

ANNUAL LANDFILL INSPECTION REPORT
Rockport Plant
Indiana-Michigan Power Company
Rockport, Indiana

Prepared for:
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ATTACHMENTS

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| Attachment A | Landfill As-Built Map with Photograph Locations |
| Attachment B | Inspection Photograph Index |
| Attachment C | Inspection Photograph CD |

1.0 INTRODUCTION

This annual landfill inspection and accompanying report has been prepared by NOVA Engineering and Environmental, Inc. (NOVA) on behalf of American Electric Power (AEP), to document the results of the annual landfill inspection performed at the Rockport Plant Landfill in Rockport, Indiana. This inspection was conducted to evaluate the landfill's compliance with the coal combustion residuals (CCR) Final Rule issued by the U.S. Environmental Protection Agency (USEPA) on April 17, 2015 and was performed in accordance with Section 257.84 of the Final Rule. A summary of the inspection and assessment of the condition of the landfill and its facilities is included herein.

The performed inspection and written report were completed by Mr. Brian H. Claar, PE of NOVA. Mr. Frank Ingram and Mr. John Lagrange at the Rockport Plant served as the project facility contacts and participated in the inspection and document research. The inspection was performed on Tuesday, September 22, 2015. Weather conditions were sunny with very few clouds, blue skies with a light breeze and temperatures were into the 80s°F. Ground conditions were very dry on the account that the area had not seen any significant precipitation (0.2 inches) in the last seven days.

Visual aids accompany this report to help clarify all of the information contained within. The most current as-built map for the Rockport Plant Landfill has been added as an attachment. This map shows locations for all of the landfill features, erosion and sediment control features, and also provides topographic information within the landfill boundaries. Also labeled on this map are the photograph numbers, locations, and orientations that were taken to document the current conditions of the landfill. All of the listed photographs are contained in a separate document file, along with a detailed descriptive index; however, a few of them have been added to the body of the report to illustrate certain deficiencies found during the inspection.

2.0 BACKGROUND INFORMATION

2.1 Plant Location and Description

The Rockport Power Plant is located in southwest Indiana in Spencer County, on property extending into three Townships: Ohio, Hammond and Grass. The plant is situated on the north bank of the Ohio River, just northeast of the intersection of State Route (SR) 66, and United States (US) Highway 231. SR 66 runs along the river between the Town of Grandview (about 1.5 miles to the east) and the City of Rockport (about 1 mile to the southwest), and US 231 runs south from Interstate 64 (about 20 miles north of the plant), crossing the Ohio River into Kentucky via the William H. Natcher Bridge just southwest of the Power Plant.

The site is owned and operated by Indiana-Michigan Power Company, a regional unit of AEP. The property was developed in the late 1970s and early 1980s. The facility consists of two coal-fired 1,300-megawatt (MW) power generating units. The first unit went into operation in December 1984, and the second in December 1989. The facility has two existing CCR storage/disposal units consisting of the ash landfill located north-northeast of the generating plant,

and two adjacent bottom ash (BA) ponds located just south of the generating plant at the north end of a wastewater pond complex.

The following description of CCR generation and handling processes at the Rockport Plant is summarized from a letter sent by AEP to the Indiana Department of Environmental Management (IDEM) on May 6, 2009:

The plant burns about 9-10 million tons of coal per year. The coal, delivered by barge, is off-loaded to the coal storage yard then transported by conveyor into one of the two generating units, where it is pulverized to a powder then injected and burned. The heat produced in burning coal converts water to steam used to drive the turbine generators which produce electricity. The burning of coal produces two types of ash - fly ash and bottom ash. The Rockport Plant produces about 400,000 tons of fly ash and 140,000 tons of bottom ash per year.

Fly ash is the fine particulate matter entrained in the hot flue gases. To remove the fly ash prior to the gases exiting through the plant stack, the flue gas is routed through an electrostatic precipitator (ESP), where the ash particles adhere to electrically charged plates. Mechanical rappers knock the fly ash off the plates down into a series of collection hoppers. From the hoppers, the fly ash is pneumatically conveyed to a storage silo. From the silo, the ash is either loaded dry into closed trucks and shipped offsite for various uses, or conditioned with a small quantity of water and hauled by truck to the onsite landfill for disposal.

