Prepared for

DTE Electric Company
One Energy Plaza
Detroit, Michigan 48226

2020 ANNUAL INSPECTION REPORT VERTICAL EXTENSION LANDFILL

MONROE POWER PLANT

Monroe, Michigan

Prepared by

Geosyntec consultants

engineers | scientists | innovators

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CHE8242V

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1. INTRODUCTION

1.1 Overview

This 2020 Annual Inspection Report (AIR) was prepared by Geosyntec Consultants of Michigan, Inc. (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 the United States Environmental Protection Agency (USEPA) Coal Combustion Residuals Rule (CCR Rule) published on 17 April 2015, as amended 30 July 2018 (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 properties 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 Ash Basin is a separate CCR surface impoundment. 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, formerly Michigan Department of Environmental Quality(MDEQ)), licensed the area for disposal via email communication on 14 October 2015, and CCR was placed in the unit beginning 16 October 2015. CCR disposal continued after 19 October 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 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); 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, and review of construction certification documentation, and review of operating records since the 2019 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 the inspection 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; and
- Section 8 – Conclusions and Certification: provides the overall conclusions of the annual inspection and certification of the AIR.

1.4 Terms of Reference

The annual visual inspection was performed by Ms. Rachel Thompson, P.E. of Geosyntec, the qualified professional engineer under the CCR Rule. Her resume is provided in **Appendix A**. DTE's "qualified person", who conducts the weekly inspections, accompanied Ms. Thompson.

This report was prepared by Ms. Rachel Thompson, P.E. of Geosyntec, and reviewed by Mr. Omer Bozok, P. E. of Geosyntec.

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
Run-on/Run-off Control System Plan for Coal Combustion Residuals (CCR) Disposal Facility-Monroe Fly Ash Basin Vertical Extension, Existing Landfill	AECOM	17 October 2016	Describes the Run-on and run-off control features for the vertical extension. Documenting how the plan meets the CCR Rule. Plan remains unchanged.
Fugitive Dust Plan	DTE	2019	Presents dust control measures. Plan remains unchanged.
Annual Fugitive Dust Report	DTE	November 2019	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	2019-2020	Qualified person inspections from December May 2019 through May 2020
2019 Annual Inpsection Report	Geosyntec	January 2020	Provides the results of the 2019 annual inspection.

Title	Prepared by	Date	Content
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.
Groundwater Monitoring System Summary Report	TRC	October 2017	Information on groundwater monitoring system components and details for the Monroe Ash Basin
Groundwater Statistical Evaluation Plan	TRC	October 2017	Basis for statistical evaluation for groundwater monitoring events for the Monroe Ash Basin
Annual Groundwater Monitoring Report	TRC	January 2020	Summary of annual groundwater monitoring results for 2019 for the Monroe Ash Basin and Vertical Extension Landfill
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

3. FACILITY DESCRIPTION

3.1 Overall Site Description

The permitted facility description includes a 79-acre vertical extension landfill (Landfill) and a 331-acre fly ash basin (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 in **Figure 1**. The Landfill is a coal ash landfill, and 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 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 the preconstruction ground surface, down to elevation approximately 563 ft[2]. The water level in the Ash Basin is maintained below El. 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, 2015).

Phase 1 of the Landfill, finished in September 2015, is the western 11-acre portion shown in **Figure 1**. Record drawings of the construction were provided in Appendix B of the 2015 Annual Inspection Report. Phase 2 cell construction was a continuation of Phase 1 construction and 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 into Phase 2. CCR placement had been started in Phase 2 at the time of the annual inspection.

3.2 Design

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

- Prepared subgrade consisting of in-situ sluiced fly ash and general fill;

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

- 30-inch thick pore pressure relief layer (PRL), comprised from top to bottom:
    - 24-inch thick layer of bottom ash or limestone aggregate,
    - Perforated collection piping encased in a filter fabric ("sock") within the 24-inch thick bottom ash/limestone aggregate,
    - Separation geotextile made of non-woven, needle-punched geotextile, and
    - 6-inch thick embedment layer;
- Monitoring system consisting of 12 settlement plates, 13 vibrating wire piezometers, and 5 slope inclinometers;
- Perimeter berm; and
- Perimeter collection swale.

