.77	615.22
PZ-2S PZ-2D	142,791.36	13,391,744.99	616.41
PZ-3S PZ-3D	142,601.23	13,391,236.06	614.71
PZ-4	142,399.11	13,392,255.75	615.42
PZ-5	142,891.20	13,392,666.26	614.76
PZ-6	142,317.97	13,393,071.44	616.26
PZ-7	142,712.44	13,393,198.77	614.87
PZ-8	141,845.96	13,393,003.18	613.93
PZ-9	141,949.20	13,393,629.57	615.37
PZ-10	142,364.59	13,393,873.25	615.47

RECORD SLOPE INCLINOMETER LOCATIONS

INSTRUMENT IDENTIFICATION	NORTHING	EASTING	ELEVATION (ft-msl)
FI-1	141,951.23	13,392,399.02	611.90
FI-2	141,360.68	13,392,909.31	612.05
FI-3	141,570.74	13,393,467.74	613.42
FI-4	141,732.21	13,393,991.01	611.64
SI-10_Top of Pipe	142,280.24	13,391,364.86	612.45
SI-9_Top of Pipe	142,989.72	13,391,192.71	611.28

RECORD DATA LOGGER LOCATIONS

DATA LOGGER	NORTHING	EASTING	G.S. ELEV. (ft-msl)
DL1	141,531.70	13,392,823.45	611.68
DL2	141,680.06	13,393,548.90	611.38
DL3	143,022.18	13,393,244.14	613.96
DL4	142,517.07	13,391,015.54	611.82

RECORD SETTLEMENT PLATE LOCATIONS

INSTRUMENT IDENTIFICATION	NORTHING	EASTING	ELEVATION (ft-msl)
SP-1	143,263.75	13,391,724.38	613.77
SP-2	142,948.78	13,391,164.48	610.94
SP-3_Top of Plate	143,124.35	13,391,551.76	615.34
SP-3_Top of Pipe	143,124.20	13,391,551.69	620.47
SP-4_Top of Plate	142,779.81	13,391,741.28	616.31
SP-4_Top of Pipe	142,779.97	13,391,741.18	621.48
SP-5_Top of Plate	142,591.55	13,391,231.59	614.76
SP-5_Top of Pipe	142,591.59	13,391,231.69	619.91
SP-6_Top of Plate	142,395.73	13,392,264.52	615.61
SP-6_Top of Pipe	142,395.73	13,392,264.52	620.65
SP-7_Top of Plate	142,887.18	13,392,678.86	615.04
SP-7_Top of Pipe	142,887.18	13,392,678.86	620.06
SP-8_Top of Plate	142,314.67	13,393,070.28	616.49
SP-8_Top of Pipe	142,314.67	13,393,070.28	621.50
SP-9_Top of Plate	142,709.21	13,393,207.63	615.03
SP-9_Top of Pipe	142,709.21	13,393,207.63	620.03
SP-10_Top of Plate	141,843.27	13,393,010.62	614.13
SP-10_Top of Pipe	141,843.27	13,393,010.62	619.16
SP-11_Top of Plate	141,946.56	13,393,636.15	615.51
SP-11_Top of Pipe	141,946.56	13,393,636.15	620.51
SP-12_Top of Plate	142,362.33	13,393,880.27	615.70
SP-12_Top of Pipe	142,362.33	13,393,880.27	620.74

LEGEND

- SI-1 — PHASE 1 SLOPE INCLINOMETER
- PZ-1D / PZ-1S — PHASE 1 VIBRATING WIRE PIEZOMETER (VWP) PAIR (DEEP & SHALLOW)
- SP-1 — PHASE 1 SETTLEMENT PLATE
- PHASE 1 REMOTE (CABLED) DATA LOGGER LOCATION FOR VWP
- DATA LOGGER CABLE
- RECORD LOCATION OF DRAINAGE PIPING
- FI-1 — 2017 SLOPE INCLINOMETER
- 2017 VIBRATING WIRE PIEZOMETER (VWP) PAIR (DEEP & SHALLOW) AND SETTLEMENT PLATE
- DATA TRANSMISSION LOCATION
- CABLING OUTSIDE OVERLINER
- CABLING INSIDE OVERLINER

CLIENT
DTE ENERGY
MONROE POWER PLANT
MONROE, MI

CONSULTANT
GOLDER

YYYY-MM-DD	2018-01-03
PREPARED	JJS
DESIGN	AK
REVIEW	
APPROVED	

PROJECT
MONROE POWER PLANT ASH BASIN

TITLE
MONITORING LOCATION PLAN

FIGURE 2

PROJECT No.
1521809D

CONTROL
1521809DA005.dwg

APPENDIX A

RESUME OF OMER BOZOK, P.E. (QUALIFIED PROFESSIONAL ENGINEER)

OMER BOZOK, P.E.

