

**DTE Energy®**



*Prepared for*

**DTE Energy**  
One Energy Plaza  
Detroit, Michigan 48226

**2015 ANNUAL INSPECTION REPORT  
RANGE ROAD LANDFILL  
ASH DISPOSAL FACILITY**

**China Township, St. Clair County, Michigan**

*Prepared by*

**Geosyntec**   
consultants

engineers | scientists | innovators

1420 Kensington Road, Suite 103  
Oak Brook, Illinois 60523

CHE8260-05

January 2016

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## 1. INTRODUCTION

### 1.1 Overview

This 2015 Annual Inspection Report (AIR) was prepared by Geosyntec Consultants (Geosyntec) to provide the results of the annual inspection of the coal combustion residuals (CCR) Range Road Ash Disposal Facility Landfill (Landfill) located in China Township, St. Clair County, Michigan. The annual inspection has been prepared to comply with United States Environmental Protection Agency (USEPA) Coal Combustion Residuals Rule (CCR Rule) published on 17 April 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, approximately one mile west of the St. Clair River between Lake Huron and Lake St. Clair. The Landfill is licensed by the Michigan Department of Environmental Quality (MDEQ) as a Type III Low Hazard Industrial Landfill. The property encompasses 514 acres, 402 designated for landfill development. The MDEQ Facility ID Number is 392562 and License Number 9395. The current license is set to expire on June 26, 2019.

The Landfill currently accepts bottom ash and fly ash from the St. Clair Power Plant, Belle River Power Plant, and the Harbor Beach Power Plant. Filling operations began in the 1950s and the current Operating License, defined as Number 9395, replaced the previous (#9207) which was issued to Detroit Edison Company on April 6, 2009. The Landfill has had an operating license since 1966.

The Landfill has multiple operating phases defined by work areas as discussed in report Section 2. Nine work areas are certified closed, three now active and three unconstructed.

### 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:

- (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, and review of construction certification documentation, and review of available operating records.

### 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 facility
- Section 5 – Instrumentation Monitoring: presents the data from 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: provides the overall conclusions of the annual inspection

### 1.4 **Terms of Reference**

The annual visual inspection was performed by Mr. Daniel G. Bodine, P.E. of Geosyntec whose qualifications as a “qualified professional engineer” under the CCR Rule are presented in Appendix A. DTE’s “qualified person”, who conducts the weekly inspections, accompanied Mr. Bodine.

This report was prepared by Mr. Daniel G. Bodine, P.E. of Geosyntec. The peer review and senior review was completed by Mr. John Seymour, P.E. of Geosyntec. Daniel Bodine, P.E. and John Seymour, P.E. of Geosyntec are qualified professional engineers per the requirements of §257.53 of the CCR Rule. Mr. Bodine was the Engineer of Record involved in the slope reconstruction of a large portion of the Perimeter Ditch on the west side of the landfill in 2010. Mr. Bodine and Mr. Seymour have both visited the landfill site together prior to the 2010 work.

## 2. REVIEW OF AVAILABLE INFORMATION

Geosyntec reviewed the following documents for the 2015 annual inspection. These documents are summarized in Table 1 below. Preparer references to TRC refer to TRC Environmental Corporation, NTH to NTH Consultants, Ltd. and Headwaters to Headwaters Plant Services, a division of Headwaters Inc.

**Table 1 Available Information Received for the 2015 Annual Inspection**

<b>Title</b>	<b>Prepared by</b>	<b>Month and Year</b>	<b>Content</b>
Landfill Development Plan without Plan Sheets	TRC	Final November 2013	Overall Development Plan for Landfill Including Design, Construction, Surface Water Management, Operation, Monitoring and Site Closure.
Range Road Ash Disposal Operating Number and License  Facility No. 392562 License No. 9395	MDEQ	June 2014	Solid Waste Disposal Area Operating License, Including Terms and Conditions.
Construction Certification /Soil Verification (Area G2) Range Road Landfill	MDEQ	September 2015	MDEQ Authorization for Waste Placement in Area G2
2014 Site Plan TRC Figure 1	TRC	March 2014	Landfill Area Plan Locations and Designations, Status and Phasing Legend.
Phasing Plan - Area F Sheet 4	TRC	November 2013	Landfill Phasing Showing South Half of Landfill Including Break Down of Area G.
Surface Water Flow Figure 00 (Working Copy)	TRC	December 2015	Plan Showing Ditch Flow Directions, Locations of Staff Gauges, Monitoring Wells Piezometers, Slurry Wall and Offsite Capture Systems.
Storm Water Modeling Results Summary	RMT (Currently TRC)	March 2007	Runoff, Elevation, Discharge and Drain Time for design storms.

<b>Title</b>	<b>Prepared by</b>	<b>Month and Year</b>	<b>Content</b>
Groundwater Contour Map November 2014 (Working Copy)	TRC	January 2015	Groundwater Flow Directions and Elevations Outside & Inside of Slurry Wall.
Construction QA Documentation Report Areas C and D1 Erosion Repairs and Downslope Flume	NTH	March 2004	NTH Professional Engineer's Certification and Report. (Text Only)
Construction Certification Clay Cover - Area D2	NTH	November 2004	NTH Professional Engineer's Certification and Report. (Text Only)
Statement of Certification Area F1	NTH	October 2009	NTH Professional Engineer's Certification Page Only.
Construction Documentation Report Area F2 Closure	NTH	October 2012	NTH Professional Engineer's Declaration Statement and Report. (Text Only)
F3 Area Field Survey as of 04-28-15, Top of Waste Grades	Headwaters	April 2015	Area F3 (Active Area) Waste Grades, Area and Waste Volume Estimates.
Cut/Fill of Existing Grade Compared to Top of Cap Design (Preliminary)	NTH	November 2015	DWG Showing Closed Areas F1 & F2; F3 & G2 (Currently Active) and Future Areas G1 & G3 Existing Grades.
Range Road Landfill Coal Combustion Residuals Fugitive Dust Plan	DTE	September 2015	Plan Certified by Professional Engineer to 40 CFR 257.80(b)(7) Revision 0.
Remedial Action Plan for Off-Site Groundwater	RMT (TRC)	July 2008 (Rev 3)	Plan Text and Tables Only.
Proposed Initial CCR Groundwater Monitoring System Layout - Figure 1	TRC	May 2015	Plan Showing Proposed Up-Gradient and Down Gradient Wells and Limit of Ash Fill.
Fourth Quarter 2014 Hydrogeologic Monitoring / Performance Monitoring Rpt.	TRC	January 2015	Summary of Background, Field Activities, and Results of GW Monitoring, Inspection, Maintenance, and Performance.

<b>Title</b>	<b>Prepared by</b>	<b>Month and Year</b>	<b>Content</b>
Third Quarter 2015 Hydrogeologic Monitoring /Performance Monitoring Report	TRC	October 2015	Summary of Background, Field Activities, and Results of GW Monitoring, Inspection, Maintenance, and Performance.
Quarterly Comprehensive Inspection Log (s)	DTE	Feb, June & Sept. 2015	Inspection Condition and Notes: Final Cover for Areas, Surface Water Ditches & Signage.
Weekly General Inspection Log (s)	DTE	Weekly Logs 10/18/15 to 12/13/15	Inspection Condition and Notes: General Site, Waste & Nuisance Control, Final Cover & Leachate and Surface Water Control.
Belle River Power Plant Environmental Outside Rounds Log Sheet	DTE	Shift #4 12/18/15 Example	Includes Landfill Gate Security, Detention Basin Total Flow Reading and Pump Status & Any Usual Conditions.
Headwaters, Inc. Worker Equipment Training Records	Headwaters, Inc.	7/18/13, 7/24/13, 8/13/14, 8/20/15, 12/2/15	Signed training records for six (6) equipment operators.