3.3 Construction

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

Phase 2 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. CCR material began being placed within Phase 2 in 2020 between the time of the 2019 and 2020 annual inspections.

4. VISUAL INSPECTION RESULTS

The annual inspection was completed on 20 May 2020. The completed inspection report form and photographs are presented in **Appendix B**.

In general, the following visual observations were made:

(i) Perimeter swales have a minimal slope, and standing water was observed in some areas but did not appear to impede overall ability to drain. Water was contained in the swales and levels were generally below the pore pressure relief pipe outlets;

(ii) A culvert was installed at the intersection of the R2 and R4 perimeter swales in the southeast corner of the Landfill. The culvert drains water from the R3 and R4 perimeter channels. Water was observed to be flowing through the culvert at the time of the inspection;

(iii) Vegetation was present on the exterior perimeter berm slopes, but some minor erosion rills were observed; and

(iv) Many of the pore pressure relief pipes were observed to have little to some sediment build-up at the outlets, but the sediment does not appear to impede overall ability to drain. Some of the pipes were observed to be flowing.

In summary, no visual and monitoring evidence of instability or detrimental settlement was noted. The entire Landfill, including the perimeter berms and 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 run-off will be managed under the NPDES permit for the Ash Basin.

As of August 2020, Geosyntec estimated the total volume of CCRs in the Landfill above the geotextile separation embedment layer to be approximately 170,000 CY, based on data provided by DTE.

5. INSTRUMENTATION MONITORING

5.1 Slope Inclinometers

Six slope inclinometers (SIs) are present along the west and south sides of the Landfill perimeter and were constructed within the existing CCR material in the Monroe Ash Basin. The SIs are designated as FI-1 through FI-4, SI-9, and SI-10, as shown in **Figure 2**. Readings for the SIs were obtained at least monthly.

5.2 Piezometers

Thirteen piezometers (PZs) are present below the Landfill overliner at the locations shown on **Figure 2**. PZs have been incorporated into the existing continuous monitoring system established for the Monroe Ash Basin. PZ readings are collected and automatically uploaded to the Cloud system and interpreted as part of the continuous monitoring system for the Monroe Ash Basin. Readings for the PZ were obtained at least every other week (minimum of twice a month).

5.3 Settlement Plates

Settlement plates (SPs) are generally co-located with PZs as shown on **Figure 2**. The SPs are founded on the surface of the Landfill overliner. SP readings were obtained every other week, twice a month.

6. OPERATION ACTIVITIES

6.1 Operations Organization

The Landfill is operated by DTE. The responsible personnel include:

- James Good – Power Generation Engineering Fossil Generation – Environmental & Safety Projects, Monroe Power Plant
- Lisa Lockwood, Amanda Kosch, and Alexis Thomas, DTE Environmental Management and Resources (EMS), Monroe Power Plant, Inspections

6.2 Operation Activities

Operations are defined in the 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 the Fugitive Dust Control Plan;
- Annual Fugitive Dust Control Report; and
- Annual Groundwater Monitoring and Corrective Action Report.

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

It was identified that 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 16 April 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 16 September 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

A culvert was installed at the intersection of the R2 and R4 perimeter swales in the southeast corner of the Landfill. The culvert is intended to drain water in the R3 and R4 perimeter channels. Water was observed to be flowing west to east through the culvert at the time of the inspection. No other maintenance had been performed since the last annual inspection.

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. The plan was revised in 2019.

The annual fugitive dust control report for 2020 was not completed at the time of inspection, but the report from November 2018 through November 2019 was reviewed. 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 swale 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 were conducted concurrently with the Ash Basin inspections. DTE reported that there was no mention of deficiencies for the Landfill in the weekly inspections.

The inspection reports were reviewed through May 2020. 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 were not collected between late October 2015 through early February 2016. The data from February 2016 through May 2020 were reviewed, and no significant findings were 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.

The four-foot high perimeter berm and swale had some vegetation growth and minor erosion features were identified on the exterior slopes of the berm. However, the design approved by EGLE did not include a requirement to vegetate the berm and swale. Any potential sediments from erosion will be deposited in the Ash Basin. Any potential run-off will be managed under the NPDES permit for the Ash Basin.