Specialties

- CCR Engineering
- Geotechnical Engineering
- Construction Quality Assurance

Education

M.S., Geotechnical Engineering, University of Missouri, Columbia, Columbia, Missouri, 2009

B.S., Geological Engineering, Hacettepe University, Ankara, Turkey, 2007

Registrations and Certifications

P.E. in Michigan and Ohio

CAREER SUMMARY

Mr. Bozok is a project engineer and responsible for managing large-scale civil projects, reviewing engineering data, writing technical reports, generating/reviewing drawings, performing geotechnical analyses and design, and managing construction quality assurance (CQA) activities.

He is experienced in design, inspection, instrumentation/monitoring, and operations of coal ash facilities. Mr. Bozok managed design of four large-scale civil projects: involving (i) mitigation of a 3.5-mile long embankment, encompassing 400-acre ash basin; (ii) closure of a 300-acre ash basin and lowering of a 100-ft tall dam; (iii) closure of a 50-acre ash basin; and (iv) remediation of a 50-acre existing Superfund landfill.

KEY PROJECT EXPERIENCE

Wood River West Ash Complex Closure, Vistra Energy, East Alton, Illinois. Mr. Bozok is the project manager and the lead civil design engineer for the project that involves closure of an existing 50-acre fly ash pond, detailed dewatering design and relocation of plant discharge pipes. The project requires approximately one million CY of earthwork. The scale of the project, availability of limited on-site materials, nature of loose ash, and extent of groundwater makes it a challenging project.

Embankment Mitigation for Fly Ash Basin and CQA, DTE Energy, Monroe, Michigan. Mr. Bozok served as the project manager and the lead civil design engineer for the project that involved design and mitigation of an existing fly ash basin embankment. The embankment is 3.5-miles long and 40-ft high. Mainly, mitigation measures included flattening of the existing slopes from 2 horizontal to 1 vertical (2H:1V) slopes to 2.5H:1V with a mid-slope stormwater conveyance channel. The project was completed in five construction seasons (2009 through 2013). Mr. Bozok managed CQA activities during construction.

The project won DTE's "Best Large Project Award" under their Major Enterprise Project group. The five-year project was completed under budget, within schedule and with no safety incidents.

Settling Pond Fly Ash Removal and CQA, City of Escanaba, Escanaba, Michigan. Project included removal of fly ash from a settling pond and adjacent areas that required excavation and re-grading. Settling pond was utilized by City of Escanaba Generating Station to dispose its coal combustion residuals. Mr. Bozok designed the cleanout, assisted with contractor bids and selection, managed onsite CQA personnel on a day to day basis, reviewed daily reports, the contractor's submittals, responded to the contractor's and the owner's requests in a timely manner for the orderly execution of the work.

CQA of Plate Load Test on Slurried Fly Ash, Electric Power Research Institute, Central City, Kentucky. Mr. Bozok documented construction and testing of a plate

load test on slurried fly ash at a power plant ash disposal basin. The test was performed by applying load on a stiffened 5-ft by 5-ft test plate. The load was resisted by four micropiles drilled into bedrock. In addition, Mr. Bozok provided oversight for the field investigation that included CPTu testing, shear wave testing and soil borings.

MIG/DeWane Superfund Site Remedial Design and Construction CQA, Republic Services, Belvidere, Illinois. Mr. Bozok was the lead design engineer for closure of a Superfund site, and managed CQA activities during construction. The project involved preparing remedial design construction drawings for an existing approximately 50-acre Superfund site to upgrade an interim cap that had been installed in 1990s. Design included: (i) construction of leachate and gas collection system consisting of approximately 4,000-ft long leachate and gas collection system trench, and underground and above ground storage tanks; (ii) augmentation of the existing clay fill cover by compacting additional clay fill; and (iii) implementation of stormwater management system.

Probabilistic Slope Stability Analysis for Fly Ash Basin, DTE Energy, Monroe, Michigan. Mr. Bozok served as the lead geotechnical engineer for the project. The client was considering mitigating a portion of a 3.5-miles long and 40-ft high the embankment to improve slope stability safety factor. Mr. Bozok performed probabilistic slope stability analysis to assess the global stability and recommend mitigation measures, if necessary. Mr. Bozok provided the client with a probability of failure information for the embankment and the client decided that mitigation was not necessary. This provided the client with approximately 5-million-dollar savings.

Emergency Action Plan for Fly Ash Basin, DTE Energy, Monroe, Michigan. Mr. Bozok prepared an Emergency Action Plan (EAP) for a 400-acre ash basin that has 3.5-miles long, 40-ft high embankment. The Ash Basin is critically bounded on the east by Lake Erie, on the west by Interstate Highway 75 (I-75), on the north by Plum Creek, and on the south by an agricultural field. Mr. Bozok evaluated four failure scenarios at critical locations around the perimeter embankment and developed the EAP based on Federal Emergency Management Agency Guidelines for Dam Safety.