### 3. FACILITY DESCRIPTION

#### 3.1 Overall Site Description

The overall site facility property is composed of the 514 acres of which 402 are designated for landfill development. The Landfill work areas are currently divided into fourteen (14) work areas, eight (8) that have been identified as “Certified Closed”, three (3) identified as “Active” and three (3) identified as “Unconstructed”. The work areas are listed below in Table 2 and shown in **Figure 1**. **Figure 1** is taken from a Phasing Plan dated November 2013, but modified to include Active Area D3 shown on a Phasing Plan dated March 2014 and discussed in the current operating license. The March 2014 plan did not show the breakdown areas of Area G that have been referenced in recent September 2015 area certification for waste placement.

**Table 2 Site Phasing Summary-December 2015**

<u>Area</u>	<u>Status</u>	<u>Size, Acres</u>	<u>Comments</u>
A	Closed	7	Certified Closed, May 17, 2002
B	Closed	102	Certified Closed prior to Sept 2, 1999
B1	Closed	9	Certified Closed prior to Sept 2, 1999
C	Closed *	16	Cert. Report Approved Aug 25, 2009
D1	Closed*	21	Cert. Report Approved Aug 25, 2009
D2	Closed *	10	Cert. Report Approved Aug 25, 2009
D3	Active	3	Active Disposal
E	Unconstructed	117	No Cell Construction or Waste Placed
F1	Closed	17	Cert. Report Approved Jan 4, 2010
F2	Closed *	12	Cert. Report Approved Feb 28, 2013
F3	Active	22	Active Disposal
G1	Unconstructed (see below)		No Cell Construction or Waste Placed
G2	Active	48.4	MDEQ Approval Letter Sept 24, 2015

G3 Unconstructed (see below) No Cell Construction or Waste Placed

\* Areas C, D1, D2 and F2 have been certified closed, but documents note that the southern edge or slopes that join active or unconstructed areas, such as E, F3, G1, G2 and/or G3 may have interim cover as designed and approved.

Table 2 also does not list acreages for Areas G1 or G3 because the areas have not yet been developed. However the total acreage for the combined G areas is 110 acres, as reported in the operating license. Using the 110 acres for G area and adding the acreage for the other areas in Table 2 gives a Total Area of 446 acres that agrees with the totals given in the operating license for the active, certified and unconstructed areas. This is less than the 514 property acreage, but greater than the 402 acres stated in the November 2013 Landfill Development Plan. Geosyntec realizes that acreages for future unconstructed areas may only be estimates until actual design is completed and waste placement approved.

The Landfill Site includes perimeter ditches, road ways, a shallow perimeter slurry wall, earth berms, a designed 10 Acre NPDES Stormwater Detention Basin (SDB) and Basin Pump House. The detention basin has also been referred to as the sedimentation basin in some of the reviewed documents and figures. The SDB is located in the southeast corner of the property, the slurry wall, reported to be approximately 10 to 15 ft deep, surrounds the entire landfill along the property perimeter and the perimeter ditch surrounds nearly all of the closed and active portions of the landfill connecting and draining to the SDB. **Figure 2**, taken from TRC's Surface Water Flow drawing, shows the location of these items, including flow and capture details of the two Offsite Groundwater Capture Systems. The pump controls for these systems and the SDB pumping system were observed in operation during the annual inspection and will be discussed in subsequent sections of this report.

The Landfill is a dry-handled (conditioned) CCR landfill licensed by MDEQ as a Type III industrial landfill with maximum 4 horizontal to 1 vertical final cover side slopes and 3 horizontal to 1 vertical interim cover slopes. The estimated annual total ash disposal rate is 233,300 in-place cubic yards/year (average). Assuming this annual rate and total remaining reported in the November 2013 Landfill Development Plan, the estimated amount of CCR in Landfill the end of 2015 was be approximately 20 million cubic yards.

The Landfill subbase is reported to be, on the average, a 70-foot thick in situ naturally occurring clay soil layer over most of the landfill. An exception to this is on the east side of the site where an approximately 10-foot thick near surface sand layer exists. To cutoff this sand layer and any near surface flow the entire site has been encircled along the property perimeter with a soil-bentonite slurry wall with a reported depth of approximately 10 to 15 ft. designed to key into the underlying clay Landfill subbase.

### 3.2 **Design**

The Landfill design is summarized in the Landfill Development Plan, Remedial Action Plan and the Quarterly Monitoring Reports. The key components of the Landfill include:

- Perimeter Slurry Wall keyed into top of 70-foot thick subbase clay layer;
- Perimeter Drainage Ditch capturing surface water and near surface groundwater;
- 10-Acre Stormwater Detention Basin collecting ditch water and pumping to plant;
- Two Offsite Groundwater Capture Systems collecting impacted water;
- Final Cover from top to bottom that includes:
  - 6-inch thick vegetated topsoil layer (erosion layer) ;
  - 24-inch thick infiltration layer (select clay layer);
  - Maximum 4H to 1V side slopes;
  - Minimum 1% grade top of landfill, and
  - Phasing plans and special conditions detailed in drawings and operating license.

Landfill design and construction are supported by construction phasing plans, surface water management plans and details, site operation (waste placement) plans and details, and leachate and environmental monitoring plans and reporting. Additionally, landfill monitoring systems maintenance and inspection, and site closure and long term care procedures are covered.

### 3.3 **Construction**

The Landfill has been operating since the 1950s. As indicated in report Section 3.1, the Landfill work areas are currently divided into fourteen (14) work areas; eight (8) that have been identified as Certified Closed, three (3) identified as Active and three (3) identified as Unconstructed. The Landfill Operating License discusses these work areas, references design, construction and monitoring documents submitted by DTE and includes conditions and criteria required for the Landfill operation, phase construction and monitoring.

The Landfill Development Plan discusses Site Operations in Section 4 of the plan. Included are discussions on dust control, noise control, odor control, and access and security requirements,

among other operating aspects. Ash filling procedures and requirements for construction observation and documentation are also included in the development plan.

#### 4. VISUAL INSPECTION RESULTS

The annual inspection was completed on 21 December 2015. The completed annual inspection log and inspection day photographs are presented in Appendix B.

In summary, no evidence of landfill instability, significant perimeter slope erosion or detrimental settlement was noted. The perimeter ditch, perimeter slurry wall, offsite capture system pumping and collection and pumping of water in the SDB appeared to be working as designed and in accordance with recognized and generally accepted good engineering standards.

Specific results of the visual inspection are summarized below. The weather on the day of the inspection was light to moderate rain, temperature and rainfall reported at 48° F and 0.39 inches, respectively.

Stormwater Detention Basin: Basin and pump system appeared in good condition. Basin slopes appeared in good condition with vegetation of varying heights. Pumps were tested for operation and all operated. The discharge flow meter appeared to be working properly. See Appendix B Photographs #s 1 to 6.