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:

Rachel Thompson _____Date 1/9/2021

Rachel Thompson, P.E.
Michigan P.E. License Number 6201069900
Engineer

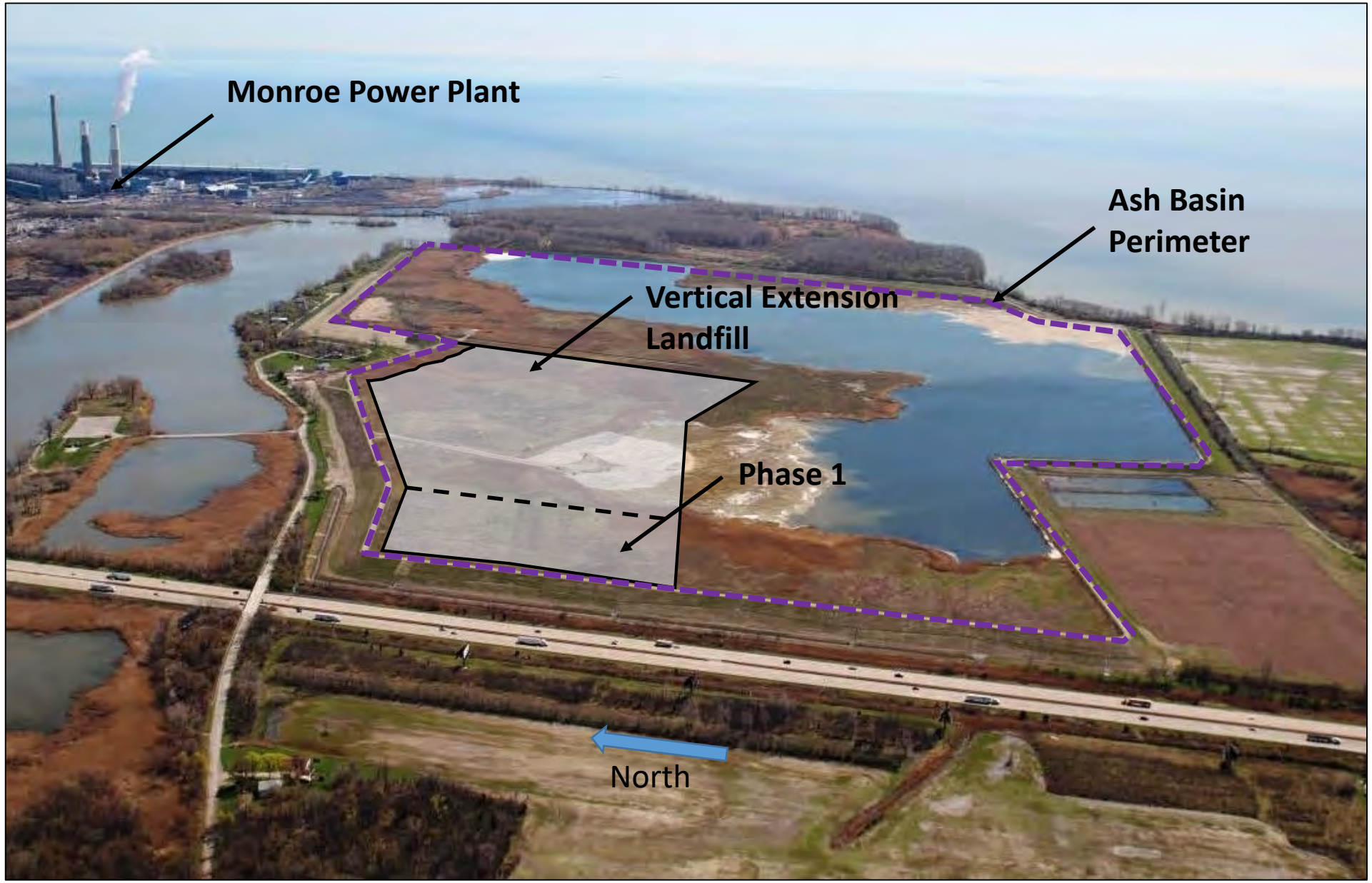
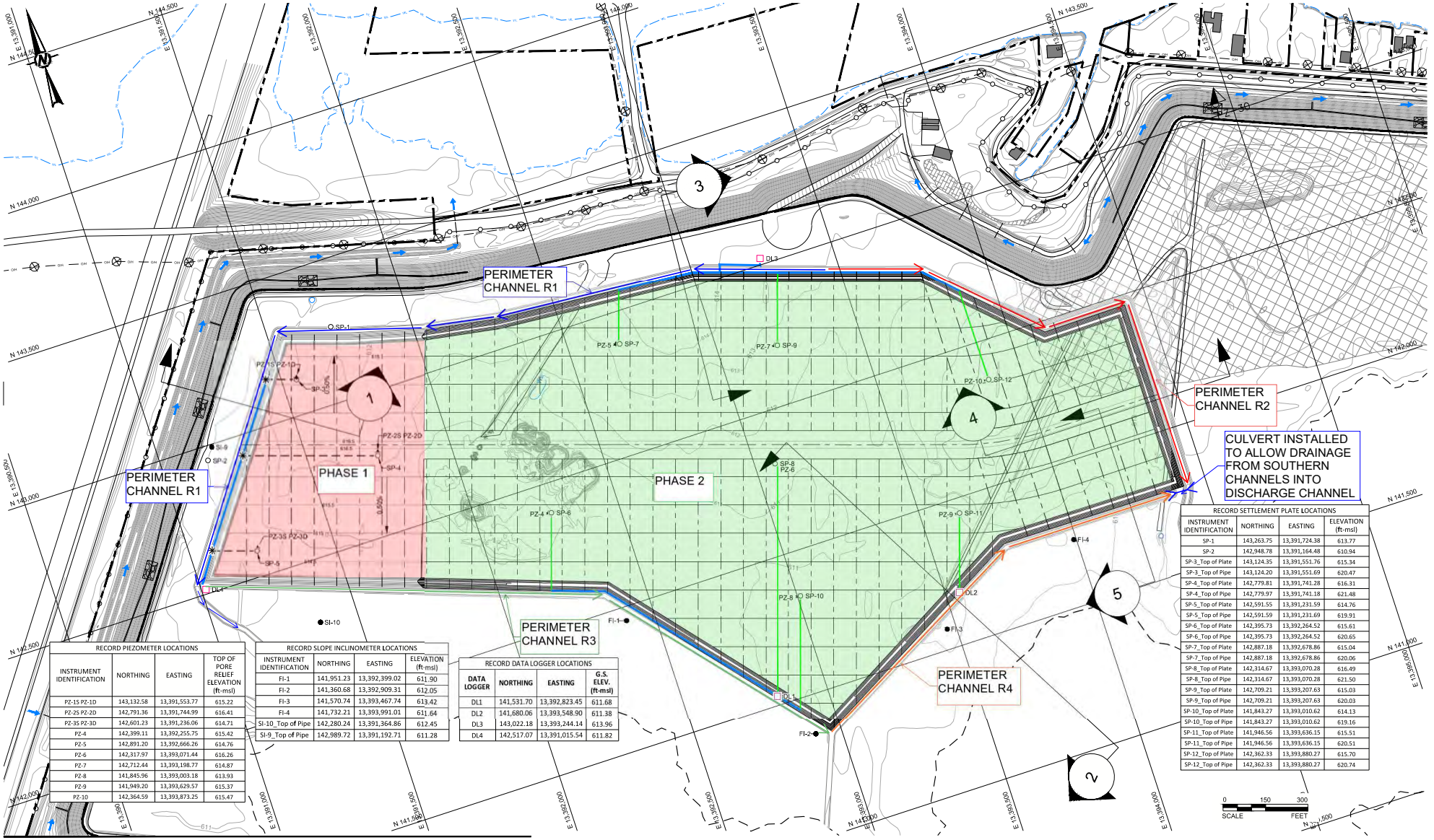


Figure 1: Site Location
Vertical Extension
Landfill
Monroe Power Plant



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

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

PROJECT
MONROE POWER PLANT ASH BASIN

TITLE
LANDFILL LAYOUT

PROJECT No.	CONTROL	Rev.	FIGURE
1521809D	1521809DA005.dwg	0	2

APPENDIX A

RESUME OF RACHEL THOMPSON, P.E.
(QUALIFIED PROFESSIONAL ENGINEER)

Geosyntec consultants

RACHEL THOMPSON, P.E.