Bottom ash (BA) includes the heavier coal ash particles that fall to the bottom of the steam generator and are collected into refractory-lined hoppers. The hoppers are kept full of water to protect the lining and break the fall of large pieces of hot slag which shatter upon contact with the relatively cool water. From the hoppers, the BA-water mixture is routed to a crusher station where the ash is crushed to a size suitable for pumping. The BA is then pumped to one of the BA ponds located in the wastewater pond complex, where it precipitates out and can be reclaimed after the pond is drained.

2.2 Landfill Location and Description

2.2.1 General

The Rockport Plant Landfill is located about 8,000 feet (1.5 miles) northeast of the generating plant. In March 1984, AEP submitted an application to develop 606 acres in the northern portion of the property for CCR disposal, including 460 acres for fly ash disposal (Storage Area 1) and 146 acres for bottom ash disposal (Storage Area 2). The Indiana Environmental Management Board (precursor agency to IDEM) issued a permit to construct in August 1985, and an operating permit (Facility Permit FP 74-2) in July 1987.

Because the bottom ash produced by the plant has been sold or used onsite for beneficial reuse purposes since the plant started operation, the portion of the property reserved for bottom ash storage and/or landfilling (Area 2) has never been used. The 1984 Permitted Boundary shown on the figures in this report includes only Area 1, the 460-acre area reserved for fly ash disposal. That area is transected by a north-south power line right-of-way (ROW). The area east of the ROW (Storage Area 1A) includes both closed and currently active portions of the fly ash landfill. The area to the west of the ROW has not been used for landfilling, but includes support facilities

for the active landfill, including an office trailer, stockpile areas, leachate storage ponds and a NPDES discharge structure.

The fly ash landfill is currently permitted by IDEM Office of Land Quality, Solid Waste Permits Section, as a Restricted Waste Site (RWS) under Indiana Administrative Code (IAC) 329 Title 10 (Solid Waste Landfill Disposal Facilities) Rule 9-4. A Restricted Waste Site may accept only one type, or related types, of waste. The waste is classified according to the results of certain leaching tests for specific parameters specified in the regulation. Classifications range from Type I (highest leachate concentrations) to Type IV (lowest leachate concentrations), and the landfill requirements (including liner system and leachate handling requirements) are determined according to the waste class. The active landfill is permitted as a Restricted Waste Site Type I. The permit was most recently renewed on 10 February 2015, and expires on 11 February 2020.

2.2.2 Surface Water and Leachate Control

Storm water from the landfill area is directed to perimeter drainage systems. The northeast, north and northwest perimeter of the landfill site is drained by Shafer Drain, part of a former agricultural drainage system that flows to Honey Creek southwest of the landfill. A perimeter ditch on the southeast landfill boundary also drains southwest to Honey Creek. Honey Creek flows southeast across the plant property to the Ohio River.

Leachate from the landfill cells is collected in lined ponds located north and west of the active landfill area. Prior to discharge, the leachate is transferred to the Leachate Treatment Pond (north of the West Leachate Pond), where it is mixed with well water from supply well PW-7. The effluent from the Leachate Treatment Pond is discharged and monitored under National Pollution Discharge Elimination System (NPDES) Permit No. IN0051845 at Outfall 002.

2.2.3 Construction and Operational History

Construction on the original fly ash landfill, located in the northeast portion of the permitted area (Area 1), was conducted between 1985 and 1987. In the early years of operation, much of the fly ash generated at the plant was beneficially reused (primarily for Ready-Mix concrete production), and filling of the landfill proceeded more slowly than anticipated at the time of permitting.

The original landfill cells were constructed on the east end of the permitted area, from north to south, with final cover being placed over the cells in this area (shown as Closed Landfill on the figures in this report) between 2000 and 2007. After 2007, expansion of the landfill continued into the southeast section of the area shown as the Active Landfill on the figures.

The ash that was landfilled originally was generated from combustion of fuel high in western coal (relative to eastern coal), and was classified as Type II. This waste had very low permeability, and (consistent with the permit) was placed in cells lined with 6 feet of clay soil (either native in-situ soil or from borrow areas) having an average bulk permeability of 10^{-6} centimeters per second (cm/sec) or less. No leachate collection system exists between the CCR and the liner in the original landfill cells. Runoff from the cells was collected in a central pond west of the original landfill and within the currently active landfill area, and transferred from there to the leachate treatment pond for discharge via NPDES Station 002. In 2014, the temporary leachate collection

pond in the active landfill area was removed and replaced with the perimeter leachate collection ponds (north and west).