Landfill Final Cover: Closed work area phases were viewed including slopes. Conditions appeared generally good and in accordance with agreements approved with the MDEQ regarding trees remaining along and on the downstream slope at the north end of the Landfill. The top and slopes of the closed areas appeared well vegetated. Some isolated areas did have some small woody vegetation that the DTE landfill engineer indicated that they would be removed as part of future routine maintenance activities. See Appendix B Photographs #s 11 to 13, 21 to 24, 29, and 42-44 all with captions for views of the landfill top and slopes. Those photographs showing some excessive woody vegetation to be removed are #s 21 to 23, 29 and 44. Other closed areas of the landfill may have some small woody vegetation starting and quarterly inspections by DTE should check for those.

Borrow in Area G2 and Temporary Landfill Runoff Control Berms: Clay borrow has been removed from the north portion of G2 to an approved grade. Appendix B Photographs #s 15 and 24 show the borrow area graded for surface flow to flow to corners where water will drain through culverts (see Photograph #16) to a stormwater collection ditch. Diversion berms are used to control and direct surface runoff. An example of a recently constructed berm during final cover construction for Work Area F2 is shown in Appendix B Photograph #12. That berm was well vegetated and controls and directs any potential surface flow away from the borrow area and G2 waste placement area.

Perimeter Ditch System: The perimeter ditch and ditch flow directions to the SDB or northwest pump location are shown on **Figure 2**. Vegetation in the bottom of most ditch areas was thick

but in accordance with agreements with the design engineer, MDEQ and DTE (non-woody vegetation could remain as long as ditch flow is maintained and monitored to confirm adequate flow). The ditch staff gauge system installed with quarterly monitoring of water elevations does provide elevation monitoring of the flow. Review of the third quarter 2015 elevation results confirms flow and flow direction as did some field visual examination during the annual inspection. See Appendix B Photograph #s 17 to 20, 29 to 34, 38 to 41 and 46 to 48 that show typical ditch and culvert conditions at various locations within the property outside of landfill waste placement areas. Note that some ditch locations are internal to the proposed waste limits, but currently located in unconstructed work areas. Several of the photographs also show slurry wall markers. All are located outside of the ditch perimeter and along the property boundary.

Operation Activates Including Waste Placement: The landfill operating contractor is Headwaters Inc. Loaded trucks hauling conditioned CCR material were observed hauling to active waste placement Areas F3 or D3. Travel is across unconstructed areas as shown in Appendix B Photograph #8. CCR dumping and placement is shown in Photograph #s 8, 9 and 14.

DTE provides operation monitoring and this was discussed and pointed out specifically during the landfill inspection. An example is the daily log monitoring of pumping from the SDB (NPDES pond flow monitoring) and weekly and quarterly check list monitoring. Appendix B Photograph #5 shows the SDB Pump flow meter; it is inspected by DTE daily and weekly.

Record Keeping: At the start of the annual inspection records, including most of the listed review references, were obtained from the landfill engineer. Additional records exist, electronically or in files not checked, or specifically requested. The current operating license dated June 26, 2014 lists many documents that have been submitted to the MDEQ by DTE as part of the landfill design, plan preparation, construction certification and documentation, surface and groundwater monitoring, and landfill operation. The records for the Landfill appear comprehensive.

## 5. INSTRUMENTATION MONITORING

### 5.1 Surface Water and Groundwater Collection

Surface water and groundwater monitoring are conducted under a monitoring plan approved by the MDEQ. The surface water that falls within the landfill waste areas and within the perimeter ditch system is collected by the ditch system and flows, for the most part by gravity, to the SDB, as shown in **Figure 2**. The exception to this is the perimeter ditch located at the northwest corner of the property where the ditch water is collected and pumped to a portion of the ditch on the north side which does gravity drain to the SDB. The perimeter slurry wall installed along the property line and outside of the ditch and basin system supplements and supports surface water collection as well as contains and directs any near-surface groundwater to the perimeter ditch.

Monitoring of the ditch water collection is accomplished through ditch visual inspection and maintenance, review of water elevations from a series of eleven (11) ditch staff gauges (SG) with their locations shown on **Figure 2**, and implementation of the Hydrogeologic Monitoring Plan (HMP) and Performance Monitoring Plan (PMP), both of which have been approved by the MDEQ (April 1, 2009 and February 11, 2009, respectively). Reporting of the monitoring is summarized in quarterly reports prepared by TRC. Review of the ditch water levels for the staff gauges show that the water gradient flows to the SDB, with its water elevation monitored with SG-13.

### 5.2 Groundwater Elevations and Offsite Capture System Monitoring

Monitoring well and piezometer locations are shown on **Figure 2** and monitoring water depths and elevations summarized in quarterly reports by TRC. Groundwater elevations and flow directions, groundwater sampling, and system maintenance, especially with respect to the offsite capture and french drain systems, are also discussed and summarized in the quarterly reports. TRC concluded in their 2015 third quarter report that “The site-wide slurry wall and conveyance trench/perimeter ditch network continue to perform as designed to prevent shallow groundwater beneath the RRLF site from migrating off-site; and The off-site groundwater capture systems are effectively capturing COCs-affected groundwater to the northwest, northeast, and east of RRLF.” The fourth quarter 2015 monitoring report had not been produced at the time of Geosyntec’s annual inspection. DTEs visual weekly and quarterly monitoring logs were available.

## 6. OPERATION ACTIVITIES

Operations are defined in Section 4, Site Operations, of the Landfill Development Plan. The following operation control measures are described in the plan:

1. Hours of Operation
2. Waste Types
3. Traffic Routing
4. Lines and Grades
5. Nuisance Control (includes Fugitive Dust Control)
6. Police and Fire Protection
7. Access Control
8. Inclement Weather Operations
9. Drainage and Erosion Control
10. Record Keeping
11. Personnel and Equipment
12. Ash Filling Procedures
13. Leachate Management
14. Environmental Monitoring

Engineering design and construction related to the Landfill design, waste type and volumes, subbase grades, site phasing, final cover, surface water management, construction observation and documentation, and final closure and long term care are included in the Landfill Development Plan. The Plan was written by DTE/TRC in November 2013, and contained the Landfill Operating License valid at that time. The current Landfill Operating License issued by MDEQ is dated 26 June 2014 prior to the effective date of the CCR Rule (19 October 2015).

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



- Weekly inspections by a qualified person, and
- Dust control in accordance with a Fugitive Dust Control Plan.

#### 6.1 **Observations**

It was identified that the overall intent of the Operations Plan was being followed. Documentation that the Operations Plan was being followed in a method "...to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards" in accordance with the CCR Rule was for the most part verified. The following was specifically observed:

The bullet items above, with the exception of contractors' ash filling procedures, were verified during the annual inspection or with documents submitted after the inspection. Those items appear to be compliant with the Landfill Development Plan. The contractors' ash filling procedures for comparison to the LDP were not available. It was suggested that these procedures and worker training certifications be kept with onsite records. The worker training records were later provided and the contractor has indicated that he will provide additional operating and placement procedures onsite.

## 7. EVALUATION

### 7.1 Design

The Landfill design was completed by TRC and is well documented in the references listed in the 26 June 2014 Landfill Solid Waste Disposal Area Operating License, and the Landfill Development Plan, dated November 2013. The design is consistent with recognized and generally accepted good engineering standards, based on available information.

### 7.2 Construction

Construction of final cover Phase Work Areas is being well documented in area closure documentation reports by NTH. Construction certification or documentation reports or portions of those reports were viewed during this annual inspection for Work Areas C, D1, D2, F1 and F2 and were signed by a professional engineer licensed in Michigan. Additionally, Construction Certification/Soil Verification for Work Area G2 was submitted and approved by MDEQ authorizing waste placement in Area G2. Construction appears consistent with recognized and generally accepted good engineering standards, based on available information.