Potential Failure Mode Analysis for Fly Ash Basin, DTE Energy, Monroe, Michigan. Mr. Bozok worked with the client to identify potential failure modes for a 400-acre ash basin that could cause ash release, resulting in environmental impact and potential for human life loss. Mr. Bozok facilitated meetings with client's staff including personnel from operations, maintenance, engineering and environmental group, to rank and categorize potential failure modes. Upon, identifying medium and high-risk failure modes, Mr. Bozok worked with the client to design and implement mitigation measures to lower risk levels.

Operations Plan for Fly Ash Basin, DTE Energy, Monroe, Michigan. Mr. Bozok, prepared a set of operations plan drawings along with the inspection, monitoring and maintenance manual for a 400-acre fly ash basin facility. Project involved installation of a continuous monitoring and alarm system for the ash basin embankment inclinometers. Mr. Bozok directed a group of field staff and instrumentation engineers to implement the program. The operations plan provides guidelines on how to safely operate the fly ash basin, structures, provides communication procedures, and provides action criteria for surface and subsurface instrumentation.

Seep Investigation Study for Fly Ash Basin, DTE Energy, Monroe, Michigan. Mr. Bozok prepared a seep investigation report for the Monroe Ash Basin embankment. The purpose of the study was to find the origin of water observed in slope indicator casings and standing water along the toe of the embankment and to recommend a mitigation approach. Mr. Bozok reviewed and evaluated the field data (including water level readings from the casings, pore pressure data from piezometers and precipitation data) and groundwater and fly ash chemical analysis results.

Stingy Run Fly Ash Reservoir Closure, American Electric Power, Cheshire, Ohio. Mr. Bozok is the project manager and the lead civil design engineer for the project that involves closure of an existing 300-acre fly ash pond and lowering of 100-ft tall dam. The project requires approximately 4 million CY of earthwork. The scale of the project, nature of loose ash, lowering of the dam, nearby highwalls, wetlands and streams make it a challenging design project and involves collaboration between different disciplines.

Use of Instrumented Test Fill to Assess Static Liquefaction of Impounded Fly Ash for Cardinal Landfill, American Electric Power, Brilliant, Ohio. Mr. Bozok assessed the potential for a fly ash subgrade to undergo static liquefaction using results from an instrumented test fill. Mr. Bozok performed time-rate settlement analyses for a flue gas desulfurization (FGD) waste landfill to be constructed over an existing fly ash pond. He evaluated the coefficient of consolidation of ash by interpreting CPTu dissipation tests and compared it against the values in the literature. Mr. Bozok used the software program SAF-TR to model the effect of ramp loading on excess pore pressure and compared it to results

from a full-scale test.

Sibley Quarry CCR Landfill Fill Plan, DTE Energy, Trenton, Michigan. Mr. Bozok was the lead civil design engineer assisting the client with phasing of landfill operations. The existing operations, site conditions and the need for landfilling 16 MCY of CCR made it a challenging project.

Engineering Correlations for Geotechnical Parameters for Ponded Fly Ash, EPRI, Palo Alto, California. Mr. Bozok was one of the principal investigators and managed the field investigation activities. The project involved performing a field plate load test at an ash basin site and preparing a report summarizing findings of the study.

Evaluation of Fly Ash Diagenesis Potential, EPRI, Palo Alto, California. Mr. Bozok was the lead principal investigator for this project. The project involved: (i) establishing a method for creating a pluviated specimen in a lab environment that reasonably represents in-situ conditions; and (ii) studying diagenesis potential of Class F fly ash and its impact on engineering characteristics.

Annual Inspection of Ash Impoundments and Landfills, DTE Energy, various locations. Mr. Bozok inspected Sibley Quarry Landfill and Monroe Ash Basin and prepared annual inspection reports per the requirements of USEPA CCR rules.

Review of Safety Factor Assessments for Various Sites, Dynegy, various locations. Mr. Bozok was a key member of a team, which reviewed safety factor assessments for various high-risk sites that were prepared by another consulting firm. The documents were prepared to meet the requirements of USEPA CCR rules and required diligent review before made available to the public.

Documentation for USEPA CCR Rules, DTE Energy, Monroe, Michigan. Mr. Bozok assisted client with meeting the documentation requirements of USEPA CCR rules. The rule requires various documentation regarding the history of construction, operations and design of various structures. He directed hydraulic capacity and safety factor assessments.

Guidance Documents for USEPA Coal Combustion Residual Rules, Electric Power Research Institute, Palo Alto, California. Mr. Bozok was a key member of the team and prepared various templates for EPRI members. Project involved preparing a series of guidance documents for utility companies that manage coal combustion residuals to meet USEPA CCR Rules. Mr. Bozok prepared templates for emergency action plans, onsite inspections and training module for inspectors.