Over a period of years, the chemistry of the fly ash changed due to changes in the sources of coal used for combustion at the plant, as well as the introduction of new materials used for emissions controls (including sodium bicarbonate used for sulfur dioxide removal in a dry sorbent system, and granular activated carbon used for mercury removal). The landfill was reclassified as a Type I landfill through a permit modification approved by IDEM in August 2012. Under the modified permit, new cells are lined with a composite liner consisting (from the bottom up) of: 2 feet of clay with a bulk permeability of 10^{-7} cm/sec or less, a 30-mil PVC synthetic liner, and 2 feet of bottom ash containing a piping network for leachate collection. In some cells, bottom ash (which is still classified as a Type II waste) is also being placed below the composite liner to raise the subgrade level, to allow gravity drainage of the leachate collection system to the collection ponds.

2.2.4 Area/Volume

The total area inside the 1984 permit boundary for Area 1 is approximately 460 acres. The latest permit renewal, issued on 15 February 2015, indicates the total permitted landfill area is 554 acres, including 408 acres in Area 1 and 146 acres in Area 2 (the area designated for bottom ash storage). The permitted portions of Area 1 include Area 1A east of the power line ROW (approximately 175 acres), and Area 1B west of the ROW (approximately 233 acres). Area 1A includes the closed landfill area (approximately 41 acres) and the active landfill area (approximately 134 acres). Within the active landfill area, 110 acres have been approved for conversion from a Type II to a Type I Restricted Waste Site.

The total estimated amount of fly ash disposed at the landfill as of the inspection date is 3,435,860 tons of Type I ash and 3,238,738 tons of Type II ash. Based on current and expected fill rates, AEP anticipates the remaining lifetime of the currently active landfill Area 1A to be about 18 years, or approximately 2033. Area 1B is expected to be developed for landfilling as Area 1A approaches capacity.

3.0 SUMMARY OF VISUAL OBSERVATIONS

3.1 Definition of Terms

The summary of visual observations uses terms to describe the general appearance or condition of an observed item, activity, or structure. The meanings of these terms are as follows:

- Good: A condition or activity that is generally better or slightly better than what is minimally expected or anticipated from a design or maintenance point of view.
- Fair: A condition or activity that generally meets what is minimally expected or anticipated from a design or maintenance point of view.
- Poor: A condition or activity that generally below what is minimally expected or anticipated from a design or maintenance point of view.

Minor: A reference to an observed item (e.g. erosion, seepage, vegetation, etc.) where the current maintenance condition is below what is normal or desired, but which is not currently causing concern from a structure safety or stability point of view.

Significant: A reference to an observed item (e.g. erosion, seepage, vegetation, etc.) where the current maintenance program has neglected to improve the condition. Usually, these are conditions that have been identified in previous inspections but have not been corrected.

Excessive: A reference to an observed item (e.g. erosion, seepage, vegetation, etc.) where the current maintenance condition is above or worse than what is normal or desired, and which may have affected the ability of the observer to properly evaluate the structure or particular area being observed or which may be a concern from a structure safety or stability point of view.

3.2 Observations

3.2.1 Closed Landfill Areas

The closed areas of Rockport Landfill are in good condition and have good access routes. The permanent top cap and outer slopes have thick, hayfield like grass that is kept mowed. There are no visible ruts, rills, or other signs of erosion. There are no evident slips, sinkholes, or settled areas. All surface water sheds off freely with no ponding or saturated areas. Surrounding berms and ditches are clear and stable.

Pictures 013, 014, & 022 show permanent slopes and access routes.

Pictures 019, 020, & 021 show permanent top cap conditions.

3.2.2 Cells 1A and 1B

These cells are finishing up liner construction. The clay base and PVC membrane have been installed and the construction crew is in the process of installing the protective bottom ash layer. The PVC liner is clean and without major wrinkles and all the berms and rain flap appears to be in good condition also.

Picture 018 shows the ash slope of the west side of Cell 1A in the background.

Picture 024 shows bottom ash spreading in Cells 1A and 1B.

Picture 025 shows the final stages of construction of the north berm for Cells 1A and 1B.

3.2.3 Cells 2 and 3

These cells are active and are the current location for ash placement from the plant. Ash surfaces are smooth, free of soft spots, ponding water, and are graded to drain to the chimney drains. Water trucks are wetting down areas to aid in compaction and to help with dust suppression. All facets of these cells are in good condition.

Picture 011 shows the berm and the west boundary of Cell 3.