### 7.3 Maintenance

Maintenance of final cover vegetation and erosion control has been identified by the DTE inspector as an ongoing activity based on results of inspections. Additionally, Quarterly Hydrogeologic Monitoring/Performance Monitoring Reports details results of the inspections and maintenance of the Off-Site Groundwater Capture Systems.

### 7.4 Operations

#### 7.4.1 **Operations Plan**

The Landfill Development Plan serves as DTE's main operations plan for the landfill. That plan has been discussed previously in this AIR and has been reviewed as part of the annual inspection information review. Contractor ash filling procedures were generally consistent with the LDP and contractor has indicated that he will prepare and retain on-site additional ash fill procedures. Records related to the contractor's worker training were forwarded, reviewed and appeared consistent with good documentation of employee equipment training for CCR landfill work. Contractor has indicated that he will retain records on-site in the future so as to be accessible for on-site inspections. Headwaters survey of top of waste grades and remaining area waste volume determination for Work Area F3 was available. This survey appeared to be an interim progress survey document and in general good engineering standards, but engineering review of the survey data was not obtained.

Records by DTE such as the daily shift report for the NPDES Pond (SDB), Landfill Weekly and Quarterly Inspection Logs were provided as part of the annual inspection information. These inspection logs are consistent with recognized and generally accepted good engineering standards.

The contractor's operations plan or ash filling procedures should be available and maintained onsite for comparison to the LDP and to generally acceptable good engineering standards.

#### **7.4.2 Fugitive Dust Control**

A Fugitive Dust Control Plan was provided by DTE. Dust Control was also discussed in the Landfill Development Plan. No dust control was required during the site inspection because rainfall was occurring most of the day. In the absence of the need during rainfall events, dust control operation is considered consistent with recognized and generally accepted good engineering standards.

#### **7.4.3 Run-on and Run-off Control**

Run-on and run-off control is maintained by final cover temporary or permanent berms, the perimeter ditch system, the perimeter slurry wall, the ditch and offsite pumping systems and stormwater detention pond pump and discharge system. The Landfill Development Plan and Off-Site Quarterly Monitoring Plans discuss, in detail, run-on and run-off control. A run-on and run-off control system plan is required by 40 CFR 257.83(c) by 17 October 2016. However, using current, available information, run-on and run-off controls are consistent with recognized and generally accepted good engineering standards.

#### **7.4.4 Inspections**

Weekly and quarterly inspections have been ongoing and documented by qualified persons. Inspections reviewed have been discussed and are consistent with recognized and generally accepted good engineering standards, based on available information. A 2015 annual inspection form has been prepared by the qualified professional engineer and is provided in Appendix B.

#### **7.4.5 Monitoring**

The CCR Rule provides minimum groundwater monitoring system requirements that must be implemented by October 2017. The Landfill has an existing groundwater monitoring system and has staked out locations for 4 new wells. One new upgradient well and 3 down gradient. Those new wells are being installed in January 2016.

#### **7.4.6 Annual Visual Inspection**

This annual visual inspection did not identify any evidence of structural weakness or instability. The perimeter ditch, perimeter slurry wall, offsite capture system pumping and collection and pumping of water in the SDB appeared to be working as designed and in accordance recognized and generally accepted good engineering standards. Some maintenance need to be scheduled for removal of some identified small woody vegetation. This has been discussed with the onsite DTE Landfill Engineer.

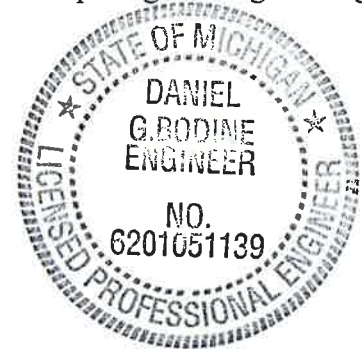
## 8. CONCLUSIONS AND CERTIFICATION

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 and maintained in accordance with generally accepted good engineering standards.

Certified by:

*Daniel G. Bodine* Date *01/15/16*



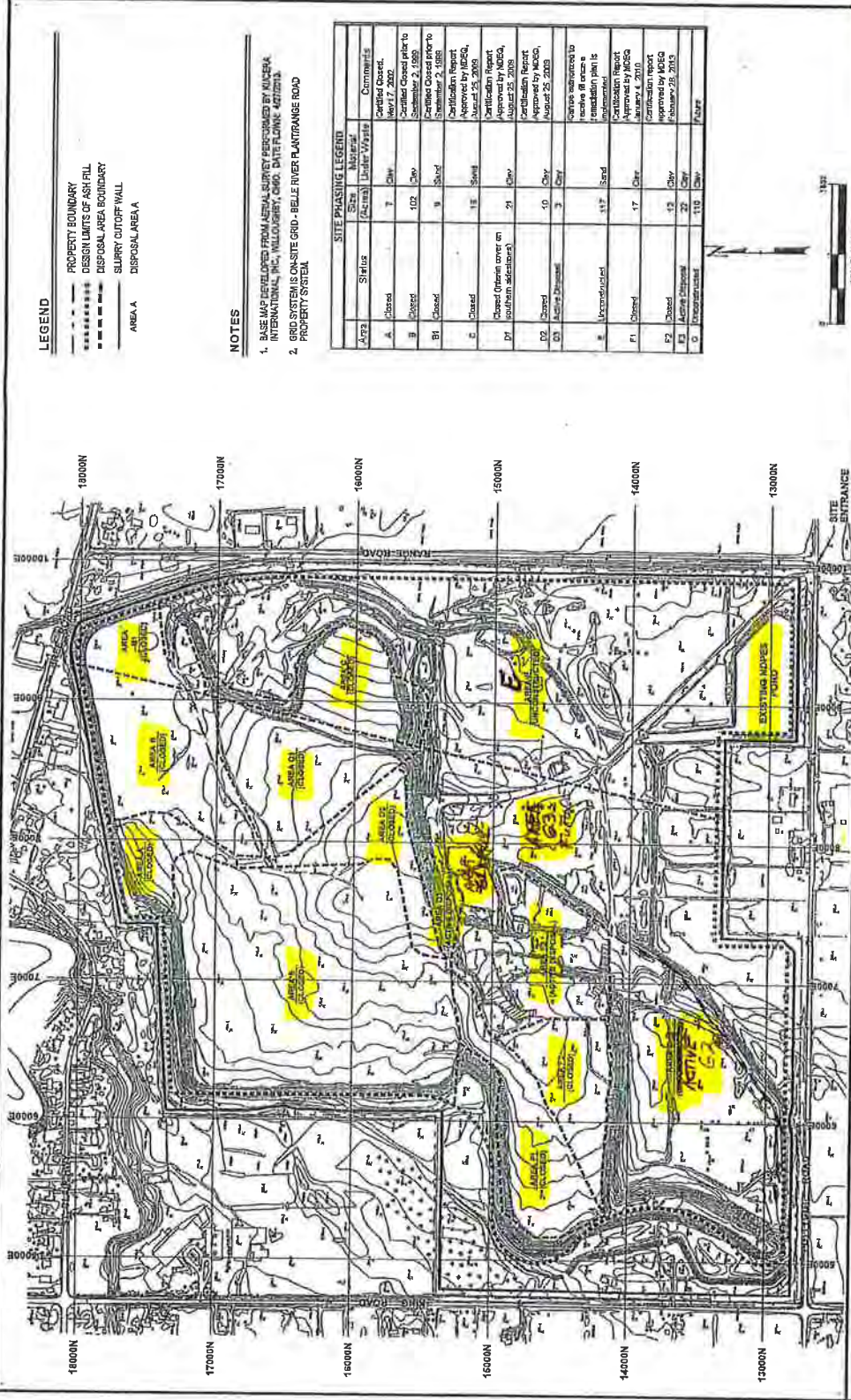
Daniel G. Bodine, P.E. - Michigan P.E. No. 6201051139  
Senior Consultant