APPENDIX B

2019 ANNUAL INSPECTION FORMS AND PHOTOS

DTE Energy

MONROE VERTICAL EXTENSION LANDFILL
2019 ANNUAL INSPECTION FORM

Name of Landfill: Monroe Vertical Extension Landfil
MDEQ Landfill ID 397800
Owner: DTE Electric Company
Operator: Headwaters
Site Conditions: Dry

Qualified Engineer: Omer Bozok
Date: 5/8/2019 **Time:** 1:00:00 PM
Weather: Sunny, 60s
Precipitation (since last inspection): 0.2 in.

I. Landfill Condition

1. Describe operations in the landfill: Disposal of fly ash, bottom ash, economizer ash, FGD sludg
   Other:
2. Are any stormwater ditches obstructed? ___ Yes x No
   If 'Yes', describe (type of debris, reason for obstruction, etc.
   Ditches have minimal slope and standing water in some areas; Does not impede overall ability to drain the 24-hour, 25-year storm.
3. Are there indications of erosion on the landfill perimeter berm? x Yes ___ No
   If 'Yes', describe what type and its condition (rill, gully, dimensions, etc
   Numerous erosion rills and gullies were observed on the perimeter access berm and perimeter clay berm (up to 12-in dep (Photograph 5)
4. Is runoff from the landfill surface contained by the perimeter ditch or Ash Basin? x Yes ___ No
   If 'No', describe where runoff flow is not containec
5. Is runon prevented from entering the landfill area? x Yes ___ No
   If 'No', describe where runoff flow is not contained.
6. Is the underdrain collection system draining? x Yes ___ No
   Describe flow conditions: Many of the underdrain collection system drains have sediment build up (Photograph 3
   Some of the pipes were draining at the time of inspection (Photograph 4).
7. Is there any unusual settlement causing "birdbaths"? ___ Yes x No
   If 'Yes', describe.
8. Other observations around the landfill (changes since last inspection): ___ Yes x No
   If 'Yes', describe.

DTE Energy

MONROE VERTICAL EXTENSION LANDFILL
2019 ANNUAL INSPECTION FORM

Name of Landfill: Monroe Vertical Extension Landfil **Qualified Engineer:** Omer Bozok
MDEQ Landfill ID 397800 **Date:** 5/8/2019 **Time:** 1:00:00 PM

II. Repairs, Maintenance, Action Items

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

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 within a year.
   Numerous erosion rills and gullies were observed on the perimeter access berm and perimeter clay berm. Not urgent. (see Photograph 5)

4. Are the instrumentation intact and functioning? x Yes ___ No
   If 'No', describe conditions of instrumentatior

III. Photography

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

	Location	Direction of Photo	Description
i.	See attached photo log		
ii.			
iii.			
iv.			
v.			
vi.			
vii.			
viii.			
ix.			
x.			

GEOSYNTEC CONSULTANTS
Photographic Record

Client: DTE Electric Company	**Project Number: CHE8242**
Site Name: Monroe Power Plant Vertical Extension Landfill	**Site Location: Monroe, MI**

Photograph ID: 1 **Date: 5/8/2019** **Direction: W** **Comments: View of Landfill (on the right side) from perimeter clay embankment along Phase 2.**	

Photograph ID: 2 **Date: 5/8/2019** **Direction: W** **Comments: Water level in the perimeter swale is high, it backs into pore pressure relief drain of the Landfill under Phase 2.**	

GEOSYNTEC CONSULTANTS
Photographic Record

Client: DTE Electric Company	**Project Number: CHE8242**
Site Name: Monroe Power Plant Vertical Extension Landfill	**Site Location: Monroe, MI**

Photograph ID: 3

Date: 5/8/2019

Direction:

Comments: Typical sediment buildup in a pore pressure relief drain under Phase 1.

Photograph ID: 4

Date: 5/8/2019

Direction: E

Comments: Several of pore pressure relief drains were observed to be draining water in to perimeter swale. Also appears to have some sediment buildup.

GEOSYNTEC CONSULTANTS
Photographic Record

Client: DTE Electric Company	**Project Number: CHE8242**
Site Name: Monroe Power Plant Vertical Extension Landfill	**Site Location: Monroe, MI**

Photograph ID: 5

Date: 5/8/2019

Direction: N

Comments: Sparse vegetation and numerous erosion rills and gullies up to about 12-inches deep were observed on the exterior face of perimeter clay embankment. These erosion features were observed to have vegetation growth.

Photograph ID: 6

Date: 5/8/2019

Direction: S

Comments: View of Phase 1 area from perimeter access road (on left side). CCR grade is near the top of perimeter access road