Specialties

- CCR Engineering
- Geotechnical Engineering
- Construction Management and Oversight

Education

M.S.E., Civil Engineering, University of Michigan, Ann Arbor, Michigan, 2016

B.S.E., Civil Engineering, University of Michigan, Ann Arbor, Michigan, 2015

Registrations and Certifications

Registered Professional Engineer in Michigan (6201069900)

Construction Stormwater Operator (CSWO), MDEQ, C-18884

40-Hour HAZWOPER 29 CFR 1910.120, OSHA

Nuclear Gauge Safety, TROXLER and HAZMAT, U.S.DOT and IATA

First Aid/CPR/AED Training

CAREER SUMMARY

Ms. Thompson is an engineer in Geosyntec's Ann Arbor office with experience in the areas of CCR surface impoundments, waste management and landfills, and construction management. At Geosyntec, Ms. Thompson performs civil design and layout, site investigation and characterization, implementation of remotely monitored geotechnical instrumentation, reporting and data management for landfills, construction oversight and quality assurance (CQA), and preparation of technical reports. Her previous experience includes construction materials testing.

KEY PROJECT EXPERIENCE

CCR/GEOTECHNICAL EXPERIENCE

Embankment Restoration and Continuous Monitoring at the Monroe Power Plant Ash Basin, DTE Energy, Monroe, MI. Ms. Thompson performed site characterization and slope stability analyses for the design of the restoration of the exterior side slopes at an active ash impoundment. She also assisted in the civil design and layout for the Drawings and led the effort to prepare the Specifications. Ms. Thompson also assisted with the installation of a remotely monitored Shape Acceleration Arrays (SAAs) for the slopes and prepares monthly monitoring data analysis and summary. The system provides continuous three-dimensional data of slope movement that may occur and communicates that data to a base station through radio signals, which are then transferred through a modem to a server for further analyses.

Wood River West Ash Complex 100% Closure Design, Dynegy, Alton, IL. Ms. Thompson performed geotechnical analyses for the 100% Closure Design of an inactive ash impoundment site per the USEPA CCR Rule. Calculations were performed to characterize the subsurface stratigraphy and estimate shear strength parameters, perform liquefaction screening analyses using standard penetration test (SPT) and cone penetrometer test (CPT) data, prepare static, seismic, and post-earthquake slope stability analyses, and calculate estimates of the anticipated post-Closure settlements at the Site.

Erosion Repairs at the Greenwood Cooling Loop Addition, DTE Electric Company, Avoca, MI. Ms. Thompson conducted a site investigation and feasibility study to recommend three erosion repair options on the slopes of a cooling loop at an active oil and gas electricity-generating facility. She led the effort to prepare the bid documents, assisted with bid evaluations, and finalized construction Drawings and Specifications for the erosion repairs. She also provided oversight and management for the construction quality assurance (CQA) effort and led the effort to prepare a construction completion letter.

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Landfill Siting Peer Review, client and location are Confidential. Performed review of methodology and calculations for geotechnical design of a horizontal and vertical extension at an existing landfill prior to submittal of the permit package to the regulatory agency. She also provided review of the construction quality assurance (CQA) Plan and oversaw the review of the leachate collection system calculations. The peer review was performed on behalf of the municipality in which the landfill is sited.

Closure Design for an Ash Impoundment, client and location are Confidential. Senior Staff Professional. Performed and reviewed geotechnical analyses for the Permit Closure Design at an active ash impoundment. Calculations included characterization of the subsurface stratigraphy and shear strength parameters based on cone penetrometer data (CPT), surcharge load modeling to estimate shear strength gain, and interim slope stability analyses during closure consolidation.