ATTACHMENT A

**Plot Data**  
 Design File: J:\DTEAS+ Clair Co\212568\0000\212568.0000.01.plt  
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 Levels On = 1-63

**Reference Files**  
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 Ref. File 2 = J:\DTEAS+ Clair Co\212568\0000\KAR6\mtr.mtr.dgn  
 Ref. File 3 = J:\DTEAS+ Clair Co\212568\0000\KAR6\proposed.dgn  
 Ref. File 4 = J:\DTEAS+ Clair Co\212568\0000\KAR6\lbr.dgn

**Logical Names**  
 (1) 45-50,53-56,58,59,61,63  
 (2) 7-10,18,29,30  
 (3)  
 (4) 1-63



**LEGEND**

- PROPERTY BOUNDARY
- DESIGN LIMITS OF ASH FILL
- DISPOSAL AREA BOUNDARY
- SLURRY CUTOFF WALL
- DISPOSAL AREA A

**NOTES**

1. BASE MAP DEVELOPED FROM AERIAL SURVEY PERFORMED BY AUREVA INTERNATIONAL, INC., WILLOUGHBY, OHIO, DATE: JUNE 14, 2013A.
2. GRID SYSTEM IS ON-SITE GRID - BELLE RIVER PLANT/RANGE ROAD PROPERTY SYSTEM.

**SITE PHASING LEGEND**

Area	Status	Size (Acres)	Material	Under Waste	Comments
A	Closed	7	Clay		Certified Closed, May 17, 2009
B	Closed	102	Clay		Certified Closed prior to September 2, 1985
B1	Closed	9	Sand		Certification Report Approved by MDEQ, August 25, 2009
B2	Closed	11	Sand		Certification Report Approved by MDEQ, August 25, 2009
D	Closed	21	Clay		Certification Report Approved by MDEQ, August 25, 2009
D1	Closed	10	Clay		Certification Report Approved by MDEQ, August 25, 2009
D2	Closed	3	Clay		Certification Report Approved by MDEQ, August 25, 2009
D3	Closed	8	Clay		Certification Report Approved by MDEQ, August 25, 2009
D4	Closed	17	Clay		Certification Report Approved by MDEQ, August 25, 2009
D5	Closed	13	Clay		Certification Report Approved by MDEQ, August 25, 2009
D6	Closed	22	Clay		Certification Report Approved by MDEQ, August 25, 2009
D7	Closed	110	Clay		Certification Report Approved by MDEQ, August 25, 2009

**NOTES**

1. BASE MAP DEVELOPED FROM AERIAL SURVEY PERFORMED BY AUREVA INTERNATIONAL, INC., WILLOUGHBY, OHIO, DATE: JUNE 14, 2013A.
2. GRID SYSTEM IS ON-SITE GRID - BELLE RIVER PLANT/RANGE ROAD PROPERTY SYSTEM.

**SCALE**  
 1" = 100'

**DATE:**  
 MARCH 2014

**APPROVED BY:**  
 V. BIENING

**PROJECT NO.:**  
 212568.0000

**FILE NO.:**  
 212568.0000.01.plt

**DATE:**  
 MARCH 2014

**DRAWN BY:**  
 IStromer

**FIGURE 1**  
 LANFILL WORK AREA PHASING PLAN



FIGURE 1



## **APPENDIX A**

### **Resume of the Qualified Professional Engineer**



**DANIEL G. BODINE, P.E**

**geotechnical and civil engineering  
geo-environmental engineering  
resident engineering  
construction management  
project management  
litigation support**

## **EDUCATION**

M.S., Geotechnical Engineering, Rutgers University, 1973  
B.S., Civil Engineering, Rutgers University, 1970  
Continuing Education Seminars

## **PROFESSIONAL REGISTRATION**

Illinois, P.E. Number 0062-047218  
Ohio, P.E. Number E-61363  
Nebraska, P.E. Number E-9478  
Michigan, P.E. Number 6201051139

Indiana, P.E. Number 920347  
South Carolina, P.E. Number 15628  
West Virginia, P.E. Number 14279  
Colorado, P.E. Number 47434

## **CAREER SUMMARY**

Mr. Bodine has over 40 years of experience in all aspects of civil and environmental engineering. He has worked 13 years for a large AE firm in the civil, geotechnical and site development departments on fossil and nuclear power plant facilities and the remainder time with two major geotechnical and environmental consultants. He has supervised and coordinated fossil and nuclear power plant geotechnical site investigations, foundation design, construction and post construction activities. He has also performed geotechnical design and construction monitoring work for recent projects for private, industrial, oil and chemical industry, and municipal and government clients. These projects involve design and construction for deep foundations including all types of piles and caissons, several types of barrier walls, site dewatering, insitu solidification and stabilization, runoff collection and treatment basins and landfill liners and caps. He has worked on dam projects such as the Ludington Pump Storage Project, Center Hill Dam Foundation Remediation, AEP Amos Fly Ash Dam and numerous other dam safety inspections for the power industry. He has worked with attorneys related to litigation/arbitration and expert witness support related to geotechnical engineering and construction claims. Specialties include dam inspection, landfill design & construction including design/build and bid package preparation. Barrier wall (slurry, chemical and sheetpile) design and construction, insitu soil and waste solidification, and deep foundation design and testing.

Mr. Bodine's management, plant design, geotechnical, environmental and construction

experience on a few selected projects has included the following:

***AEP Surface Impoundment and Landfill CCR Rule Compliance Evaluation, Ohio.*** Project manager and qualified professional engineer for the evaluation, documentation and certification of whether a CCR landfill meets the location restrictions.

***Detroit Edison Power Company Ash Basin Evaluation & Design Modifications,*** Monroe, MI. Performed dike inspection of large ash basin to assist in evaluation of a large number of shallow slope failures. Part of Geosyntec's project design team that prepared construction plans and specifications for repair and reconstruction of slopes and related drainage facilities for the basin. Provided quality construction expertise for the 2009 through 2013 construction phases, all now completed.

***Detroit Edison Power Company Ash Basin Drainage Ditch Evaluation & Design,*** Managed and performed design of a large drainage ditch along an existing ash basin that involved culvert alternatives including a large diameter structural pipe arch. Project completed in 2010.

***American Electric Power Dam Inspections,*** Providing multi-year (1999-2001) independent annual dam safety inspections and reporting of dike and dam structures at 18 facilities for American Electric Power in the states of Indiana, Ohio, Kentucky, West Virginia and Virginia. Dams range from small dike containment structures to large high hazard classification dams. Internal inspections and repair recommendations for rock, concrete or steel discharge pipes were also provided at three AEP facilities. Reports for the utility and state agencies were prepared for all facilities. Prior projects include dike, dam and spillway inspections of ash disposal and power plant lake facilities in the states of Illinois, Wisconsin, Indiana, Ohio, Kentucky, Colorado and Texas.