Picture 012 shows ash slopes and dust suppression on the west side of the Cell 3 fill.

Picture 015 shows the boundary channel that runs along the west edge of Cell 3.

Picture 016 shows the ash slope and berm on the south side of the Cell 3 fill.

Picture 017 shows permanent outer slope condition on the south side of Cell 3.

Picture 018 shows the ash surface and the ash haul road in Cell 2.

Picture 026 shows the ash surface and a chimney drain in Cell 3.

Picture 027 shows ash placement in Cell 3.

3.2.4 Cells 4A, 4B, and 5

These cells are in the beginnings of liner construction. The clay liner and erosion control measures are in good condition. Some of the clay liner is installed but not to the full 2 foot depth that is required before PVC can be put down. The clay is smooth and dry and free of ponding water. It has been temporarily seeded and mulched until construction can begin again at a later date. Bottom ash is being stockpiled in Cell 4B.

Picture 023 shows the north boundary of Cells 4A and 4B (note bottom ash stockpile).

Picture 024 shows seeded and mulched clay in Cell 5 in the foreground.

Picture 025 shows the south berm of Cell 5, where it ties in with Cells 1A and 1B.

Picture 028 shows the boundary channel that runs along the west edge of Cell 4B.

3.2.5 Cells 6 and 7

These cells are idle and in good condition. The clay liner has been installed and there is a good stand of intermediate vegetative cover over the entire area. There is no ponding water or evidence of clay erosion.

No pictures for these cells.

3.2.6 Treatment Pond

The Treatment Pond and all its components are in good condition. It has been cleaned out recently and the liner is in good shape. Grass covers the embankment and the fence and catwalks are stable. The dewatering system functions well also.

Picture 001, 003, and 004 shows the pond surface, interior banks, liner, and fencing.

Picture 002 shows the west catwalk that leads out to the dewatering system.

Picture 010 shows the pump/mixing house and the outlet channel.

3.2.7 West Leachate Pond

The West Leachate Pond and all its components are in good condition. All the berms are covered in stone and the concrete forebay is free of holes and cracks. The liner in the settling bays is in good shape. The perimeter fence is stable with no unplanned entry points. The dewatering systems and structures are operating adequately. The splitter dikes are in good shape with the faulty one currently under repair.

Picture 005 shows the concrete basin.

Pictures 006, 007, and 008 show the settling bays and the splitter dikes.

Picture 009 shows the dewatering controls and structures.

3.2.8 North Leachate Pond

The North Leachate Pond and all its components are in good condition. All the berms are covered in stone and the concrete forebay is free of holes and cracks. The liner in the settling bays is in good shape as well as the splitter dikes. The perimeter fence is stable with no unplanned entry points. The dewatering systems and structures are operating adequately.

Picture 029 shows the concrete basin condition.

Pictures 030 and 031 show the settling bays and the splitter dikes.

Picture 023 shows the dewatering controls and structures.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the visual inspection, the general condition of the Rockport Landfill and Leachate Management System is good. The plant is performing maintenance and inspection activities on a regular basis and keeping up with ash operations.

Presented below are some maintenance recommendations for the areas that are listed as fair in the Observations section of this report:

- Regularly inspect and monitor the newly installed splitter dike in the West Leachate Pond. Watch for signs of instability or leaning of the new wall and watch for signs of leaks that could develop at the seams of the liner patch. (Picture 008 below)



- Clean out the accumulated ash between the toes of the ash fill and the cell berms. Reclaim capacity in the swales and make sure to establish proper flow lines. Also, and most importantly, be diligent to not damage any components of the liner system or the leachate collection system during maintenance activities. (Picture 016 below)



- Regularly inspect and monitor the areas of poor vegetation that have been reseeded to insure that this is enough to promote better plant growth. If not, other measures, like adding fertilizer or taking soil tests, may need to be implemented to achieve the proper cover. If cover conditions do not improve, grading operations will have to be performed to repair erosion on the slopes. (Picture 017 below)



5.0 PE CERTIFICATION

Professional Engineer's Certification

I certify that I have completed an inspection of the existing Rockport Plant Landfill at the AEP, Rockport Generating Station located in Rockport, Indiana. These findings are summarized and documented in this report so as to satisfy the requirements in 40 CFR Section 257.84.

Brian H. Claar

Printed name of Registered Professional Engineer

Brian H. Claar

Signature

PE11500426

Indiana

July 31, 2016

Registration No.

Registration State

Expires