Hydraulic Analyses for Landfill Bottom Liner System, client and location are Confidential. Performed analyses using the Hydrologic Evaluation of Landfill Performance (HELP) model to calculate: (i) bottom liner system equivalency with the requirements of the USEPA CCR Rule; (ii) head build-up in the leachate collection layer is less than the maximum allowed by the USEPA CCR Rule; and (iii) peak leachate generation rates for sizing the leachate collection system.

Final Cover Assessment for MSW Landfill, client and location are Confidential. Geosyntec performed an assessment of the final cover system at a closed MSW landfill to evaluate whether replacement of the cover would be required per the facility's Consent Order. The assessment investigated the performance of the final cover based on the Illinois Environmental Protection Agency (IEPA) regulations for minimizing the infiltration of stormwater, fugitive emissions and odors. Geosyntec worked closely with the IEPA to determine that a replacement final cover system was not required. This saved our client over $7 million in construction costs.

Data Management for MSW Landfill, client and location are Confidential. Ms. Thompson reviews data each month and prepares automate spreadsheets for the internal management of leachate and gas collection data at an active MSW landfill. She manages client communication to receive monthly data and assists in updating the tracking metrics for landfill performance each month. She also prepared the SOPs for calculation of the tracking metrics.

CONSTRUCTION OVERSIGHT AND MANAGEMENT

Augmented Staff/Project Engineer/Owner's Representative for Ash Impoundment Closure Construction, Consumers Energy Company, Erie, MI. Provided review and comments on Contractor bids for the Closure construction of inactive ash impoundment per the CCR Rule. She aided in the preparation of a spreadsheet and point system to compare bids from the Contractors and participated in internal client meetings to review and select a Contractor for the project.

She also provided construction management and field engineering services during closure construction of an inactive surface impoundment including review of Contractor submittals, tracking construction quantities, monitoring construction and CQA activities to ensure compliance with the Closure Plan and construction documents, and facilitating construction update meetings and communications between the Owner, the Contractor, and the CQA Consultant. She also coordinated internal of review of the Closure Certification Report and Record Drawings.

Construction Quality Assurance and Oversight for Deep Soil Mixing Pilot Study, client and location are Confidential. Ms. Thompson performed construction quality assurance testing and oversight for a mass mixing method (MMM) and deep soil mixing (DSM) pilot study at an active CCR pond. MMM and DSM samples were collected for field unconfined compressive strength (UCS) testing and laboratory UCS and hydraulic conductivity testing.

Construction Quality Assurance the Monroe Power Plant Ash Basin, DTE Energy, Monroe, MI. Ms. Thompson provided construction oversight and in-situ density testing of compacted soils during restoration of side slopes at the active ash impoundment and prepared daily field reports and photo logs.

Construction Oversight for Regrading of Weadock Landfill, Consumers Energy Company, Essexville, MI. Ms. Thompson assisted with construction oversight and in-situ density testing of compacted soils and prepared daily field reports and photo logs during regrading of an active ash landfill. The project was designed to reduce the area of the landfill that would require final cover.

APPENDIX B

2020 ANNUAL INSPECTION FORMS AND PHOTOS

MONROE VERTICAL EXTENSION LANDFILL
2020 ANNUAL INSPECTION FORM

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

Qualified Professional Engineer: Rachel Thompson, P.E.
Date: 5/20/2020 **Time:** 8:30:00 AM
Weather: Fair, 60s, NE Wind 5-10 mph
Precipitation (since last inspection): ~3.8

I. Landfill Condition

1. Describe operations in the landfill: Disposal of fly ash, bottom ash, economizer ash, FGD sludge
Other:

2. Are any stormwater swales obstructed? ___ Yes x No
If 'Yes', describe (type of debris, reason for obstruction, etc.)
Standing water is observed in some areas; however, perimeter swales still drain (Photo 3).

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.)
Some erosion rills were observed on the exterior slope of the perimeter berm. Overall, vegetation observed on exterior slope of perimeter berms (Photos 1 and 3).

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 contained.
Perimeter swales were generally observed to have standing water. Water was contained in the swales and levels are generally below the pore pressure relief pipe outlets (Photos 3 and 4).