***Cardinal RWL/FAR 1,*** Brilliant, OH. Responsible for Geosyntec design and major permit document preparation for a 127 acre 18 million cubic yards FGD gypsum landfill at a power plant facility in the State of Ohio. Major portion of new landfill is to be constructed over an existing closed fly ash disposal area. Design and permit documents included detailed geotechnical settlement and stability analyses. Permit was issued in 2007; construction drawings prepared and cell construction followed with Cell 1 completed in 2008 and Cell 3 in 2012.

***Gavin Power Plant Residual Waste Landfill Expansion,*** Cheshire, OH. Part of the project design team preparing a permit to install (PTI) package for the lateral and vertical expansion of a 47,000,000 cubic yard CCR landfill. Performed design reviews of plans, drawings and specifications, including leachate treatment ponds and assisted in major field investigation program that had to be performed thru-out the winter months and during the holiday period. The PTI has been approved and owner waiting for formal permit to be issued in early 2014. A separate construction package for Stage 1 & Stage 2 construction of the landfill expansion has also been prepared and issued to the owner for bid and initial construction beginning in late 2014.

***Steel Facility Landfill Cap & Tar Pond Solidification***, Indiana, Confidential Owner. Working for contractor provided CQA project management, site work and construction certification of an approximate 60-acre landfill containing two large tar ponds. Geosyntec performed onsite CQA observation, testing, documentation and preparation of the construction completion report including onsite testing of tar solidification stabilization activities. Project substantially completed in 2014 with Construction Completion Report issued in early 2015.

***Ash Reservoir Dam Modification***, Cheshire, OH. As part of the design and permitting for the closure and capping of a large ash reservoir the 100 ft high dam is being modified by reducing the dam height and providing a new discharge structure for safe discharge of the 100-year and PMF storm flows. Mr. Bodine is the Engineer of Record for the dam modification.

***Indianapolis Power & Light Ash Pond Dike Inspections***, Provided system wide CCR facility inspection in June 2008 for three power plant sites. Prepared inspection reports with findings and recommendations for maintenance and critical dike re-evaluations.

***Sylvan Lake Dam Evaluation***, Rome City, IN. Performed dam and spillway inspections and report for 2004 through 2014 (present) at Rome City, Indiana. In 2004 Geosyntec prepared a special dam evaluation report reviewing a critical Dam safety report prepared by U.S. Army Corps of Engineers. In 2007 consulted with dam owner for operations during periods of very heavy rainfall concerning the need for opening of emergency flood gate. Attended and took part in the Emergency Action Plan table-top-exercise in 2007 and 2011. Prepared the project O&M Manual and has provided training of owner personnel and annual dam safety inspection activities since 2004. Remain as Rome City's on-call engineer with respect to dam safety and inspection.

***Groundwater Remediation System CM and CQA***, Provided design and construction bid document and specification review for a groundwater remediation interceptor trench and surface water collection basin and controls. Performed CM and CQA activities at the site and prepared a project construction certification report. Reviewed all contractor draft invoices and assisted client negotiating settlement of work claims and revised contract when project changed from non-union to union labor and operator work. Project was successfully completed and performing as intended.

***Elgin Illinois Landfill Closure***, Elgin, IL. Managed CQA monitoring, assisted outside design engineer with cover redesign and provided CQA Certification of Closure of Elgin Landfill Superfund Site located in Kane County, Illinois.

***Boeing Design/Build Slurry Wall & Landfill Cap Expansion***, Wichita, KS. Supervised the preparation of design and construction plans and specifications including technical reports and documents submitted to the KDEH. Served as the task manager

for the construction QC/QA work including preparation and certification of the construction completion report completed in August 2010. The slurry wall and landfill cap extension, located adjacent to the Arkansas River, surrounded a closed landfill and was constructed without opening the closed landfill clay cover.

***Bofors Nobel Superfund Site***, Muskegon, MI. Mr. Bodine was responsible for design and Geosyntec management of slurry wall and chemical sludge lagoon cap for the Bofors-Nobel superfund project located near Muskegon, Mi. Work included field and laboratory investigation work plan, 30%, 95% and 100% design, construction bid package preparation, CQA documentation and performance of 75-125 ft deep barrier wall installation. The closure cap design and construction closed-out 10 chemical sludge lagoons and evaluated and removed large amounts of miscellaneous demolition debris and chemical tanks. Mr. Bodine was the Engineer of Record for the Phase 1 barrier wall design and construction and lead geotechnical engineer and engineer of record for the Phase 2 lagoon cover work and debris removal.

***Design & Construction of Permeable Reactive Barrier (PRB) Slurry Wall***, Ontario, Canada. Worked as the contractor's slurry wall specialist and prepared contractor plans and technical memorandums for bench scale testing and mix design and construction quality control testing and monitoring procedures for a slurry wall that included design sheet pile control structures for the reactive material. This was for a funnel & gate permeable reactive barrier (PRB) wall within soils and ground water impacted with radiation. Provided recommendations for onsite construction procedures and conducted QC training of personnel performing slurry and soil-bentonite backfill mixing and testing. Project is completed, performing exceptionally well and is confidential.

***Cooling Lake and Dam Inspections***, Conducted cooling lake and dam safety inspection and monitoring activities for lakes up to 3000 acres in size and 25 miles of embankment dikes or dams. Prepared construction completion and inspection reports for submittal to client and appropriate state and federal agencies. The largest of these projects (Braidwood Nuclear Power Station Cooling Lake) involved dike construction and cutoffs constructed over and through extensive coal strip-mine spoils and over underground coal mines. Site monitoring included settlement monitoring of pre-load and dike fills over strip-mine spoils up to 120 ft thick, slope indicator movements, piezometer measurements and sampling for seepage and water quality evaluations.

***Foundation Site Investigation, Geotechnical Design and Construction***. During the 1970s and 80s coordinated site investigation and geotechnical foundation design of power plant and CCR disposal and transport structures for large fossil units located in the Midwest and South. Foundation design included shallow and deep foundation (steel, timber & concrete piles, caissons and drilled shafts) under a range of loading conditions and conducted several large-scale load tests some documented in professional papers.

***Ludington Pump Storage Reservoir & Hydroelectric Plant, Ludington Mi.*** During 1970 and 1971 Mr. Bodine performed full time onsite QC testing and inspection for reservoir dike, clay and asphalt linings and power plant unit fills. Facility is owned jointly by Consumers Energy and Detroit Edison.

***SWMUs at Argonne National Lab,*** Illinois. Performed Visual Site Inspections and Structural Integrity Assessments for Solid Waste Management Units (SWMUs) at DOE's Argonne National Laboratory-East as part of a corrective action program under RCRA. Performed duties as the project's Certifying Professional Engineer.

## **PROFESSIONAL EXPERIENCE AND AFFILIATIONS**

Geosyntec Consultants, Chicago/Oak Brook, IL, June 1996-Present

Woodward-Clyde Consultants, Chicago, IL & Clifton, NJ, Mar 1989-1996; 1970-1976

Sargent & Lundy Engineers, Chicago, IL, 1976-1989

ASCE - Life Member, NSPE/ISPE, DFI, ACEC, SAME & Industry Assoc.

## **LANDFILL/BASIN RELATED PUBLICATIONS-OTHERS PROVIDED ON REQUEST**

“Design and Permitting of a FGD Landfill Over and Existing Ash Reservoir” (2009), D. G. Bodine, B. F. Tanyu, P. J. Sabatini, M. A. Ajlouni and D. E. Limes, Geotechnical Special Publication No. 187, Contemporary Topics in Ground Modification, Problem Soils, and Geo-Support, pp. 496-503.

“Case Study: Stability of Two Horizontal to One Vertical Embankment” (2011), Tanyu, B. F., Neal, W., Seymour, J. P., Bodine, D. G., Bozok, O., Paper presented at the ASCE Geo-Frontiers March, 2011, Dallas, Texas.

“RCRA Closure of Refinery Sludge Basin Using In-situ Solidification and Containment”, D. G. Bodine and F. M. Trevino, in *The Proceedings of The Fourth Great Lakes Geotechnical/Geoenvironmental Conference: In-Situ Remediation of Contaminated Sites*, Krishna R. Reddy, Editor, University of Illinois at Chicago; May 17, 1996. Containment was by cement bentonite slurry wall and cement bentonite jet grout wall on the shore of Lake Michigan.

## **APPENDIX B**

**Range Road Landfill Annual Inspection Log**

**Range Road Landfill Annual Inspection Photographs**

# Detroit Edison Company Range Road Ash Disposal Facility Annual Inspection Log

Inspector: Dan Bodine, P.E., Geosyntec  
 Consultants Dave Huxhold, DTE Assisted &  
Provided Documents  
 Date: 21 December 2015, 8-3 pm

Weather: Intermittent Lt. to Moderate Rain, 0.39 in  
Temperature 48° F, Light Wind

Previous P.E. Annual Inspection Date: None Noted

Item	Condition			Related Photo # (s)	Notes and Comments (LDP=Landfill Development Plan)
	Good	Adequate	CA Req.		
<b>General Site</b>					
1. Site Access Restricted / Attendant On-duty	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Visitor Sign in	Gates locked, except active ash haul road entrance near Guard.
2. Security Fence / Gates	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	DTE noted	Good, some minor cut openings N & NW side, DTE plans to repair.
3. Signs and Markers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7,28,39,45,46	May need to update some, but signs/markers were present.
4. Access Roads	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8, 14	Most very good. Some perimeter ditch alignment requires walking
5. Traffic Flow	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14	Haul Trucks appeared moving safe & freely during wet weather
6. AST Inspection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14	Not Inspected, but Shown in Photo #14 with Fire Extinguisher.
7. Universal Waste (properly labelled, container condition, less than one (1) year from accumulation start date)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Reported that only CCR waste material hauled to landfill. Sources noted in documents have changed (reduced). License is Updated.
<b>Waste and Nuisance Control</b>					
8. Ash Hauling Contractor On-site Safety/Training	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Equipment worker training documents provided.
9. Ash Hauling Contractor Equipment Condition/Adequacy	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	9	Equipment appeared adequate, but placement varied from LDP.
10. Ash Hauling Contractor Filling Active Area to Appropriate Grade	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	9, 14	Appeared Filling Areas D3 or F3. Suggest review filling procedures.
11. Waste Condition (i.e. - waste from approved source, no recyclables, no MSW, no liquids, no hazardous wastes, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Previous sources noted in LDP, but Operating License has been Updated to Remove Cargill Salt Co. CCR from List.
12. Noise Level	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Covered in LDP. No contractor noise heard during perimeter ditch inspection and most closed cover areas.
13. Dust Control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Wet Weather	Dust Control Plan available and dust control discussed in LDP.
14. Adequacy of Interim Cover	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10, 12 & 15	Closed or final cover area slopes joining active areas appeared stable and most vegetated. No erosion observed. Photo #12 Shows Runoff Diversion Berm Just Above Interim Cover on Slope.
<b>Final Cover</b>					
15. Landfill Side Slope Condition (i.e.-no seeps, no cracking, no settling, no burrows, adequate vegetation)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	31, 32 & 40 21,22,23,& 47	No erosion noted. Trees on N, NE, NW sides, reported approved to stay. Some other woody vegetation noted; DTE may remove.

Detroit Edison Company  
Range Road Ash Disposal Facility  
Annual Inspection Log

16. Final Cover Top Condition	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	12,42, 43, 44 are Typical	Top and slope final cover areas were well vegetated. Some small woody vegetation noted. DTE indicated they would remove. No Observed Settlement or Stability Conditions
<b>Leachate and Surface Water Control</b>			
17. Stormwater Detention Pond Water Quality (unnatural films, foams, oils, etc.) and pump operating condition (panel, meter etc)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1, 2,3, 4,5 & 6	Quality appeared Good. Pump Run & Light Conditions Checked (DTE person). One Pump Lights to be Re-checked by Operations.
18. Stormwater Detention Pond Side Slope Condition (erosion, riprap, vegetation) and any other operating observations not in	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1 & 2	Appeared Stable and Adequately Vegetated & Slope Protected. WL Also Monitored with Staff Gauge SG-13. Flow Meter Working.
19. NW Corner Lift Station Surface Water Ditch Level & Pump	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	36 & 37	Ditch Level at Discharge not Noted. Staff Gauge Levels Reviewed.
20. NW Corner Lift Station Operating Condition	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	36 & 37	
21. NE Off-site French Drain Operating Condition	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	27	Pump Flow Condition Only Checked. Covered in Quarterly Rpt.
22. NW Off-site French Drain Operating Condition	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	36 & 37	Pump Condition Only checked, Covered in TRC Quarterly Rpt.
23. NE/NW Off-site French Drain Outfall Water Quality	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		Not part of this CCR Inspection. Covered in System Quarterly Rpt.
24. Perimeter Slurry Wall Marker Condition	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	17, 28,30 & 45	Slurry Wall Below Grade and Surrounds Entire Landfill at/near Property Line. Barrier to Any Below Grade GW Flow. Markers Show Alignment.
25. Perimeter Ditch System (Flow & Staff Gauge Monitoring)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	16,19,20,33,34, 39,40,46 & 47	Some Flow Observed. Staff Gauge Elevations in Quarterly Rpt. Reviewed and Confirmed Gradient Flow in System.
26. Perimeter Ditch System (Slope & Bottom Conditions)	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	16,17,18,19,20, 21,29,30,31,32, 33,34,38,39,40, 41,46, 47 & 48	Perimeter Ditch Located Around Entire Active and Closed Landfill Areas. Runon and Runoff Controlled. Flow Appears to be Maintained. DTE Indicates that Non-woody Vegetation has been Approved to Remain as Long as Flow Maintained. Some Small



**APPENDIX B**  
**DTE Range Road Landfill Annual Inspection 21 Dec 2015**



1. Storm Water Detention Basin, South and West Sides. Slopes Protected with Stone. No Visible Slope Erosion or Woody Vegetation on Slope.



2. Storm Water Detention Basin, North and East Sides. Slopes Protected with Stone. No Visible Slope Erosion or Woody Vegetation on Slope.



3. Pump House Pumps and Valves. Water from Basin is Pumped Back to Power Plant. DTE Plant Inspects Daily and Records Pump Observations.



4. Pump Control Panel. Pumps were Run Checked. Pump #3 Running. Pump #1 Light Indicates Failure, but Cause was No Reset after Inspection.