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 pore pressure relief pipes were observed to have some sediment build-up at the outlets (generally < 0.5 inches deep). Some of the pipes were draining at the time of inspection. Sediment build-up does not appear to impede flow. (Photo 6)

7. Is there any unusual settlement causing "birdbaths"? ___ Yes x No
If 'Yes', describe.

8. Other observations around the landfill (changes since last inspection): x Yes ___ No
If 'Yes', describe. New culvert was installed between R2 and R4 perimeter swales in southeast corner to collect flow from R3 and R4. Flow observed through the recently installed culvert (Photo 5).

MONROE VERTICAL EXTENSION LANDFILL
2020 ANNUAL INSPECTION FORM

Name of Landfill: Monroe Vertical Extension Landfill **Qualified Professional Engineer:** Rachel Thompson, P.E.
EGLE Landfill ID 397800 **Date:** 5/20/2020 **Time:** 8:30:00 AM

II. Repairs, Maintenance, Action Items

1. Has any routine maintenance been conducted since the last inspection? x Yes ___ No
   If 'Yes', describe. To lower water levels in perimeter swale, new culvert was installed between R2 and R4 perimeter swales in southeast corner to collect flow from R3 and R4. Flow observed through culvert (Photo 5).

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.
   No "Urgent" maintenance items were identified. Other maintenance items have been identified and reported to DTE.

4. Are the instrumentation intact and functioning? x Yes ___ No
   If 'No', describe conditions of instrumentation. SP-10 observed to be knocked over. No ongoing filling in this area, and SP-10 has been reset since the inspection.

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: CHE8242Y**
Site Name: Monroe Power Plant Vertical Extension Landfill	**Site Location: Monroe, MI**

Photograph 1 **Date: 5/20/2020** **Direction: W** **Comments: Perimeter berm on the north side, west of access road near Station 62 shows vegetation growth and erosion features not observed.**	
Photograph 2 **Date: 5/20/2020** **Direction: SE** **Comments: Filling in Phase 2 began in 2020. Perimeter access roads are in good condition.**	

GEOSYNTEC CONSULTANTS
Photographic Record

Client: DTE Electric Company	**Project Number: CHE8242Y**
Site Name: Monroe Power Plant Vertical Extension Landfill	**Site Location: Monroe, MI**

Photograph 3 **Date: 5/20/2020** **Direction: NE** **Comments: Standing water observed in R4 perimeter swale on the southwest side. Water level well below perimeter berm crest. Minor rill erosion was observed on the perimeter berm.**	

Photograph ID: 4 **Date: 5/20/2020** **Direction: N** **Comments: Several of the pore pressure relief pipes were observed to be draining water into the perimeter swale. The water level in the swale is above the invert of the pipe.**	

GEOSYNTEC CONSULTANTS Photographic Record	
Client: DTE Electric Company	**Project Number: CHE8242Y**
Site Name: Monroe Power Plant Vertical Extension Landfill	**Site Location: Monroe, MI**

Photograph ID: 5 **Date: 5/20/2020** **Direction: S** **Comments: New culvert between R2 and R4 perimeter swales in the southeast corner observed to be flowing.**	
Photograph ID: 6 **Date: 5/20/2020** **Direction: S** **Comments: Typical sediment build-up in pressure relief pipes at the outlet. Sediment depth < 0.5 inches and does not appear to impede flow.**	

GEOSYNTEC CONSULTANTS
Photographic Record

Client: DTE Electric Company	**Project Number: CHE8242Y**
Site Name: Monroe Power Plant Vertical Extension Landfill	**Site Location: Monroe, MI**

Photograph ID: 7

Date: 5/20/2020

Direction: W

Comments: View of over liner in Phase 2 on the east side of Landfill. No filling activities in this area. Vegetation growth was observed on perimeter berm.

Photograph ID: 8

Date: 5/20/2020

Direction: E

Comments: View of Phase 2, where filling started. CCR grade is near the top of the perimeter access road in Phase 1. No observed low spots.

GEOSYNTEC CONSULTANTS Photographic Record	
Client: DTE Electric Company	**Project Number: CHE8242Y**
Site Name: Monroe Power Plant Vertical Extension Landfill	**Site Location: Monroe, MI**

Photograph ID: 8	
Date: 5/20/2020	
Direction: N	
Comments: Small standing water observed in R1 and R2 perimeter swales along the north side.	