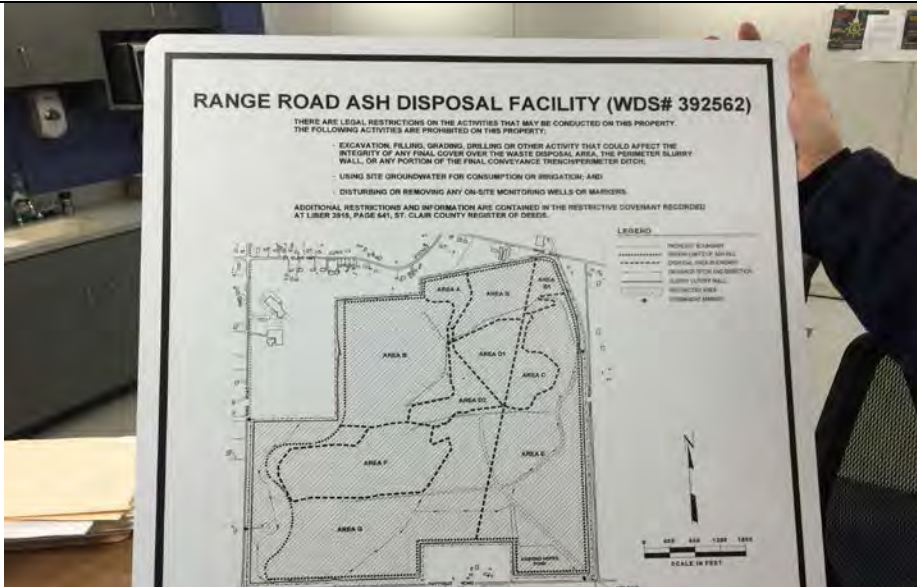
**APPENDIX B**  
**DTE Range Road Landfill Annual Inspection 21 Dec 2015**



5. Pump System Discharge Rate & Total Meter in Gal/Min and Gallons. Total Recorded Daily on Day Shift Report.



6. Basin Intake Screens. No Significant Blockage Noted.



7. View of Landfill Phasing Plan Board. Missing Was Phase D3 and Brake-down of Phase F to F1, F2 and F3 that are Shown on Drawings.



8. Entrance to Active Landfilling Areas over Unconstructed Phase G3 and E Areas. Light Rain (0.38 in) During Inspection. Temperature Reported 48°F.

**APPENDIX B**  
**DTE Range Road Landfill Annual Inspection 21 Dec 2015**



9. Face of Active Placement in Landfill Phase F3. Placement from Top and Bottom. Small Runoff Collection Pond in Center of Photo.



10. Borrow Area in G2. G2 Just Became Active, Approved for Placement. Drilling Confirmed Thick Layer of Clay Soils Beneath.



11. Top of Phase F2 Cover in Top of Photo. Phase 2 Closed in October 2012. Certification Report Viewed.



12. Final Cover Temporary Clay Berm at Top of Phase 2 Controlling and Directing Surface Runoff at Boundary with Phase G2.

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13. Typical Vegetation Conditions Top of Closed Phase F1 and F2.



14. View of Active Portion of Phase F3 from Top of Phase F2. Ash Dry Handled Transported in Trucks Dumped and Spread.



15. Another View of Completed Borrow Area in Phase G2 where Surface Water Drains to Corner Where Below Rd Culvert has been Installed to Drain East.



16. Culvert Drains to Existing Ditch which Connects to Ditches Draining into Storm Water Detention Basin.

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17. Looking West at Perimeter Ditch Parallel to Puttygut Road. Ditch Slopes were Reconstructed in 2010 and Remain Stable and Visually Erosion Free.



18. View of Perimeter Ditch at Road Crossing Looking Northeast. Slopes Appeared Stable and Well Vegetated. No Observed Woody Vegetation.



19. North End of Culvert Installed where Perimeter Ditch Located too Close to Existing Landfill Slope. No Blockage. Slurry Wall Exist Along Property Line.



20. Looking South at Perimeter Ditch Near West Corner of Landfill. Slopes Remain Vegetated and Generally Erosion Free. Ditch Flow Observed.

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21. West Southwest Side of Landfill. Slopes Well Vegetated and Stable with No Significant Areas of Slope Erosion. Perimeter Ditch w/2 Road Crossings Shown.



22. Close-up View of Typical Exterior Slope. Southwest Corner. Woody Vegetation on Slopes in Photos 21 - 23 and Others. Planned for Removal.



23. Same Photo as Photo 21.



24. Another View of Completed Borrow Area in Phase G2 Looking from the East Side.

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25. Runoff Collection Pond Located in Center of Landfill and Which Drains into Ditch Leading to Detention Basin.



26. Location of Proposed New Monitoring Well, Located within Landfill Property, but in an Undeveloped Area. Planned Downgradient Well.



27. Northeast Off-Site Groundwater Capture System Building. Capture System Inspected Routinely and Sumps (not shown) Inspected and Cleaned 3<sup>rd</sup> Q 2015.



28. Gate Location Along Northeast Off-Site Groundwater Capture System. Slurry Wall Location Inside Fence at White Markers. Raining Thru-out Day.

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29. Location of Proposed Downgradient Monitoring Well. Some Woody Vegetation on Slope.



30. Looking South at Perimeter Ditch. Slurry Wall Marker on Left. Range Road Outside of Property. Ditch Perimeter was Walked.



31. Perimeter Ditch Looking North from Ditch Crossing Near NE Capture System. Non-Woody Vegetation Allowed in Ditch as long as Still Flowing.



32. Looking South at Perimeter Ditch. Small Riprap Protection Provided in Several Ditch Slope Areas. Slopes were Intermittently Closely Inspected.



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33. Location of Ditch Staff Gauge, SG 12 North End of Landfill. Water Level Estimated at 0.75 Plus-Minus Feet.



34. Perimeter Ditch Location Showing that Water is Still Flowing within Vegetation. DTE & MDEQ Allow Grassy Vegetation if Flow Maintained.



35. Observation Well or Piezometer, Believed to be OW or PZ-1R, Located Along Perimeter Property Fence Along Bree Road.



36. Sump with Discharge Pump for Northwest Groundwater Capture System.

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37. Northwest Groundwater Capture System Sump Pump Control Panel. Pump No. 2 is Running. Running was Verified for Pump Nos. 1 and 2.



38. Riprap Along Perimeter Ditch at this Location Near NW Capture System. Riprap Placed in Several Locations Especially Near Culverts.



39. Perimeter Ditch Staff Gauge. Water Level Approximately 0.3 feet.



40. Perimeter Ditch Along North Side of Landfill. Road Crossing and Culvert Shown was Open for Flow (Lower Right in Photo).

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41. Culvert and Secondary Ditch Perpendicular to Landfill Slope. Fallen Tree Across Ditch.



42. Typical Top of Landfill. Looking Toward Area B from Area F1.



43. Typical Top of Closed Portion of Landfill, Believed to be Areas F1 and F2 to the Right.



44. Another Adjacent View of Top of Closed Portion of Landfill. Here a Couple of Small Woody Brush Growing. DTE Plans Removal.

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45. Looking South West Side of Property where Proposed Upgradient Well is Located and Slurry Wall Alignment is on the Right. Gate to Road Not Shown.



46. Location of Perimeter Ditch Staff Gauge, Believe to be SG 09. Some Ditch Slope Erosion Noted in Photo.



47. Construction Road Crossing of Perimeter Ditch. Culvert Shown and Stone on Slope for Surface Runoff Channel Draining to the Ditch. Runoff at Areas F1/F2 Boundary.



48. Looking South Along Perimeter Ditch Toward Southwest Corner and Fenced Area. Some Woody Vegetation of Landfill SW Berm W of Area G2.